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Determinants of Public Funding for Professional Athletic Venues

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Determinants of Public Funding for Professional Athletic Venues

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Abstract

This paper examines the financing of professional athletic venues and why certain franchises are able to obtain high percentages of overall stadium funding from the public. Existing literature shows the negligible effect of new athletic venues on the local economy and per capita income, and therefore the benefits from such a project are largely intangible. I use an ordinary least squares regression and show that the more successful a team is the less public funding they tend to receive. I also find that broad city statistics do not represent the specific areas that policy makers consider when making decisions about spending public money.

I. Introduction

In the last twenty years there has been a large spike in stadium construction for professional sports franchises in the United States. Across the four major professional sports leagues (The National Football League, Major League Baseball, National Basketball Association, and National Hockey League) eighty-one of the one hundred and twelve total organizations have moved into a new stadium since 1994. Many of the other teams who continue to play in outdated stadiums have been developing plans and proposals to refurbish or build a new facility in the coming years. Certainly there is a trend towards newer and more aesthetically pleasing facilities, and teams who fail to deliver on this front are falling back and leaving potential fans behind.

One theme that remains at the forefront of stadium construction is technology. Technological advancement in recent years has enabled franchises to build faster, smarter, and more elaborately than ever before. Furthermore, cutting edge technology within the stadiums allows fans to enjoy themselves in more ways than people could when they went to a ballgame twenty years ago. Levi's Stadium, which is set to open before the start of the 2014-2015 NFL season, is set right in the Silicon Valley and will have WiFi capability, Internet Protocol Television, and mobile connectivity[1]. These amenities among others are what franchises want in order to get their fans excited and passionate about their team.

Additionally, it has become rare for two different franchises to share a facility. Of course, there are examples where this is still the case, yet in general there is a strong trend away from sharing and towards a unique venue that displays character, promotes passion,

[1] "Levi's Stadium." *Levi's Stadium*. N.p., n.d. Web. 27 Apr. 2014. <http://levisstadium.com/>.

and inspires confidence. There is no question that a world class facility will strengthen a fan base, but the fact of the matter remains: stadiums are expensive. With recent projects costing over $1 billion, it can be very difficult for a franchise owner to secure the funding necessary to complete their ideal facility. Often, the owner and other financiers cannot obtain enough private funding to erect a facility of such magnitude, so they must turn to the government and in turn the public for financing help.

In a typical stadium funding situation, a private-public partnership is employed. Although there are certain stadiums that are financed one hundred percent publically (Turner Field in Atlanta) and others that are funded one hundred percent privately (MetLife Stadium in East Rutherford) the vast majority have a split: a certain percentage of both private and public funding. Public funds come in many different forms from both local and state governments. A few of the standard funding sources are laid out in Table 1.[2]

A lot of work has been done on the pecuniary benefits that new stadiums provide and the results have been overwhelmingly consistent – the erection of new stadiums does not boost local economies or raise per capita income.

Table 1

City Sales Tax	Car Rental Tax	Utility Tax	Land Contributions	Sale of Held Property	Interest-Free Loan
County Sales Tax	Food/Beverage Tax	Lottery Funds	Public Parking Revenue	Sales Tax Rebate	Capital Fund Allocation
Lodging Tax	Property Tax	Ticket/Admission Tax	Grants	Income Tax Rebate	Infrastructure Improvements
Excise Tax	Income Tax	Parking Tax	General Contribution	Operating Subsidy	Utility/Transit Allocation

[2] "NFL Stadium Funding Information." . Convention Sports and Leisure, n.d. Web. 27 Apr. 2014. <http://cbsminnesota.files.wordpress.com/2011/12/nfl-funding-summary-12-2-11.pdf>.

However, there are benefits that are not necessarily captured in these results. Unfortunately, it is hard to quantify these benefits because there are no units of measurement that can be compared to monetary value. Since policy makers are constantly comparing projects, it can be very difficult for people to make the case that a city's money would be better spent on a stadium as opposed to education, for example. However, it remains true that out of the eighty-one stadiums that have been constructed for major sports teams in the last twenty years, nearly all of them have some percentage of public funding.

In this paper I review current literature on why cities choose to fund stadiums by examining the benefits that come about as a result. These benefits include pecuniary benefits and non-pecuniary public good benefits. An overwhelming amount of literature shows that the economic benefits of building new athletic venues are negligible, yet there exist benefits that are intangible in nature. Nonetheless, they are unquantifiable in large part and do not explain why cities choose to fund professional athletic venues. In order to gain deeper insight into why cities ultimately choose whether or not to provide financing for new venues, I have compiled a data set that includes historical and current team success metrics, team value, fan base rankings, city and county statistics, and new stadium characteristics.

In phase one of my study, I examine variation among success factors, team value, and fan base rankings in how they effect percentage of public funding. With this regression, we obtain some basic information as to how historical success and recent success affect the percentage of financing that government agencies are willing to provide. Additionally, this will help us understand how a supportive and active fan base

plays a role in stadium funding. In phase two, I only include city and county statistics in the regression and omit all of the success metrics. These variables will provide a better picture of how city characteristics help determine the amount of public funding in a city given certain demographics. In phase 3 of my analysis I include success, team value, strength of fan base, and regional statistics together. This phase will enlighten us as to how the four sets of variables affect each other in the regression results. Finally, in phase four, I add a final set of statistics: stadium characteristics. Including this data in the model will ultimately clarify the extent to which the explanatory variables reveal trends in public funding for professional athletic venues.

II. Literature Review

Many studies have been done to analyze the effects of professional sports franchises on local economies. More specifically, there is a large amount of literature that discusses implementation of professional athletic stadiums in certain areas and how those areas change economically as a result. Primarily, economists have focused on tangible and intangible benefits that new stadiums provide to their communities. Unfortunately, these benefits are often hard to calculate and therefore it is difficult to say whether or not new stadiums warrant the amount of public funding that they receive.

A. Professional Sports Franchises and Stadiums do not Boost Local Economies

The argument that a new stadium will bring about economic improvement in a given area has been used for a long time in hopes to obtain public funding from government agencies. However, very little evidence exists that supports a new stadium's

correlation with economic growth. According to Dennis Coates (2007), the vast majority of literature points to the fact that professional sports and new stadium construction have negligible impact on income, taxable sales, employment, and even tax revenue from the franchise and facility itself.[3] Of course, certain areas have experienced positive effects when a team moves into a new stadium, but these are mostly products of redistribution as opposed to innate development according to Coates. Instead of economic improvement on a broad scale, certain areas will suffer while only small pockets improve.

As Baade and Sanderson (1997) point out, local economies can only grow when spending in that area increases. Though it would seem intuitive that constructing a professional athletic venue would increase spending in the immediate area, it turns out that such a project ultimately takes spending away from other areas.[4] Baade and Dye (1990) look into this theme further by analyzing the economic situation of nine different cities after they had built a professional football or baseball facility. What they found was that the types of jobs created through such projects had no effect or even reduced per capita income. Those jobs pay less than average wages and therefore do not actually increase overall income in the area.[5]

Research done by Coates and Humphreys (2003) further enhances Baade and Dye's argument and focuses primarily on the groups of people that public funding proponents think will benefit from stadium erection. It turns out that in certain industries, such as retail, amusement, and entertainment, wages may increase in the presence of a

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[3] Coates, Dennis. "Stadiums and Arenas: Economic Development or Economic Redistribution." *Contemporary Economic Policy* 25 (2007): 565-577. Print.
[4] Baade, Robert, and Allen Sanderson. "The Employment Effect of of Teams and Sports Facilities." *Sports, Jobs, and Taxes: The Economic Impacts of Sports Teams and Stadiums*(1997): n. pag. Print.
[5] Baade, Robert , and Richard Dye. "The Impact of Professional Sports on Metropolitan Area Development." *Growth and Change* 21 (1990): 1-14. Print.

new sports facility while in other industries wages tend to fall. Coates and Humphries' findings fall in line with most economists who believe that the substitution effect is at play in these situations and that within an entire geographic area the aggregate economic benefits are negligible: "city by city there is substantial evidence of a harmful effect from the sports environment on employment and earnings in those sectors of the economy that stadium advocates claim will be beneficiaries of sports-led development policies" (Coates and Humphries). [6]

According to Hamilton and Kahn (1997), even stadiums that are thought of as successful examples from which other franchises should model their facilities rarely make the city or state any profit. One such venue is Baltimore's Camden Yards Ballpark. The Oriole's Camden Yards was opened in 1992 and is situated in downtown Baltimore. Hamilton and Kahn studied annual returns from the ballpark to the statewide economy and how much the economy suffers as a result. Each year, Camden Yards returns approximately $3 million to the statewide economy of Maryland. However, even though they provide such an amount to the statewide economy, the state actually loses about $9 million per year because of ballpark related expenses.[7] Although it remains true that all ballparks, not just the most lucrative, provide a channel for money to flow into the local economy, the fact remains that it is very hard for such a facility to provide positive net economic impact on the local area or state.

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[6] Coates, Dennis, and Brad Humphreys. "The Effect of Professional Sports on Earnings and Employment in the Services and Retail Sectors in U.S. Cities." *Regional Science and Urban Economics* 33 (2003): 175-198. Print.

[7] Hamilton, Bruce, and Peter Kahn. "Baltimore's Camden Yards Ballpark." *Sports, Jobs, and Taxes: The Economic Impacts of Sports Teams and Stadiums* (1997): n. pag. Print.

In terms of public funding, Noll and Zimbalist (1997) found that there have been no cases in which the government or public funding agency has any sort of reasonable return on investment. In fact, it doesn't matter how the geographic region is measured – city, county, or even a larger region – the results seem to remain the same: pecuniary benefits are not realized by the city or citizens as a result of a new stadium.[8] Other economists have tried to see beyond this apparent trend by employing other models such as the trade multiplier, but with little success and validity. Employing models such as the trade multiplier is extremely difficult because they are based on assumptions and do not account for structural change within the local economy in the future. When the economic conditions shift in the longer run, these models cease to work and therefore are somewhat irrelevant when it comes to the effect of new stadiums on the economy.

B. The Rational for Public Funding

It seems clear that tangible economic benefits are insignificant when it comes to new stadium construction. The argument from proponents of public funding that such construction will create jobs and increase per capita income will not hold forever. According to Eckstein and Delaney (2002), awareness of this fallacy among the residents will take off and will force people to think of other ways that a new stadium can benefit the local area.[9] Crompton (2004) agrees and suggests that "instead of investing funds in commissioning flawed economic impact studies, proponents of public subsidies for major league sports facilities would be better advised to commission studies that measure the

[8] Noll, Roger, and Andrew Zimbalist. "The Economic Impact of Sports Teams and Facilities." *Sports, jobs, and taxes: The economic impact of sports teams and stadiums* (1997): 55-91. Print.
[9] Eckstein, Rick, and Kevin Delaney. "New Sports Stadiums, Community Self-Esteem, and Community Collective Conscience." *Journal of Sport and Social Issues* 26 (2002): 235-236. Print.

psychic income which residents ascribe to a sports team or event."[10] Psychic income, which includes enhanced community pride, emotional involvement, and increased collective self-esteem, is an intangible and non-pecuniary benefit that cannot be measured simply and effectively with a dollar amount.

Schwester (2007) believes that these non-pecuniary benefits exist in the form of public good externalities. In order to understand these public good externalities and see whether or not they justify public funds, we must ask ourselves two questions:

1. "To what extent do stadiums generate civic pride throughout their communities, enhance their city's reputation and national identity, and offer a patrimonial benefit?"
2. "Do the public good externalities of professional athletic venues justify the use of public resources to finance such projects?"[11]

To answer these questions, Schwester first thinks it is important to understand what public good externalities are products of constructing a new stadium. The second vital step when considering public funding is determining whether the positive public good externalities warrant public funding over other projects that may have pecuniary benefits.[12]

Although he argues for the existence of a substitution effect with tangible economic benefits, Coates shows evidence that new stadiums bring about intangible positive public good externalities.[13] One of these benefits is consumer surplus. This implies that a consumer's willingness to pay (WTP) for tickets to a given sports game is higher than the market price for those goods. This can be noticed throughout America as

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[10] Crompton, John. "Beyond Economic Impact: An Alternative Rationale for the Public Subsidy of Major League Sports Facilitis." *Journal of Sports Management* 18 (2004): 40-58. Print.
[11] Schwester, Richard. "An Examination of the Public Good Externalities of Professional Athletic Venues: Justifications for Public Financing?." *Public Budgeting and Finance* 27 (2007): 89-109. Print.
[12] Ibid.
[13] Coates (2007)

professional athletic events often sell out. Certainly there are examples in which franchises struggle to get fans to games; however, a new stadium with state of the art amenities has the ability to encourage a larger fan base to support their team each game.

Swindell and Rosentraub (1998) give further evidence that professional athletic teams and facilities provide public good benefits by taking into account civic pride and national identity.[14] To focus on these two characteristics, they surveyed Indianapolis residents to understand how important the Indianapolis Colts and the Indiana Pacers are to the city's national image. Their results showed that both franchises contributed greatly to their sense of civic pride and also gave them a large sense of identity on a national scale. Specifically, 75 percent of residents felt that the city's reputation would suffer if the Colts were to move cities and 81 percent felt the same way about the Pacers. As Charles Euchner (1999) points out, Indianapolis was once a quiet city with no national reputation; now it is "widely regarded as a sports hub."[15]

Another public good benefit that athletic venues provide is 'existence value.' According to Willis and Garrod (1998), facilities such as Wrigley Field, Fenway Park, and Madison Square Garden can be landmarks and offer residents value even though they may not utilize them. This is known as 'nonuse' value and is especially common in those stadiums with historical value.[16] However, Ahlfeldt and Maennig (2010) affirm that such

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[14] Swindell, David , and Mark Rosentraub. "Who Benefits from the Presence of Professional Sports Teams? The implications for Funding of Stadiums and Arenas." *Public Administration Review* 57 (1998): 11-20. Print.

[15] Euchner, Charles. "Tourisms and Sports: The Serious Competition for Play." *The Tourist City* (1999): n. pag. Print.

[16] Willis, K. G., and G. D. Garrod. "Estimating the Demand for Cultural Heritage. Artifacts of Historical and Architectural Interest." *Hume Papers on Public Policy* 6 (1998): 1-17. Print.

nonuse value also applies to brand new stadiums.[17] With the added element of grandiose architecture and cutting edge technology, dazzling athletic facilities give the city a "major league" image. As a result, these new stadiums are offering benefits that have never before been considered such as increased tourist attraction. People are excited to live in a place with beautiful athletic facilities that underscore the pride and unity of the community.

Unfortunately, these non-pecuniary benefits are very difficult to measure. Coulson and Carlino (2004) tried to set up a model whereby they compared homes in cities with NFL teams to similar homes in cities without such teams. They concluded that, in general, homes in NFL cities are more expensive than those in non-NFL cities.[18] However, there could be a number of reasons as to why homes in one area are more expensive than homes in another, so critics have greatly challenged the robustness of their results. Johnson, Groothuis and Whitehead (2001) also set up a method to measure intangible benefits and named it the Contingent Valuation Method (CVM).[19] Essentially, they asked people about their WTP for nonmarket goods and services that may be brought about by the implementation of a new stadium. In turn, they were able to quantify intangible benefits that are otherwise nearly impossible to measure. This method is also far from perfect; it is rare that people will accurately depict their WTP for nonmarket goods that they have never before considered. Furthermore, certain citywide benefits including civic pride are much more valuable than people understand on an

[17] Ahlfeldt, Gabriel, and Wolfgang Maennig. "Stadium Architecture and Urban Development from the Perspective of Urban Economics." *International Journal of Urban and Regional Research* 34 (2010): 629-46. Print.
[18] Coulson, Edward, and Gerald Carlino. "Compensating Differentials and the Social Benefits of the NFL." *Journal of Urban Economics* 56 (2004): 25-50. Print.
[19] Johnson, Bruce, Peter Groothuis, and John Whitehead. "The Value of Public Goods Generated by a Major League Sports Team: The CVM Approach." *Journal of Sports Economics* 2 (2001): 6-21. Print.

individual level. Though it is undeniable that positive public good externalities exist as a result of stadium construction, measuring and comparing such value with that of other possible projects remains a large problem for local governments.

III. Empirical Data

The data used in this study was compiled from multiple sources. Only franchises that have built new facilities or have had major renovations in the last 20 years are considered in this model. In total, there are sixty franchises from the National Football League, Major League Baseball, and National Basketball Association that fill this description and have available the data necessary to complete this study – twenty-three NFL teams, twenty MLB teams, and seventeen NBA teams.

The data compiled for this study includes measurements of team success right before attaining their new stadium, historical success, team

Table 2: Variable Descriptions

Variable Name	Explanation
Years in league	Number of years the franchise has been in existence
Winning percentage	Regular season winning percentage of the franchise
Conference championships	Total number of times the franchise has won their conference championship
League championship	Total number of times the franchise has won the league (Super Bowl for NFL, World Series for MLB, NBA Finals for NBA)
Winning pct last 3 yrs	The winning percentage of the franchise in the three seasons preceding the new stadium
Fan base rank	Strength of fan base relative to other teams in the same league
Population	City population of the city where the stadium resides (presented in 100,000's)
Median income	The median income in the city where the stadium resides
Mean income	The mean income in the city where the stadium resides
Median property tax	Median property tax paid in the county where the stadium resides
Years since built	The number of years that have passed since the stadium opened
Total project cost	The cost to erect the new stadium (presented in $1,000,000's)
Team Value	The franchise's valuation provided from Forbes
%public	The percentage of the overall cost to build the new stadium that the public provided

value, strength of fan base, and certain city characteristics. Table 2 provides a more detailed explanation of each variable used in the regression analysis. Additionally, summary statistics for each of the three professional sports leagues are laid out in Table 3.

Table 3: Summary Statistics

National Football League (NFL)

	(1) % Pub	(2) Win %	(3) Conf. chmp	(4) Lg. chmp	(5) Fan base rk	(6) Win %, 3yrs	(7) Yrs in lg	(8) Pop	(9) Med. income	(10) Mean income	(11) Med. prop tax	(12) Tot. proj cost	(13) Yrs since built	(14) Team Val
Mean	0.56	0.49	3.22	1.61	15.13	0.49	57.22	6.56	49,598.04	66,666.91	2,828.39	541	10.34	1,236.56
St. Dev.	0.33	0.05	2.69	1.88	9.27	0.15	25.42	6.75	17,215.02	18,829.26	2,096.25	418	5.24	343.89
Min.	0	0.39	0	0	1	0.29	11	0.08	26,556	37,897	1,042	121	0	840
Max.	1	0.58	9	6	30	0.81	93	26.95	92,198	110,472	8,750	1,600	18	2,300
n.	23	23	23	23	23	23	23	23	23	23	23	23	23	23

Major League Baseball (MLB)

Mean	0.60	0.49	8.2	3.7	14.15	0.51	80.75	11.79	46,540.05	65.954.4	2,613	411	10.8	772.85
St. Dev.	0.27	0.03	10.26	6.18	7.29	0.06	45.79	17.49	13,604.3	20,094.13	1,121.05	251	5.44	430.20
Min.	0	0.46	0	0	3	0.43	15	29.69	26,556	37,879	1,042	175	1	500
Max.	1	0.57	40	27	29	0.61	137	81.75	73,802	107,520	6,063	1,300	19	2,500
n.	20	20	20	20	20	20	20	20	20	20	20	20	23	23

National Basketball Association (NBA)

Mean	0.54	0.50	3.82	3.29	15.06	0.49	45.52	12.95	45,386.35	68,843.88	2,273.71	237	13.94	658.76
St. Dev.	0.42	0.07	4.48	5.24	9.07	0.16	16.28	11.37	9,076.83	14,374.96	685.04	93.2	3.49	245.92
Min.	0	0.36	0	0	2	0.22	10	39.68	26,556	37,897	955	89	8	410
Max.	1	0.61	18	17	29	0.73	68	37.93	64,267	99,511	3,349	420	19	1,350
n.	23	17	17	17	17	17	17	17	17	17	17	17	17	17

Note: Tot. proj cost is the total cost of the new facility and is in $1,000,000's. Team Val is team value in $1,000,000's. Pop is population in 100,000's. All data is for NBA teams with new stadiums within the last twenty years. % Pub is the percentage of total cost of the stadium paid by the public. Win % is the franchise overall regular season winning percentage. Conf. chmp is the overall number of conference championships won by the franchise. Lg. chmp is the overall number of league championships won by the franchise. Fan base rk is the relative rank of the franchise fan base. Win %, 3 years is the teams winning percentage in the three years preceding their new stadium. Yrs in lg is the total number of years the team has been in existence. Med. Income is median income in city with the stadium. Mean income is the mean income in the given city. Med prop tax is the median property tax, per capita, in each city. Yrs since built is the number of years that have passed since the stadium opened.

IV. Empirical Strategy

The empirical model used for this study is an ordinary least squares (OLS) linear regression. This is based on an equation that examines the relationship between the percentage of each stadium's cost that was publicly funded and certain explanatory variables:

$$y_i = \alpha + \beta x_i + \varepsilon_i$$

In this model, the dependent variable (y_i) represents the percentage of the new athletic facility funding that was given by the public. The explanatory variables will differ based on the four phases of the regression analysis.

In phase one I solely include team value, team success statistics, and strength of fan base as explanatory variables in the regression with public funding. Data on the teams' valuations was acquired from Forbes.[20] The team success metrics that are included in the data are overall franchise regular season wins/losses, franchise winning percentage, conference championships, league championships and years in existence. To avoid perfect multicolinearity, franchise wins/losses are omitted from the regression and only winning percentage is used. Each of the success metrics gives us a slightly different picture of how successful a team has been over the course of its existence. They will provide insight into how the historical success of a franchise affects the host city's willingness to expend resources on a new professional venue. Furthermore, the number of years that the franchise has been in existence is included to look at a team's longevity

[20] "NFL Team Values." *Forbes.com*. Forbes, 27 Apr. 2014. Web. 27 Apr. 2014; "MLB Team Values." *Forbes.com*. Forbes, 27 Apr. 2014. Web. 27 Apr. 2014; "NBA Team Values." *Forbes.com*. Forbes, 27 Apr. 2014. Web. 27 Apr. 2014.

and its impact on their success in obtaining public funding. Each of these success variables for the NFL, MLB, and NBA are taken from pro-football-reference.com,[21] baseball-reference.com,[22] and basketball-reference.com,[23] respectively. For each of these variables, the data is up to date through the end of the last completed season. For the NFL, data is complete through the 2013-14 season, while MLB and NBA data is complete through the 2012-13 seasons. In addition to these measures of historical success, the model also incorporates winning percentage of the team for the three years prior to the opening of the new facility. This data is compiled from the same sources as the other success metrics, yet may give a more accurate snapshot of the success climate when the decision to publicly finance was made by local government authorities.

The other variable that is included in phase one is fan base rank. This is a rank of the strength of each fan base within the professional sports leagues included in this study. The ranks are relative to each other and are provided annually by Emory Sports Marketing Analytics. The rankings are compiled using a revenue premium model of fan equity:

> The key idea is that we look at team box office revenues relative to team on-field success, market population, stadium capacity, median income and other factors. The first step in our procedure involves the creation of a statistical model that predicts box office revenue as a function of the aforementioned variables. We then compare actual revenues to the revenues predicted by the model. Teams with relatively stronger fan support will have

[21] "Franchise Encyclopedias." *Pro Football Reference*. Sports Reference LLC, n.d. Web. 27 Apr. 2014.
[22] "Franchise Encyclopedias." *Baseball Reference*. Sports Reference LLC, n.d. Web. 27 Apr. 2014.
[23] "Franchise Encyclopedias." *Basketball Reference*. Sports Reference LLC, n.d. Web. 27 Apr. 2014.

revenues that exceed the predicted values, and teams that under perform have relatively less supportive fan bases.[24]

Team and stadium statistics that were used by Emory Sports Marketing Analytics were taken from ESPN. Including this variable will help explain whether or not having supportive and loyal fans in the area plays a role in the local government's decision to fully finance, partially finance, or refuse to finance the professional facility.

In the second phase of this study, I use city statistics such as population, median income, and mean income. Each of these is taken directly from the 2010 United States Census Bureau.[25] This data was specifically chosen in order to give a sense of the kinds of trends in stadium financing that stem directly from innate city characteristics. There is a large range of populations between host cities and also a large distribution of average incomes across cities in our sample. These are vital statistics to keep in mind since each host city is unique and demographics are rarely considered in this framework.

In addition to these city statistics I also incorporate median property tax data for the counties where the stadiums reside. This data takes into account each property owner in the county and is provided by the Tax Foundation,[26] a source that gets its numbers from the Census Bureau as well. Although this will not fully represent regional revenue and local budget constraints, it will give us a sense of the monetary inflow that the certain counties are working with.

The third phase of this study will incorporate the explanatory variables from phase one and phase two. The success statistics that will be included in this section are

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[24] Lewis, Mike, and Manish Tripathi. "Best Fans." *Emory Sports Marketing Analytics*. Emory University, n.d. Web. 27 Apr. 2014.
[25] "2010 US Census." . U.S. Census Bureau , n.d. Web. 27 Apr. 2014.
[26] Kasprak, Nicholas. "Property Tax Data by County." . Tax Foundation, n.d. Web. 27 Apr. 2014.

historical winning percentage, recent winning percentage, total conference championships and total league championships. Additionally, team value, fan base rank, population, mean income, and median income are used. This phase of the study should provide a deeper understanding of how these variables effect public funding in the presence of other types of variables.

In the final phase of this study, I add information about the athletic facility to the data already included in phase 3 to see even deeper into how these factors affect public funding. The facility information includes the original cost of the stadium and the number of years since it originally opened. Also included in the original data were percentages of public and private funding, yet since percentage of public funding is the dependent variable in each phase, neither will be used as explanatory variables in the regression analysis. The funding information for each stadium, ballpark, and arena was taken from Stadiums of Pro Football,[27] Ballparks of Baseball,[28] and basketball.ballparks.com[29] respectively. As previously stated, stadiums built or renovated prior to 1994 were not taken into account in this study.

[27] "Stadiums." . N.p., 27 Apr. 2014. Web. . <http://www.stadiumsofprofootball.com/>.
[28] "Stadiums." . N.p., 27 Apr. 2014. Web. . <http://www.ballparksofbaseball.com/>.
[29] Munsey, Paul, and Cory Suppes. "Arenas." *Ballparks.com*. N.p., 27 Apr. 2014. Web. . <http://basketball.ballparks.com/>.

V. Empirical Results

The regression results for all four phases of the OLS regression can be found in Table 4. Table 4 also shows the heterskedasticity-robust standard errors.

A. Phase 1

In phase one, only success and team-specific statistics are included in the regression. Interestingly, regular season winning percentage, conference championships, and winning percentage in the three years prior to the opening of the new stadium do not correlate with public funding at any level of significance. Furthermore, the number of league championships that a franchise has won in its lifetime correlates negatively with the percentage of overall stadium cost that is funded by the public and is statistically significant at the five percent level. For every additional league championship that a franchise has won, public funding decreases by 0.032 of a percentage point. This may point to the fact that success is far from a primary factor that governments look at when determining whether or not to extend some of the cost to their constituents. Instead, it may be more likely for teams who have not experienced a high level of success to obtain public funding. A possible reason for this is the fact that local authorities may want their losing teams to win in order to increase civic pride. A new stadium could spur increased fan support, player confidence, and ultimately team success.

Another telling result from regression one is team value's negative correlation with percentage of public funding. This is sensible because as a team's value increases, they will have more resources at their disposal and can more easily privately fund the erection of a new stadium. Although this coefficient is insignificant at all relevant levels,

Table 4: Regression Results

VARIABLES	(1) %public	(2) %public	(3) %public	(4) %public
Team value	-0.000147		-2.42e-05	-6.14e-06
	(9.13e-05)		(9.65e-05)	(0.000117)
Winning percentage	0.381		-0.115	0.304
	(1.286)		(1.250)	(1.254)
Conference championships	0.0143		0.0162	0.0154
	(0.0133)		(0.0146)	(0.0159)
League championships	-0.0318**		-0.0258*	-0.0284**
	(0.0145)		(0.0133)	(0.0132)
Years in league	-0.00239		-0.00320**	-0.00330**
	(0.00144)		(0.00159)	(0.00153)
Winning pct last 3yrs	0.262		0.422	0.288
	(0.506)		(0.449)	(0.497)
Fan base rank	0.00870		0.00653	0.00478
	(0.00593)		(0.00506)	(0.00568)
Population		-0.00691***	-0.00438	-0.00294
		(0.00233)	(0.00488)	(0.00489)
Median income		-8.93e-06	-3.66e-06	-2.87e-06
		(5.87e-06)	(6.40e-06)	(6.16e-06)
Mean income		2.21e-06	-2.35e-06	-3.29e-06
		(5.14e-06)	(5.34e-06)	(4.71e-06)
Median property tax		-6.36e-05***	-5.87e-05***	-4.85e-05
		(2.22e-05)	(2.06e-05)	(3.67e-05)
Total project cost				-0.000259
				(0.000204)
Years since built				-0.0198*
				(0.0113)
Constant	0.416	1.076***	1.053*	1.257**
	(0.593)	(0.145)	(0.557)	(0.564)
Observations	60	60	60	60
R-squared	0.247	0.289	0.422	0.461

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Tot. project cost is in $1,000,000's. Team Value is in $1,000,000's. Population is in 100,000's

it is important to control for this factor because teams that have been around for a long time tend to have higher valuations than newer franchises.

Regression one also shows that the number of years that a team has been in existence does not correlate with public funding with any statistical significance. This may not be surprising since the teams that have been around a long time, in addition to having higher valuations, often have stadiums that are architectural landmarks for their city. For example, the Chicago Cubs' Wrigley Field, the Green Bay Packers' Lambeau Field, and the New York Knickerbockers' Madison Square Garden are examples from all three of the sports in this study of facilities that provide substantial historical significance to their cities. Teams who play in such stadiums tend to be older franchises with fans that enjoy the historic venue and governments who see no reason to pay for another.

B. Phase 2

Phase two includes a different set of variables with the same dependent variable: public funding percentage. Population and median property tax per property owner, two of the four explanatory variables examined in this regression, correlate with public funding with statistical significance at the one percent confidence level. For every increase in population by one hundred thousand people, public funding decreases by 0.007 of a percentage point. While this is statistically significant, each incremental increase affects public funding an imperceptible amount. Of course, the population statistic is very broad as it refers to the total population in an entire city. Perhaps a more specific number based on the immediate area surrounding the new stadiums would provide a better picture of how population influences the decision to publicly fund.

Median income and mean income are also negligible in how they affect public funding, and neither of these variables is statistically significant. Similarly to population, these metrics are measures across the entire city. Perhaps the decisions authorities make when determining whether to fund a new facility depends on a smaller sub-area within the city. Naturally, benefits of a new venue extend beyond city limits and into surrounding areas, yet motives for policy makers to provide public funding may depend solely on a certain part of town. For example, a common explanation for targeting a specific area is to improve quality of life in that area. If local governments are keeping these considerations above all others, the regression results in this case make sense.

The final variable included in phase 2 is median property tax. This variable is per property owner and gives us some insight into how much tax revenue the host city obtains via property tax. Interestingly, when included only with other city statistics, median property tax correlates negatively with public funding. For every increase in median property tax of one dollar, public funding decreases by 0.00006 of a percentage point. This does not seem like a large amount, but it implies that if each property owner's taxes in a given city increased by one hundred dollars, public funding decreases by 0.006 of a percentage point.

These city statistics, taken purely on their own with respect to public funding, paint us a fascinating picture: local authorities do not base funding decisions off city characteristics yet instead focus on smaller, perhaps more fragile pockets within the city that they hope to revive.

C. Phase 3

Phase three comprises each of the variables that were used in phases one and two. In the presence of the other set of variables, there were some changes in coefficients and significance levels.

Although the coefficients for winning percentage, conference championships, and winning percentage in the three years prior to the opening of the new stadium changed slightly, they still do not explain public funding with any statistical significance. However, league championships maintain a negative correlation with public funding with statistical significance at the 10 percent level. This regression shows that for every additional league championship public funding decreases by 0.026 of a percentage point. These findings further verify the intuitions provided by regression one that success of a team does not play a role in public funding for a new stadium. In fact, teams who have not done well are more likely to receive public funding as local governments may want to rejuvenate their cities through increased communion and excitement as a result of a state-of-the-art professional athletic venue.

Another variable that furthers the verification of phase one results is the number of years that the team has been in existence. In this regression, this characteristic has statistical significance at the 5 percent level and indicates that for every additional year a team has been in the league, public funding decreases by 0.003 percentage points. In cities where a certain team has been around for a long time, it is more likely for the stadium to exhibit 'existence value.' This means that the stadium itself provides a benefit to residents of the city either because it is architecturally magnificent or historically

valuable. Teams that have been around for a longer time are more likely to have stadiums with historic significance.

In terms of city statistics, the extra variables do not affect the results much. The most noticeable shift was in population, which has no statistical significance in this regression. However, although it was statistically significant at the one percent confidence level in regression two, it did not explain much and therefore still means very little. Similarly, median and mean incomes continue to lack statistical significance at all relevant levels. Furthermore, while there were no dramatic shifts in significance level of median property tax, the coefficient value regressed towards zero. These results allude even further to the fact that broad city characteristics do not explain why in certain cities franchises have an easier time obtaining public funding than in others.

D. Phase 4

Phase four of this study built upon phase three and added two variables that are specific to the new professional athletic venue: total project cost and the number of years since the stadium opened. The inclusion of these variables adds a new element to the model and changes how significant some of the other variables are in terms of their explanation of public funding.

First, the negative correlation between league championships and public funding strengthened after including these variables. With statistical significance at the five percent confidence level, for every additional league championship that a franchise wins, public funding decreases by 0.028 of a percentage point. Additionally, these results help confirm the fact that teams that have been around for a long time receive less public

funding because of the possible 'existence value' on their current stadium. This final regression strengthens the claim that both increased success and a team's longevity negatively affect public funding of a stadium.

Another interesting consequence of including these variables is the loss of statistical significance for median property tax. This makes sense given the fact that this data was from the entire county and the results have been pointing to localized focus on the part of the decision-makers. In phase four, city statistics are not significant at any relevant level and therefore can be considered inconsequential when it comes to determining public funding.

Although the total project cost does not provide us any insight into the determinants of public funding, the number of years since the stadium was built does. For each additional year that has passed since the new stadium opened for a professional sports franchise, public funding decreases by 0.02 percentage points. This variable is significant at the 10 percent confidence level and indicates that in recent years franchises have been more successful in obtaining a higher percentage of public funding. Of course, the coefficient is not overwhelming, yet this phenomenon is interesting and should be considered in future research.

VI. Conclusion

This study is an empirical analysis of why certain cities tend to offer public funding for the construction of new professional athletic facilities. It is well known among economists in the field that the erection of a new facility does not spur economic activity; it neither causes increases in local spending nor raises per capita income. Of

course, certain industries and small areas benefit from the implementation of such a venue, yet those benefits are more than offset by other industries and larger areas who suffer as a result. Nevertheless, it remains true that new stadiums are being built at a faster rate than ever before. It turns out that the majority of the benefits that come about as a result of a new stadium are non-pecuniary benefits such as public good externalities. These include civic pride, national identity, existence value, and a sense of a 'major league' image among many more. The fact that these benefits are unquantifiable in nature makes it tough for local government agencies to justify spending millions to fund a stadium; it is very difficult to judge whether or not the net benefit is greater than that of another possible project. In this analysis, I employ an ordinary least squares regression model to uncover trends in cities that decide to finance a large part of a new professional athletic venue.

The results show that great success among sports franchises does not explain why certain teams are able to attain public funding for their new facility. In fact, teams that have done worse generally get a higher percentage of public funding than the more successful team. This may possibly be the case because erecting an inspiring new stadium in an area with a losing team will generate a much larger increase in non-pecuniary benefits than it would in an area with a winning team. Winning areas are already full of civic pride, national identity, and other forms of psychic income, and therefore they do not have as much to gain from a new stadium as areas with unsuccessful teams. For this reason, policy-makers in areas with winning teams may tend to opt for another project as opposed to spending a great deal of money on a new stadium.

In terms of city statistics, the results shed light on the fact that citywide characteristics do not play a large role as determinants of public funding. These results are very telling; when policy-makers examine a city's need for a new stadium, they are primarily focused on the geographic area immediately surrounding the new facility. Though many others experience a degree of psychic income, those who live in the immediate area experience the most. In future studies, data with demographic information in the smaller area around the stadium would potentially be more useful. Also, including specific city and county revenue and spending information would paint a more complete picture of the budgetary considerations that policy-makers encounter when making these decisions.

Finally, the results point to the fact that recent stadiums have had a higher percentage of public funding than older ones. Although this is by a relatively small margin, it remains absolutely true that stadiums are being built and will continue to be built at a faster rate than ever before. New technology has enabled more efficient building strategies while allowing still allowing for grandiose architecture and even more immersive fan experiences. In the future, stadiums will become more elaborate and cutting-edge, and franchises will feel inadequate if theirs does not match up. Of course, these facilities need to be funded and policy makers will continue to be forced into making these difficult funding decisions at involving public money.

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