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Take Me Out of the Ball Game: The Efficacy of Public Subsidies in the Success of Professional Sports Stadiums

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TAKE ME OUT OF THE BALL GAME: THE EFFICACY OF PUBLIC SUBSIDIES IN THE SUCCESS OF PROFESSIONAL SPORTS STADIUMS

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Introduction

The evolution of athletics into organized sports is a feat nothing short of astonishing, with its current state largely affecting the economic wellbeing of billions worldwide. While sports are an escape from real life, the business of sports is quite real. On and off the field, the ecstasy of victory is so universally attractive that it causes fans and investors to lose sight of reality, and obsess over the game.

But while sports may be like a game, it exists as a hub of the entertainment industry, with its professional levels earning multi-billion dollars yearly in the Unites States alone. Everything associated with sports is about competition, and the game's players at every level will do whatever it takes to be a winner. Whether it's the players on the field, the owners of the teams, or the politicians responsible for approving the construction of a team's new home, the intrinsic motivations may be different, but their fundamental purpose is entirely the same: play to win.

Housing a professional sports team is a feat desired by almost any city with deep enough pockets. Sports bring recognition, brand, and a quest for superiority against other cities. We are united by the romance of sports, as while we watch or follow our team, we forget about the harsh realities, either in our lives, or in the constructs of modern professional sports. From a political perspective, the ability to bring one's city together to assert its dominance against another may seem like a feat that triumphs economic limitations. But dreaming about a team is one thing; actually housing a professional franchise is another. Like all public policy decisions, providing a stadium for a professional sports franchise requires careful consideration of multiple factors.

Since public policy began to support sports entertainment in the early 1900s, tens of billions of dollars have been paid by taxpayers to developers and owners of professional sports stadiums and arenas (Keating 1999). In light of the 2008 financial crisis, heavy competition has arisen for public investment, while sports seem to continue to receive public funds. Traditional recipients in sectors such as public safety and education appear to be suffering, and one must question the political leaders' willingness to make sports entertainment a priority. In the face of much controversy, it has become

clear that there are few economic benefits related to the practice, yet the policy seems likely to continue at the current rapid pace.

The main focus of this paper revolves around the argument of whether governmental subsidies towards stadium and arena construction are necessary, fair, or economically sound. This paper argues that the extent of public money allocated to stadium construction is inappropriate, and its return on investment is unsustainable. The discussion begins by providing a brief contextual history of the issues surrounding public money towards stadiums. Analysis of the arguments for the use of these funds will come next, including an evaluation of the political strategies used to secure taxpayer money for the projects. Discussion will follow on the further arguments against using heavy subsidies to finance professional sports stadium construction. These issues will be connected to economic literature, largely focusing on community welfare and alternative ideas.

The question, then, becomes: what is the cost of winning? What does it take to "win" the stadium game, and who comes out on top in the end?

Winning here, describes not only the on-field performance by a professional team, but also the decision-making games played by leaders of stadium finance and development. The research for this paper proves that public subsidies, currently invested in over 80% of the stadiums and arenas in my sample, do not guarantee success for the venue.

With such disparities in regards to the true economic impact of housing a professional sports team on a city's economy, determining the correct way to fund a stadium is extraordinarily variable and difficult to quantify. If we assume that

professional sports will continue to demand new stadiums for their team operations at alarming rates, it must be assumed that current stadium projects are inefficient, failing to take various welfare measurements into full account. This paper will ask how can the process of developing and financing stadiums be improved, and what factors will help contribute to creating a successful professional sports stadium.

Although I will focus on many aspects and strategies of general stadium finance, I am most critical about the persistent heavy public funding towards stadiums and arenas. Professional sports are likely more private than public goods, but the endeavors are supported as if they're public utilities. Heavy subsidies, which don't tend to create equitable returns, and aren't clearly necessary to build a quality product in the first place, continue to be budgeted towards stadium construction.

In short, professional leagues act as a cartel. The four major professional sports leagues all enjoy monopoly power and government support, preventing market entry, and hurting consumers. Leagues have the free ability to limit supply of franchises (usually to around thirty teams) in manners that don't reflect market demand. Leagues and teams receive governmental legislative and financial support to segment the market, and drive up prices. By achieving this scarcity, professional sports are apt to receive further subsidies, tax exemptions, and fan interest. There are few industries in the United States that enjoy the monopoly powers of professional sports.

Sports stadiums are built to benefit both private and public welfare; however, the public frequently pays an unfair percentage of the costs, without enjoying a fair benefit. Governmental support for stadium construction is inconsistent with economic literature. Findings show that few jobs are actually created, urban renewal arguments are limited,

and income is unreasonably evaluated and inappropriately allocated, leading subsidy advocates to fabricate or simply ignore data. Sports economists find that city welfare is hardly enhanced by stadium construction.

Through an examination of the necessities, tendencies, and purpose of public subsidies towards sports stadiums and arenas, I've developed a definition for stadium and arena "success," that requires both high attendance, and a low public subsidy. This metric will be regressed in a logit statistical model with variable factors likely to be correlated with a successful stadium or arena, to determine which variables are most related to a successful stadium. By combining an economic analysis of the implementation of subsidies in stadium finance, and applying it to a model to determine the relevance of quantifiable factors of success, this paper will attempt to determine some of what it takes to be victorious in the game of stadium development.

Evaluating and Refuting Arguments and Strategies to Implement Public Subsidies

To begin, every project is different, and various reasons for public money are argued, depending on the circumstance. Even the leadership and support for public money is variable. Delaney points out that the leadership is different in each project, but is often led by politicians and business leaders through a "growth coalition", often disregarding of public sentiment (Delaney 205). This analysis will explore and discuss the legitimacy of the different sorts of arguments used by these players.

The simplest argument is that of the multiplier effect of stadium construction. By building it, more people will come to the surrounding area, and will spend money inside,

and more importantly, outside the stadium. In theory, this would lead to further economic growth and development. The advancements could include fans spending additional money at restaurants before and after the game, or exploring other offerings near the city. Stadiums are attractions that should "put feet on the street… and heads in the beds" (Delaney 21). If so, a city would experience related economic development in the form of more shopping, restaurants, and hotels, and would thrive as more people would be visiting and spending time in the district. The effects of this would include increases in tax revenue, city beautification, and general income.

The highly coveted job creation argument will first be deconstructed. According to Delaney, residents are promised new jobs to for the stadium's construction and permanent jobs that will "enhance local tax revenues, ticket sales, concession sales, and income tax from new employee wages" (Delaney 23). The jobs created by new stadium construction may or may not employ residents, and are only temporary. Yet, as many professional stadiums are already in existence in popular markets, most new building construction represents a replacement for one outdated. Thus, few permanent new jobs are created, but rather transferred from the old facility. Further questionable is the new employee income and sales tax revenue, as much of this comes from players and owners of the team who frequently live in different municipalities, paying taxes elsewhere. Rosentraub and Delaney estimate that a stadium is a very minimal source of a large city's total employment, at around 0.2% (Delaney 191).

Measuring the economic impact of a stadium's presence is highly variable. Baade (1996) looked at cities before and after the construction of stadiums during the later part of the 20th century, and found that the creation of jobs and net economic effect are

insignificant, that in no instances did a city experience a positive economic impact. Many variables are difficult to control or identify, and timing is an issue.

Other studies vouching for subsidies seem to make invalid assumptions, or rely on an irregular premise. One misinterpretation is about the Keynesian Multiplier, where some determined number is multiplied by the construction costs, total revenue generated, and other values to estimate the total economic impact resulting from the venue. Some of these studies struggle with correlation versus causation issues, as growth can't necessarily be linked entirely to the construction of a new stadium. Again, this assumes that inputs and outputs stay in the municipality, which is for the most part untrue, given that the biggest displacement, player salaries, is unpredictable. Interestingly, according to Keating (1999), the multiplier effect doesn't exactly lead to the substantial impacts to large market economies, as promised. In New York, the comptroller estimates that all of the professional teams in the metropolitan New York City area account for a total of $1.15 billion in economic activity, based on generous multipliers (Keating 1994). This surmounts to only 0.3 percent of the regional economy, resulting from nine professional sports teams. In addition, these multipliers added to subsidies may not even be positive, as the average resident's tax increases may cause total spending to be diminished (Keating 1994). If the positive multiplier implies the circulation of spending surrounding the venue, then a tax increase would cause a reduction of spending in all areas, and decrease the net effect. Also, Coates and Humphreys (2000) point out that many of the arguments based on growth from stadiums is a result of a focus on gross, not net, spending, the two leading to highly different outcomes.

As such, the "substitution effect" implies that simply because sports-related

spending increases, total city spending is hardly changed. This is because people would have spent this money elsewhere, had the stadium not existed. Wealth is redistributed, rather than created, so the further developments allegedly stemming from the venue's construction, may not be relevant. Delaney adds that if we assume consumers have "relatively stable entertainment budgets that they split among different activities," (Delaney 28), only consumer preferences are changing. The results of these studies may be limited, but we can be reasonably certain that the public investment is not economically beneficial as argued.

But sometimes the public should be required to help pay for common goods, that will benefit the community. Chema (1996), a proponent of subsidies, proposes thinking of sports stadium and arena investments as infrastructure, rather than entertainment. Returns from said investments are often intangible, but they open new doors to further progress. While these buildings are often grand and do lead to other progress (whether substantial or not), stadiums don't constitute public infrastructure since they can't be freely accessed by the masses. Even referencing a fee-based public good, such as a toll road, is invalid since the usage price is much more affordable to the average citizen than that of a ballgame. Coates (2010) agrees with Chema that the investment in stadiums is like investing in roads, but if so, is public money really going towards the "highest return," as is required of effective policy? Is there more to gain from a professional ballpark than a public high school? Precise conclusion is difficult, but I have trouble believing that stadiums bring equitable returns on investment.

Yet as many politicians will argue, the taxpayer investment may only a minimal contribution. They maintain that the public isn't being required to pay that much money,

per capita. Suppose that per capita spending would only equate to $50 over five years. For a non-sports fan, is this nominal tax increase justifiable at all? Where does democracy interject? Even if it spurs regional economic development, it's unclear whether the marginal growth can justify a significant tax increase. Politicians have the capability to argue that any publicly funded endeavor leads to economic or regional spin-off. I'm hesitant to agree that the opening of a few bars and restaurants in the wake of a new stadium constitutes a substantial urban renewal; however, the byproducts of stadium construction are not the main focus of this paper. I'm more concerned with the priorities of many American cities, and why sports entertainment seems to supersede many other necessities.

Given the present day trend of government money towards stadiums, team owners may demand the subsidy money based on precedent. Sports have always enjoyed special privileges such as antitrust exemptions, waiver of environmental restrictions, subsidies, and favorable lease agreements based on revenue, and team owners will continue to use the past circumstances as leverage. Plus, the entire benefit of public money stays with the players and owners of teams, as fans likely see no subsidy money towards ticket prices, becoming victims of the all-powerful owners' leverage. One wonders how this trend will ever be reversed, given the changes in labor agreements in professional sports.

Free agency is a fairly new opportunity for players' ability to affect the subsidy game. The movement of players as a commodity on an open market is a phenomena that has contributed to an increased urgency to build new stadiums. Owners of teams demand the services of star, mid-level, and more inexpensive talent, and compete for these players on an open market, knowing that the players have the ability to move to a

more attractive franchise at will. As a result, owners demand tax revenues and cost assistance to be able to keep a competitive team in town. More disposable income to spend on player talent, along with a reputable forum to display their talents, can lead to a better product on the field, and in turn, high attendance figures. But does this mean that residents are paying incremental taxes to build a winning team?

Surely free agency requires teams to provide adequate stadiums, but it holds no teams accountable of maintaining a substantial on-field product, to give fans something to be excited about. Since professional sports teams are franchised in a league, they are given relative authority to manage the team's construction and player acquisitions, and when they don't receive the public assistance demanded, chaos can occur.

Most notably is the case of the MLB's Florida Marlins, in their legendary journey from triumph to misery. In 1997, the four-year-old team heavily increased its payroll costs, and it paid off, winning them the World Series. But it was only short lived, as the ownership demanded significant public funds towards a new stadium prior to the season, arguing that other teams with new buildings were winning, and that sharing a building with an NFL team was uncomfortable (Keating 1999). To put pressure on the city, the owner threatened to sell the team, but no further public money was granted, and nuclear results ensued. Upon winning the championship, the owner cut payroll by 70%, making a contention for a repeat impossible, as the team went on to have the worst season in MLB history in the year after winning a title. The team was subsequently sold, and the incoming owner's agenda was quite similar, to the dispair of the fans: more public money.

But maybe sports make the city a better place, by bringing everyone together around a common interest. Eckstein notes that subsidy proponents frequently disregard economic literature, and instead focus on the intangible benefits, namely "community self-esteem, and community collective conscience" (Eckstein 236). Going to a game is an exceptional way to unite around a common goal, while cheering and enjoying one's self. Politicians love ways to bring people together, and sports have a unique ability to bring out the irrational, yet positive emotions. Not to mention, when people gather together, they spend money together, thus supporting local businesses. Developers trying to lure a team to their city are sometimes most concerned with the pride associated with having a professional team and respective stadium in their city.

Being a "Major League City" is an attractive way to enhance a city's image, but the taxpayers shouldn't have to bear the majority of the burden to help market a city's reputation. To the same degree, the threat to a city's brand in the event of relocation can be tragic, as the team is an integral part of the city's culture. The extent of civic pride created may be only limited to the team's fans, and if the team is consistently losing, it may also be a source of embarrassment. While these intangible, emotional benefits may exist, the adamant disregard for the quantifiable welfare of taxpayers is quite alarming.

Further Arguments against Public Subsidies

Through discussing and objecting to the impracticalities of heavy subsidies used towards stadium construction, it becomes clear allocating heavy percentages of total construction are difficult to justify.

Most uncertain is whether stadiums and arenas are truly public works, and the numbers aren't in favor of the public. Although both stances can be argued, private parties attending the games benefit significantly more than the general public. Many attendees come from outside the city, potentially visiting the city as sports tourists, and may be enjoying the positive externality of not having to pay the tax increases. Likely only a small percentage of resident taxpayers are fans of the teams playing in the stadium, and an even smaller number attend the games. Regardless, the most rabid NFL fans can only watch their team on the home field eight times per year. The unsettling truth is that many residents can't even afford the expensive ticket prices to use the stadium, yet they're paying for its construction. With the current popularity of the big four professional sports leagues, all games are shown on television, and residents with cable packages have the ability to watch all of the local team's games, but this is reserved for interested fans with access to the technology.

The unprecedented rate of stadium construction has led to a unique allocation of public funds, namely to the hands of franchise owners. In the current state of affairs, teams are given tax revenues without many liabilities, as they pay little or no rent on the public land, and receive most or all of the revenue (Delaney 24). In some instances, stadiums receive tax breaks, or further cost assistance. Usually, teams are also given discretion to name the stadium, and implement operating policies, despite the fact that cities may own a significant portion of the endeavor. Logically, the public sector's involvement in private operation leads to many inefficiencies, aside from the benefits given to teams. Government-based decisions are politically driven, while private decisions can be more efficiently implemented. The natural flow of goods and services to

their optimal levels and locations in a market economy is entirely inconsistent with government's ill-advised seizure of private decision-making. Therefore, the government's involvement in these matters is riskier, jeopardizing residents.

All this love given to teams still isn't enough to guarantee success for stadiums, as a team could relocate even if it was supported financially. The current threat of franchise relocation is no better displayed than the historical example of the NFL's Oakland Raiders, and their decisions to move from north to south and back north thereafter. In the 1960's when their Oakland-Alameda County Coliseum was constructed with all public money, the Raiders shared the building with the MLB's Athletics. Although they were heavily supported in Oakland, the Raiders sought to move to Los Angeles, a move opposed by the city of Oakland and the league, which argued that the city had provided adequate support for the team to stay. In a famous anti-trust suit, the Raiders won against the NFL, and elected to break the hearts of Bay Area fans through their move to the Los Angeles Coliseum.

Although the move resulted in only a brief stint in Los Angeles, concluding in the outdated stadium's inability to provide adequate renovation plans, the initial move south demonstrates that no city is safe from relocation, even if significant public funds are initially invested in the building. The city provided significant support through attendance, subsidies, and their lease agreements, before the Raiders left, and again to lure them back, but it's debatable whether this was a good public decision. Further, Oakland's rabid fandom didn't exactly represent the majority, as the agreement to bring black and silver back to the Bay Area saw harsh public opposition, and was a monumental factor in the Oakland mayor's failed reelection campaign (Baim 94).

As a result of its instability upon the Raider return, the Oakland Coliseum was hanging by a thread, only to be bailed out by further governmental support. In the mid 1980s, the building's chances of a positive net present value at the end of its lifespan seemed grim, leading the government to alter their investment return interest for the sake of saving the building and its tenants. In 1986, the city renegotiated its lease with the city, largely regarding increased concession revenue to the Coliseum, which caused the city to go from earning a $2 million net cash flow to losing $1.5 million annually on its investment, but allowed the stadium to continue business (Baim 167). This building is still in use, but is wisely regarded as a run-down structure in dire need of another renovation.

Here, one is apt to label these subsidies and revenue deference decisions as financially practical. This case is significant because Oakland's persistence through subsidizing the entire stadium, and taking all measures necessary, was almost not enough to keep the team around. The city continues to lose money on the building, but football and baseball remain integral parts of the area's history and brand. Much of the stadium's success, aside from its ability to withstand the test of time, is a result of having double the revenue, coming from two tenants. Had the Los Angeles experiment been successful, the Oakland Coliseum (now called the O.Co Coliseum) may have been put out of use, as the Oakland Athletics alone may not have generated sufficient revenue to keep the building's operations feasible. Other times, initial estimates may only appear financially justifiable until the truth is discovered.

Projected costs of stadium construction are often deceiving metrics used by proponents of public money towards the impressive endeavors. In my analysis, I came

across few stadiums that were constructed at a cost marginally close to the estimated budget. Rather, these investments frequently cost the public a significant amount greater than the already extravagant proposed per-capita tax increases. Through Baim's 1994 analysis of fifteen public and privately financed stadiums in significant media markets, the average stadium was built 78% over budget, with fewer than half of the buildings constructed within 50% of the proposed budget (Baim 169). Some of this can be explained by the lengthy development process, variable construction costs, and bureaucratic red tape; however, it seems that underestimating stadium costs is a common strategy implemented to convince residents of the affordability of stadium construction. Regardless of the percentage of total cost subsidized, the new Yankee Stadium was estimated to require a $129.2 million capital contribution in 2006, and by 2009, that number had multiplied two and a half times to $325 million because of miscalculations, according to the New York Times (Chan, 2009). This brutal miscalculation is a negligent disregard for public welfare, and metrics like this should be more closely observed, or be required to stay below a price ceiling. It should go without saying, if a team with the grandeur of the New York Yankees has the extraordinary financial capability to pay three players a contract total of $423 million, it can probably find a way to invest in a stadium without forcing residents to bear a significant portion of the cost of the stadium, regardless of their affection for the pinstripes.

Although it becomes obvious that many advantages of housing a city with substantial public assistance are seen in non-economic, or unquantifiable benefits to a city, net present value shouldn't be ignored. I'm not arguing that stadiums must have a positive net present value to be successful, but rather that if a stadium that can cover its

fixed and operating cost in the long run, this can serve as an alternate determinant of the stadium's success. Cities investing in a stadium construction project should consider costs and projected revenues, to assess the likelihood of return on investment, and the expected lifespan of the building.

Unfortunately, stadiums don't seem to be sound financial investments for cities, using net present value as the determinant. I was unable to implement cash flows in my model, as the data for my stadiums and arenas of choice was unavailable, however Baim (1994) analyzed the accumulated cash flows of fourteen municipal stadiums, all of which were at least ten years old, and found only one (Los Angeles Dodger Stadium) that had a positive present value (Baim 170). Many stadiums and arenas operate at a loss, and only some of those have the consistent ability to cover their operating costs. For reasons like this, profit is also a limiting measurement of stadium success, since unique accounting, combined with government assistance to keep the team running, allows teams to operate at a loss, or suppress team and venue quality (and attendance as a result) to make a profit. Team profit can also be highly correlated with a high public subsidy, implying that many teams earning profit are unsuccessful. Given that I demonstrate that public money is currently overused in these projects, the next section will further elaborate on those factors which help achieve stadium and arena success.

Research and history show that successful stadiums can be built without high subsidies. In deciding to implement only the venues in the top ten media American markets, I assume that reasonable financial centers exist in each city, or that owners have easy access to the main American investment hubs, such that developers and owners have reasonable capability in coming across enough investors to pay for most of the cost of

construction. Whether the owners are able to justify the sustained future value of these projects is a separate discussion, but there are plenty of cases that demonstrate the feasibility of private finance towards stadium and arena construction.

Quite intriguing is the unique ownership model of the Green Bay Packers of the NFL. The team plays a Wisconsin city of little more than 100,000 people and the entire venture is owned by the city, as opposed to the traditional format of a single owner or partnership. This is the only team in sports with this type of model, and it has worked well, as the Packers have sold out all their games for years, and are the face of their city. Fans or investors can purchase stock in the team, and the burden of team finance is placed on individuals willing and interested in accepting, a more efficient allocation. It's possible that this model might only work in a small market with extraordinarily loyal fans.

In my sample of all the sports stadiums and arenas for all four professional sports in the top ten American media markets (to be further discussed in the next section), 47.2% of the venues were built with less than half of the total cost paid by residents, and also successful by the model's definition. Further, 16.7% of the stadiums in the model were built without any public money, can be labeled successful, and half of which were built in my lifetime. Therefore, if heavy subsidies shouldn't be implemented into stadiums, and the venues can be built successfully without them, then a stadium can't be labeled successful with them. This led me to study the degree that various other factors contribute to a successful stadium or arena.

Explaining the Model

Through my analysis of sports stadiums in major media markets in the United States, I argue that the two most integral components of a stadium's success are attendance and public subsidy percentages. For a stadium to be labeled "successful" in this analysis, it must have both a minimal public subsidy for its construction, and an adequate percentage attendance.

The sample includes all venues from the big four professional sports leagues (MLB, NBA, NFL, NHL) with arenas in the top ten media markets, according to the ProAdvance 2006 list. Large and small market teams face different challenges with regards to factors such as attendance, stadium location, team value, and popularity, so comparing venues from different market sizes appears invalid. Also, I assume that politicians in densely populated metropolitan areas use different tactics to justify these tax increases, especially given the priorities of bigger and smaller cities. Cities with more industry and public works would have higher opportunity costs of public money towards other important governmental sectors, or may justify per-capita tax increases on the grounds that the incidence will be more broadly dispersed.

As previously discussed, public investment in stadiums has become a trend that is unsustainable, inefficient, and undemocratic at its current rates. Evidence has shown that economic data doesn't defend high subsidies in these regards, and a city's residents often oppose the use of public funds for a private good. Further findings demonstrate that stadiums can be successfully built and maintained without heavy public assistance, thus

leading me to argue that residents shouldn't be paying for a substantial portion of a given new stadium.

Public money has, and will continue to be used to fund these private endeavors, but I argue that since attending a sporting event is exclusively for private parties, the public shouldn't be required to pay for the majority of its construction. For the sake of straightforwardness, I've ignored subsidies in real terms, instead choosing to focus on the percent of the total stadium construction cost that is passed to the public. As such, a stadium or arena can't be labeled successful if it includes a subsidy that is fifty (50) percent or more of total cost.

This may be a simplistic model, in that heavy subsidies may see only nominal tax increases, however the defining principle is that if more public than private money is used to finance the construction, then the stadium can't be labeled successful. Certainly bigger media markets tend to spend more on their respective teams, and my assumption is that among the top ten media markets, total spending on stadium cost is related enough to the city's population, that I can assume a population would see a significant tax increase if a 50% or greater portion of total building cost was levied for stadium construction. This substantial tax increase from these subsidies is enough reason to oppose the project.

There is an exception, mainly because American sports are a timeless component of American culture, and some stadiums have withstood the test of time, worthy of recognition. Even given the constraints for success in this analysis, many of the oldest stadiums and arenas are the most successful. Yet, there are a few historical buildings still in operation that were built with high subsidies, or have waning attendance figures, that must also be labeled successful, even if they're not the buildings they used to be. For

example, Anaheim's Angel Stadium was built with all public money, forty-five years ago, and has enjoyed consistently adequate attendance since. Also, Oakland's O.co Coliseum (originally named the Oakland-Alameda County Coliseum) has successfully housed both the Oakland Raiders (NFL) and Athletics (MLB) since the 1960's (despite the Raiders brief move to Los Angeles), amid current criticism of its age and decrepitude. These old and faithful buildings are historical landmarks, and represent the history of the sport.

Given the erratic pace of new stadium construction, I've developed a "twenty five (25) year exception," that allows stadiums built with public money before 1986 to be labeled successful, provided they're still operational after their long history. In my highly variable sample, the mean stadium age was 24.3, so I've determined that buildings lasting a quarter century or longer are automatically successful, since they have consistently seen substantial enough attendance figures for many years, to the extent that they're still selling tickets. Additionally, these potentially high-subsidized construction costs have likely been paid off by now, and residents can enjoy their local sports without having to pay a high price.

Put simply, one can't label a stadium successful if its team's fans don't attend the games. Just as stadiums are the office for team competition, they're also built to house fans, so low attendance figures indicate a mediocre to poor fan experience. Like all other variables in the sample, attendance statistics are highly variable, depending on the type of building and league standards. For a stadium or arena to have satisfactory attendance, it must have an average percentage attendance above the league's mean percentage attendance in the most recent measurable year, 2010. This may be a fairly subjective

metric, in that one year's attendance figures may not be an adequate sample size of a stadium's long-term attendance patterns. However, if a stadium or arena has recent attendance figures close to the league mean, and fails to exceed the league's average in the most recent year, adequate consideration is given to attendance figures from years past, assuming the building passes the subsidy requirement.

Many professional sports stadiums and arenas have multiple tenants, and these buildings deserve special attention, in that their total attendance generated can be twice that of single-tenant buildings. My analysis of public subsidization of these buildings stays consistent with single-tenant stadiums and arenas, but more attendance consideration is given to buildings near the average for those housing multiple teams. When evaluating attendance figures, winning percentages, and championships for a corresponding stadium or arena with multiple tenants, the highest measured values are displayed in the chart. Take the New York Jets and the New York Giants of the NFL who both compete at Metlife Stadium at the Meadowlands, for example. Both teams had 2010 attendance figures above the league's mean, however the Jets had a higher 2010 win-loss percentage (0.688), while the Giants have a greater all-time franchise winning percentage (.544). As such, the highest values exhibited in the arena are shown on the chart.

Attendance is a function of a multitude of factors, many of which are unquantifiable, but this model serves to estimate which measurable determinants are most correlated with stadium success. In combination with a subsidy of less than 50% total cost, attendance is the most tangible measurement of stadium success. The foundation of this analysis focuses on stadiums' and arenas' attendance figures during the respective

teams' seasons. Special consideration is given to buildings with multiple tenants, regardless of the sport, to accommodate the additional total venue attendance. However, the underlining truth of all stadiums is that they only make money when they are being used. Even given the expensive ticket price revenue earned by popular sports venues, there are few home games in a season. Teams in the National Football League, though charging the highest average ticket price of all four American professional sports leagues, only play eight home games per season, and may host few or many non-sporting events in the building. Any theoretical stadium may only be earning revenue ten days per year, and losing significant money annually, but my findings may label this stadium successful, simply if it isn't heavily financed by local residents, and has high average attendance figures during the football season. The focus is on sport-related success, and the contributing factors, not including secondary use of the stadium.

Through statistical software, I've implemented a logit statistical model, which uses my definition of success as the independent variable (SUCCESFUL=1, NOT SUCCESFUL=0) for all stadiums and arenas in the top ten American media markets. I've recognized factors that likely contribute to success, which will be used as the dependent variables. This model uses both binary and continuous dependent variables, and a binary independent variable. The purpose of this model is to determine the odds that the factors of success contribute to measured "stadium/arena success." Further, the marginal effects are analyzed, to determine the percentage change in probability of success with the addition of another unit of the dependent variable. The theoretical model will be explained next.

Theoretical Model

The logistic model used in the analysis estimates the relationship between the dependent variables, both continuous and binary (dummy), and the independent binary variable of stadium success. The purpose is to fit a number of functions to an outcome variable, {0,1}. This will indicate the probability relationship to success. The model

logit(p) = log(p/(1-p)) = $\beta_0 + \beta_1$***(Corporate Naming Rights)** $+ \beta_2$***(Real Cost)** β_3***(Mass Transit) +** β_4***(Age of Building) +** β_5***(Team Winning Percentage, History) +** β_6***(Team Winning Percentage, 2010) +** β_7***(Total Team Championships) +** β_8***(Multiple Tenant Dummy)**

yields coefficients β_i that give the rate of change in "log-odds" as X increases by one unit. Multiplying the coefficient by the exp function will yield the odds ratio (Probability of success divided by probability of not), where the values greater than one indicate an increase in the odds of success by the increase of one unit of X. The marginal effects, $dp/d\beta = f(\beta X)\beta$, represents the derivative of the logit function. For a dummy dependent variable with a positive marginal effect, if X=1 the chances of success are higher by that value, than if X=0, by the percentage of the coefficient.

Given that the sample is relatively small, it's likely that the model may have two or more dependent variables that are highly correlated with each other, often known as multicollinearity. If so, the estimation of a single dependent variable, all else constant, is less precise, given that is may be directly related to another. Often, high standard errors result. Each dependent variable will be explained.

Corporate Naming Rights Dummy: As is so common in this day and age, corporate interests can be found everywhere. One popular method of securing stadium revenue for the building's ownership, however, is by naming the building after a sponsor. These deals often cost sponsors tens of millions of dollars per year, but serve as a steady revenue stream for tenants. These deals are often made before the stadium is built, and having this guaranteed revenue may allow a stadium to not require as significant of a public subsidy to cover the building's cost. Alternatively, developers of successful stadiums may choose not to name the building after a corporate interest, believing that a name such as Houston's "Toyota Center" represents brand dilution for their team or attaches a negative corporate connotation with the team's image. If the stadium or arena is named after a corporate interest, it receives a one, and if not, a zero.

Real Cost: Stadium construction costs can have a tremendous impact on the magnitude of public money required to finance the building. I've converted all cost figures into real 2011 dollars terms. High costs may indicate a high quality, successful construction, or a tremendous burden to residents that can lead to low attendance and high need for government money. Financers of a $1 billion stadium are more likely to require a big subsidy, than those of smaller projects.

Mass Transit: The presence of public transit systems, such as trains, but not highways, facilitates the ballgame experience, as people can get to the game efficiently and safely. Interestingly, stadiums without access to public transit can force people to spend more

time in the neighborhood before and after the game, which argues in favor of public support to initiate further spending in a metropolitan area. Theoretically, however, a city may be more compelled to spend on a stadium with public transit, as the systems will be heavily used on game day. Mass transit also implies that the stadium is located in a heavily populated area, which is usually a preferred location to rural areas far away from the general traffic. Nelson (2002) argued that these sorts of areas are most beneficial in his study of location:

> …metropolitan economies appeared to do better when major league teams played anywhere in the central city but do poorly when major league teams played in the suburbs. Linking a trip to the game with a nice meal, some shopping, and visiting other attractions will result in more spending. Downtowns usually do a better job of providing these opportunities than suburban and most other central city locations…

Age of Building: Buildings that have survived for 25 years or longer are automatically successful, but they often represent the most lucrative stadiums as well. Many would argue that Fenway Park and Wrigley Field, the two oldest stadiums in use in American professional sports, are the two best ballparks to watch a game, as spectators feel as if they've traveled back in time to witness for the legendary occasion. These two consistently sell out their home games, even with poor on field performance.

Team Winning Percentage, History and 2010[1]: Everything is better when the team is winning. In this case, a thriving team can cause incremental attendance increases, but not necessarily by enough to seat more people than the league's percentage mean, on average. Maybe a winning team isn't enough of a reason to go to games in a poor stadium. Also, this begs the question of which is more important: a winning season, or a winning history. Storied franchises seem to bring many people to games, even if the on-field product isn't what it used to be. Conversely, if everyone loves a winner, would this give the city leverage and permission to increase taxes for stadium construction?

Total Team Championships: Professional sports, like any other business, buy low and sell high. Upon winning a championship, teams may raise ticket prices, demand a better venue, or sell off their players, all of which could adversely affect attendance. Of course, winning titles also brings more fans in to watch the best team. Similar to historical winning percentage, championships can make fans loyal for life, as they'll always remember the winning team, even when the current team is entirely dissimilar.

Multiple Tenants: Buildings with multiple tenants are more efficient, and are often well constructed, since they need to attract fans of twice as many teams. Further, the values analyzed for the multiple tenants incorporate the highest values of all the teams, so the

[1] Note: Hockey records are measured in point percentage, not win percentage. In modern NHL scoring, a team earns three points with a win, and zero with a loss in regulation. However, if the two teams are tied at the end of regulation, both teams are assured at least one point, as the overtime loser earns one, and the winner earns three. Teams with the most accumulated points at the end of the season advance to the playoffs.

building may be successful only as a result of one of the teams. Plainly stated, more people come to the games if there are twice as many opportunities to do so.

By-sport dummy variables: Could football stadiums be more likely to be successful than hockey stadiums, simply because of the game played in the building? Would decision makers capitalize on the fact that more people like football than hockey, and require all residents to pay a higher portion as a result? Are some sports more suited for big markets than others? Unfortunately, these questions revealed nearly inconclusive evidence, as will be discussed next.

Model Results

Table 1 shows the frequency distribution of successes, by sport, totaling to 23 out of the 36 stadiums and arenas in the sample. From the table, I was surprised to find that neither of the two hockey-only arenas was successful (NHL and NBA teams often share an arena), but nine of the ten multiple tenant cases were successful. Hockey is often considered the least popular of the major four American sports, but its union with basketball in an arena greatly increases its chances of success.

Table 2 shows the stadium success predictors for each stadium or arena, based on a regression that takes into account all dependent variables, and assesses the likelihood of success. Many successful stadiums have a predictor around 90%, implying that many factors frequently contribute to success, and consistency amongst these stadiums can be used as cases for what a theoretical successful stadium may look like.

Table 3 shows the logit model results from a regression run with all variables except by-sport dummy variables. The most relevant column is the marginal effect, the derivative of the logit model. The interpretation with dummy dependent variables is straightforward, as the value indicates the probability increase (or decrease) with the presence of the variable.

Corporate naming rights significantly hurt a stadium's chance at success by 27.7%, as an unsuccessful stadium may have difficulty obtaining sufficient investors, and would need to sell naming rights to cover the cost, or receive sufficient governmental assistance, rather than finance internally.

The presence of mass transit increases a stadium's chance at success by about 10%, but this is not statistically significant. Also, having mass transit makes a stadium 1.8, or 80% times more likely to be successful. This analysis doesn't cover whether the mass transit is more related to low subsidies or high attendance, but furthering the study would yield interesting results for policymakers concerned with infrastructure investments.

Also noteworthy is that buildings with multiple tenants are 30.4% more likely to be successful than single-tenant buildings. Combined with a high odds ratio of 6.5, stadiums with more than one team have a better chance at success, likely because they can have twice the opportunities for revenue. Unfortunately, teams playing on fields continue to demand their own house to play, and their odds at building a successful building heavily diminish.

Interpreting the marginal effects of continuous variables can become more complex. For stadium age, all else constant, an increase in a year of age increases the

venue's odds of success by 20%. As for team championships, all else constant, winning an additional championship increases the odds of stadium success by 41%.

For the two percentages variables, all else constant, an increase in a team's historical winning percentage by one percentage point will increase its odds of success by 12%. But, by increasing the stadium team's historical winning percentage by five percentages points, the odds of success increase by 76%.[2] Both the team's historical and 2010 winning percentages can be labeled significant at a non-traditional 75% confidence level, but in comparing the two, it appears that the team's historical figures lead to higher odds of success.

Controlling for each sport becomes difficult, since including a binary variable for each sport can lead to multicollinearity. The model fit was poor for controlling for a single sport, all else constant. The best way to control for differences in tenant types was the dummy for multiple tenants. The results from the regressions by-team are listed in Table 4.

Analysis of the results, like the model itself, includes limitations. The model is an imperfect tool to predict expected outcomes, to make decision making clearer, but is by no means precise.

The sample is small, and results only discuss the results of 36 stadiums and arenas, strictly in large media markets. Different results may have been determined with a larger sample that included all buildings from all market sizes, but for this paper I assumed that comparing large and small market stadiums and arenas is invalid.

[2]Exp[5*Coef(Team Winning %, History=.1138267)]

The regression values are also constrained. The "pseudo R-squared," a tool used to explain the proportion of binary "success" variance explained by the factors of success is normally lower in logit than in other regressions, and is no different in this model. The most complete model explained only 48% of the variance, implying much ambiguity and noise. Further, many of the findings cannot be considered significant at high confidence levels, as some p-values were too high for traditional confidence analysis. Like any business decision, the model includes reasonable confidence, but no certainty in any of the findings. As such, I've concluded the legitimacy of some variables at 75% confidence, which can lack academic merit, but can still be a useful tool in decision-making.

Upon testing the hypothesis that different sports have different chances of success, the results were nearly inconclusive. None of the p-values can be labeled significant by any standards, but the results indicated that basketball arenas have the highest chance of success, of any sport. When combined with other variables, in substitution for the multiple tenant dummy, the pseudo r-squared heavily declined, and the p-values decreased in most other variables. Studying the potential for success based on the different sports played in the buildings could yield significant results if the model were designed differently, and I cannot conclude that the two events are unrelated.

There are certainly other factors that can either define, or contribute to success, which have been ignored. Quite simplistic is the independent variable for success, which neglects basic components such as revenue and profit. These could make a more complete definition of success, but also can be manipulated by team owners who spend at different magnitudes to create a competitive team, and these financial values may not

reflect the stadium's circumstance. Many variables are unquantifiable, such as stadium quality, or the general consensus of residents and fans. One significant factor is climate, as even loyal fans may become uninterested or unable to attend a game in inclement weather. Indoor buildings may accommodate some of this hesitation, but fans may still be uninterested in driving to the game in the snow. Plus, some cities simply love their team more than others. Stadiums with similar factors may be successful in one locale, and flop in another, for unknown reasons.

Conclusion

Given the American passion for the visceral returns from sports entertainment, professional sports will continue to occupy both the private and public sectors at the expense of the public coffers. But the extent of support given to private industries has been a matter of inconsistency for some time. In 1957, the mayor of New York City warned residents, "If we began to subsidize baseball teams, all sorts of business enterprises would demand the same things... They have to carry their own weight. We will not be blackjacked" (Keating 1999). Professional sports possess a unique power and immunity that must be closely monitored.

Most notable is the consistent ability of stadium and arena developers to receive public contributions towards their private venues. Advocates argue that securing a respectable stadium is required for attracting fans to the games, players to the teams, and teams to stay in the city. Cities cite growth studies, and expect urban development to spawn from the investment. Civic pride seems to come as a result, through uniting

residents both physically in the community, and emotionally in favor of the team. The public contributes to stadiums just as they would any public structure or utility, some argue. In theory, the entire city is enhanced through a minimal contribution from all taxpayers.

Economic studies have helped determine that these tax increases are harmful and unnecessary to the public, and that democratic principles of public welfare are in jeopardy. Public subsidies for stadiums don't seem to do as promised, as the "spin-off development" from construction doesn't display the wishful trickle-down returns. Most jobs are transferred, rather than created, and income and wealth effects are menial, misinterpreted, and misleading. Further, the "multiplier effects" on the total economic impact from stadium construction suffer similar issues of bias from subsidy advocates. Often, the economic studies are ignored, and policy makers argue on the basis of intangibles, through emotional appeal. Said attempts to rally the public only perpetuate the inefficiencies of tax increases for private benefit. To the chagrin of the taxpayer, stadium projects continually see tax increases involved. Widely accepted, and most egregious, is the fact that these projects can be financed privately and still be successful, concluding that public funds are highly overused for sports entertainment.

This analysis, through both the subsidy discussion and the factors of success model, has applicability to city residents and leaders in the planning or development phase of a new stadium. Residents must be aware of the potential for political abuse, just as policy members must be strategic in their implementation, so as to protect the welfare of the community. The statistical model provides insight into the legitimacy of various quantifiable factors, and the likelihood they contribute to stadium success.

Supplementing the model with an understanding of the balance between practicality and merit of public subsidies would help both sides of the argument design and execute a stadium plan with improved efficiency. Interestingly, the strongest determinant of success, the binary variable for venues with multiple tenants, is also an example of a practical plan that can generate twice the traffic and revenue of a single tenant venue. Understanding the differences in odds that each variable will contribute to success can help mitigate residents and developers towards strategic and effective decisions, that can help reverse the trend of welfare reduction resulting from stadium construction.

Table 1: Stadium Success Frequency Table, by Sport

1) **Baseball**
2) **Football**
3) **Basketball**
4) **Hockey**
5) **Multi-Tenant**

1)	2)	3)	4)	5)	**Success** NO	YES	**Total**
0	0	0	1	0	2	0	2
0	0	1	0	0	2	1	3
0	0	1	1	1	1	7	8
0	1	0	0	0	3	5	8
0	1	0	0	1	0	1	1
1	0	0	0	0	5	8	13
1	1	0	0	1	0	1	1
				Total	13	23	36

Table 2: Stadium Success Predictors, Success Ratings

Stadium/Arena	Success Predictor	Success
Yankee Stadium	0.95905	1
Citi Field	0.262426	1
Madison Square Garden	0.997849	1
Metlife at Meadowlands	0.917982	1
Prudential Center	0.872061	0
Dodger Stadium	0.969785	1
Angel Stadium	0.313447	1
Staples Center	0.955225	1
Honda Center	0.158819	0
U.S. Cellular	0.55973	0
Wrigley Field	0.982007	1
United Center	0.982245	1
Soldier Field	0.99804	1
Citizens Bank Park	0.738396	1
Wells Fargo Center	0.986986	1
Lincoln Financial Field	0.693433	1
Fenway Park	0.997302	1
TD Garden	0.971419	1
Gillette Stadium	0.99639	1
AT&T Park	0.79869	1
O.Co Coliseum	0.997531	1
Oracle Arena	0.275397	1
Candlestick Park	0.969547	1
HP Pavilion	0.269853	0
Rangers Ballpark	0.094957	0
American Airlines Center	0.616725	1
Cowboys Stadium	0.893647	1
Nationals Park	0.283353	0
Verizon Center	0.701977	1
FedEx Field	0.179939	0
Turner Field	0.265317	0
Georgia Dome	0.541016	0
Philips Arena	0.028257	0
Minute Maid	0.007858	0
Reliant Stadium	0.08439	0
Toyota Center	0.678955	0

Table 3: Logit Model 1

Dependent Variable: Stadium/Arena Success Dummy

	Log-Odds Coefficient	Odds Ratio	Marginal Effects
Corporate Naming Rights Dummy	-1.711516* (1.364431)	.1805918* (.2464051)	-.2771923* (.20912)
Real Cost	.0538116 (.0686264)	1.055286 (.0724205)	.0087152 (.0111)
Mass Transit	.590436 (1.154681)	1.804775 (2.083939)	.095625 (.18557)
Age of Building	.1786804** (.1075826)	1.195639** (.1286299)	.0289386** (.01671)
Team Winning Percentage, History	.1138267* (.089695)	1.120558* (.1005089)	.018435* (.01332)
Team Winning Percentage, 2010	.1029077* (.0774172)	1.108389* (.0858084)	.0166666* (.01337)
Total Team Championships	.3460254* (.2350159)	1.413439* (.3321805)	.0560413* (.03946)
Multiple Tenant Dummy	1.878355* (1.638533)	6.542735* (10.72049)	.3042131* (.26617)
Pseudo R-Squared	0.4776	0.4776	0.4776
Number of Observations	36	36	36

*Significant at the 25% level or better

** Significant at the 10% or better

Table 4: Logit Model, By Sport

Substituting each sport individually for "Multi-Tenant" into **Model 1** yielded less significant results across the board. Below are the "By-sport" coefficients from four new logit regressions, all of which are statistically insignificant, but still noteworthy:

	Log-Odds Coefficient	**Odds Ratio**	**Marginal Effects**
Baseball	.5371667 (1.2111)	1.711152 (2.072376)	.090199 (.20158)
Basketball	.9519084 (1.152256)	2.590649 (2.985091)	.1588104 (.19396)
Football	-.6825746 (1.297008)	.5053143 (.6553967)	-.1139899 (.21372)
Hockey	.000861 (1.396105)	1.000861 (1.397307)	.0001468 (.23808)

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