DOES OVERSPENDING ON ATTRACTING AND RETAINING PROFESSIONAL SPORTS TEAMS EFFECT ECONOMIC GROWTH?

by

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1. Introduction

Professional sports teams are run by many of the world's wealthiest individuals and families yet, when they complain about declining revenues and the need for upgraded facilities, municipal, states and even federal governments are quick to come to their aid with subsidies and tax benefits. To give an idea of the level of public funding of professional sports in the United States alone, consider the National Football League (NFL); where teams host a total of 8 games a year (excluding playoffs). Since 2000, 12 NFL teams have kicked off at new stadiums. Of those 12, 11 were partially funded using public dollars. The total cost of these new stadiums exceeded 7.3 billion US dollars, 43.43% of which was publically funded (that number jumps to 55.4% if MetLife Stadium is excluded, which was 100% privately funded), representing a significant investment for any host (see Table 7 in the Appendix). [1] To defend their spending, politicians have consistently marketed new stadiums as hosts for attractions that will have positive economic impacts and bring life back to their downtown metropolises. This defense is not hard to believe, as it is easy to imagine a boom in tourism, local merchants relocating to prosperous downtown sites to and even residents returning downtown from the suburbs.[2]

Professional sports teams act as profit maximizing firms controlled by owners that only consider the private costs and benefits of their investments. As a direct investment, a new stadium can typically generate enough new revenue to justify privately funding the project. Thus, if government aid were not an option, owners would still decide to build or upgrade their stadiums when it is optimal to do so. In reality government aid is not only an option, but also the norm. The government operates differently as they must weigh the

[1] CBS Minnesota, "NFL Stadium Funding Information"

[2] Michael Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.

direct costs and benefits of the investment, as well as the social costs and benefits. The government, as an owner, must be able to decipher if the projected increase in revenue is crowded out from other ventures or if the increased revenue is actually new spending. If the new revenue is crowding out other forms of entertainment, the gains to the government from the investment are not nearly as clear. In this scenario tax revenues are simply being transferred from one source to another. Therefore, when long term leases between professional sports owners and host cities are set to expire, there are two parties basing their investment decisions on different criterion. Very few facilities end up being 100% privately funded, and most governments end up taking significant losses on their investment because the rent they charge is not sufficient to pay labor, utility and the stadium's depreciation.[3] The loss is partly caused by the owners knowing the host city, or a substitute city will be willing to pay for the social benefits.

Previous economic literature states that any advertised benefits are grossly exaggerated and that stadiums and their teams have no effect on economic growth.[4] Simply put, cities are overpaying to retain and attract professional sports franchises. The main argument for operating facilities at a loss is derived from the cities "sense of identity" that is established by hosting a professional sports team and the non-financial benefits that are generated.[5] This "sense of identity", applies to both the city and the residents, as local governments believe teams put their city "on the map" and make them more attractive to tourists as they are more frequently mentioned in the media.[6]

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[3] Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.
[4] Robert A. Baade, "An Analysis of the Impact Stadiums and Professional Sports Have on Metropolitan Area Development."
[5] Raymond J. Keating, Sports Pork: The Costly Relationship Between Major League Sports and Government
[6] Keating, Sports Pork: The Costly Relationship Between Major League Sports and Government,

There also exists a belief that if owners do not have to spend their own money, they will not seek low-cost solutions.[7] This makes the live sports experience more affordable to the public and the subsidy would simply be paying for the increase in consumer surplus. The overall popularity of major professional sports leagues only increases the owners bargaining power, and their threats to relocate create bidding wars that cause cities to overspend more than they already are.

This paper will investigate whether overspending on attracting and retaining professional sports teams negatively impacts economic growth. This paper is organized as follows: Section 2 provides a background on benefits and leakages in the professional sports market, related economic concepts, and attempts to explain why cities overspend on professional sports. Section 3 presents the paper's hypothesis, and the various models used to investigate the proposition. Section 4 presents the data used, and section 5 the results. Section 6 offers a discussion on the findings, outlines potential sources of error and gives suggestions for extension of this analysis in the future.

2. Background and Context:

2.1 Leagues, Owners and Host Cities

Professional sports leagues limit the number of franchises available in order to maintain competition and to maximize their respective owners monopoly profits. By doing so, leagues can drive up the price which cities must pay to attract and retain franchises by charging relocation and expansion fees. Each league has a finite amount of athletes that are skilled enough to employ (although, it could be argued that only star players are finite

[7] Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.

in availability, and there is an infinitely elastic supply at a base wage), and by diluting the league with additional franchises, eventually some teams will have to hire a disproportionate amount of unskilled workers leading to a competitive imbalance. A league does better without teams of demonstrable low quality, as uncompetitive teams are less likely to be profitable.

A professional sports team is typically defined by its market size. Some teams with large markets have shown that they can still make enormous profits regardless of their team's skill level, while the revenue of small market teams is much more dependent on the team's win-loss record.[8] For fans of big market teams this is an unfortunate relationship, as there is an incentive to spend less money and field a team less likely to be successful. For the owners of small market teams, the personnel (coaches, players, scouts etc.) must maximize the probability of success in order to keep profits high. It is not necessarily an arms race because increasing the team's costs does not guarantee a successful team. League executives trumpet the competitive balance of their teams and have attempted to create a fair playing field by utilizing revenue sharing, luxury taxes, and salary caps; These are all designed to help small market teams boost cash inflow so that the spending matches that of teams in large markets, and to increase their probability of retaining star players. Small markets have problems retaining players and fielding competitive teams because they cannot generally offer competitive salaries. This league structure also makes expansion less likely, as the most successful teams do not want to share their revenues with more cities. Additionally, what makes it even more difficult for small markets to attract and retain star players is the increased potential for endorsements

[8] Nate Silver, "Why Can't Canada Win the Stanley Cup?" *New York Times*, online, May 31, 2013

and alternative revenue streams that big cities offer. There is also an increased probability that players may choose to make a big market their home city.[9] Owners of small market teams use these disadvantages to leverage cities for more support.

When long-term leases between cities and owners expire, owners have the opportunity to relocate. The opportunity is used to negotiate the best possible deal for the owner, and threats of relocation are used for leverage. Threats are much more credible to small markets because there are likely to be many other cities with similar demographics willing to pay to host the franchise. Small markets act as substitute goods, while big markets do not. It is easy to imagine a team relocating from Hartford to Raleigh, but New York to Raleigh is hard to envisage. There is also an incentive problem from a political and public relations point of view. If the municipal government were to allow the local team to relocate, it is highly likely the popularity of the elected officials would decrease, and they would risk losing reelection, even if it were the correct decision from an investment point of view. Owners derive increases in bargaining power from threats of relocation, positive public perception and the idea that small markets need help to compete. They frequently negotiate tax breaks, stadium subsidies, lower rent and revenue guarantees tied to attendance in exchange for their loyalty.

2.2 Multiplier, Spillovers and Substitution Effects

The direct benefit to a community hosting a sports franchise is the city's portion of any of the team's revenues. A typical deal would include rent paid annually by the team to the city (assuming the city funded a portion of the stadium). These payments can either be fixed, or floating. A typical floating relationship would be rent payments that are

[9] Gene Warner, "Hockey Team has $65 million Impact, Hevesi Says," *Buffalo News,* online, February 26, 2003

determined by attendance (or attendance revenue). This type of relationship gives an incentive for owners to field less competitive teams (decreases in rent, unless the expected increase in revenue is sufficient), and historically these contracts have favored the owners.[10] Fixed rent payments involve less risk for the cities but these contracts have been equally unsuccessful, as the negotiated rent has historically been below market value.[11] Other sources of revenue include a special tax on ticket sales, concessions, and parking. Cities are also more likely to get a larger share of sales from luxury boxes because these purchases are not included in league revenue sharing. As well, professional sports teams bring with them many high tax bracket jobs for front office executive and athletes, as well as many other opportunities for local people. Depending on the sport, the jobs available for local people could be active as few as 8 times a year (for football) or as many as 81 times (for baseball), not including special non-sporting related events throughout the year. These jobs are seasonal and tend to be used as secondary sources of incomes, and thus do not have a significant effect on employment. Most high paying jobs are given to people imported into the community.[12]

Cities enter deals with professional sports franchises knowing the direct benefits will not outweigh the costs, but hope that the indirect benefits will cover their overhead and make it a worthwhile investment. As explained in the introduction, a sports franchise must create new spending in a region in order for it to boost local economic activity. To create new spending, a sports franchise can either stimulate net exports or change

[10] For example, the rent paid by the Cleveland Cavaliers has the same contingencies as the rent paid by the Cleveland Indians, despite playing half as many home games in a much smaller venue (thus, they have never paid rent).
[11] Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.
[12] [14]Baade, "An Analysis of the Impact Stadiums and Professional Sports Have on Metropolitan Area Development."

consumer's behavior by inspiring them to spend more money.[13] A professional sports franchise can stimulate the local economy's net exports directly by getting more visitors to the region. In order for residents to have a positive effect on net exports, they must spend money locally that they would have otherwise spent outside the region. In order for tourists to have a positive effect, they must visit the region when they otherwise would not have, and cannot be displacing an identical tourist that would have otherwise visited the region but chose not to because of the sporting event. Sports teams can also have a positive effect by increasing the consumer's average expenditure. These effects are not mutually exclusive, and both can have a real, positive effect on economic growth.

When a new job is created in a region, a portion of that salary will be spent locally and the producers that profit off that spending will now have more money to spend themselves. They then spend a portion of their profits that they would not have had, and this pattern will increase until the portion that is passed on to the next producer becomes negligible. The impact is described as a ripple, and we can measure the total economic impact by using simple multipliers. The modified multiplier by Noll and Zimbalist that takes into account unique factors facing a municipality hosting a professional sports franchise[14]:

$$M_{local} = \frac{1}{(1 - MPC \bullet f)}$$

Where MPC represents the marginal propensity to consume (approximately 0.9) and f represents the fraction of local consumption expenditures that causes incomes to rise (0.5). Using various estimated values, the local multiplier has been found to be

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14 Roger G. Noll, 1997. *Sports, Jobs, and Taxes: The Economic Impact of Sports Teams and Stadiums*: Brookings Inst.

approximately 1.5. This multiplier is used in various sports impact studies[15], and means that an increase in expenditures by 1 dollar will have a total economic impact of 1.50 dollars. All the new spending must go back into the region for the value of 1.5 to be realized. The downtown municipality will not get the full benefit if all of the increased expenditures are spent in the suburbs. During the 70's-80's, most new stadiums were being built in suburbs to take advantage of the cheaper value of land. A location in the central business district tends to benefit more consumers.[16] By not covering the land cost premium to locate downtown, cities were denying their local producers the positive spillovers from entertainment and sporting events. In the 1990's, having learned from these experiences, new stadiums were again being built downtown most notably Camden Yards in Baltimore. These stadiums were being designed as the center and driving force of downtown revivals. It also allowed cities to charge higher prices for parking at sporting events and in addition increased the use of public transportation.

One of the main attractions of hosting a professional sports team is the potential for big events, such as the playoffs, all-star games or even the super bowl. For example, recently a report on the 100th Grey Cup reported the event generated over 133 million dollars in total economic activity in the province of Ontario, and over 94.7 million in Toronto alone.[17] Local residents and tourists are surveyed to measure how much money they are spending before, after, and during the event. Essentially, companies try to determine the amount of positive spillovers created by the event in order to estimate the total economic impact. The reports typically confirm that event attendees have increased

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15 Gene Warner, "Hockey Team has $65 million Impact, Hevesi Says," *Buffalo News,* online, February 26, 2003

16 Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.

17 Analysis based on CSTA's STEAM

their spending locally but the reports tend to be quite biased. What the surveyors fail to distinguish is the economic activity that would have taken place regardless of the event. In a thriving downtown, most popular restaurants and bars will be filled on Friday and Saturday nights, so this cannot necessarily be attributed to the event itself. This means that most economic reports significantly overestimate the effects of these sports events.[18] Unfortunately, there are also indirect costs to hosting a professional sports franchise. Negative externalities include congestion, noise, and pollution. These costs are borne for the most part by nearby homeowners. The value of their property will diminish and they often seek compensation from the city. For business owners, the effect is probably reversed. Owning a bar or restaurant close to a new facility will increase their property value, as their walk in customers will increase greatly on game nights. Cities also experience a winner's curse when attracting teams. They can get caught up in a bidding war and overpay for the sake of winning the auction. Lastly, most athletes and executives do not reside locally year round. This represents a leakage outside the city boundaries that counters some of the increases in new spending the sport may bring. Instead of adding money to the local economy, in this scenario professional sports act as a transfer. New money is entering the economy and leaving the economy from the same source, with no boost in local economic activity.

3. Hypothesis and Objectives

By continuing to support professional sports, government's show they believe the positive externalities outweigh the negative externalities. Previous economic literature

[18] Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.

has found that professional sports and new stadiums have had little to no impact on local economies. Each professional sports team typically has a stadium lease or contract with the city that guarantees they will not relocate for a fixed amount of time. When the contracts expire, owners use their bargaining power and political influence to extract the absolute best possible deals from cities. When a new stadium is built, cities have a difficult time recovering their initial investment because the contracted companies and the team's owner capture most of the economic rent.[19] This paper, through various statistical methods, will explore the hypothesis that small market teams overspend on attracting and retaining professional sports teams to the extent of negatively impacting economic growth.

When a small market franchise invests in a professional sports team, or a new stadium, other projects and some private investments are crowded out because the necessary funds become unavailable. As the size of the market decreases, so do the available resources, and thus large investments crowd out a larger proportion of potential small market projects (the same project may crowd out the same amount of projects in a small/big market, but there are less potential projects in a small market). Small market cities that invest in professional sports and the necessary infrastructure are potentially missing out on alternative investments with a higher rate of return. Alternative investments vary in use from improvements to education, health care, and local infrastructure and capital, or swaying large companies to relocate to their city to create jobs. When a team first moves in, there is always an initial level of excitement with increased retail and season ticket sales. A city should see an initial boost to the economy

[19] John J. Siegfried, 2000. "The Economics of Sports Facilities and Their Communities," Journal of Economic Perspectives, American Economic Association, vol. 14(3), pages 95-114, Summer.

from temporary jobs that are needed for construction or upgrades of the facility to be used by the team. For that reason, there may be reason to believe in a short-term boom to the local economy. Difference-in-differences estimators can be used to calculate any benefits a city may see over the first year by using a group of treated cities[20] and cities with similar demographics as controls. When the new jobs cease to exist and there is no longer money being spent on construction, the city will expect a return on their investment through revenue streams. In the long run, due to poorly negotiated contracts, overestimated positive spillovers and additional negative externalities, cities may never recover their initial investment. By taking a loss, and missing out on alternative investments, cities should see a stunt in growth in comparison to other cities that invested responsibly. Using markets that have had teams recently relocate and controlling for relevant economic variables (unemployment, growth etc.), a fixed effects estimator can test for significant changes in growth caused by professional sports teams using a dummy variable:

$$\ddot{y} = \ddot{x}_{controls_{it}}\beta + \ddot{T}_{it}\lambda + \ddot{u}_{it}$$

Where **x** represents the control variables and T represents the team dummy variable. In this model, the team variable represents any league, or the aggregate of all four teams. An alternative model will also be explored that separates the dummy variable into four, one for each major sport to determine if one sport is more detrimental than another.

It is important to note that professional sports only represent .75% of private sector payrolls in the 161 counties with a population over 300 0000.[21] This is obviously a very small percentile of the overall economy. A sports franchise shock to the market may be

[20] Treated cities are either expansion or relocated teams

[21] Leeds. *The Economics of Sports,* (Boston: Addison-Wesley, 2002), 183-250.

too small to appear in economic growth variables.[22] In order to further the analysis, the next methodology will focus on economic variables that measure spending on leisure that should capture any positive spillovers.[23] If there are no changes in leisure spending when a team enters (or leaves) a market, it suggests that professional sports act as a substitute good. Spillovers are then simply crowding out spillovers from alternative forms of entertainment or nonexistent. Fixed effects models will be used, however the economic growth variable will be replaced by growth in relevant industries that should capture positive spillovers.

Evidently, professional sports are not the only factor that may have an affect on growth and leisure spending, so the model must control for relevant growth determinants. The model will include a measure for growth in capital stock, population growth and a labor force demographic variable. The results should suggest that small markets may see a short-term benefit, but in the long run their investments will be ill fated.

4. Data

The data used in this study was obtained from US Department of Commerce Bureau of Economic Analysis in two different sections, Personal Income by major source and earnings, and total full-time and part-time employment by industry. In 1997 North American Industry Classification System (NAICS) replaced the Standard Industrial Classification (SIC) changing the definitions of some of the industry data. The method of calculating all of the data used in this analysis did not change. The data necessary to analyze this longitudinal study was not available at the city level, but was available at the

[22] Mark Rosentraub, Major League Losers: The Real Cost of Sports and Who's Paying for it. New York Basic Books, 1997. Pp. 538.

[23] Industries used: Amusement and Recreation, Bars and Restaurants and Accomodations

county level. The disadvantage to not having the city specific data is that a lot of professional sports teams are marketed as tools to revitalize downtown metropolises, so city data would capture money leaking into the suburbs and surrounding communities, while county data would not. In the majority of cases, the city represents a large portion of the county and should also be the main source of economic activity.

The timeline consisted of annual data from 1967 until 2011, and all data presented in this study was originally in current US dollars. It was then adjusted for inflation using the All Items Consumer Price Index for All Urban Consumers for the U.S. City Average, 1982-1984=100. Estimates of earnings for 1969-74 are based on the 1967 SIC, the estimates for 1975-87 are based on the 1972 SIC, and the estimates for 1988-2000 are based on the 1987 SIC. Estimates of earnings for 2001-2006 are based on the 2002 NAICS, estimates for 2007-2010 are based on the 2007 NAICS, and the 2011 estimates are based on the 2012 NAICS. The Census Bureau midyear population estimates were used to calculate population growth. The panel included 32 different groups; including 8 National Football teams, 4 Major league Baseball teams, 11 National Hockey League teams and 10 National Basketball Association teams. Of the 32 groups, 17 featured teams that entered the market, 6 featured teams that left the market, and 9 featured teams that both entered and departed, or vice-versa.

For the majority of this analysis economic growth was the variable of interest and was calculated by using per capita income. To control for changes in capital stock, growth in the manufacturing of durable goods was used. Increases in the capital stock represent the high cost upgrades companies can make and signal confidence in business conditions. To control for changes in the demographics of the labor force, a growth

variable was constructed by calculating the ratio of jobs per population. By calculating the growth in this variable and subtracting population growth, it gives a good representation of changes in the structure of the work and cyclical unemployment. The idea is to capture any shocks to the labor force and it's potential effect on the economy. Growth in retail trade was used as a control for consumer spending, as personal consumption plays a major role in the health of the economy and represents changes in disposable income. The final control variable is population growth, as shocks to the population will affect income per capita. A dummy variable was constructed to indicate the presence of a professional sports team, and the coefficient represents the effect of a team on local annual growth. Cities used, and their corresponding counties are available in the Appendix, table 11.

As mentioned previously, most of the benefits cities hope to achieve are indirect. In order to capture these effects, data from industries that analysts predict should boom were utilized. Growth rates in the hotel and accommodation industry, the restaurant and bar industry and the amusement and recreation industry were used to replace economic growth as the dependent variable in an attempt to capture positive spillovers.

5. Results and Analysis

In order to capture any short-term benefit of a professional sports team entering a market, I will estimate difference-in-differences estimators for the four major professional sports leagues. Ideally, there would be an estimate for teams entering and leaving the market (they should have the opposite effect) but since the early 1970's there have not been instances of multiple teams relocating from different cities at the same time. In 1995,

both Los Angeles National Football League teams relocated, however they are both in the same city, and by far the biggest market that has lost a team in recent history, making them the exception. It is much easier to find instances of multiple teams entering different markets at the same time due to league expansion. In 1993, the National Hockey League expanded to Anaheim, California and Fort Lauderdale, Florida. In 1989 the National Basketball Association expanded into two different markets, Miami and Charlotte. Although at the time Charlotte* had only a quarter of the population Miami* did, Charlotte had nearly double the growth level, and a higher per capita income.[24] In 1995, as mentioned, both Los Angeles National Football League teams relocated (to Oakland, California and St. Louis, Missouri respectively). At the same time, the Jacksonville Jaguars entered the league as an expansion franchise, although their county was half the size of Oakland's*, with St. Louis* falling in between. Finally, in 1998 Major League Baseball expanded into Phoenix, Arizona and Tampa Bay, Florida. The counties were quite different in population, but both experienced high growth in 1997.

In order to find difference-in-differences estimators, ideally there would be a sample of identical cities, treat a portion of them and then estimate the effect of the treatment with a first difference regression. It is up to the owners to determine which cities are "treated" and when they are treated. For all four regressions the same 7 cities were used as controls. They were identified as major cities that had the potential to host a professional sports team. See Table 11 in the Appendix for controls used for difference-in-differences estimators. The model was constructed as:

$$\Delta y_{i2} = \theta_2 + \Delta z_{i2} + \delta_1 treatment + \Delta u_{i2}$$

[24] * All data in reference to a city is actually in reference to their corresponding county

Where y represents growth rates, z represents a group of control variables relevant to growth, and a dummy for treatment. When omitting the control variables, the coefficient on the dummy variable becomes the difference-in-differences estimator.[25]

Table 1: Difference-in-Differences estimators for each major sports league

League	D-I-D Estimator	Robust Std. Err.	t statistic	P>|t|
NHL	-.0119233	.0088781	-1.34	0.197
NBA	.0251842	.0124364	2.03	0.0059
NFL	.0295673	.0019564	15.11	0.000
MLB	.044713	.0039406	11.35	0.000

The estimator for the NBA was statistically significant at the 6% level, and the NFL and MLB were statistically significant at the 1% level, while all had positive effects on economic growth. The NHL variable was insignificant and the opposite sign of what was anticipated. When an owner is deciding to relocate, they will always attempt to identify a "winner" and use current income and projected future growth as a criterion in choosing the host city. All things equal, the owner would place their team in the city with the highest current and expected growth, evidence that the variable is likely endogenous. The coefficients on the significant estimators are misleading because any change in the economy due to a sports team will continue beyond the initial time period, and in this regression they are high and unrealistic for the sports industry.

[25] Jeffrey M. Wooldridge, 2001. "Econometric Analysis of Cross Section and Panel Data," MIT Press Books, The MIT Press, edition 1, volume 1

Table 2: Fixed Effects and First Difference regression results

	Fixed Effects (n=1339)		First Difference (n=1296)*	
Variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Team	-.0007273	.0014728	-.006043	.004825
Capital Stock	.0390528	.0148862	.0433622	.0137417
Demographics	.9228587	.090485	.7347147	.072844
Population	.6867386	.143795	.4182405	.1162812
Disposable Income	.0465282	.016997	.0288395	.0128918

Fixed effects models are superior to random effects, and pooled ordinary least squares for this analysis because the treatment variable can be systematically related to the persistent component in the error term, v_i.[26] A Hausman test showed there was no significant difference between random and fixed effects estimators and either model would be acceptable. Table 2 represents the two preliminary models to estimate the impact of the professional sports market changing, the first being a fixed effects model, and then a pooled OLS model using first differences. In both cases, the models had control variables for population growth, growth in age demographics, growth in capital stock, and growth in disposable income as outlined in the data section. Both models produced similar results, as the team dummy variable had a negative coefficient, although statistically insignificant. The four control variables were positive and statistically significant at the 5% level, and the time dummies are omitted from presentation. When compared to the

[26] Jeffrey M. Wooldridge, 2001. "Econometric Analysis of Cross Section and Panel Data," MIT Press Books, The MIT Press, edition 1, volume 1

first difference estimators, fixed effects are more efficient when the error terms are serially uncorrelated and first difference errors are more efficient when the error terms follow a random walk.[27] It is likely that the true answer falls in between, and so the results from both models are worth looking at and produce very similar results. Additionally, according to the test outlined by Wooldridge[28], the fixed effects model exhibited no evidence of autocorrelation.

Table 3: Fixed Effects Feasible Generalized Least Squares Results

FEGLS (n=1339)		
Variable	Coefficient	Robust S.E.
Team	-.0020011	.0007713
Capital Stock	.0284069	.0053193
Demographics	.9232065	.0404598
Pop Growth	.7178416	.0575916
Disposable Income	.0739722	.0103358

To account for heteroscedasticity, I re-estimated the model using fixed effects feasible generalized least squares and the three control variables were very similar to those from the fixed effects model, and again the time dummies are omitted from presentation. The dummy for the presence of a professional sports team in this model was

[27] Wooldridge, 2001. "Econometric Analysis of Cross Section and Panel Data," MIT Press Books, The MIT Press, edition 1, volume 1

[28] Wooldridge, 2001. "Econometric Analysis of Cross Section and Panel Data," MIT Press Books, The MIT Press, edition 1, volume 1

statistically significant at the 95% level with a p-value of .014. The coefficient is interpreted as having a -0.2% impact on growth in the region's economy when a team is present. This impact may be exaggerated but the important point is the effect is negative.

Table 4: FE and FEGLS regression results for various leisure spending dependent variables

	Fixed Effects (n=1339)		FEGLS (n=1339)	
Variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Amusement	.0242356	.0065973	.0107802	.0041603
Accommodation	-.0074679	.0096195	-.0050471	.0039422
Restaurant/Bars	-.0004345	.0037331	-.0000872	.0027485

Table 3 shows the fixed effects and feasible generalized least squares estimators (there was evidence of heteroscedasticity) for the team coefficient when analyzing various industries that are supposed to benefit from the presence of a professional sports team. Data from the industries listed in Table 4 replaced growth in income per capita as the dependent variable; otherwise the models remained the same as the previous analysis. For complete regression analysis see Table 8 and 9 in the Appendix. The Amusement and Recreation industry saw a boom from the presence of a team, which should be expected as professional sports fall directly in this category. For the Accommodation and Restaurant industries, the effect was negligible as the coefficients were insignificant.

Table 5: FE and FEGLS regression results for league specific dummy variables

	Fixed Effects (n=1339)		FEGLS (n=1339)	
League	Coefficient	Robust S.E.	Coefficient	Robust S.E.
NFL	-.0011544	.0020299	-.0036383	.0010259
MLB	.006512	.0072286	.0013533	.0023556
NHL	-.002171	.0023786	-.001594	.0010153
NBA	-.0009993	.0014759	-.0007554	.0011615

Table 4 represents the coefficients of dummy variables used to separately capture the effect of the four professional sports leagues. Rather than have one dummy variable for the presence of a team, this model has four dummy variables, one for each league, otherwise the two models remain the same. For the fixed model, all four dummy variables were statistically insignificant, and all but the Major League Baseball coefficient were negative. It is interesting that the coefficient on MLB would be positive because they play 81 home games a year, and thus would have the most opportunities to produce positive spillovers and effect growth. For the feasible generalized least squares, the National Football League had a negative coefficient that was statistically significant at the 1% level. In contrast to MLB, the NFL has the least opportunities to produce spillovers with only 8 home games, and also has the same capital requirements for a stadium. Complete regression results are available in Table 10 in the Appendix.

Table 6: Results for Dynamic Panel Analysis

	Arellano-Bond (n=1339)		Arellano-Bover/Blundell-Bond (n=1296)*	
Variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Team	-.0014979	.0011458	-.0012769	.001096
Capital Stock	.0413931	.0061752	.0423108	.0060465
Demographics	.9043797	.0478967	.919178	.0462532
Population Growth	.6345448	.0727719	.6660772	.0701989
Disposable Income	.0355751	.0106389	.0315078	.0103096
Growth Lag 1	.0444652	.0249268	.0264764	.0223287

Finally, to deal with the endogeneity problem caused by the potential causality loop between growth and hosting a team, two dynamic panel models were analyzed. Unlike the fixed effects, these dynamic models allow the robust standard errors to be efficient when including the lag of the dependent variable in the regression when T is not necessarily high. Although the time period is long, using annual data limits the actual amount of data used. The dynamic models first differenced lagged dependent variable is instrumented with its past levels, and allows variables to be treated as both pre-determined and endogenous. In both models the control variables were all statistically significant at the 1% level, however the lags of the dependent variable were both insignificant at the 5% level. The team variable was treated as endogenous, and produced

p-values of .191 and .244 respectively. They did, however, produce negative coefficients, which was consistent across the analysis. The p-values were also much improved in comparison to the original fixed effects model, but downgraded from the feasible generalized least squares model. There was no evidence of autocorrelation in levels as I failed to reject the null hypothesis of AR(2) in first differences using the Arellano-Bond test.

6. Discussion

Although it was not the primary objective of this study, it should be emphasized that the primary results of this analysis agree with previous literature that professional sports are not an economic stimulant. It quite often seems there is a new North American city considering building a new stadium to lure a team to their hometown, and the evidence from this study suggests that overspending may be negatively impacting their economy in the long run. The coefficients on the team variable were insignificant in some of the models, but were consistently negative ranging from -.07% to -.36%. What the data is estimating and what the original hypothesis suggests are not perfectly aligned, as it is not likely that the initial investment will stunt growth in perpetuity. The years of concern in this case are when leases between the city and teams are near expiry, but not yet expired. During these years it is likely any effect has worn off, as the initial costs have been paid off. The problem lies in the length of the panel, but it is necessary to insure a large amount of cities are included in the analysis. Once the leases expire, cycle will repeat itself, as pressure from owners will cause local governments to make poor investments.

Perhaps an amendment to the model in the future should include a dummy for renegotiations.

As outlined in the background section, there are many leakages in the professional sports market that are omitted from economic impact reports. These impact reports are most important to teams that face threats of relocation and can easily be influenced to overestimate the benefits to a city, while ignoring economic leakages. Instead of tying all economic activity in a city to the event, it should instead compute the economic activity that was over and beyond what a normal day would have produced, or alternative events that the city could have hosted in it's place. Most of these reports are based off surveys and it would not be difficult to collect the necessary data to include these additional factors. When deciding to invest in a project, cities conduct a cost benefit analysis that includes their estimates of positive spillovers. By reducing the expected benefits, fewer projects will be approved and there will be a reduction in total public funding on professional sports. The results of this study suggest that cities considered small markets in professional sports leagues should collude to reduce the price of retaining and hosting a sports team. Price collusion normally increases deadweight loss to society, but under a monopoly (the league) with finite amount of consumers (substitute "small market cities") reducing the monopoly price cities pay would actually increase consumer surplus and increase social efficiency.

As seen by the leisure spending analysis, there were no significant changes in the industries that would expect to see a boom indirectly from the addition of a sports team. The amusement industry saw slight growth, but this should be expected because professional sports falls directly in this industry. For these models, since growth is being

analyzed, it might have been worthwhile finding difference-in-differences estimators as there might be an initial boom after treatment, and then stagnant until future changes to the market. The results suggest that any spillovers from professional sports are crowding out spillovers from other forms of entertainment. Professional sports act as a substitute good for entertainment, and should be treated as such, not advertised and funded as an economic stimulant. This does not mean professional sports should cease to exist, it means that they should operate independently of public funding. If this strategy were implemented, owners would then choose the host city that maximizes revenue and will invest their own money in new stadiums when it is optimal to do so, decreasing the two largest costs to a host city. With owners investing their own money in stadiums, the threat of relocation will also decrease drastically so long as all of the cities hold to the original agreement. Under this format, the non-financial benefits that a sense of identity brings, combined with positive spillovers simply have to outweigh the negative externalities for professional sports to be a benefit to the community.

Although it would be the socially optimal solution, finding cities that are willing to work together to drive down the price of league monopolies is unlikely, and having them maintain a agreements in the long run while their individual leaders are continually in flux is even less likely. Alternatively, the next best solution would be to properly educate the public that their economic stimulant is actually a form of entertainment. By doing so, each resident will have to personally decide whether the benefits of hosting a team outweigh the value of their tax dollars. It will also eliminate any information asymmetry on the role of professional sports in the community. If projects are still approved with proper education, perhaps past studies have undervalued the non-financial benefits. More

than likely however, it will lead to the conclusion that residents are not willing to subsidize owners that are capturing all of the economic rents from the project.

To complement the findings of this study the model could be altered to include teams whose stadiums have relocated downtown. This will give an accurate financial approximation for any positive spillovers and a proper measurement for the multiplier associated in each city for professional sports. This type of data will help cities decide if it is worth paying premium rent to locate their stadiums downtown. If the premium land is assumed to be economically worthwhile, the cities can subsidize owners for the price difference of locating the arena downtown versus the lower rent suburbs. Although this solution seems counterintuitive to the whole study, subsidizing location costs to maximize spillovers is vastly different than subsidizing a team simply to avoid relocation. Under this scenario, the subsidies would directly finance positive spillovers in the community, and not contribute to the rents captured by the owner.

There are a few sources of error that should be considered in this study. The controls are not perfect representations of the growth factors they attempt to identify, and there is no guarantee that cities would properly invest any available funds if they were not tied up in professional sports. At the county level, the data sets used in this study are not measured annually, and are instead based off the previous Economic Census and post census information. It is possible that there is not enough volatility in the data to capture any shocks to the economy that a change in the professional sports market may have. Taking the results from the difference-in-differences estimators, it is clear that the owners are good at predicting which cities will be winners in terms of short-term growth. This highlights the fact that there is an endogeneity problem between hosting a sports team

and economic growth. In order to deal with this problem, an IV model could have also been used, but identifying a strong instrument proved difficult. Under normal fixed effects, including the lagged dependent would lead to more endogeneity problems and inconsistent estimators unless T was very large. In order to deal with this source of error, dynamic panels were used and the team variable was treated as endogenous. Finally, the teams that are relocating in this data set are also those that are most likely to be unsuccessful, either due to minimal support or mismanagement. Either case reduces the chance for positive spillovers, and there are many instances of so-called small market teams becoming constants in the community and never leaving. The argument in this case is that the data is biased towards teams that were unsuccessful, and thus more likely to be bad investments. The length of the data set should more than account for this problem. A significant number of cities acquired teams early on in the timeline, and never allowed that team to leave indicating a reasonable level of success. Other sports variables were also considered, but were omitted from this study because they did not improve the strength of the model. Dummy variables for championships and the presence of an additional professional sports team were considered, as well as the team's winning percentage.

7. Conclusion

By building a panel data set of 32 cities that have experienced changes in their market for professional sports I was able to formulate multiple models that analyzed the impact of hosting a professional sports on local economic growth. The feasible generalized least squares model supported the initial hypothesis of a negative impact on economic growth

in the smaller markets. The fixed effects and dynamic panel models agreed with previous studies that professional sports had no significant effect on economic growth, as the team variable was insignificant. It is likely that cities are overspending to attract and retain teams to the extent they are stunting their own growth.

Further analysis on the subject is reliant on more accurate data at the county level, finding appropriate instruments, or increasing the amount of panel groups via new expansions and franchise relocations in the major sports leagues. If the same data were available for the cities rather than the counties, that would also increase the accuracy of the analysis. All of these contingencies are not easily attainable, as the amount of relocations and expansions in professional sports has decreased in recent history and it is not possible to go back in time and record all of the necessary data for each year in a more specific area. Finding an instrument to run IV is the most likely solution, although by using county data the variables that are widely available for a longitudinal analysis are minimal. Tax revenue could be used as an alternate measure of economic growth. Although the controls may not be available for the city, county data or state data could be used as controls, and would give a better idea of the impact directly in the city. Finally, using a league such as the Canadian Hockey League would yield interesting results, as the majority of the cities in the league are true small markets, and the necessary capital investments in an arena to host a team are significant.

The popularity of sports will presumably continue to rise with the growth of social media and television networks dedicated solely to professional sports leagues. The growth in popularity would make it even more difficult for cities not to finance new stadiums and pay rising fees to retain their beloved team. Despite the findings from this

study and many others, it is highly unlikely there will ever be significant changes to the current inefficient structure of professional sports leagues.

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Appendix:

Table 7: Private and Public spending on new NFL stadiums since 2000

Stadium	Team	Year Opened	Total Cost (millions $)	Private Funding (millions $)	Public Funding (millions $)
MetLife Stadium	New York Giants/Jets	2010	1600.0	1600.0	0
Cowboys Stadium	Dallas Cowboys	2009	1194.0	750.0	444.0
Lucas Oil Stadium	Indianapolis Colts	2008	719.6	100.0	619.6
University of Phoenix Stadium	Arizona Cardinals	2006	455.0	147.0	308.0
Lincoln Financial Field	Philadelphia Eagles	2003	518.0	330.0	188.0
Gillette Stadium	New England Patriots	2002	412.0	340.0	72.0
Ford Field	Detroit Lions	2002	440.0	330.0	110.0
Reliant Stadium	Houston Texans	2002	474.0	185.0	289.0
CenturyLink Field	Seattle Seahawks	2002	461.3	161.0	300.3
Heinz Field	Pittsburgh Steelers	2001	280.8	109.2	171.6
Sports Authority Field at Mile High	Denver Broncos	2001	400.8	111.8	289.0
Paul Brown Stadium	Cleveland Browns	2000	449.8	25.0	424.8

Table 8: Complete fixed effects regression results for various leisure spending dependent variables

	Amusement (Robust SE)	Accommodation (Robust SE)	Restaurant (Robust SE)
Variable	Coefficient	Robust S.E.	Coefficient
Capital Stock	.0677214 (.0430658)	.0807665 (.0272832)	-.0161681 (.0215788)
Demographics	.4288417 (.3772428)	.855039 (.1902741)	.4404798 (.2675228)
Population Growth	1.179017 (.5695121)	1.660949 (.282299)	.9093342 (.4148791)

Disposable Income	.0459983 (.1086153)	.0473652 (.052701)	.6956395 (.1275534)
Team	.0242356 (.0065973)	-.0074679 (.0096195)	-.0004345 (.0037331)

Table 9: Complete FEGLS regression results for various leisure spending dependent variables

	Amusement (Robust SE)	Accommodation (Robust SE)	Restaurant (Robust SE)
Variable	Coefficient	Robust S.E.	Coefficient
Capital Stock	.0213229 (.0267094)	.0731195 (.0225374)	-.0017739 (.0172909)
Demographics	.7904965 (.2181268)	.9296935 (.1761871)	.0397617 (.1348116)
Population Growth	1.60181 (.3045442)	1.773119 (.2548094)	.381771 (.1868724)
Disposable Income	-.0441274 (.0452953)	.0272343 (.0351833)	.6996945 (.0348062)
Team	.0107802 (.0041603)	-.0050471 (.0039422)	-.0000872 (.0027485)

Table 10: Complete FE and FEGLS regression results for league specific dummy variables

	Fixed Effects (n=1339)		First Difference (n=1296)*	
Variable	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Capital Stock	.0394514	.0145313	.0283109	.0053088
Demographics	.9262671	.0909683	.9188863	.0403419
Population	.6906738	.1457815	.703382	.057652
Disposable Income	.0450262	.0187388	.0735907	.0103255
NFL	-.0011544	.0020299	-.0036383	.0010259
MLB	.006512	.0072286	.0013533	.0023556
NHL	-.002171	.0023786	-.001594	.0010153
NBA	-.0009993	.0014759	-.0007554	.0011615

Table 11: List of cities and corresponding counties used in the analysis

City	Corresponding County	Treated (how market is affected) or Control
Charlotte	Mecklenburg	Treated (arrival and departure)
Raleigh	Wake	Treated (arrival)
Seattle	King	Treated (departure)
Cleveland	Cuyahoga	Treated (arrival and departure)
Houston	Harris	Treated (arrival and

		departure)
Dallas	Dallas	Treated (arrival)
Hartford	Hartford	Treated (departure)
Atlanta	Fulton	Treated (arrival and departure)
Saint Paul	Ramsey	Treated (arrival)
Minneapolis	Hennepin	Treated (departure)
Baltimore	Baltimore	Treated (arrival and departure)
Oakland	Alameda	Treated (arrival and departure)
Kansas City	Jackson	Treated (departure)
New Orleans	Orleans	Treated (arrival and departure)
St. Louis	St. Louis	Treated (arrival and departure)
Washington	District of Columbia	Treated (arrival)
Sacramento	Sacramento	Treated (arrival)
Oklahoma City	Oklahoma	Treated (arrival and departure)
Phoenix	Maricopa	Treated (arrival)
Nashville	Davidson	Treated (arrival)
New Jersey	Essex	Treated (arrival)
Miami	Miami-Dade	Treated (arrival)
Orlando	Orange	Treated (arrival)
Jacksonville	Duval	Treated (arrival)
San Jose	Santa Clara	Treated (arrival)
Tampa	Hillborough	Treated (arrival)
St. Petersburg	Pinellas	Treated (arrival)
Fort Lauderdale	Broward	Treated (arrival)
Anaheim	Orange	Treated (arrival)
Indianapolis	Marion	Treated (arrival)
San Diego	San Diego	Treated (departure)
Memphis	Shelby	Control for DID (analysis prior to 2001), and then treated (arrival and departure)
Omaha	Douglas	Control for DID
El Paso	El Paso	Control for DID
Fresno	Fresno	Control for DID
Louisville	Jefferson	Control for DID
Tucson	Pima	Control for DID
Austin	Travis	Control for DID