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Abstract

Professional sports teams commonly reevaluate their location decisions based on the prospect of building new, more attractive, stadiums. Even though a large economic literature warns about the modest (and possibly negative) effects on the local economy of hosting a professional sports team, the economic effects of professional teams and stadiums remain blurry for the general public, and cities in the United States continue to compete to lure teams with generous public subsidies. This paper integrates several contributions of the literature into one cohesive and simple framework based on cost-benefit analysis and provides estimations of the average local economic effects of teams in the four biggest professional leagues in the United States. If professional sports games do not attract visitors from other cities, or if players and owners do not spend a significant share of their income in the area, hosting a team can severely hurt the local economy.

Keywords: professional sport teams, public subsidies, economic impact

JEL codes: R13, R58, H71, D61, Z23

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1. Introduction

The consensus of an extensive literature on the economic effects of new sports facilities is that new professional sports stadiums, and thus also the teams that play in it, have a rather small, and possibly negative, net effect on economic activity (Campbell 1999, Siegfried and Zimbalist 2000, Zimbalist 2004, Coates 2007, Coates 2015).[1] In spite of this, local and state governments have contributed, on average, to 49.6 percent of the construction costs of the 96 professional stadiums or arenas built in the United States between 1990 and 2019, and they have consistently provided generous subsidies to professional teams that seem not to have credible financial needs (Alakshendra 2016).

Table 1 shows the upward trend in construction costs and public subsidies in the four professional leagues during the last three decades. In the most recent decade from 2010–19, 17 stadiums were built for professional teams in the country, with an average cost of $921.5 million—68 percent higher than in the previous decade. During this period, the public sector covered 43 percent of the costs, on average. This share is lower than the 53 percent covered in the two previous decades, but the average subsidy per stadium is 38 percent higher than in the previous decade and 130 percent higher than in the decade before. Part of these subsidies, Propheter (2017) suggests, have just fueled unnecessary increases in "stadia opulence."

Why do local and state governments continue to subsidize professional sports teams? Stadium advocates use different strategies to promote the investment in professional stadiums for the local community. According to Delaney and Eckstein (2003), stadium proponents seem to

[1] We commonly distinguish between 'stadiums,' usually open-roof and relatively large venues for outdoors sports (used, for instance, for baseball and football games) from 'arenas,' enclosed and smaller venues for indoors sports (used for instance for basketball and hockey games). In this paper the word 'stadium' is used to refer, indistinctly, to all these venues.

make “conscious strategic decisions” in order to justify the use of public funds in different cities. While at the beginning of the 1990s the main strategy was based on very favorable but methodologically flawed economic impact studies focused on tangible benefits (Humphreys 2006), there was a shift later to intangible benefits, which are more difficult to dispute. Delaney and Eckstein (2003) suggest that, in part due to the unimpressive findings of the specialized literature and in order to avoid contentious debates with ‘anti-subsidy forces’ armed with less favorable academic studies, stadium advocates became less inclined to promise economic wonders and moved to emphasize intangible benefits like ‘community self-esteem’ and ‘collective conscience.’

Table 1. Professional Stadiums’ Costs and Share of Public Burden

Period	League	Number of new stadiums	Average cost ($M 2018)	Average public share	Average public cost ($M 2018)
1990–2019	MLB	24	541.6	58.7%	318.1
	NBA	27	423.5	44.5%	188.3
	NFL	21	729.0	49.2%	358.7
	NHL	23	372.9	45.5%	169.5
2010–19	MLB	3	673.6	67.5%	455.0
	NBA	6	837.0	35.2%	294.4
	NFL	4	1,470.9	38.7%	569.1
	NHL	4	684.9	48.2%	330.4
2000–09	MLB	12	648.7	47.0%	304.7
	NBA	6	328.8	76.8%	252.4
	NFL	11	646.3	53.1%	343.3
	NHL	5	348.0	47.1%	164.0
1990–99	MLB	9	354.9	81.8%	290.4
	NBA	15	295.9	40.6%	120.2
	NFL	6	385.9	63.9%	246.6
	NHL	14	292.6	42.9%	125.5

Source: Author’s calculations, based on data from Sports Facility Reports, National Sports Law Institute of Marquette University Law School (June 2019)

Intangible benefits can possibly offer a valid justification for government subsidies. Owen (2003), for instance, argues that teams create a social value that cannot be fully captured through the teams’ operational revenue, but they can use the threat to move away (or not to move in) to demand subsidies from local governments. However, it is not clear that teams should fully

own the social value they help to create, especially because that value also depends on other factors like public investments and the participation of the community. Moreover, even though the methodologies used to estimate the intangible benefits are imperfect, most available studies (e.g., Johnson, Groothuis and Whitehead 2001; Johnson, Mondello and Whitehead 2007) conclude that intangible benefits are not high enough to provide a convincing justification for the degree of current public sector involvement.

This paper contributes to the debate about public financing of stadiums by providing a clear account of the main benefits and costs associated with the construction of new professional stadiums in the United States and integrating many of the insights provided by the literature into one cohesive framework. The need for this discussion comes from the great confusion that still exists on the topic, especially among taxpayers and policy makers. Unfortunately, both the promoters and detractors of teams have incentives to provide misguiding information that serves their own purposes (Delaney and Eckstein 2003), and decision makers in the public sector use 'motivated reasoning' to justify policies that are not necessarily appropriate for their communities (Rogers 2020). There can also be problems with the quality of technical studies; Crompton (1995) and Farrow (2013) warn about mistakes and malpractices in the preparation of economic impact reports and in doing so provide some guidelines about how an 'honest' cost-benefit analysis should be performed.

The main objectives are to better inform decision makers and the public about the key variables that determine the overall economic impact of new stadiums and, in the same vein, to support the community outreach efforts that Rogers (2020) urges scholars to make in order to guide and influence public policy decisions. The goal is to help local communities avoid the main sources of risks and losses associated with investing in professional stadiums.

Since the benefits and costs of a stadium and the team(s) playing in it are concomitant, the analysis informs equally about the benefits and costs of hosting a professional sports team. Using available data, this paper estimates some of the main 'average' effects and the net economic impact of hosting a professional sports team. The estimations are made for each of the four main professional leagues in the United States: Major League Baseball (MLB), National Basketball Association (NBA), National Football League (NFL) and National Hockey League (NHL).

The direct (tangible) net effects of professional teams on the local economy are found to be negative on average. In particular, attendance appears to have negative net effects in the four leagues (mostly due to substitution effects), ranging from average losses of almost $65 million per year (after accounting for multiplier effects) for NFL teams to losses of $111 million per year for MLB teams. Since almost half of professional teams' revenue goes to players, and an important percentage of the remaining revenue is received by owners, the final effects of a team on the local economy depend critically on whether players and owners spend their income locally. After considering these factors, as well as the local spending by other team employees, the average negative effects on the local economy range from a loss of $10 million per year for NFL teams to a loss of more than $56 million for MLB teams. These losses may or may not be offset by the intangible benefits of hosting a team, and it is very likely that, in many cases, intangible benefits will not be enough to also offset the subsidies financed by the local communities.

Of course, costs and benefits will vary widely across cities and teams, and it is not possible to properly estimate the net effect of hosting a professional team without careful consideration of specific local conditions. Having said this, however, it is important to highlight

the fact that negative net monetary effects on the local economy are expected to also have negative effects on employment. The reason is that professional teams concentrate a significant share of their revenue on very few high-income earners, while the sectors of the economy that suffer a revenue reduction due to professional games in the area tend to employ many low-income earners. Consequently, the decision of hosting a team is generally associated with a worsening of local income inequalities, a consequential problem that is too often overlooked in the literature and in public debates about professional teams' relocations.

Section 2 describes the analytical framework. Section 3 presents back-of-the-envelope estimations of the economic impact of professional teams and stadiums on local economies. Section 4 concludes with a brief discussion of the results.

2. Analytical Framework

This section identifies the main costs and benefits for a local economy of building a new professional sports stadium. Since the effects of building a professional sports stadium are tightly intertwined with the effects of hosting a professional team, these two decisions can be seen as only one joint decision associated with a common set of benefits and costs. For this reason, from the perspective of the local community, all the benefits and costs to be described in this paper can be associated indistinctively with both the presence of a team and the stadium where the team plays. The relevant counterfactual, or the situation with respect to which (changes of) benefits and costs are measured, is *not to invest in a stadium and not host a professional team*, which might mean either to not receive a new team in the city or let the current team to leave.

There is a vast literature devoted to estimating the economic effects of large physical investments like stadiums, as well as less tangible benefits like the social value of teams. For

example, Scandizzo and Pierleoni (2018) offer a complete list of benefits and costs and a summary of relevant valuation methods used in sports, although with a focus on the Olympics. For the purpose of this paper, it is sufficient to distinguish Economic Impact Analysis (EIA) from Cost-Benefit Analysis (CBA). The former focuses on the effects on economic activity, usually measured in terms of the value of total local production and employment, and commonly based on assumptions about the size of multiplier effects. The latter also requires measuring these effects but additionally attempts to estimate all unrealized (i.e., not monetized) welfare costs and benefits resulting from changes in the economic conditions.[2]

Here we follow the more general CBA approach, although some of the traditional practices of CBA are adjusted in order to tailor the analysis to the specific circumstances of privately-owned professional sports teams. For instance, professional teams are willing and able to monetize part of the welfare benefits they help to create, which implies that the methodology of CBA, originally designed to analyze *public* projects or investments, would tend to overstate the net benefits of a community hosting a professional team.

It is crucial to distinguish the different parties involved and their competing stakes in stadium projects. A revenue increase for a team may be publicized as evidence of economic success, but the actual economic impact on the local economy may well be negative. This point is clear for most (not all) economists, but less so for the general public. To clearly describe the economic impact of teams we need to identify the flows of revenue and expenditure between the team and the rest of the economy. To make those flows explicit, we consider three interdependent perspectives:

[2] Taks et al. (2011) explain, apply and discuss the two models in the context of sports events.

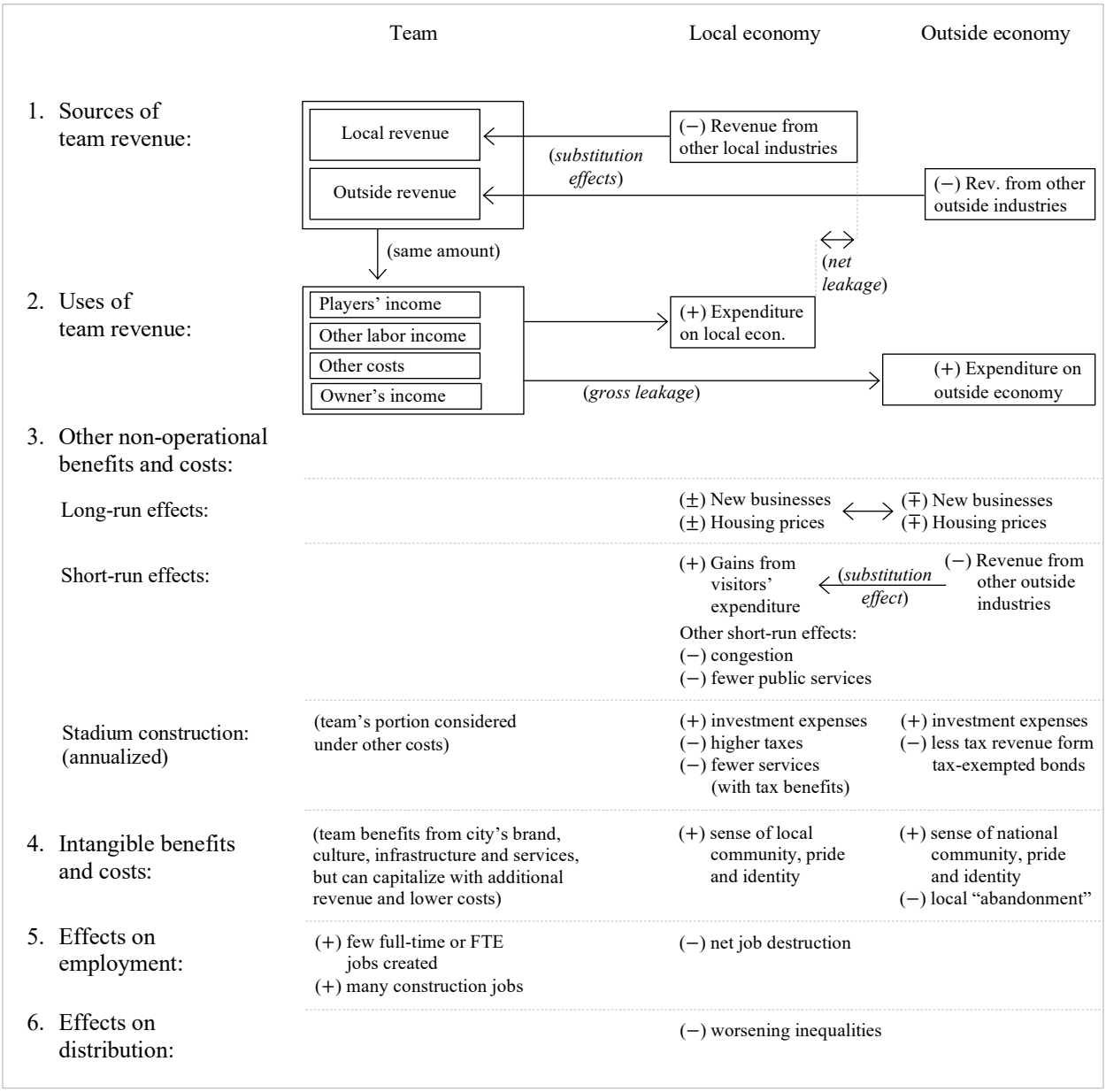
- *Team*. The benefits received by the team are necessarily channeled through revenue, which will be the direct source of income for both team owners and players
- *Local economy*. This consists of the community that hosts the stadium, which faces both tangible and intangible benefits and costs. Tangible benefits and costs are subject to multiplier effects. For simplicity, we assume that it corresponds to the benefit area, and that this is the area where taxpayers contributing to the financing of the stadium reside.
- *Outside (national) economy*. Anything immediately beyond the local economy is considered to be the part of the national economy. It also faces both tangible and intangible benefits and costs. Since the positive and negative effects of cities with teams tend to offset each other because teams distribute their games symmetrically, it can be useful to think about the national economy as having no other teams. Moreover, absent net national gains from a team's relocation, national effects would balance out the sum of team and local effects.

The analysis is divided into six mutually exclusive categories (see Figure 1). The first three categories are sources of team revenue, uses of team revenue (team expenditure), and other (non-operational) benefits and costs. These categories determine the main effects that teams and stadiums have on economic activity at the local and national levels. The fourth category is intangible benefits, which incorporates an important, albeit difficult to estimate, group of benefits for the local and national economies. In order to obtain the net gains or losses for the team, the local economy and the national economy in monetary terms, the estimations obtained for these four categories should simply be added at each level.

The fifth category consists of the effects on employment, which need to be presented separately because it is expressed in terms of full-time equivalent jobs (FTE), not in monetary

terms. [3] Finally, the sixth category is the effects on distribution, which identifies the winners and losers of investing in a stadium and hosting a sports team.

Figure 1. Benefits and Costs of Professional Sports Teams, Local and Outside (National) Economies



[3] The use of the concept of FTE jobs is necessary to standardize the measures of employment. The time worked in part-time jobs is expressed in terms of the time associated with full-time jobs, such that the number of (FTE) jobs can be added consistently among workers of a similar salary. For instance, if 1,000 equally paid workers are each hired for 8 days in a year, and a full-time job consists of 250 working days in a year, then each worker has been hired for 8/250 = 0.032 FTE job, and therefore 32 FTE jobs are being created during that year.

A complete CBA analysis should contain numerical estimations in each of these six categories. In contrast, a complete EIA normally excludes intangible benefits and the costs and effects of income distribution, and it is less clear about what benefits and costs are included, which in practice opens the door for less accurate estimations and has often led to an overestimation of net benefits (Taks et al. 2011).

The rest of this section presents a more detailed discussion of each of the six categories, with a focus on the identification of the key sources of benefits and costs and some of the main insights provided in the specialized literature.

2.1 Sources of Team Revenue

Revenue is not created in a vacuum. The revenue received by the team comes either from within or from outside the local economy. Even when the presence of a team has a positive net effect on the local economy, the redistribution of revenue across sectors of the economy creates winners and losers. Identifying and quantifying the gains and losses of different sectors and groups of the local community is necessary to properly account for all the relevant economic effects of teams.

Revenues are grouped here into three categories: attendance, revenue sharing, and other revenue. Attendance revenue consists of ticket sales, concessions, parking fees, etc. Fans, and consumers in general, have limited budgets for entertainment, and when they decide to go to the stadium they are implicitly deciding not to go to a restaurant, movie theater, or spend their money on other local business. The revenue that a team obtains from residents of the local economy mostly corresponds to a reduction in revenue from other local industries. There cannot be a significant net increase in local economic activity if only local residents are attending the games; in that case, there would only be a transfer of revenue from other local industries to the

team. This result, usually called *substitution effect*, is widely acknowledged by economists and considered an important cost of hosting a team for the local economy (Siegfried and Zimbalist 2000, Zimbalist 2004).

Revenue sharing systems vary widely from league to league, but they are all similar in their objectives and general effects.[4] Their main objective is to enhance competitive balance, and for this purpose they usually transfer resources from teams in affluent economies to teams in less affluent economies. For instance, the MLB, the NBA and the NFL share the national broadcast revenue equally across all teams, but the NFL is unique because it does not give individual teams control over local broadcasting rights. In addition, the national broadcasting deal of the NFL is the largest media contract in professional sports: Each NFL team received $255.9 million in 2018 and $274.3 million in 2019 as national revenue, which is more than the average amount of local revenue in the league.[5] In other leagues, teams depend more heavily on local revenue, so there are greater variations in revenue. Teams in bigger markets generally make more revenue (Bradbury 2019), and we expect this pattern to be partially offset by the revenue sharing system. The expected sign of the revenue shared, therefore, will largely depend on the popularity of the team and the market where it plays. A small team that struggles to produce revenue will likely see an increase in revenue due to revenue sharing, while a large team that collects a substantial amount of revenue locally may have to sacrifice part of its revenue in the short run.

[4] See Bradbury (2019) for a recent brief summary of the revenue sharing systems used in the main four professional leagues of United States.
[5] Few key financial results of the NFL, like national revenue, are made available with the Green Bay Packers annual statements, the only publicly owned (non-profit) franchise in professional sports in the United States.

Other revenue includes a variety of sources. Among the most common we find naming rights (which generally belong to the team regardless the ownership of the stadium), the unshared portion of broadcasting rights, and licensing income.

We can expect revenue sharing and licensing income to come mostly from outside the local economy, and thus to have no negative (substitution) effects on other local businesses. How these revenue sources will end up impacting the local economy will depend, instead, on how they are spent. That is the focus of the next subsection.

2.2 Uses of Team Revenue

Uses of teams' revenue can be divided into players' income, other workers' income, other costs of operation, taxes and owners' income. Close to one half of sports teams' expenditure goes to the salaries of players, a relevant portion goes to other team member salaries (coaches, assistants, etc.), and a smaller portion to full-time administrative positions and part-time workers hired in a per-game basis. Details about each team's cost structure are not publicly available, as private companies are not required to disclose them; however, the Green Bay Packers' Annual Reports provide some information about the composition of a franchise's expenses: In the period 2016–19, besides players' salaries, around 13 percent of Green Bay Packers expenses went to the rest of the team (coaches, team assistants, etc.), 15 percent to sales and marketing, 7.5 percent to stadium maintenance and 14 percent to administration costs.

Economists have for long recognized that a significant share of these resources can easily leak out from the local economy (Siegfried and Zimbalist 2000, Zimbalist 2004). The reason is that very few people (players, coaches and owners) receive most of the team revenue and will likely spend it somewhere else. This is not a minor technical concern. If the amount of money that stays in the local economy is lower than the team proceeds from economic activity displaced

due to the substitution effect, then there will be a continuous leakage of resources that will negatively affect local economic growth and development. In that case, a teams' promise of development may turn only into a veiled redistribution of local residents' income and wealth.

Zimbalist (2004) describes three sources of *leakages* from players and owners' incomes, which describe how part of the money paid to them can be expected to leave the local economy. The first source is federal taxes. Players and owners receive more than enough income to face the top marginal tax rate for federal taxes, currently at 37 percent. Considering that the top marginal tax rate is not applied to the entirety of taxable income (the effective rate is lower than the top marginal rate), and an additional Medicare tax of 1.45 percent, the percentage of revenue leaving the economy to pay federal taxes can be assumed to be around 37 percent. The second source is given by the high percentage of high earners income that is either saved or invested, most likely in international financial markets or affluent economies inside or outside the country. Third, what is left for consumption is not fully spent locally. Players, owners and their families do not necessarily live in the team's area. Siegfried and Zimbalist (2002) collected information about NBA players during the 1999–2000 season and found that only 29 percent of the players had their permanent residence in the city of the team. Moreover, considering these three sources of leakages, they estimated that only 10 percent of players income was spent in the local economy.

Besides the players, other full-time workers include coaches, team assistants and other "team" members, and administrative employees. Among them, coaches can receive very high salaries, but other full-time positions are more in line with the average salary in the country. Part-time workers include hundreds of workers hired for the games. Given the limited number of

games per season and hours of work per game, part-time workers represent a relatively small number of FTE jobs.[6]

Other operational expenditures can vary substantially depending on the stadium used, its ownership, and the business strategies of the team. For instance, about 29 percent of the maintenance costs of the Green Bay Packers stadium, the Lambeau Field, was covered in the period 2016–19 with lease-obligated contributions from the Brown County Professional Football Stadium District. In general, in the case of publicly owned or publicly subsidized stadiums, it is common for teams and the local municipalities to reach agreements about rent payments, tax incentives, and the government contributions to operating, maintenance, and improvement costs (Zimbalist 2011).

Siegfried and Zimbalist (2002) describe two additional sources of leakages related to other operational costs. Between 11 and 12 percent of professional teams' revenue may go to minor league teams, usually located in other cities, for players' development. In addition, food sales at the stadium may also flow away towards the headquarters of the concessionaire company.

Teams are often expected to contribute to the economy (local or national) with significant tax payments. However, there are at least two reasons why this may not happen. One is that teams are routinely granted tax reductions and tax exemptions, for instance, in local property taxes applied to the stadium. Another reason is that professional sports teams enjoy special tax benefits due to the Roster Depreciation Allowance (RDA), which currently allows them to

[6] An estimation of FTE jobs from part-time workers hired is presented in section 3.5.

depreciate close to 100 percent of the market value of the team during a period of 15 years.[7] The practical effect of the RDA is that owners can drastically reduce the taxable income and avoid substantial state and federal tax payments.[8] As a result, team owners may be able to retain most of the operational profits of the team.

An important partial conclusion is that, if cities cannot make sure that a significant share of team expenditures will stay in the area, then they face the risk of draining local economic activity due to the redistribution of income caused by the team. In this line, Siegfried and Zimbalist (2002) have already warned about the 'unusually large' and 'huge' leakages that sports expenditures can impose on the local economy.

2.3 Non-operational Benefits and Costs (Externalities)

The literature describes many non-operational benefits and costs of teams and stadiums. This section is not intended to provide a comprehensive review of this literature, but instead to simply identify the main externalities of professional stadiums and to place them in the broader context of our analytical framework.

We can distinguish short term from long term effects of stadiums. Short term effects are associated with game attendance. If a game attracts visitors from other jurisdictions, then these visitors may also spend money on local restaurants, hotels, stores, etc., increasing net revenue in those sectors of the local economy. Of course, that additional revenue will likely mean that other

[7] Coulson and Fort (2010) describe the different RDA systems applied since 1946, when the law was first enacted, and their effects on owners' tax payments. From the perspective of the owners, the tax savings due to RDA are just temporary, as they will have to pay taxes on capital gains when the team is sold in the future. See Keeney (2016) for a clear illustration.

[8] Based on Forbes' 2018 estimates of teams' market values, the amount that an average team would have been allowed to amortize per year is $119 million in the MLB, $125 million in the NBA, $171 million in the NFL and $39 million in the NHL. The amount of taxes avoided per year can easily be estimated by multiplying these amounts by the corporate income tax rate, currently at 21 percent.

jurisdictions are suffering a revenue loss. Specially around the stadium, attendance may also produce negative externalities in the form of congestion, littering and, in some cases, property damage.

Long term effects are related with economic development, the housing market, and the costs of stadium construction. According to available empirical studies, the long-term effects on other sectors of the local economy are rather mixed. For instance, Dehring et al. (2007) found that the Dallas Cowboy's announcement in 2001 that the team might move to Dallas downtown had a positive effect on property values in that area, but a negative effect in property values in Dallas County, where taxes were going to increase to pay for the stadium. Once the proposal was abandoned, these effects were reversed. Harger et al. (2016) analyze 12 U.S. cities between 2002–05 and find no evidence that new professional stadiums increase the number of new businesses openings. Feng and Humphreys (2012) consider all the facilities used in the four main professional sports leagues in the country and find positive effects on housing value within a five miles radius. Comparable positive effects are found by Tu (2005) for the case of the FedEx Field, and in Feng and Humphreys (2018) for the case of two sports facilities in Columbus, OH. However, Humphreys and Nowak (2017) conclude that the presence of a professional team stadium "is not the most important factor" explaining increases in housing values, and that games can even have a negative impact on property value due to disamenities in the form of congestion, noise, trash, etc.

The literature on minor baseball leagues provides additional insights. Van Holm (2019) finds that minor league baseball stadiums can help to revitalize a city's downtown, but at the expense of other areas that held back; he concludes that stadiums result in a concentration of

redevelopment, although not in greater economic growth. Agha (2013) suggests that, in some minor baseball leagues, teams are starting to have positive effects on per capita income.

All in all, the effects of professional sports stadiums on long term economic development depend on a complex array of factors and seem to vary widely on a case-by-case basis. Stadiums can be part of successful development and redevelopment plans, but by themselves are expected to have a small effect on the local economy (Zimbalist 2004).

Other long-term effects are given by the funding arrangements reached between teams and local governments. Alakshendra (2016) and Gayer, Drukker and Gold (2016) describe the extent and characteristics of public subsidies. A number of financial schemes (e.g., tax-exempted bonds, interest free loans, tax rebates, subsidies, etc.) are used to provide assistance to the teams, and several tax instruments (mainly sales tax, excise taxes, hotel tax, car rental tax, and ticket or admission tax) are used to collect the public funds.[9] The greater the public contributions, the greater the annual costs for the community and, most likely, the longer the community will be bearing that burden, either in the form of higher taxes or fewer public services.

2.4 Intangible Benefits

Intangible effects include a number of non-monetary, mostly subjective and even psychological effects that the presence of a team may have on the community. Although difficult to measure, we should not underestimate their importance and value, and stadium advocates rightly claim that they need to be considered when evaluating the contributions of a team to the local economy (Delaney and Eckstein 2003, pp. 21–24). Among the main sources of intangible

[9] In particular, municipal bonds are exempted from federal taxes, and are widely used as a cheaper financial source by professional teams. This is because the buyers of the bonds are avoiding federal taxes, and so are willing to accept lower interest rates. This cost is implicitly being borne by all taxpayers in the country.

benefits of teams, we can recognize community pride and self-esteem, and a sense of identity and collective conscience.[10]

A recent but growing literature has applied the contingent valuation method (CVM) to estimate the value of these intangible benefits, which are sometimes referred to as the 'surplus' or the 'public goods' created by teams.[11] Johnson, Groothuis, and Whitehead (2001) analyzed the case of an NHL team, Owen (2006) the case of professional sports teams in Michigan and Minnesota, and Johnson, Mondello and Whitehead (2007) the case of an NBA team. The results in these studies suggest that the value of intangible benefits is significant; but in most cases lower than the public subsidies provided. There are also studies reaching the opposite conclusion. For instance, Fenn and Crooker (2009) estimated the welfare contribution by the Vikings to households in Minnesota under a credible threat of relocation. The authors argued that the credibility of this threat made the surveys more reliable and estimated that the welfare contribution (ranging from $445.3 million to $1,571.3 million) could be significantly superior to the cost of a new stadium (between $450 million and $500 million).

Estimations of intangible benefits, the same as any estimations obtained with the use of CVM, are meant to inform about the value of *non-market* goods. It follows that any portion of the value that teams are able to monetize through the market goods they produce, should be subtracted from the estimation of the intangible benefits of the local economy; otherwise, the same benefit would be assigned to both the team and the community. This is important because

[10] Naturally, in cases of relocations, the positive intangible benefits of a team moving into a city can be partially of fully offset at the national level by the loss of those benefits and the 'sense of abandonment' suffered by the city being left by the team.

[11] Even though it is true that these intangible benefits of teams and stadiums are examples of public goods –because they are, to some extent, non-rival and non-excludable, the use of the term 'public goods' may be misleading. The reason is that an (impure) public good like a stadium has value not only because of the intangible benefits it creates, but also because of its tangible benefits. For instance, the social value of the stadium should contain the value of tickets sold to attend games.

intangible benefits (e.g., community pride and self-esteem) can be partially monetized in the prices paid for tickets and all the other goods sold by the team. In practice, it may be very difficult to isolate the portion of intangible goods' value that benefits the local economy, but this argument suggests that estimates obtained in the literature may need to be adjusted downward.

Owen (2003, 2006) argues that it is important and correct to consider the intangible benefits when evaluating the economic impact of teams and stadiums on the local economy, because public subsidies can be understood as payments for the "unrealized social value of the team." According to the previous argument, however, only a limited portion of tangible benefits may correspond to unrealized social value.

The available evidence suggests that public subsidies have been excessive, and it is not entirely clear that professional teams and leagues should claim for themselves the unrealized social value they create. To see why, think about a team moving or threatening to move to another city every other year to demand the unrealized social value it creates every time. How many times could a team make that claim before we can argue that it has been excessive? Indeed, the fact that the team has the power to demand public subsidies does not mean that it is economically efficient. Fiscally induced mobility of businesses (e.g., via subsidies) has for long been regarded as a source of economic distortions, and there is no reason to believe that a team will maximize its private profit at the socially optimal level.

Moreover, a team cannot create by itself the social value that it captures in the form of public subsidies. The same as the city and even the country can gain from a team because of the intangible benefits it creates, the team also depends on the local and national economies, as well as on the enthusiasm of fans, to be profitable, increase its own value, and then create the intangible benefits associated with the team. For instance, Bradbury (2019) finds that the amount

of revenue received by a team depends on the size of the market in which it plays, and not so much on its own performance. The social value is created together between the teams, the fans and the government, but only the teams have the will and power to capitalize those benefits.

Intangible benefits need not be a zero-sum game, and benefits can be enjoyed at all levels. Naturally, however, when a team leaves a city, the intangible effects will be negative for that city, and may not change much (if at all) in the country as a whole.

Intangible benefits can be understood as the unrealized (not monetized) value of benefits from non-market goods. But market goods are also associated with unrealized benefits. In general, unrealized benefits are represented in economics by the concept of consumer surplus. The consumer surplus is calculated as the difference between the maximum price people are willing to pay for something, or 'willingness to pay,' and the price actually paid.[12] While willingness to pay is a measure of the total benefit received by an individual from consuming a good, consumer surplus (which can be measured at the individual or at collective levels) corresponds to the *net* benefit obtained from that good. It is correct to incorporate the consumer surplus of relevant (intangible or market) goods into the estimation of benefits from hosting a team, but adjustments need to be made in order to identify the *net* economic contributions to the economy. Estimating the net contributions at the local level requires to subtract the reduction in consumer surplus in the sectors harmed by substitution effects. Estimating the net contributions to the national economy would require considering the unrealized net benefits lost by the previous host city. Unfortunately, these adjustments are routinely disregarded and, as a consequence, the net unrealized contributions of teams are normally overestimated.

[12] In the case of the intangible benefits of non-market goods, the price paid may be zero.

2.5 Effects on Employment

Teams usually claim to create a significant number of jobs. However, economists are well aware that the number of jobs created by teams is small compared to the number of jobs lost when the team arrives to a city. One reason for this is that most of the salaries paid by the team go to few players and coaches, and the revenue required to pay them usually comes from other industries in the local economy. It is easy to see that the average salary of only one professional player, $4.3 million in 2018, could otherwise be used to pay 83 salaries of $51,960, which is the average salary of 'all occupations' in the same year. [13]

In the long run, we can expect the employment effects on the national economy to mirror the effects on the local economy; the city left by the team will likely see trends in the opposite direction than the city where the team is moving into. Other than a temporary increase in construction jobs if a new stadium is built, there is no *a priori* reason to expect a team that is relocating to change the number of workers hired for its operation.

2.6 Distributional effects

By adding up all the effects of teams and stadiums on the local (or national) economy from subsection 2.1 to subsection 2.4, we obtain the key result that determines whether having the team in the area justifies the public subsidy or not. A positive net benefit implies that this "project" is worthwhile, and a negative net benefit implies that it is not. Although this is arguably the most relevant result in a cost benefit analysis, it does not inform about the distributional effects of hosting a professional team. Distributional effects are not quantifiable in monetary

[13] The average salary of professional players was computed with players' salary data from Forbes and assumes each U.S. team hires the maximum number of players allowed in their league. The average salary of 'all occupations' can be found in the Occupation Employment Statistics, Bureau of Labor Statistics (BLS).

terms because we cannot compare welfare across individuals.[14] But distributional effects are real, and communities do have preferences about them. For this reason, it is important to identify the winners are losers in the local economy, and to assess the extent of income inequalities created by hosting a professional team. Unfortunately, even though economists realize that the presence of professional teams can negatively affect income distribution in the local economy (Zimbalist 2004), the impacts of stadiums and professional teams (and sports events in general) on the distribution of income remains critically under-researched (Potter 2016).

3. Economic Impact of an "Average" Professional Sports Team

This section presents back-of-the-envelope estimations of the economic effects on a local economy of hosting a professional sports team in each of the four biggest major leagues in the United States.

In order to have some perspective about the magnitudes of the economic flows channeled through the professional sports industry, it is helpful to know about the basic structure of teams' revenue and costs. Table 2 presents the average revenue and costs per team in 2018, for each major league.

[14] Economists are reluctant to assign monetary values to distributional effects. Instead, this problem is usually avoided with the application of the Kaldor-Hicks criterion, which, simply put, states that the winners should be *able* to compensate the losers, but the compensation itself need not to occur. In other words, the gains should be greater than the losses, but distributional issues are disregarded.

Table 2. Revenue and Cost Structure for Average Teams in the U.S. ($M 2018)

	MLB	% of total revenue	NBA	% of total revenue	NFL	% of total revenue	NHL	% of total revenue
Gate Receipts [1]	95.2	28.7%	58.7	22.0%	70.0	15.5%	55.6	36.2%
Other Revenue [2]	236.9	71.3%	207.9	78.0%	382.4	84.5%	97.8	63.8%
Total Revenue [3]	**332.1**	**100.0%**	**266.6**	**100.0%**	**452.4**	**100.0%**	**153.5**	**100.0%**
Player Expenses [4]	155.7	46.9%	120.2	45.1%	219.9	48.6%	75.3	49.0%
Other expenses [5]	134.9	40.6%	86.4	32.4%	130.3	28.8%	57.8	37.7%
Total expenses	**290.6**	**87.5%**	**206.7**	**77.5%**	**350.3**	**77.4%**	**133.1**	**86.7%**
Operating Income [6]	41.5	12.5%	60.0	22.5%	102.1	22.6%	20.4	13.3%

Source: Own calculations based on data from Forbes.
[1] Revenue from tickets sales; includes club seats.
[2] Includes revenue sharing, unshared broadcasting rights and licensing income, concessions, stadium naming rights, etc.
[3] Net of stadium revenues used for debt payments.
[4] Includes benefits and bonuses.
[5] Computed as total revenue – player expenses – operating income.
[6] Earnings before interest, taxes, depreciation and amortization, EBITDA (net of stadium debt service).

3.1 Effects of Attendance

We focus first on the economic impact of attendance, which includes the substitution effect associated with gate revenue, as well as the inflow of new spending on other local business by the visitors attracted to the games. The estimations are presented in Table 3. Fans that reside in the area spend money on attendance instead of on other local businesses. According to Siegfried and Zimbalist (2000), visitors represent between 5–20 percent of attendance. Here we assume, rather optimistically, that 15 percent of gate revenue comes from visitors. This implies that 85 percent of gate revenue is being displaced from other local businesses. From the perspective of the local economy, the money moved away from local business is a loss, and thus is presented with a negative sign in row (2). The other 15 percent of gate revenue is received by the team (row 3) and has no direct effect on the local economy. However, considering that 36 percent of visitors' sports travel spending went to sports events in 2018 (U.S. Travel Association), we can compute the total amount spent by visitors in the area and thus also the amount received by other local businesses (row 4).

The net effect of attendance on the local economy (row 5) corresponds to the sum of the substitution effect (row 2) and the gain of other businesses in the local economy (row 4). This result represents a 'first-round' leakage from the local economy. The total economic impact on the local economy should consider also the indirect and induced effects of this spending, which will not be realized because the money has left the area. Simply put, indirect effects would consider the additional economic activity created at the level of input providers, and the induced effects the economic activity created by the additional incomed earned by workers in the area. These two effects lead to what economists call the multiplier effect. A change in local spending, positive or negative, is multiplied by a factor whose value varies widely in accordance to economic conditions. In this example (and the rest of the paper), we assume for simplicity that the value of the multiplier is 2.

Table 3. Economic Impact of Attendance for Average Teams in the U.S. ($M 2018)

		MLB	NBA	NFL	NHL	Formula
(1)	Gate Receipts	95.2	58.7	70.0	55.6	Table 2
(2)	Substitution effect	-80.9	-49.9	-59.5	-47.3	(2) = -0.85*(1)
(3)	Gate receipts from visitors	14.3	8.8	10.5	8.3	(3) = 0.15*(1)
(4)	Gain of local economy	25.4	15.7	18.7	14.8	(4) = (3)*0.64/0.36
(5)	Net effect on local economy	-55.5	-34.2	-40.8	-32.4	(5) = (2)+(4)
(6)	Multiplied net effect	-111.0	-68.5	-81.7	-64.9	(6) = (5)*2

Source: Own calculations.
Assumptions and/or sources by row:
(2) 85 percent of gate revenue from local fans (revenue lost by local businesses). Based on Siegfried and Zimbalist (2000)
(3) 15 percent of gate revenue from visitors. Based on Siegfried and Zimbalist (2000)
(4) Gate revenue by visitors corresponds to 36% of visitors spending. Source: U.S. Travel Association www.ustravel.org/system/files/media_root/document/2019_Sports-Travel_07.11.19.pdf.
(6) Multiplier assumed equal to 2

The estimated economic impact from attendance is shown in row (6). Teams from all leagues are shown to create substantial losses for the local economy per year. Since the assumptions used in this exercise are the same for all leagues, the level of losses is proportional to the level of revenue, which is systematically higher in the MLB due to the greater number of

games played per season.[15] Note that the multiplier effect can possibly lead to a total loss for the economy that is greater than the amount of gate revenue. This result may seem paradoxical. After all, the arrival of visitors injected new money in both the local economy and the team. This is true; however, the team received money from visitors *and* residents, and *if* the team retains all that revenue, it would stop the ongoing multiplying process that would have continued to benefit the local economy during a given year.

3.2 Gross and Net Leakages

The net effects of attendance would be substantially more positive (or less negative) if teams put the money back into the local economy. However, it is not possible to guarantee that professional (for profit) teams will generally do that. Even though other sources of revenue are much greater than gate revenue across the four leagues (see Table 2), and teams need to assume significant operating costs, nothing prevents them from buying and hiring services in other areas. Indeed, economists have warned about the several ways in which the team can channel resources away from the local economy.

First, we estimate the leakages from players' income. Following Siegfried and Zimbalist (2002), we can estimate the share of players income that is expected to be spent locally. Based on the percentage of players that reside in the city of the team, denoted by R, the effective income tax rate t that they face, the percentage of their disposable income that they do not save—their marginal propensity to consume MPC, and the percentage of consumption on "imports" M, or goods not from the jurisdiction (e.g., travel, online shopping). The percentage of players' income actually spent locally is given by $R \times (1 - t) \times MPC \times (1 - M)$. Using the

[15] Teams in the MLB play 81 games locally each regular season, compared to 41 games played by NBA and NHL teams and only eight games by NFL teams.

main finding of Siegfried and Zimbalist (2002), $R = 29\%$, an effective tax rate $t = 37\%$, and the two additional assumptions they made, $MPC = 70\%$ and $M = 10\%$, the percentage of players' income spent locally is 11.5 percent.

Table 4 presents the results for an average team in each major league. The expected first-round spending by players on the local economy is presented in row (2), and the total amount leaked from players' income is shown in row (3). We cannot yet interpret these leakages as losses of the local economy, because players' income may not be fully financed with local resources. However, the leakage does show that local economies, on average, do not gain much from players' income. As a reference, note that the amounts in row (2) are all smaller than the losses from attendance shown in row (5) of Table 3. When considered together, in row (4) of Table 4, the average teams in the four leagues appear to have a negative net effect on the local economy. The average baseball team appears to impose the greatest net loss, and the average football team the smallest. Moreover, these negative effects can be expected to be magnified due to multiplier effects.

Table 4. Leakages from Players' Incomes for Average Teams in the U.S. ($M 2018)

		MLB	NBA	NFL	NHL	Formula
(1)	Players' income	155.7	120.2	219.9	75.3	Table 2
(2)	Amount of players' income spent locally	17.9	13.8	25.3	8.7	(2) = 0.115*(1)
(3)	Gross leakage	-137.8	-106.4	-194.6	-66.6	(3) = (2)-(1)
(4)	Net leakage	-37.6	-20.4	-15.5	-23.8	(4) = Table 3(5)+(2)
(5)	Multiplied effect of net leakage	-75.2	-40.8	-31.0	-47.6	(5) = (4)*2

Source: Own calculations.
Assumptions and/or sources by row:
(2) Based on Siegfried and Zimbalist's (2002) procedure, the percentage of players' income spent locally is assumed to be 11.5 percent.
(5) Multiplier assumed equal to 2

In addition, we can also expect a share of owner's income to leave the local economy. There are many factors determining the owners' spending decisions, but little information to make reliable estimations. In the professional sports industry, the roster depreciation allowance

(RDA) helps owners retain a significant share of teams' earnings before interest, taxes, depreciation and amortization (EBITDA).

Table 5 provides an estimation of the average owner's income per league, and the effect of owners' expenses on net leakages from the local economy. The RDA allows owners to amortize almost the entire market value of the team (row 1), for a period of 15 years. Since losses can be carried on, however, the amortization period can in practice be extended. Row (2) shows the average length of ownership, or the average number of years that teams in each league have been owned by the 2018 owner. Row (3) provides the average amortization amount per year of ownership. In the cases of the MLB, the NBA and the NHL, that amount is significantly higher than the EBITDA (row 4), which suggests that, on average, income in these leagues is not taxable during the average ownership period.[16] In practice, of course, some income will still be taxable, but here we will assume that federal taxes in these leagues are zero. This is equivalent to assuming, rather optimistically from the point of view of the local economy, that all the money that would leave the local economy in the form of federal taxes, remains instead in the hands of the teams' owners. Only in the case of the NFL there is a positive (and thus taxable) difference between the EBITDA and the amortization per year. Using a corporate income tax rate of 21 percent, the expected average tax payments per year are those reported in row (6). Assuming for simplicity that interest expenses are zero, the estimated owners' income is given by row (7).[17]

[16] Recall that these tax savings are only temporary because owners will have to pay capital gains taxes once they sell the team (Keeney 2016).

[17] Interest expenses can vary greatly across franchises, as they are affected by the ownership of the stadium (private versus public ownership), the cost of the stadium, and the specific financial arrangements (e.g., tax-exempt bonds are associated with lower interest rates). The lack of readily available information provides an additional justification for this assumption.

Table 5. Leakages from Owners' Incomes for Average Teams in the U.S. ($M 2018)

		MLB	NBA	NFL	NHL	Formula
(1)	Team value	1,782.1	1,875.2	2,569.8	591.9	
(2)	Length of ownership (years)	18.1	15.2	34.9	16.2	
(3)	Amortization per year	98.2	123.2	73.6	36.6	(3) = (1)/(2)
(4)	EBITDA	41.5	60.0	102.1	20.4	Table 2
(5)	Taxable portion of EBITDA per year	0.0	0.0	28.6	0.0	(5) = (4)-(3); if positive
(6)	Taxes per year (at 21%)	0.0	0.0	6.0	0.0	(6) = (5)*0.21
(7)	Estimated owners' income	41.5	60.0	96.1	20.4	(7) = (4)-(6)
(8)	Amount of owner's income spent locally	2.1	3.0	4.8	1.0	(8) = (7)*0.05
(9)	Gross leakage	-39.4	-57.0	-97.3	-19.4	(9) = (8)-(7)
(10)	Net (cumulative) leakage	-35.5	-17.4	-10.7	-22.8	(10) = Table 4(4)+(8)
(11)	Multiplied effect of net leakage	-71.0	-34.8	-21.4	-45.5	(11) = (10)*2

Source: Own calculations.
Assumptions and/or sources by row:
(1) Source: Forbes
(2) Based on data from Sports Facility Reports, National Sports Law Institute of Marquette University Law School (June 2019)
(4) Source: Forbes
(6) A 21-percent tax rate applied on EBITDA in excess to team value amortization
(8) Assumption: Owners spend 5 percent of their income locally
(10) The net 'cumulative' leakage is adding the owners' income spent locally to the net leakage obtained with players' expenditure.
(11) Multiplier assumed equal to 2

The portion of owners' income spent locally cannot be estimated reliably with (the lack of) available information but proceeding with an assumption will be useful to understand the impact that owners' spending decisions can have on net local leakages. In principle, there is no reason to expect individual owners to spend more in the local economy than the players, so we may initially presume that the same share of 11.5 percent could be spent locally. However, owners will likely not need to move to the area of the stadium, and in those cases in which they already live there, their local expenses will not represent a net gain for the local economy. For these reasons here we assume that only 5 percent of their income stays to offset the leakage.[18] In that scenario, the NFL is the league with the smallest average net leakage, and it is likely that for some teams in this league, the sum of expenses by players and owners ($25.3 and $4.8 million on

[18] The low percentage represents the low likelihood of owners increasing their spending locally. However, it is important to note that if an owner chooses to move to the area of the stadium, a better estimation might be based on 11.5 percent of their income; and if the owner decides not to move to the area, or is already there, a better estimation would be based on 0 percent.

average, respectively) could exceed the net effect of attendance in the local economy ($40.8 million on average according to Table 3), and thus turn the net effect on the local economy into a positive number.

This analysis leads to three key (partial) conclusions. One is that revenue from attendance is owned exclusively by teams, and by no means can be used as a measure of local economic gains. The second is that the estimation of the economic impact of professional teams must be informed by realistic estimates of the number of visitors that will be attracted, as well as their expected expenses in the local economy. The third is the importance of players and owners spending decisions in the net effect of hosting a professional sports franchise; the net economic effect on the local economy will critically depend on the spending decisions of few high-income individuals. Of course, each case is different, and we cannot claim that hosting a team will necessarily lead to net losses (or gains) for the local economy. However, it seems safe to say that, if conditions are not given for players and owners to spend locally, then the presence of a professional sports franchise will likely have a negative effect on local economic activity. For instance, if owners take all their money away from the host cities, then the expected net and total loss of economic activity will be given, respectively, by rows (4) and (5) in Table 4. These conclusions are consistent with the specialized literature, but unfortunately, these aspects of the problem can be difficult to model and quantify and are rarely discussed in the press or by political actors.

In contrast to players and owners, other full- and part-time employees of professional teams can be expected to spend a significant share of their income in the local economy. This additional spending will have positive effects on local economic activity and further reduce the size of the net leakages. An estimation of that spending and the *final* net leakages is presented

below in Section 3.5, immediately after the estimation of the number of jobs created by professional sports teams.

3.3 Other Monetary Benefits and Costs

There are several other sources of benefits and costs that can be incorporated into the analysis. This subsection provides a brief overview of them, but do not produce average estimations because they can vary too widely across cities. One of the main reasons explaining this variability is that stadiums can either be owned by a team, in which case all operational costs are likely borne by that team or can also be owned by a local or state government, in which case the government may be able to receive revenue from the team and other events performed at the stadium. Table 6 shows the percentage of stadiums owned by the public sector, usually represented by a city or county government, but in some cases district and state governments, or other agencies (e.g., Sports or Stadium Authority), are involved in the ownership. In the four major leagues considered, the public sector owns a majority of the stadiums.

Table 6. Public versus Private Ownership

	MLB	NBA	NFL	NHL
Number of stadiums in the U.S.	29	29	32	24
Number of stadiums publicly owned	23	18	24	15
Percentage of stadiums publicly owned	79.3	62.1	75.0	62.5

Source: Author's elaboration, based on data from ballparks.com/ and www.wikipedia.org

From the perspective of the local economy, we can classify the other sources of benefits and costs in three categories: significant, potentially significant, and insignificant.

The most significant source of benefits and costs is the construction of the stadium. Among the benefits, construction spending will most likely have a positive and significant impact on local economic activity. As a reference, considering an average population of 1.2

million and a GDP per capita of $63,000, the average size of the local economy can be estimated in $75.6 billion.[19] Considering also the average stadium cost of $921.5 million between 2010–19, and assuming that such a stadium is built in two years, then the construction phase may result in an inflow of money equivalent to 0.6 percent of the local economy during these two years, which may be augmented by the multiplier effect.[20] Among the costs of construction, we can consider the portion of spending financed by local taxpayers, which will vary greatly depending on the magnitude of the investment and the extent of the public subsidies.

Potentially significant sources of benefits and costs depend on the specific agreements reached between governments and teams. While private stadiums are owned by teams, and often receive benefits in the form of financial subsidies (e.g., through the use of tax-exempted municipal bonds) tax rebates, or public spending on services and development, public stadiums are used by teams under very different circumstances, and in some cases can provide local governments with significant additional revenue. The following are some items that deserve special attention:

- Annual rent: If the stadium is publicly owned, then the leasing arrangement will determine the stream of payments to the relevant government authority. There is no standard practice about the amount to be paid. In the NFL, for instance, the average annual rent among 23 public facilities in 2017 was around $2.9 million; with a maximum annual payment of $24.5 million by the San Francisco 49ers for the use of the Levi's

[19] The average population of the local economy is based on a sample of 41 cities and 19 counties that currently host professional teams. The GDP per capita is based on a GDP of $20,611.9 billion (Source: Bureau of Economic Analysis) and a population on 327.2 million (Source: U.S. Census Bureau).
[20] By the same token, note how small the yearly operational effects derived in Tables 3, 4 and 5 are compared to the size of the local economy. This is why economists generally do not expect the presence of a team to have sizable long-term effects on local economic growth.

Stadium, two teams paying nothing for the use of a public stadium (Baltimore Ravens and Cincinnati Bengals), and the New Orleans Saints even being paid $6 million yearly for playing at the Mercedes-Benz Superdome.[21]

- Revenue from other events: Concerts and other events can bring additional revenue to local governments when the stadium is publicly owned. This can be an important source of revenue for the government, but it can vary considerably in accordance to the location of the venue, the number and type of events that are hosted, and the specific leasing arrangements with the team(s). In the case of playoff games, the attendance effects described previously (in subsection 3.1) will likely be magnified.
- Other costs: The local government may have to cover, partially or fully, the operational costs of the stadium, and may have to provide costly public services to the stadium and the area around it. Disruptions to the transportation system during the construction phase and during games may also lead to high costs for the government and the community.

It is important to recognize that all these sources of benefits and costs must be considered jointly. An apparently good deal for the city in the form of, for instance, a high rent per year, can easily be offset by the operational costs assumed by the local government or by the public services provided to the stadium.

Insignificant sources of benefits and costs are given by items that, even if large, cannot be expected to have a relevant effect on the local economy. One example is naming rights, which are very visible because they are responsible for associating well-known commercial brands to the stadium and the teams. As of agreements in place in 2019, naming rights of arenas (used by

[21] Based on data from Las Vegas Review-Journal (www.reviewjournal.com/; data retrieved in December 2020)

NBA and NHL teams) ranged from $0 to $17.5 million and averaged $4.95 million per year. Naming rights of stadiums (used by MLB and NFL teams) ranged from $0 to $30 million, and averaged $6.88 million per year.[22] Nevertheless, naming rights are usually received entirely by the teams, and therefore are irrelevant for the local economy. Only in few cases, naming rights revenue is used to pay for part of the stadium construction costs, implying that the revenue is being indirectly used to finance spending in the local economy during the construction phase.

3.4 Intangible Benefits

The value of intangible benefits per year may or may not be enough to compensate the local community for the possible losses suffered due to net leakages. As explained, it is important to consider *net* intangible benefits, as opposed to total intangible benefits. Intangible benefits lost with the activity displaced by the team should be subtracted from the total intangible benefits associated with the team. In addition, if the team is able to monetize part of the benefits that the community receives in the form of pride or sense of belonging (by wearing a team's jersey, for instance), that part should also be subtracted. Here we do not include estimations of intangible benefits because they can vary substantially across cases, and it is not clear how available estimates should be adjusted to fit with the cost-benefit framework presented in the paper.

3.4 Effects on Employment and Final Net Leakage

Employment effects are measured in terms of the number of jobs created or destroyed, not in monetary terms, and without much regard of the amount of income per worker. The

[22] Based on data from Sports Business Journal (www.sportsbusinessdaily.com, data retrieved in December 2019). The average considers only the cases with naming rights higher than zero. The maximum naming rights amount for a stadium was set to be paid since 2020 for the SoFi Stadium in Inglewood, California, while the maximum naming rights amount for an arena was paid for the Chase Center (Golden State Warriors) in San Francisco, California.

objective is to identify the number of people directly affected by changes in economic conditions. This section focuses on jobs created during the regular operation of teams; jobs created during the construction phase of stadiums are excluded because, although relevant, are temporary and do not necessarily have long term impacts in the local economy.

The number of jobs created by the presence of teams is relatively low. Generally, there are few individual earning very high incomes, including players, coaches and owners. According to Siegfried and Zimbalist (2000), teams typically employ 70–130 workers in a full-time basis and 1,000–1,500 workers for part-time, day-of-game, low-wage positions. Table 7 provides estimations for the average number of jobs created per team in each of the four major leagues. The assumptions are rather 'optimistic' and consider the maximum number of players per team (row 1), 130 additional full-time jobs per team and 1,000 part-time jobs per game in the MLB, NBA and NHL, and 1,500 in the NFL (due to higher attendance per game). In order to find the full-time equivalent (FTE) number of jobs associated with the part-time hires, it is assumed that these workers are paid for four hours of work each day-of-game, and that a full-time job consists of eight hours of work over 250 days.

The total number of jobs created by a team ranges from 209 in the NFL to 332 in the MLB. The main driver of the differences is the number of games played in each regular season.

Table 7. Job Creation

		MLB	NBA	NFL	NHL	Formula
(1)	Max. number of players per team	40	15	55	23	
(2)	Full-time jobs	130	130	130	130	
(3)	Local games per (regular) season	81	41	8	41	
(4)	Part-time jobs per game	1,000	1,000	1,500	1,000	
(5)	FTE part-time jobs	162	82	24	82	(5) = (3)*(4)*4/[8*250]
(6)	Total number of full-time jobs	332	227	209	235	(6) = (1)+(2)+(5)

Source: Own calculations.
Assumptions and/or sources by row:
(2) & (4) assumption based on Siegfried and Zimbalist (2000)
(5) assumptions: each PT worker is paid for four hours of work per game; a FTE job consists of 250 working days of eight hours each.

Other than players and coaches, the jobs created by a team can be expected to be mostly low- or middle-income jobs given to local residents. Table 8 presents an estimation of the income that remains in the area because these workers spend part of their income locally. For simplicity, we assume that they spend (after taxes, savings, etc.) 80 percent of their income locally; that the income of the 130 full-time jobs created by an average team corresponds to the average salary of 'all occupations' in 2018, equal to $51,960; and that the FTE part-time jobs are paid at the federal minimum of $7.25 per hour. Provided that a full-time job has been assumed to consist of 8 hours per day and 250 days per year, each FTE part-time job is associated with an annual income of $14,500.

Under our assumptions the four leagues appear to leak resources away from the local economy. The MLB leaks the greatest amount of money, $28.2 per year, and thus the greatest impact on local income, $56.4 per year. The reason is that the MLB has a more negative impact on competitive local industries due to the greater number of games. In contrast, the NFL leaks the smallest amount of money, $5 per year, and thus also the smallest impact on local income, $10.1 per year. The reason is the few games played during each regular season.

Table 8. Local Spending by Employees and Final Net Leakage

		MLB	NBA	NFL	NHL	Formula
(1)	Local spend. by full-time employees	5.4	5.4	5.4	5.4	(1)=130*51,960
(2)	Local spend. by part-time employees	1.9	1.0	0.3	1.0	(2)=Table 7(5)*14,500*0.8
(3)	Local spending by employees	7.3	6.4	5.7	6.4	(3)=(1)+(2)
(4)	*Final* net (cumulative) leakage	-28.2	-11.0	-5.0	-16.4	(4)=Table 5(10)+(3)
(5)	Multiplied effect of final net leakage	-56.5	-22.1	-10.1	-32.8	(5) = (4)*2

Source: Own calculations.
Assumptions and/or sources by row:
(1) Full-time employees receive the average salary for 'all occupations' in the U.S. in 2018, equal to $51,960 (Source: Occupation Employment Statistics, BLS)
(2) Part-time employees receive the minimum federal wage rate, equal to $7.25. An FTE job consists of 250 working days of 8 hours each.
(5) Multiplier assumed equal to 2

Table 9 provides estimations for the average number of jobs destroyed by the presence of professional teams. The main source of employment losses is the reduction of revenue in other sectors of the economy. The revenue reductions in other sectors can be measured under alternative scenarios. Here we define five alternative scenarios. Separately, these scenarios can be interpreted as different sets of plausible assumptions; combined, they describe different stages of influence that a team can have on local labor markets. The first scenario (S1) considers the substitution effect of attendance, which measures the direct negative impact of the team on other local industries. The second scenario (S2) corresponds to the net effect of attendance, obtained by considering the substitution effects, together with the contributions of visitors to the local economy, and their multiplier effect on the local economy. The third scenario (S3) adds the positive effects of players' spending (assumed equal to 11.5 percent of their income), the fourth scenario (S4) incorporates the positive effects of owners' spending (assumed at 5 percent), and the fifth scenario (S5) incorporates the positive effects of other employees' spending.

The negative effects on employment are calculated as the number of workers that could be hired with the monetary changes in economic activity. As relevant references, we consider the average salary of 'all occupations' and 'waiters and waitresses' in 2018, equal to $51,960 and $25,830, respectively.[23]

In most cases, the job losses are far greater than the job gains reported in Table 7, with the only exception of the NFL under S5 and equivalent 'all occupations' job losses: Row (S5.a)

[23] A more common approach to estimate the change number of jobs is to use employment multipliers. For instance, Bivens (2019) calculates employment multipliers for a number of sectors of the economy. In particular, in the sector 'food services and drinking places', each additional $1 million in final demand leads to a direct increase of 13.15 jobs, and to an indirect increase (equal to the sum of supplier and induced jobs) of 12.67 jobs, for a total effect of 25.82 jobs. Using this multiplier is equivalent to computing the number of jobs lost in Table 9 with a salary of $38,730, which is between the two salaries used here as reference.

shows that, conditioned on visitors representing at least 15 percent of attendance and spending in the local economy, players spending at least 11.5 percent of their salaries locally, owners spending at least 5 percent of their income locally, and other employees spending 80 percent their salaries locally, an NFL team could have a very modest positive effect on the number of jobs. Otherwise, the net effects on employment appear to be significantly negative. For instance, the substitution effect that reduces revenue in sectors that offer alternative entertainment activities, like restaurants and bars, can be better represented by row (S1.b), which shows the number of waiters and waitresses that can be paid for with the revenue transferred from these sectors to the team. An average MLB team appears to have a negative net effect of 2,800 jobs (332 jobs created versus 3,132 jobs destroyed), and the minimum net loss, equal to 1,595 jobs, is associated with the average NHL team.

Table 9. Job Destruction

		MLB	NBA	NFL	NHL	Formula
	Scenarios (in millions of dollars):					
(S1)	Substitution effect of attendance	-80.9	-49.9	-59.5	-47.3	Table 3(2)
(S2)	Multiplied net effect of attendance	-111.0	-68.5	-81.7	-64.9	Table 3(6)
(S3)	Multip. net leakage after P spending	-75.2	-40.8	-31.0	-47.6	Table 4(5)
(S4)	Multip. net leakage after P+O spend.	-71.0	-34.8	-21.4	-45.5	Table 5(11)
(S5)	Multip. net leakage after P+O+E spend.	-56.5	-22.1	-10.1	-32.8	Table 8(5)
	Equivalent 'all occupations' jobs lost: *					
(S1.a)	Substitution effect of attendance	-1,556.9	-960.1	-1,145.1	-910.0	(S1.a) = (S1)/51,960
(S2.a)	Multiplied net effect of attendance	-2,136.9	-1,317.8	-1,571.7	-1,249.0	(S2.a) = (S2)/51,960
(S3.a)	Multip. net leakage after P spending	-1,447.2	-785.1	-597.3	-915.6	(S3.a) = (S3)/51,960
(S4.a)	Multip. net leakage after P+O spend.	-1,367.3	-669.6	-412.3	-876.4	(S4.a) = (S4)/51,960
(S5.a)	Multip. net leakage after P+O+E spend.	-1,086.9	-425.0	-193.6	-631.7	(S5.a) = (S5)/51,960
	Equivalent 'waiters and waitresses' jobs lost: **					
(S1.b)	Substitution effect of attendance	-3,131.9	-1,931.3	-2,303.5	-1,830.5	(S1.b) = (S1)/25,830
(S2.b)	Multiplied net effect of attendance	-4,298.7	-2,650.8	-3,161.7	-2,512.4	(S2.b) = (S2)/25,830
(S3.b)	Multip. net leakage after P spending	-2,911.1	-1,579.2	-1,201.6	-1,841.8	(S3.b) = (S3)/25,830
(S4.b)	Multip. net leakage after P+O spend.	-2,750.4	-1,347.1	-829.4	-1,762.9	(S4.b) = (S4)/25,830
(S5.b)	Multip. net leakage after P+O+E spend.	-2,186.5	-855.0	-389.5	-1,270.8	(S5.b) = (S5)/25,830

Source: Own calculations.
Abbreviations: P = Players, O = Owners, E = Employees (full- and part-time)
* The average salary for 'all occupations' in the U.S. in 2018 was $51,960 (Source: Occupation Employment Statistics, BLS)
** The average salary for 'waiters and waitresses' in the U.S. in 2018 was $25,830 (Source: Occupation Employment Statistics, BLS)

It is clear that the results are very sensitive to the underlying assumptions, and that specific conditions of each host city will likely lead to great differences in the employment effects of hosting a professional team. In line with previous conclusions (in subsection 3.2), if cities cannot expect the high-income earners of teams to spend their income locally, then a professional sports franchise can have a dramatic negative effect on the local labor market.

3.5 Distributional Effects

As explained, it is not possible to obtain monetary measures of the distributional effects of hosting a professional team, but it is nonetheless important to identify the winners and losers.

Specific demographic and economic characteristics of the host city will ultimately determine the distributional effects. However, the scenarios used previously to estimate the extent job losses can help identify the groups of workers that could be impacted in negative and positive ways. Scenario 1 (S1) identifies those workers in sectors that compete directly with games' attendance, like restaurants, movies theaters, retail stores, etc. These sectors employ unskilled workers at low wages, many of whom might lose their jobs after the arrival of a new team. The second scenario (S2) considers also the local gains form visitors spending, and the multiplier effects that would be spread around the local economy. The additional workers affected under S2 need not be in the same sectors than the ones affected in S1. It would be interesting to know what are the sectors (and geographical areas) that would be hurt and those that would benefit from visitors' spending and multipliers effects. The next three scenarios (S3, S4 and S5) incorporate the positive effects of local spending by players, owners, and other employees, respectively. It seems reasonable to expect that high earners individuals (players and owners) will tend to consume more luxury goods than the average resident (e.g., luxury restaurants, financial advisers, lawyers, etc.), which will tend to concentrate the benefits of their

spending in higher earnings. If this were the case, the estimations of jobs destroyed under S3, S4 and S5 would be underestimating the number of jobs lost at lower income levels. Moreover, if players' and owners' spending are creating mostly high-wages jobs, then the impact on income inequalities would worsen even further.

Besides the likely negative effect on low-wage jobs, and possibly the positive effect on high-wage jobs, economists have identified other ways in which the presence of a professional team could increase income inequalities. Zimbalist (2004), for instance, highlights the use of regressive tax instruments, like the sales tax, to finance public subsidies for stadium construction.

Overall, there are convincing reasons to expect relevant negative effects on the distribution of income in the local economy. This, surprisingly, seems to be one of the most significant and inescapable effects of the presence of a professional team in an economy, but at the same time the most overlooked. It seems that, in the words of Potter (2016), economists have not done justice to the impact of teams on inequality.

4. Conclusions

This paper clearly describes a simple framework to perform a cost-benefit analysis of hosting a professional sports team in the United States, or alternatively, fully or partially financing the construction of a stadium for that team. Back-of-the-envelope calculations of the effects of an 'average' professional team or stadium on the local economy inform about the order of magnitude of the key variables at play.

The estimations obtained are mostly in line with the available literature, and the main conclusions of the analysis can be summarized in the following points:

- Attendance is associated with a substitution effect that has a clear and sizable negative economic impact on the local economy in the four major leagues.
- Considering all income sources, as well as different 'leakages' described in the literature and 'reasonable' assumptions about players and owners' spending in the local economy, the four major leagues considered appear to have negative, although not sizable, net effects on the local economy.
- The effects on employment are mostly negative, and under most scenarios the loss of low-wage jobs is substantial.
- The presence of a professional sports team can be expected to have a negative effect on the distribution of income, as low-wage workers are expected to lose a significant number of jobs, while most of the income of the team will be distributed among very few high-income earners.

Naturally, these conclusions cannot be generalized, as actual conditions in host cities can vary widely. A precise estimation of the net impacts of professional teams on economic activity, employment and income distribution, must be performed in a case-by-case fashion.

However, provided any estimates about these outcomes, the question that should guide the decision of hosting a team is the same: Given the estimated net effects on economic activity, employment and income distribution, plus other relevant intangible effects, is hosting a team making a positive contribution to the local community? If the answer is yes, then the city should do it, but hopefully making sure that proper measures are in place to address the additional inequalities created in the process.

In retrospect, we can also question whether the benefits received by hosts cities are, on average, higher than the public contributions to stadium financing, which in Table 1 are shown to be $455 million for each MLB stadium, $294 million for each NBA stadium, $569 million for each NFL stadium, and $455 million for each NHL stadium in the last decade. It does not seem likely that the temporary gains received by a local economy in the construction phase, plus the intangible benefits received by the community, minus the losses computed in the previous section, will regularly lead to net gains greater than those public contributions.

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