

SHOULD THE CONSTRUCTION OF NEW PROFESSIONAL SPORTS FACILITIES BE SUBSIDIZED?

Brad R. Humphreys

INTRODUCTION

North American governments subsidize the construction of new professional sports facilities. Since 1970, 129 new or replacement stadiums and arenas for Major League Baseball (MLB), National Basketball Association (NBA), National Football League (NFL), and National Hockey Association (NHL) teams opened in Canada and the United States at a cost of 52.44 billion (in 2017 dollars). Total direct state and local subsidies accounted for \$32.5 billion, about 65 percent of costs.¹ Gold et al. (2016) estimated that the federal government provided an implicit \$3.2 billion subsidy and lost \$3.7 billion in forgone tax revenues on 36 new facilities that opened since 2000; the use of tax exempt bonds to finance construction generates indirect subsidies.

New professional sports facility construction projects will likely increase over the next 10 to 15 years. Figure 1, which shows the average age of the existing facilities replaced by a new stadium or arena since 1970, suggests why. The trend line drawn through these data has a negative, statistically significant slope of about -0.4 . The average age at which an existing sports facility was replaced with a new one has steadily declined over the last 50 years.

The vertical line on Figure 1 at 1992 marks the opening of Camden Yards in Baltimore, home of the MLB Orioles, which generally defines the modern era in sports facility design. Note the clear increase in replacement facilities after 1992. This explosion of facility construction included replacement of many existing facilities less than 25 years old. The average age of a replaced facility is currently about 27 years; 20 new facilities built between 1995 and 2005 will turn 25 years old between 2020 and 2030 and, based on recent experience, many of the owners of teams that play in these facilities will demand public subsidies for their replacements.

Stadium subsidies require some economic justification because private activities (professional sports events) take place in these facilities and professional sports are clearly not pure public goods. The most common justification made by subsidy proponents, net new economic benefits directly generated by professional sports, has been extensively disproven in a large body of peer-reviewed research (Coates & Humphreys, 2008).

Despite substantial evidence to the contrary, subsidy proponents continue to claim that professional sports increase local income, wages, employment, and tax revenues. Subsidy proponents now also point to urban revitalization as an additional important reason for public subsidization of this private activity (Rosentraub, 2014). I argue that neighborhood revitalization, an urban place-based policy, cannot justify these subsidies if spatial equilibrium models of the urban economy represent a reasonable description of urban outcomes. In addition, a growing body of research

¹ Source: Long (2012) supplemented by various media reports.

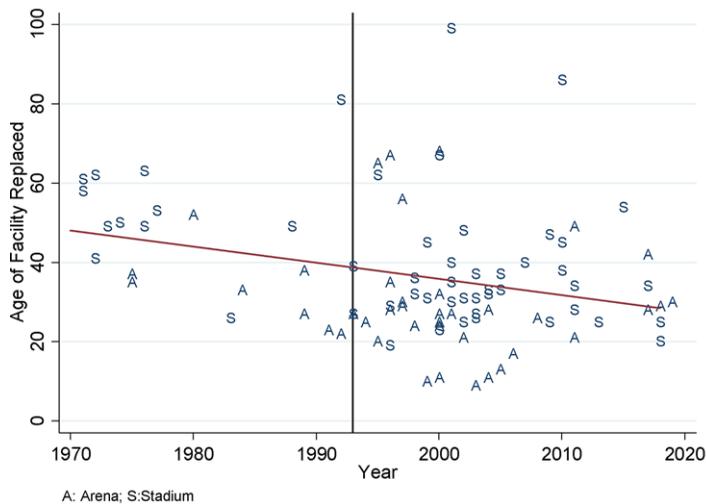


Figure 1. Age of Replaced Facilities 1970 to 2017.

based on causal inference methods finds that professional sports events generate substantial negative externalities, in the form of increased crime, traffic congestion, air pollution, and related negative health outcomes. If professional sports increase urban congestion disamenities, then new facilities should be taxed, not subsidized, which is the standard economic remedy for negative externalities.

EVIDENCE ON GENERATION OF TANGIBLE ECONOMIC BENEFITS

Subsidy proponents consistently claim that subsidies can be justified because the construction and operation of professional sports facilities generate important tangible economic benefits. A large body of literature in peer-reviewed academic journals investigates the impact of professional sports facilities and teams on tangible economic outcomes such as employment, wages, and income. An early comprehensive empirical analysis by Coates and Humphreys (1999) found no evidence that the opening of a new stadium or arena in the NFL, NBA, NHL, or MLB was associated with any increase in local income per capita over the period 1969 to 1994.

Coates and Humphreys (2008) surveyed this literature and found remarkable consistency: no prior research published in peer-reviewed academic journals reported evidence that a new professional sports facility generated tangible local economic benefits. The literature surveyed by Coates and Humphreys (2008) generally used spatially aggregated data at the county or metropolitan area level.

In the years since this survey, no new evidence of tangible economic benefits generated by professional sports facilities or teams emerged. Despite the lack of supporting evidence, proponents of sports facility subsidies continue to generate forecasts of substantial tangible future economic benefits after proposed new facilities are built.

These claims, typically summarized in economic impact reports written by paid consultants, rely heavily on forecasts generated by regional input-output models to develop evidence supporting the generation of tangible economic benefits. These models have clear, long-recognized limitations that make them unsuitable for assessing future economic benefits that might be generated by new publicly subsidized sports facilities (Crompton, 1995). Despite their well-known limitations, the use of regional input-output model forecasts to justify sports subsidies continues.

Neighborhood Revitalization, Place-Based Policy, and Spatial Equilibrium

Subsidy proponents recently advanced a somewhat different justification, in terms of claims of tangible economic benefits. Even if the scholarly research correctly identifies no tangible city-wide economic benefits from a new, publicly subsidized professional sports facility, these facilities, and the events taking place in them, concentrate economic activity spatially, revitalizing the nearby area (Rosentraub, 2014).

Professional sports facilities clearly concentrate economic activity spatially and temporally. The lack of evidence that professional sports generate net new economic activity suggests that the concentration of economic activity in and around facilities on game day represents displacement of existing consumer spending. The money spent at games comes primarily from local residents and would have been spent elsewhere in the area absent a professional team.

Using public subsidies to increase economic activity in a specific urban area represents a place-based policy. Other examples of urban place-based policies include the HUD Empowerment Zone program and enterprise zones in the UK. While place-based policies attempt to directly address urban decline in a targeted way, the predictions from the standard model of the urban economy cast doubt on their usefulness.

Along with the innocuous assumptions that firms maximize profits and housing sector equilibrium ensures that the cost of housing reflects all costs of house production, the standard urban economic model assumes sufficiently small migration costs that make consumers indifferent between residential locations; this implies equal consumer utility across all areas in cities and across cities. This spatial equilibrium assumption matches observed patterns in key urban economic outcomes such as housing prices, wages, and commuting patterns, and generates predictions that inform place-based policies (Glaeser & Gottlieb, 2008). In particular, if residents of a city are indifferent to place of residence, then few economic justifications exist for government policies that specifically target poor urban areas.

Equilibrium conditions in the standard urban model predict that residents of poor urban areas are not disadvantaged because of their choice of residence. Low incomes earned by residents of declining urban areas are offset by low housing prices in these areas, holding human capital constant. Equilibrium conditions also predict that any successful government policy aimed at increasing income in declining urban areas will also generate an equal, offsetting increase in local housing prices.

In this case, the truly disadvantaged residents of a declining urban area targeted for revitalization by a place-based policy (who typically rent their home) may not benefit from the policy because of this increase in local housing prices; instead, property owners, who may or may not live in the neighborhood targeted for revitalization, represent the only group to clearly benefit from local urban revitalization. These predictions have clear implications for publicly subsidized sports facility-driven urban revitalization.

New sports facilities clearly affect local property markets. Housing prices are higher near new (Tu, 2004) and existing (Feng & Humphreys, 2012, 2018) professional sports facilities, as are commercial land rents (Propheter, 2018). The opening of new sports facilities increases nearby residential mortgage applications (Huang & Humphreys, 2014). While subsidy proponents trumpet these outcomes as evidence that sports facility-led urban redevelopment projects work, in the spatial equilibrium context these outcomes have an uneven impact, likely hurting renters and helping property owners.

Rosentraub (2014) documents numerous recent sports-related urban redevelopment projects dominated by real estate developers who own large tracts of land near new facilities. Most real estate developers understand the prediction from the

standard urban model that only property owners unambiguously gain from urban revitalization projects. While customers of high-end retail shops and residents of newly built luxury housing units near new facilities clearly benefit, the impact on existing residents of these neighborhoods is unclear from a spatial equilibrium perspective.

Glaeser and Gottlieb (2008) observe that urban place-based economic policies can succeed in the presence of important local agglomeration effects. The limited evidence on the presence of agglomeration near new sports facilities is mixed. Humphreys and Zhou (2015a) develop a spatial model featuring the introduction of a new sports facility in an urban area; the model predicts agglomeration in consumer service-providing firms occurs near facilities, with some offsetting exit of other existing local firms. Harger, Humphreys, and Ross (2016) find no evidence supporting new business formation near new sports facilities.

Professional Sports and Congestion Disamenities

A growing body of empirical research finds that professional sports generate substantial urban congestion disamenities, including crime, traffic congestion, and pollution. Much of this research generates causal evidence. If professional sports cause increased congestion disamenities, then subsidies for the construction of facilities where these events take place appear problematic, as taxpayers subsidize a private activity that reduces local quality of life on several margins.

The relationship between professional sports and crime has received increasing attention. Baumann et al. (2012) performed the first comprehensive analysis of the relationship between MLB, NFL, NBA, and NHL teams and crime in U.S. cities. Baumann et al. (2012) analyzed county-level annual crime data from the Uniform Crime Reports (UCR) over the period 1981 to 2006, aggregating county-level data to the Metropolitan Statistical Area (MSA) level and crime data into two broad categories, property crime and violent crime.

Baumann et al. (2012) found no relationship between the presence of a professional sports team in a city and crime. However, the UCR data are highly temporally aggregated, and indicator variables for the presence of a team in an MSA represents a relatively simple identification strategy, since the presence of a team may be correlated with many unobservable factors affecting urban crime.

Kalist and Lee (2016) took a similar panel data approach but focus only on cities with NFL teams and use data reflecting the number of crimes committed each day in a sample of 12 U.S. cities, eight with NFL teams, over the period 2004 to 2006. Kalist and Lee (2016) found a 2.6 percent increase in all crimes, and a 2.9 percent increase in economically motivated crimes, such as robbery and motor vehicle theft, on days when NFL home games were played relative to non-game days and to the same days in cities without NFL teams. The temporally disaggregated crime data used by Kalist and Lee (2016) likely explains the difference in results relative to Baumann et al. (2012).

Marie (2015) and Yu et al. (2016) took a different approach. Both analyze temporally and spatially disaggregated crime data from London and Memphis, Tennessee, respectively. Both exploit the exact timing of games to identify the relationship between games and crime. Marie (2015) used data on the number of crimes committed during six hour windows in 31 boroughs in London and the exact start and end time of professional soccer matches over the period October 1994 to March 1997. Yu et al. (2016) used data on the number of robberies committed in each hour near a basketball arena used by both a professional and a college team in Memphis and the exact start time of games in 2010 and 2011.

Marie (2015) found a 7 percent increase in property crimes before and after home soccer matches in boroughs that were home to teams relative to days with no home

matches, and to boroughs with no teams. Yu et al. (2016) found a 19 percent increase in robberies in hours before and after NBA games, and a 31 percent increase in robberies in hours before and after college basketball games near the arena relative to periods when no games occurred. Both explain these results as reflecting the impact of large numbers of fans concentrated in and around facilities on game days on the local propensity to commit crimes.

Pyun (2018) used another approach, exploiting the move of a new professional baseball team into Washington, DC, using a synthetic control approach. Pyun (2018) used monthly UCR data from Washington, DC and other cities with MLB teams and exploited variation in the number of MLB games played each month over 2000 to 2009 (the team arrived in 2004) to identify the effect of games on local crime. The control group was a weighted average of observations from other cities with MLB teams over the sample period with weights determined optimally to match economic conditions in Washington, DC during the pre-treatment period. Pyun (2018) found that assaults increased by 7 percent in Washington after the team arrived.

Professional sports teams generate other negative urban externalities. Humphreys and Pyun (2018) investigate the causal impact of MLB games on traffic congestion using urban mobility data from 25 cities home to professional baseball teams from 1990 to 2014. They use an instrumental variables approach where team success explains team attendance in an econometric model of the determination of urban vehicle miles traveled (VMT). The results indicate that MLB games account for about 28,000 additional hours of traffic delay per year in cities with teams, which in turn generates more than \$7 million in additional annual social costs from CO₂ emissions. Annual VMT in cities with MLB teams is 5.4 percent higher than in cities without teams.

Locke (2018) directly estimates the impact of games on urban air quality using daily frequency data from the Environmental Protection Agency's AirData program for cities with MLB teams over the period 2010 to 2016. Locke (2018) exploits temporal variation game scheduling, which should be exogenous to unobservable factors affecting air quality, to assess the impact of MLB games on vehicle-generated airborne particulate matter. The results indicate that an MLB game with league average attendance (about 34,000 fans) increases the local air quality index (AQI) by about 0.65 percent on game day; higher AQI implies worse local air quality. Ozone and NO₂ concentrations increase by about 0.1 percent on game days.

Recently, Humphreys and Ruseski (2018) analyzed the impact of new sports facility construction projects on infant birth weight in a sample of 28 U.S. cities that built new facilities over the period 1995 to 2002. Facility construction generates substantial airborne particulate matter over relatively long periods of time, two to three years, and the large public subsidies provided for these projects can have opportunity costs that reduce other government-provided services. Both could affect pregnant women.

Using the same EPA air quality data as Locke (2018), Humphreys and Ruseski (2018) found increased levels of airborne particulate matter (PM 2.5 and PM 10) during sports facility construction projects in cities; they also find a reduced number of maternal prenatal visits to health care providers during and after construction, which may reflect reduced access to government-provided services.

Humphreys and Ruseski (2018) find evidence of lower infant birth weights based on a difference-in-differences approach and on exact matching on observable maternal characteristics. The reduction in infant birth weights is similar in size to that found for the roll-out of the food stamp program in the U.S. in the 1960s as well as economic shocks such as mass layoff events. Roughly 2,000 infants were born at low birth weight who would have been born at normal birth weight absent new sports facility construction projects. Low birth weights are associated with increased

current health care costs and also adversely impact future educational and labor market outcomes for infants born at low birth weights.

Taken together, this emerging evidence supports the idea that professional sports events and construction of new facilities generate substantial negative externalities in host cities. These negative externalities include increased crime, traffic congestion, and environmental damage that affects newborns. These problems already exist in most U.S. cities but the presence of a professional sports team intensifies them.

CONCLUSIONS

Despite continued claims by subsidy proponents, research in peer-reviewed journals finds no evidence supporting the idea that professional sports events generate tangible new economic benefits in host cities. Subsidies for the construction of new professional sports facilities cannot be justified by these claims.

Professional sports facilities clearly concentrate economic activity temporally and spatially, which can revitalize distressed urban areas. However, the predictions of the standard urban spatial economic model show that these place-based policies do not generate increases in social welfare if local residents are indifferent between residential locations. The presence of higher house prices near professional sports facilities supports the predictions of this model and reflects the importance of these facilities as urban consumption amenities.

Glaeser and Gottlieb (2008) note that place-based policies are appropriate in the presence of spatial disequilibrium. Proponents of subsidies for sports-related urban revitalization projects never provide evidence of specific market failures that would generate spatial disequilibrium, and the existence of distressed urban areas does not mean that the distress stems from market failures. Again, the standard urban spatial model predicts that disadvantaged residents of distressed urban areas are effectively compensated by low housing costs, relative to other parts of a city. This lack of evidence that market failures explain distressed urban areas highlights an important future research area.

Finally, recent evidence indicates that professional sporting events cause increases in common urban congestion disamenities, a negative externality. This evidence argues strongly against subsidies for the construction of new professional sports facilities and supports taxing these activities as a way to reduce negative externalities. Unfortunately, local taxes on professional sports may not be feasible. Professional teams in all four major leagues have a long history of moving. The special anti-trust status granted to professional sports leagues generates monopoly power leading to fewer teams supplied than cities capable of supporting a team. Team owners will always have an outside option—a viable new home city—where they can credibly threaten to move. Credible threats to move will likely deter any local government from taxing local professional sporting events, just as they enable team owners to extract subsidies from taxpayers (Humphreys & Zhou, 2015b).

BRAD R. HUMPHREYS is a Professor of Economics at West Virginia University, P.O. Box 6025, Morgantown, WV 26506 (e-mail: brhumphreys@mail.wvu.edu).

REFERENCES

- Baumann, R., Ciavarra, T., Englehardt, B., & Matheson, V. A. (2012). Sports franchises, events, and city livability: An examination of spectator sports and crime rates. *The Economic and Labour Relations Review*, 23, 83–98.
- Coates, D., & Humphreys, B. R. (1999). The growth effects of sport franchises, stadia, and arenas. *Journal of Policy Analysis and Management*, 18, 601–624.

- Coates, D., & Humphreys, B. R. (2008). Do economists reach a conclusion on subsidies for sports franchises, stadiums, and mega-events? *Econ Journal Watch*, 5, 294–315.
- Crompton, J. L. (1995). Economic impact analysis of sports facilities and events: Eleven sources of misapplication. *Journal of Sport Management*, 9, 14–35.
- Feng, X., & Humphreys, B. R. (2012). The impact of professional sports facilities on housing values: Evidence from census block group data. *City, Culture and Society*, 3, 189–200.
- Feng, X., & Humphreys, B. R. (2018). Assessing the economic impact of sports facilities on residential property values: A spatial hedonic approach. *Journal of Sports Economics*, 19, 188–210.
- Glaeser, E. L., & Gottlieb, J. D. (2008). The Economics of place-making policies. *Brookings Papers on Economic Activity*, 155–253.
- Gold, A. K., Drukker, A. J., & Gayer, K. (2016). Why the federal government should stop spending billions on private sports stadiums. *Brookings Institution Report*.
- Long, J. G. (2012). *Public-private partnerships for major league sports facilities*. Routledge.
- Harger, K., Humphreys, B. R., & Ross, A. (2016). Do new sports facilities attract new businesses? *Journal of Sports Economics*, 17, 483–500.
- Huang, H., & Humphreys, B. R. (2014). New sports facilities and residential housing markets. *Journal of Regional Science*, 54, 629–663.
- Humphreys, B. R., & Pyun, H. (2017). Professional sporting events and traffic: Evidence from US cities. *Journal of Regional Science* (forthcoming).
- Humphreys, B. R., & Ruseski, J. (2018). Geographic determinants of infant health: The impact of sports facility construction projects. Unpublished working paper, West Virginia University, Department of Economics.
- Humphreys, B. R., & Zhou, L. (2015a). Sports facilities, agglomeration, and public subsidies. *Regional Science and Urban Economics*, 54, 60–73.
- Humphreys, B. R., & Zhou, L. (2015b). Reference-dependent preferences, team relocations, and major league expansion. *Journal of Economic Behavior & Organization*, 109, 10–25.
- Kalist, D. E., & Lee, D. Y. (2016). The National Football League: Does crime increase on game day? *Journal of Sports Economics*, 17, 863–882.
- Locke, S. (2018). Estimating the impact of Major League Baseball games on local air pollution. *Contemporary Economic Policy* (forthcoming).
- Marie, O. (2015). Police and thieves in the stadium: Measuring the (multiple) effects of football matches on crime. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 179, 273–292.
- Propheter, G. (2018). Estimating the effect of sports facilities on local area commercial rents: Evidence from Brooklyn's Barclays Center. *Journal of Sports Economics* (forthcoming).
- Pyun, H. (2018). Exploring causal relationship between Major League Baseball games and crime: A synthetic control analysis. *Empirical Economics*, 1–19.
- Rosentraub, M. S. (2014). *Reversing urban decline: Why and how sports, entertainment, and culture turn cities into major league winners*. Routledge.
- Tu, C. (2005). How does a new sports stadium affect housing values? The case of FedEx Field. *Land Economics*, 81, 379–395.
- Yu, Y., Mckinney, C. N., Caudill, S. B., & Mixon Jr., F. G. (2016). Athletic contests and individual robberies: An analysis based on hourly crime data. *Applied Economics*, 48, 723–730.

IS THERE A CASE FOR SUBSIDIZING SPORTS STADIUMS?

Victor Matheson

INTRODUCTION

The case in favor of subsidizing large sports facilities is much harder to make than the one against. The peer-reviewed literature typically finds little or no evidence that the construction of new professional sports facilities results in significant increases in any type of measurable economic activity including personal income, wages, employment, tax revenues, or tourist spending (Coates & Humphreys, 2008). In addition, the privately funded consulting reports that frequently accompany stadium proposals, and which invariably tout large economic benefits from subsidized stadiums and arenas, have been shown to suffer from significant theoretical flaws that make their conclusions suspect at best, and simply false at worst (Crompton, 1995). In fact, some academic economists suggest, only partially in jest, that if one wants to know what the true economic impact of a stadium project will be, simply take whatever number the consultants project and then move the decimal point one place to the left.

However, in specific circumstances, it may be possible to justify some level of public subsidies for the construction of sports venues. This should not be interpreted to mean that the optimal level of public spending is the roughly two-thirds of average stadium construction costs that taxpayers paid for during the period from 1990 through 2008 or even the roughly one-third of stadium construction costs that taxpayers paid for on average since the Great Recession in 2008. Rather, the only claim being made here is that the optimal level of funding may be higher than zero percent.

STADIUMS AS PUBLIC GOODS

It is a standard axiom of welfare economics that free markets lead to optimal allocations and that any government intervention, such as subsidies for stadium construction, that interferes with the normal operation of the market is likely to lead to welfare losses to society as a whole. Equally standard, however, is that in cases of market failure, government intervention may result in Pareto improvements in societal outcomes. A solid case can be made that stadiums and professional sports franchises have a public good element to them and that stadiums and franchises may provide positive externalities to the local economy or to neighborhoods near the stadium.

A public good is a good that is both non-rivalrous and non-excludable in its consumption. While tickets to sporting events are obviously excludable, and a sold-out game is clearly rivalrous, other aspects of sports fandom fit the standard concept of a public good. Broadcast games on television are a classic example of a public good, and the more esoteric concept of simply "being a fan" also fits the definition. Fans of a team may gain value from being able to root for their team and talk about their team's successes and failures with friends and colleagues even if they don't directly spend any money buying tickets, merchandise, or pay-per-view

media. Because the team or league doesn't benefit from the value it provides to these fans, in a free market the product will be undersupplied. Government subsidization of an input to the production of the sports product through stadium subsidies may serve to bring the market output up to the socially efficient level.

Professional sports franchises can also serve as an amenity that can improve the quality of life for local residents who are not sports fans. The team can be a source of civic pride. For example, when more than 60 percent of Oklahoma City voters approved \$120 million of public spending in order to renovate the city's Ford Center arena in the hopes (and eventual success) of luring an NBA franchise to the city, civic leaders said the vote was more about "becoming a 'Big League City'" rather than a road to any direct economic benefits (Seattle Times, 2008). There is little doubt that professional sports can serve to "put a city on the map," and a city such as Green Bay, Barcelona, or Manchester may get more national or international media mentions from their successful sports franchises than from all other sources combined.

Furthermore, while teams may be able to capture the use value of local sports fans through ticket sales, they are unlikely to be able to capture the option value of local residents. Option value is a common element of cost-benefit analysis that accounts for the value, or willingness to pay, a consumer places on having a sports entertainment option even if there is little or no likelihood that they will ever watch any games. The concept is often used in public policy decisionmaking in order to justify public spending on public goods such as parks or wilderness preserves. Sports teams clearly have some similar characteristics to these environmental resources.

Because components of value such as amenity value, civic pride, and option value are non-market values, special techniques are required to estimate their magnitude. Two of the most common methods used to identify non-market values are contingent valuation and hedonic pricing. The contingent valuation method (CVM) uses surveys designed to get consumers to reveal their valuation of non-market resources, and this methodology has been used for the presence of sports teams and events.

Johnson, Groothuis, and Whitehead (2001) surveyed Pittsburgh residents to find a total discounted non-use value of the Pittsburgh Penguins NHL team to the host metropolitan statistical area (MSA) of between \$17.2 and \$48.3 million. These figures are only a fraction of the total cost of the new \$321 million arena the team eventually built in 2010, but they are also not zero. While amenity or non-use value could not justify a public subsidy for the complete cost of the facility, an economic case for the public paying for something between 5 percent and 15 percent of the facility could be made. Indeed, the survey results could justify about one-quarter of the roughly \$130 million public contribution that was finally made towards the Penguins' arena. Other CVM studies of sports teams and facilities have found similar results and are summarized in Table 1. Studies of major sporting events such as the Olympics and World Cup have found similar positive "feel-good" effects. See, for example, Allmers and Maennig (2009).

The hedonic pricing method of valuation uses the observed prices of goods and services that are sold in markets to tease out the value of a non-market component. For example, to determine the value of a non-marketed commodity like air quality, one could compare the market price of a house in an area with high air quality to an otherwise identical house in a low air quality area and then infer that the observed difference in housing prices is the result of the otherwise non-measurable value of better air quality.

Carlino and Coulson (2004) use hedonic pricing to measure the housing costs in NFL cities to non-NFL cities. They find that home buyers are willing to pay 8 percent more for houses in NFL cities, which the authors attribute to the amenity value of NFL franchises. It should be noted that this study is not without its detractors and that Carlino and Coulson's results are not robust to variations in model specification

Table 1. Examples of CVM studies of sports teams.

Location	Sport	Non-use value (\$ mil.)	Facility cost (\$ mil.)	Public cost (\$ mil.)	Source
Pittsburgh	NHL	\$17.2-\$48.3	\$321	\$130	Johnson, Groothuis, and Whitehead (2001)
Jacksonville	NFL	\$36.5	\$121	\$121	Johnson, Mondello, and Whitehead (2007)
Jacksonville	NBA	\$22.8	n.a.	n.a.	Johnson, Mondello, and Whitehead (2007)
Calgary	NHL	\$24.1C	\$500C (est.)	\$225C (est.)	Johnson et al. (2012)
Edmonton	NHL	\$24.6C	\$591C	\$304C	Johnson et al. (2012)
Minnesota	NFL	\$440.4	\$1,061	\$498	Fenn and Crooker (2009)

Source: Facility costs from Baade and Matheson (2012) and various media sources.

(Coates, Humphreys, & Zimbalist, 2006). Findings by Feng and Humphreys (2012, 2018) that residential housing values rise near professional sports venues can also be explained by appealing to the amenity value of having a professional sports entertainment option nearby.

STADIUMS AS NEIGHBORHOOD DEVELOPMENT TOOLS

Stadiums and arenas can also serve as an anchor for local economic development. While the old construction model of a stadium as a “walled fortress surrounded by a moat of parking lots” clearly led to few neighborhood spillovers, modern arena construction has been much more successful at integrating stadiums into local, and recently more often than not, downtown neighborhoods (Baade, Matheson, & Nikolova, 2007). While the data clearly show that stadiums and arenas do not typically lead to citywide increases in economic activity, there is strong evidence of localized impacts. Tu (2005), Feng and Humphreys (2012, 2018), and Propher (2018) all find significant increases in real estate prices near stadiums, and many stadium projects such as PetCo Stadium in San Diego (Rosentraub, 2014), Rogers Place in Edmonton (Staples, 2015), and Barclays Arena in Brooklyn, have seen significant commercial and residential real estate development in the area of the stadium following facility construction. Indeed, some stadium deals may be better thought of as real estate developments with a stadium thrown in as opposed to the other way around.

Of course, it is important to recognize that much of the real estate development that can accompany stadium construction may have occurred otherwise, and stadium subsidies may just be an expensive way to relocate economic activity from one area of the city to another. However, there could be real economic reasons to promote the economic health of one region of a city over another. First of all, well-designed stadiums built with an urban plan in mind may result in an agglomeration of entertainment businesses (Humphreys & Zhou, 2015). A concentrated entertainment district created by a stadium, such as San Diego’s Gaslamp District or Denver’s LoDo, may increase economic activity by creating a focused attraction for tourists and visitors from outside the city.

Second, there may be real public policy or urban planning reasons to value one area in a city over another. It is commonly argued that vibrant and active downtown areas produce “unique and valuable intangible benefits for their cities” (Johnson et al., 2012). An economically healthy downtown provides a local identity, promotes

the city's image, enhances civic pride, and serves as a melting pot for different races, ethnicities, and socio-economic classes (Rosentraub, 2008). If viable central business districts are more valuable to a metropolitan area's image and economic prospects than other locations in the area, it may make sense to spend public money to locate a stadium and its accompanying economic impact into a downtown location in order to boost that area even if income in the greater metropolitan region is unchanged.

POLITICAL ECONOMY

Along a similar vein, to the extent that stadiums simply relocate spending from one area to another, if these locations are in different government jurisdictions, it may be profitable for local governments to subsidize facility construction in order to shift the economic activity of the team from a neighboring town to their own. For example, the Dallas Cowboys and Texas Rangers are clearly teams enjoyed by fans throughout the region who would be willing to travel anywhere in the Dallas-Fort Worth metroplex to watch games. When Arlington, Texas subsidizes stadiums for these teams, they attract fans to Arlington who otherwise would have spent their time and money in other parts of the metropolitan area. While, again, regional economic activity is unchanged, Arlington's economy benefits at the expense of other cities and towns in the area.

Under this line of thought, it is clear that stadium subsidies reflect poor regional economic policy even as they may be good local economic policy. For this reason, lawmakers have occasionally banded together to prevent this sort of destructive cross-border competition for sports franchises, but this type of multi-jurisdictional decisionmaking is difficult to accomplish in practice (Suderman, 2018).

Stadium projects (as well as mega-events) are often also touted as methods to force politicians to undertake needed improvements in general infrastructure that are unable to generate sufficient political will without an external catalyst like a new sports facility. Following the Athens Olympics in 2004, Spyros Kapralos, president of the Hellenic Olympic Committee, noted, "... the Games did serve to upgrade a big portion of the infrastructure of the city and the country. Greece lives off tourism and after the Olympics, Athens got a new airport, new ring roads, new metro, new tram system, new trolleys, new buses, new telecommunications network, new power stations. The quality of life here improved immensely" (Smith, 2012).

Similarly, the city of Worcester, Massachusetts justified its planned \$70 million expenditure on a new minor league baseball stadium in part on its ability to convince the state to put \$35 million in transportation infrastructure improvements into the area around the proposed stadium. According to the Massachusetts' lieutenant governor, the commonwealth had "long wanted" to do a project to improve the intersection before the stadium, ranked as far and away the most dangerous intersection in the state for traffic accidents. However, only with the announcement of the stadium project did the Department of Transportation commit funding to the project (Croteau, 2018). Obviously, it would be better for local taxpayers to get the needed infrastructure improvements without the wasteful expense of hosting the Olympics or building a baseball stadium, but government activities are not always without friction, and using a stadium project to spur other more useful infrastructure projects may be a second-best solution.

IS ZERO REALLY ZERO?

Even under the most optimistic estimates, professional sports teams play a small role in the large, diverse economies in which they reside, and it is easy for the impact of sports to get lost in the natural variations of the local economy. Many studies of the

impact of professional sports facilities that find no statistically significant impact of sports on tangible economic variables are underpowered. This is particularly true of many of the older studies that relied on metropolitan area wide annual data (Coates & Humphreys, 1999). Even if a new stadium were to inject tens or hundreds of millions of dollars into the economy, given the fact most major league cities sport gross domestic products well in excess of \$100 billion, searching for such a “small” figure is akin to looking for the proverbial needle in a haystack.

For example, Baade and Matheson’s (2006) examination of the Super Bowl found that its impact on the host economies was not statistically different from zero. However, the authors also noted that given the sensitivity of their model, the Super Bowl would have to generate at least \$300 million in benefits before they would pick it up as statistically significant. Any impact level below that, no matter how real the benefits were, could not be differentiated from the statistical noise.

More recent studies have attempted to solve this problem by looking at smaller geographic areas or shorter time frames, effectively making the haystack smaller (e.g., Baumann, Matheson, & Muroi, 2009), but even with improvements in measurement techniques it is still much more accurate to claim that the peer-reviewed literature generally doesn’t find large economic benefits from building new stadiums as opposed to claiming that the literature proves that there are no benefits whatsoever.

CONCLUSIONS

It remains true that stadiums are typically poor public investments. Research in peer-reviewed journals finds little evidence that professional sporting franchises or events generate tangible new economic benefits for their cities. It would be exceedingly rare to find a sports facility project that would justify a public subsidy that would cover most of or all of the construction cost. However, the (absolutely true) claim that sports generate minimal economic benefits is not the same as claiming that sporting events, facilities, and franchises provide zero in net economic benefits for their host communities. And the same peer-reviewed literature that finds little evidence of tangible economic benefits in the form of increased income, wages, employment, and tax revenues also consistently finds positive public good benefits as measured by both contingent valuation and hedonic pricing methods.

Furthermore, even if stadiums do not increase net economic activity or citywide societal welfare at all, the evidence is fairly clear that they can generate significant neighborhood effects, and policymakers may have good reason to make a conscious decision to prefer one area over another. Therefore, it may be possible to justify some level of public subsidies for the construction of sports venues. It is again crucial to reiterate that this should not be interpreted to mean that the optimal level of public spending is anywhere near what taxpayers in North America (and many places in the rest of the world) have paid for stadiums and arenas over the past several decades. Simply, one can make a reasonable economic argument that the optimal level of sports facility funding may be higher than zero percent.

VICTOR MATHESON is a Professor in the Department of Economics and Accounting at the College of the Holy Cross, 1 College Avenue, Box 157A, Worcester, MA 01566 (e-mail: vmatheso@holycross.edu).

REFERENCES

- Allmers, S., & Maennig, W. (2009). Economic impacts of the FIFA soccer World Cups in France 1998, Germany 2006, and outlook for South Africa 2010. *Eastern Economic Journal*, 35, 500–519.

- Baade, R., & Matheson, V. (2006). Padding required: Assessing the economic impact of the Super Bowl. *European Sports Management Quarterly*, 6, 353–374.
- Baade, R., & Matheson, V. (2012). Financing professional sports facilities. In Z. Kotval, & S. White (Eds.), *Financing economic development in the 21st Century*, 2nd ed., (pp. 323–342). Armonk, NY: M.E. Sharpe Publishers.
- Baade, R., Matheson, V., & Nikolova, M. (2007). A tale of two stadiums: Comparing the economic impact of Chicago's Wrigley Field and U.S. Cellular Field. *Geographische Rundschau International Edition*, 3, 53–58.
- Baumann, R., Matheson, V., & Muroi, C. (2009). Bowling in Hawaii: Examining the effectiveness of sports-based tourism strategies. *Journal of Sports Economics*, 10, 107–123.
- Carlino G., & Coulson, E. (2004). Compensating differentials and the social benefits of the NFL. *Journal of Urban Economics*, 56, 25–50.
- Coates, D., & Humphreys, B. (1999). The growth effects of sport franchises, stadia, and arenas. *Journal of Policy Analysis and Management*, 18, 601–624.
- Coates, D., & Humphreys, B. (2008). Do economists reach a conclusion on subsidies for sports franchises, stadiums, and mega-events? *Econ Journal Watch*, 5, 294–315.
- Coates, D., Humphreys, B., & Zimbalist, A. (2006). Compensating differentials and the social benefits of the NFL: A comment. *Journal of Urban Economics*, 60, 124–131.
- Crompton, J. (1995). Economic impact analysis of sports facilities and events: Eleven sources of misapplication. *Journal of Sport Management*, 9, 14–35.
- Croteau, S. (2018). Worcester's infamous Kelley Square to be redesigned as part of PawSox deal. *MassLive*, posted August 17 at <https://www.masslive.com/expo/news/erry-2018/08/4ba581097f7314/worcesters-infamous-kelley-squ.html>.
- Feng, X., & Humphreys, B. (2012). The impact of professional sports facilities on housing values: Evidence from census block group data. *City, Culture and Society*, 3, 189–200.
- Feng, X., & Humphreys, B. (2018). Assessing the economic impact of sports facilities on residential property values: A spatial hedonic approach. *Journal of Sports Economics*, 19, 188–210.
- Fenn, A., & Crooker J. (2009). Estimating local welfare generated by an NFL team under credible threat of relocation. *Southern Economic Journal*, 76, 198–223.
- Humphreys, B., & Zhou, L. (2015). Sports facilities, agglomeration, and public subsidies. *Regional Science and Urban Economics*, 54, 60–73.
- Johnson, B., Whitehead, J., Mason, D., & Walker, G. (2012). Willingness to pay for downtown public goods generated by large, sports-anchored development projects: The CVM approach. *City, Culture and Society* 3, 201–208.
- Johnson, B., Mondello, M., & Whitehead, J. (2007). The value of public goods generated by a National Football League team. *Journal of Sport Management*, 21, 123–136.
- Johnson, B., Groothuis, P., & Whitehead, J. (2001). The value of public goods generated by a major league team: The CVM approach. *Journal of Sports Economics*, 2, 6–21.
- Propheter, G. (2018). Estimating the effect of sports facilities on local area commercial rents: Evidence from Brooklyn's Barclays Center. *Journal of Sports Economics*, (forthcoming).
- Rosentraub, M. (2008). Sports facilities and urban redevelopment: Private and public benefits and a prescription for a healthier future. In B. Humphreys & D. Howard (Eds.), *The business of sports*, vol. 3, bridging research and practice, (pp. 57–80). Westport, CT: Praeger Publishers.
- Rosentraub, M. (2014). *Reversing urban decline: Why and how sports, entertainment, and culture turn cities into major league winners*. Routledge.
- Seattle Times. (2008). Oklahoma City passes arena tax to lure Sonics. Posted March 5 at <https://www.seattletimes.com/sports/nba/oklahoma-city-passes-arena-tax-to-lure-sonics/>.
- Smith, H. (2012). Athens 2004 Olympics: What happened after the athletes went home? *The Guardian*. Posted May 9 at <https://www.theguardian.com/sport/2012/may/09/athens-2004-olympics-athletes-home>.

- Staples, D. (2015). Edmonton Arena District is the fastest growing arena district in the history of such mega-projects. *Edmonton Journal*. Posted May 27 at <https://edmontonjournal.com/sports/hockey/nhl/cult-of-hockey/edmonton-arena-district-is-the-fastest-growing-arena-district-in-the-history-of-such-mega-projects>.
- Suderman, A. (2018). Lawmakers in Virginia, Maryland and D.C. team up in effort to ban bidding war for Redskins stadium. *Associated Press*. Posted January 18 at <https://www.nbcwashington.com/news/local/Bipartisan-effort-would-ban-bidding-war-for-Redskins-stadium-470146433.html>.
- Tu, C. (2005). How does a new sports stadium affect housing values? The case of FedEx Field. *Land Economics*, 81, 379–395.

FACILITY SUBSIDIES REDUX

Brad R. Humphreys

Professor Matheson (2018) argues that some aspects of professional sports teams constitute a public good. Following a local team, talking about the local team with friends and family, and the intangible “sense of community” and “world class city status” generated by high-profile sports teams clearly embody characteristics of a public good. The large CVM literature cited by Professor Matheson supports the idea that professional sports teams generate valuable intangible local benefits of at minimum tens of millions of dollars in large cities.

Matheson (2018) further observes, correctly, that public subsidization of a public good can generate Pareto improvements, since profit maximizing firms operating in competitive markets undersupply pure public goods. Unfortunately, the market for professional sports teams falls far short of the ideal assumptions that generate this prediction.

The market for professional sports teams in North America contains monopoly sports leagues that restrict the number and location of teams. As a matter of public policy, these leagues operate with explicit—in the case of Major League Baseball and the National Football League—and implicit special antitrust status granting leagues substantial, permanent monopoly power. This results in a restriction on the number of professional sports teams that would exist in a market with free entry.

Local governments can, and do, subsidize local professional sports teams. The special antitrust status granted leagues makes it extremely unlikely that additional teams will be supplied in response to these subsidies, unlike the theoretical case of pure public goods and competitive markets. This also substantially reduces the likelihood of any Pareto improving market response to these subsidies. Instead, these subsidies represent rent extraction from local taxpayers under the threat of team relocation (Humphreys & Zhou, 2015). Again, this occurs because the special antitrust status granted to professional sports leagues in the United States generates outside options for teams.

Absent the special antitrust status granted to professional sports leagues by policymakers, and ignoring the fact that policymakers appear to have no interest in

actually revisiting this issue, subsidies could potentially generate benefits to society in efficiency terms. However, the equity implications of continued subsidies for the construction and operation of professional sports facilities remains an important open question. Economic inequality appears to have increased over time in the United States.

At first glance, public subsidization of professional sports teams represents a transfer of income from tax payers to the owners of professional sports teams, most of whom are billionaires, and to professional athletes, many of whom earn salaries in excess of one million dollars per year; some earn substantially larger salaries. Of course, fans of teams who attend games clearly benefit from these subsidies by gaining access to new, palatial stadiums and arenas with improved sight-lines, seating, concessions, parking, and other amenities such as in-facility swimming pools. These fans also pay dearly, in the form of high ticket prices, for these benefits.

The equity implications of the transfer of billions of dollars of taxpayer funds to the owners and employees of professional sports teams clearly deserves more attention in the literature and warrants careful analysis. Intuition suggests that these transfers do not contribute to economic equality.

Professor Matheson does not discuss the role played by consumer surplus in a comprehensive economic assessment of sports subsidies. A small, and relatively old literature estimating consumer surplus generated by professional sports exists (Alexander, Kern, & Neill, 2000; Irani, 1997). Both papers estimated substantial consumer surplus generated by professional sports teams, using relatively old price data of relatively low quality compared to currently available data; only one develops econometric evidence on the size of the consumer surplus generated by professional sports teams. Additional evidence on the size of consumer surplus currently generated by professional sports teams appears to be warranted.

No comprehensive cost-benefit analysis of sports facility subsidies that includes consumer surplus, CVM estimates of intangible benefits, and direct economic benefits exists. Professor Matheson's observation that many of the existing estimates of direct economic benefits suffer from data limitations, coupled with the fact that few of these studies employ modern causal inference methods, makes a convincing case that the existing body of evidence omits some direct local economic benefits too small to be detected in existing, imperfect data using correlative methods. The complete lack of any evidence of large tangible economic benefits from professional sports places an upper bound on the possible size of these as-yet undetected direct tangible economic benefits.

The emerging evidence on urban congestion externalities discussed in Humphreys (2018) places dollar value estimates on these negative externalities, which could be used in a comprehensive cost-benefit analysis. Many studies place a dollar value on crimes committed, which could also be incorporated into a cost-benefit analysis. Professor Matheson and I disagree on what bottom line value a comprehensive cost-benefit analysis would produce. He suggests a small positive number and I counter with a small negative number. This exchange underscores the need for a comprehensive cost-benefit analysis accounting for all these factors to better inform this important area of public debate. Unfortunately, actual subsidies provided continue to be of a size consistent with an exceptionally large positive number. I think both of us agree that a comprehensive cost-benefit analysis would be extremely unlikely to generate a positive net benefit estimate anywhere close to the size of the actual subsidy provided to the average new professional sports stadium or arena built in North America.

BRAD R. HUMPHREYS is a Professor of Economics at West Virginia University, P.O. Box 6025, Morgantown, WV 26506 (e-mail: brhumphreys@mail.wvu.edu).

REFERENCES

- Alexander, D. L., Kern, W., & Neill, J. (2000). Valuing the consumption benefits from professional sports franchises. *Journal of Urban Economics*, 48, 321–337.
- Humphreys, B. R. (2018). Should the construction of new professional sports facilities be subsidized? *Journal of Policy Analysis and Management*, 38, 264–270.
- Humphreys, B. R., & Zhou, L. (2015). Reference-dependent preferences, team relocations, and major league expansion. *Journal of Economic Behavior & Organization*, 109, 10–25.
- Irani, D. (1997). Public subsidies to stadiums: Do the costs outweigh the benefits? *Public Finance Review*, 25, 238–253.
- Matheson, V. A. (2018). Is there a case for subsidizing sports stadiums? *Journal of Policy Analysis and Management*, 38, 277–279..

RESPONSE TO PROFESSOR HUMPHREYS

Victor Matheson

Professor Humphreys suggests that subsidies for the construction of new or refurbished professional sports facilities cannot be justified by the research presented in peer-reviewed journals. As an author of a significant portion of that literature, I am in broad agreement with that assessment. It is clear that teams, leagues, and sponsors of major sporting events, such as FIFA or the International Olympic Committee, routinely exaggerate the benefits from building sports infrastructure and hosting sporting events while downplaying the costs.

As further noted by Professor Humphreys, the monopoly power exerted by the suppliers of spectator sports places cities in direct competition with one another for teams and events and puts them at a distinct disadvantage to the purveyors of sports when attempting to negotiate on the appropriate level of public subsidy for sports facilities. It is fairly easy to look at the over \$20 billion (nominal) of taxpayer money spent on professional sports facilities in the U.S. and Canada since 1990 and decry the waste and injustice without asking the harder question about what would have been a reasonable and economically justifiable amount of public spending for this multitude of new and refurbished stadiums and arenas (Baade & Matheson, 2012).

Professor Humphreys notes that using stadiums to revitalize distressed urban areas may “not generate increases in social welfare if local residents are indifferent between various residential locations,” and that “proponents of subsidies for sports-related urban revitalization projects never provide evidence of specific market failures that would generate” a spatial disequilibrium that would justify a place-based economic development policy (Glaeser & Gottlieb, 2008).

I believe the evidence is in Professor Humphreys’ favor if one is simply considering placing arenas and stadiums in blighted areas in order to clean up and gentrify a particular part of town. On the other hand, many urban planners (e.g., Rosentraub, 2014) do believe that the central business districts of modern cities

possess attributes of a public good, and it is well-accepted that government subsidization is a reasonable solution to the market failure associated with the provision of public goods. I share Professor Humphreys' concern that the talk about the magic of the urban central core is often based more on rhetoric than data, but it is also clear that vibrant and thriving downtowns are a clear amenity for residents living anywhere within a metropolitan area and may help cities attract and retain a highly skilled workforce.

Professor Humphreys' article makes a nice contribution to the literature by reviewing much of the newer work on the costs and benefits of sport facilities. Much of this research focuses on the potential negative externalities associated with professional sports. With respect to the findings on crime, I am not entirely convinced that the fact that crime increases around sporting events is particularly damning. As Willie Sutton famously quipped about why he robbed banks, "Because that's where the money is," it should come as no surprise that crime increases when one congregates a large number of people in a specific place. Stadium subsidy opponents (including both myself and Professor Humphreys) often argue that the presence of economic activity around sporting events shouldn't count as a benefit if sports-related spending has simply displaced spending that would have occurred in other locations. Similarly, if a big sporting event attracts all of the pickpockets and purse-snatchers, that shouldn't be considered as a cost if this crime is simply diverted from another part of town.

In addition, not all of the literature suggests that sporting contests increase crime. Copus and Laquer (2018) examine citywide criminal activity in Chicago and find consistent decreases in crime during times at which the Chicago sports teams are playing. They attribute this decrease to the diversionary nature of spectator sports. This idea harkens back multiple millennia to the days of ancient Rome where it was claimed that the way to keep the citizenry peaceful was to provide "bread and circuses."

The findings that sporting events lead to clear negative externalities related to traffic congestion and air quality may suggest the nature that any public subsidies for sports projects should take. The provision of infrastructure is a core responsibility of government, and ensuring that customers and businesses can efficiently meet up with one another is a role that government can and should take on. Therefore, many critics of general stadium subsidies (this author included) can embrace generous public spending on transportation projects in coordination with privately financed stadiums.

For example, Gillette Stadium, home of the NFL's New England Patriots and MLS's New England Revolution, was built in 2002 with \$325 million in private funding from owner Robert Kraft. However, as part of the stadium construction project, the state of Massachusetts agreed to provide \$33 million in public funding for road and interchange enhancements that would improve fan access to the stadium (Baade & Matheson, 2012). This type of spending modestly subsidizes the construction of the stadium while reducing both the traffic congestion and the related air pollution associated with events at the stadium. Both the magnitude and the type of public funding provided to the Gillette Stadium construction project, at least, seem entirely reasonable to this author, and I suspect Professor Humphreys would agree.

It is the nearly unanimous opinion of economists that stadium and arena subsidies represent a poor use of public funds (IMG Forum, 2017), and governments in the U.S. and Canada have spent far too much money over the past three decades subsidizing playing facilities for millionaire players and billionaire owners. There are sound economic reasons, however, to provide some level of public subsidy for stadiums; but, given the natural bargaining advantages that sports teams have over

host cities due to their monopoly power, there is little reason to believe we will be underfunding stadiums any time in the foreseeable future.

VICTOR MATHESON is a Professor in the Department of Economics and Accounting at the College of the Holy Cross, 1 College Avenue, Box 157A, Worcester, MA 01566 (e-mail: vmatheso@holycross.edu).

REFERENCES

- Baade, R., & Matheson, V. (2012). Financing professional sports facilities. In Z. Kotval, & S. White (Eds.), *Financing economic development in the 21st Century*, 2nd ed., (pp. 323–342). Armonk, NY: M.E. Sharpe Publishers.
- Copus, R., & Laqueur, H. (2018). Entertainment as crime prevention: Evidence from Chicago sports games. *Journal of Sports Economics*, (forthcoming).
- Glaeser, E. L., & Gottlieb, J. D. (2008). The Economics of place-making policies. *Brookings Papers on Economic Activity*, 155–253.
- IMG Forum. (2017). Sports Stadiums. Posted January 31 at <http://www.igmchicago.org/surveys/sports-stadiums>.
- Rosentraub, M. S. (2014). *Reversing urban decline: Why and how sports, entertainment, and culture turn cities into major league winners*. Routledge.