

THE IMPACT OF PROFESSIONAL SPORTS FRANCHISES AND VENUES ON LOCAL ECONOMIES: A COMPREHENSIVE SURVEY

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ABSTRACT. Local governments routinely subsidize sports stadiums and arenas using the justification that hosting professional franchises produces economic development and social benefits in the community. The prevalence of venue subsidies generated an extensive and vibrant research literature, which spans over 30 years and includes more than 130 studies. We chronicle this body of research from early studies of tangible economic impacts in metropolitan areas, using basic empirical methods, through recent analyses that focus on sub-local and non-pecuniary effects and employ more sophisticated empirical methods. Though findings have become more nuanced, recent analyses continue to confirm the decades-old consensus of very limited economic impacts of professional sports teams and stadiums. Even with added non-pecuniary social benefits from quality-of-life externalities and civic pride, welfare improvements from hosting teams tend to fall well short of covering public outlays. Thus, the large subsidies commonly devoted to constructing professional sports venues are not justified as worthwhile public investments. We also investigate the paradox of local governments continuing to subsidize sports facilities despite overwhelming evidence of their economic impotence. Our analysis informs academic researchers and policymakers to motivate future studies and promote sound policy decisions guided by relevant research findings. (*JEL*: R58, H71, L83, Z28)

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1. INTRODUCTION

Between 1970 and 2020, state and local governments devoted \$33 billion in public funds to construct major-league sports venues in the United States and Canada, with the median public contribution covering 73 percent of venue construction costs.¹ The prevalence of subsidized sports stadiums and arenas spawned an active economics literature evaluating their efficacy at stimulating economic activity. This literature contains near-universal consensus evidence that sports venues do not generate large positive effects on local economies. Several existing surveys of this literature have documented the strong consensus of null findings (Baade and Dye 1988b; Siegfried and Zimbalist 2000; Coates and Humphreys 2003b, 2008; Coates 2007). However, this literature expanded considerably since the last comprehensive literature survey. We survey the extensive academic literature on the economic impacts of sports teams and venues on local communities, which includes more than 130 articles and spans more than 30 years, most published in the past decade. We document the presence of a clear consensus in the results reported in this literature. Supplementary Appendix Table A1 provides a list of included studies and brief summaries of the main findings.² We also discuss explanations for why these subsidies continue despite the consensus evidence that they generate little in terms of tangible local economic benefits.

The early empirical literature on economic impacts of sports venues and games primarily employed multiple regression models using annual data aggregated to the metropolitan area level to compare economic outcomes across urban areas with teams over time. With the key empirical question, the (lack of) tangible economic impacts flowing from professional sports teams and venues, largely settled, much of the recent economics and urban/regional development literature focused on investigating the existence of localized economic development effects and quality-of-life amenity benefits. Matheson (2019) notes that even though sports events are not associated with large tangible economic benefits in metropolitan areas, and may not deserve substantial public funding, the optimal subsidy for a new sports facility may be greater than zero. Benefits may be concentrated in neighborhoods or business/entertainment districts that deliver concentrated economic benefits that

¹Real dollars in 2020 terms. 1970 to 2010 stadium funding from Long (2013), and subsequent funding from various media reports compiled by authors.

²There exists a complementary literature on mega-events (e.g., Olympic Games, World Cup, Super Bowl, etc.), which similarly finds these events have limited positive impacts on host communities. We do not include these studies in this review, as the subsidization of sports venues to host professional sports teams is extensive enough to warrant a separate treatment. Economic studies of mega-events are sufficiently distinct and abundant to require a separate survey and have been more recently summarized by (Baade and Matheson 2016; Barrios et al. 2016; Scandizzo and Pierleoni 2018).

some communities may value. If the presence of a vibrant sports-anchored development represents a desirable feature of modern cities, then sports venues may be useful and valuable developments.

The presence of a local team may also generate intangible non-pecuniary amenity benefits that raise the welfare of local residents, even if they are not directly enriched by it. However, studies that have estimated values for these factors still largely concur with early findings of the inefficiency of stadium studies, which further supports the academic consensus of limited positive impacts from hosting sports franchises.

Robust empirical findings documenting the impotence of professional sports in local economies likely reflect a simple theoretical explanation: consumer spending on sports represents a transfer from other local consumer spending, not net-new spending. Although sports games attract some non-locals to spend money in the area, these visitors also crowd out other tourists attracted to other consumption amenities common to major US cities. Even with the presence outside visitors attracted by sports events, most consumer spending in and around pro sports venues derives from local residents; therefore, the opportunity cost of local sports consumption falls primarily on other competing local businesses, such as movie theatres, restaurants, and retail shopping. Most spending on game tickets, concessions, and associated hospitality near a sports venue would have occurred in other parts of the host jurisdiction without the presence of a pro sports team. Sports-related spending largely reflects a redistribution of existing spending by residents rather than increased local spending.

Any added spending from visitors attending games tends to be concentrated in certain sectors in the local economy and in locations that may not bear the full tax burden generated by subsidies. In addition, the influx of consumers also generates local nuisance or congestion externalities in the form of traffic, crowds, noise, litter, and crime, which may mitigate any positive economic effects. Furthermore, there is no obvious reason to expect income or employment multipliers from sports spending to be greater than those for other types of local consumption spending that are crowded out; thus, the consistent empirical findings of insubstantial tangible economic impacts from professional sports teams and venues conform to theoretical expectations.

This paper undertakes a systematic, comprehensive review of the literature assessing the role that professional sports teams and venues play in local economies. We begin with a discussion of the state of public funding of sports stadiums and arenas in Section 2, which provides motivation for this survey. We then divide our literature review of economic impact studies into

specific subjects. Section 3 focuses on metropolitan-level studies, the dominant spatial unit of observation in the early literature. Section 4 summarizes research that focuses on sub-local economic effects near stadiums, primarily related to business activity. Section 5 reviews estimates of positive externalities from non-pecuniary intangible social benefits, and Section 6 reviews recent evidence of negative nuisance and congestion externalities from hosting sports events. Section 7 critically assesses several objections raised by the small minority of researchers who dissent from academic consensus regarding the lack of tangible economic benefits. In Section 8, we address the apparent paradox of why stadium subsidies persist despite the abundance of evidence that sports venues are poor public investments. Section 9 concludes with a summary of findings and suggestions for future research. Though research on the economic effects of sports franchises and venues is profuse, further study is needed to exploit new empirical techniques and assess newer facilities and sport-focused development strategies that local governments continue to support.

2. STYLIZED FACTS AND KEY POLICY ISSUES

In 1970, teams in North America's four major sports leagues—Major League Baseball (MLB), the National Basketball Association (NBA), the National Football League (NFL), and the National Hockey League (NHL)—played games in 80 stadiums and arenas in the US (76) and Canada (4) (Okner 1974). Between 1970 and 2020, 135 new or replacement stadiums and arenas hosting teams opened, representing an average of 2.6 new venues per year. Figure 1 shows a modest increase in new facilities in the 1970s and a robust construction boom occurring in the 1990s and 2000s. Few new facilities opened during the 1980s, and the period following the mid-2000s experienced relatively less new facility construction; however, Humphreys (2019) notes that the average age at which teams are replacing their existing stadiums (27 years) indicates that another wave of stadium construction is expected within the next decade, as the facilities built in the 1990s and early 2000s are deemed obsolete. For example, in 2017 team owners in Atlanta replaced their NFL and MLB stadiums after only 25 and 20 years of use, respectively.

Stadiums and arenas are often replaced even though they remain viable venues. From the 1960s through the 1980s, NFL and MLB franchises often shared a public multipurpose stadium—older fans will remember the infield dirt making for treacherous footing for football players in shared stadiums. Team owners preferred separate single-sport stadiums rather than share space, scheduling, and revenue with a co-tenant. A further motivation for teams to seek new facilities was

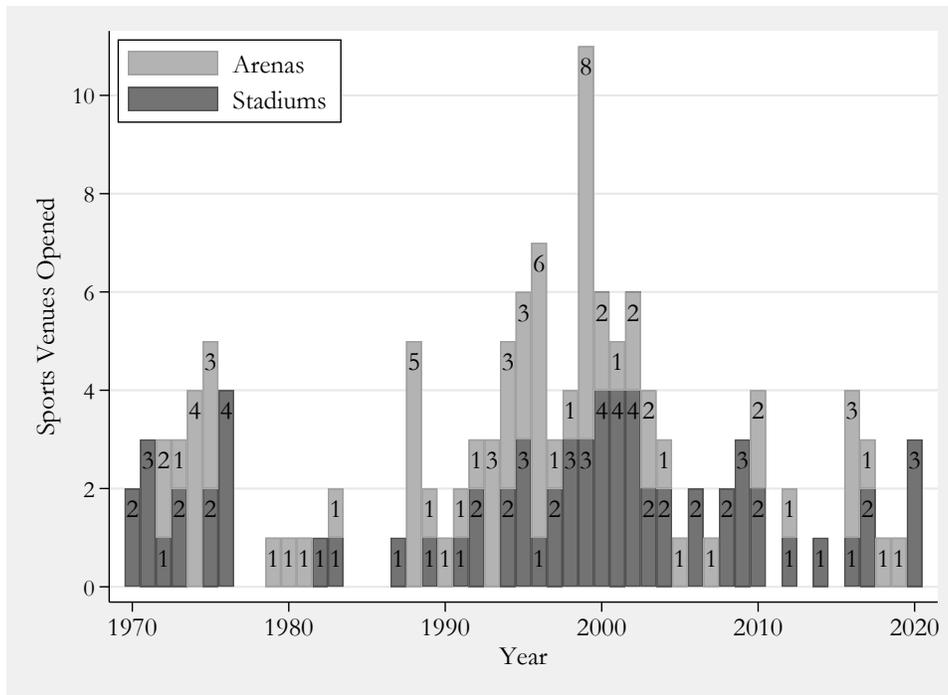


FIGURE 1. Major-League Sports Venues Opened in US and Canada by Year (1970–2020). Stacked bars sum to cumulative annual total.

to generate added revenue from modern amenities, like luxury boxes and club seating, that cater to a lucrative customer cohort of affluent individual and business spectators.

An added benefit to NFL teams was that premium seat fee revenue was not initially subject to league revenue sharing (Vrooman 2012). Fort (1999) notes that the stadium revenues of teams that have new facilities “often outpace the ‘have nots’ by a multiple of twenty in MLB and the NBA, and almost forty in the NFL.” A novelty effect from constructing new venues that increase the spectator demand and correspondingly increase team revenues is well-documented in all sports leagues (Coates and Humphreys 2005; Bradbury 2019). Poitras and Hadley (2006) estimate that the private returns from new stadiums are high enough to cover the construction costs, rendering any spillover benefits to be inframarginal.

Although the rate of new facility construction slowed during the 2010s, the cost of new sports facilities increased substantially. Long (2013) provides an extensive summary of publicly-reported stadium costs and public contributions, which we extend through 2020. While median publicly-reported costs represent 73 percent of total costs (60 percent mean) they routinely omit less obvious costs, such as land, infrastructure, operations, capital improvements, municipal services, and foregone property taxes. Long finds that including these relevant public obligations increased

public contributions 40 percent greater than reported costs in 2001 (Long 2005) and 25 percent in 2010 (Long 2013, p.80). Such underreporting of costs likely continues.

Figure 2 reports the fraction of total new facility costs covered by public subsidies, including the mean and median public share by decade, which has declined over time. The average public share of construction costs fell from almost 100 percent in the 1970s to approximately 50 percent in the past decade; however, the declining public share largely reflects teams building more costly stadiums than in the past, rather than a reduced public contribution.

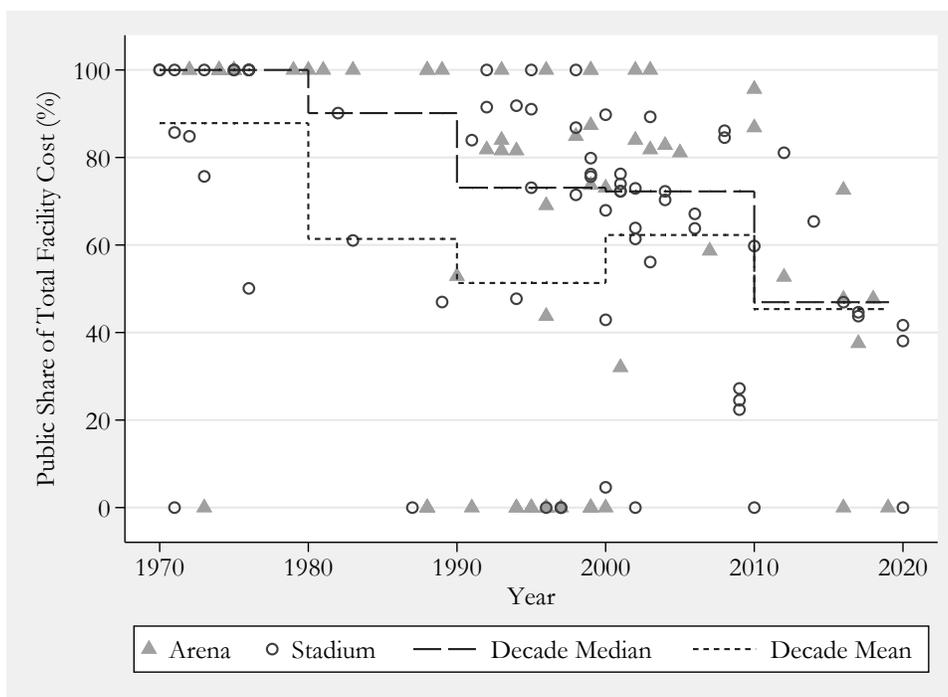


FIGURE 2. Public Share of Sports Venue Construction Costs (1970–2020). Sources: 1970–2010, Long (2013), pp. 19–29; 2011–2020, compiled from media reports.

Figure 3 shows that public funding has increased as stadiums and arenas have grown more expensive. Spectator sports are a normal good, and as the economy has grown, so have consumers’ tastes for sports spectatorship. Stadiums have evolved from austere multi-sport facilities with concrete bleachers and minimal concessions into extravagant sport-specific venues that offer amenities and comforts for which spectators are willing to pay—luxuries which professional clubs are more willing to provide when bearing less than the full cost. Propher (2017) finds support for Quirk and Fort (1997)’s gold-plating hypothesis, that stadium opulence is positively correlated with public subsidies, with each \$1 million in public funding associated with 20 to 50-percent increases in construction costs. The three stadiums that opened in 2020 exceeded \$1 billion in construction

costs. SoFi Stadium in Los Angeles, home to the NFL’s Rams and Chargers, cost \$5.5 billion to build.³

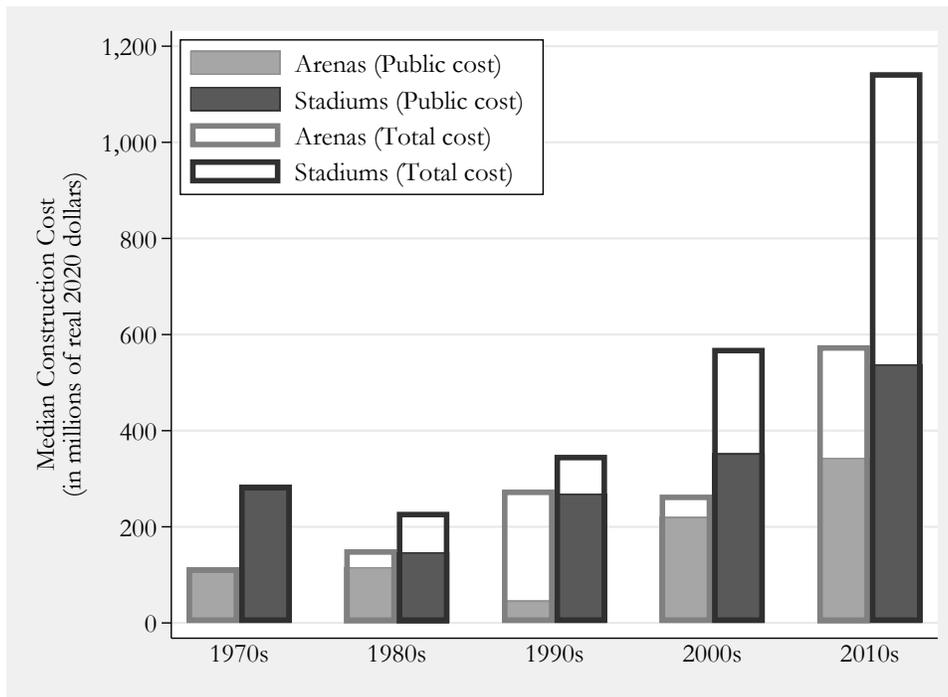


FIGURE 3. Stadium and Arena Construction Costs by Decade (1970–2019). Sources: 1970–2010, Long (2013), pp. 19–29; 2011–2019, compiled from media reports.

In addition to subsidies provided by local and state governments, new sports facility construction projects financed by sub-national governments may qualify for a federal tax exemption on bond interest. Funding stadium construction with tax-exempt municipal bonds lowers borrowing costs for team owners, which can result in significant cost savings on projects where expenditures are measured in hundreds of millions of dollars. Drukker et al. (2020) estimates that the present value of the implicit nationwide subsidy to bondholders from 2000 to 2020 was \$3.6 billion, and resulted in \$4.3 billion in lost revenue to the federal government. Although the Tax Reform Act of 1986 included provisions designed to end this practice, the new restrictions had the unintended consequence of increasing public funding from sources not tied to the facility’s use.⁴ Stadium projects

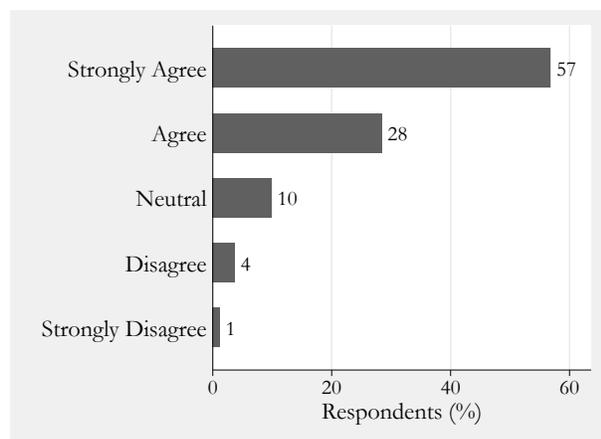
³SoFi Stadium construction was entirely privately financed, which is a notable exception among recent new stadium projects. Los Angeles did not host an NFL team from 1995 through 2015, and the two-team relocation to Los Angeles was part of an NFL effort to return football to one of the US’s largest markets. Construction costs were shared by the two team owners, and the League provided large loans to finance the construction.

⁴The Act categorized municipal bonds as private—thus, not tax exempt—if more than ten percent of the funded project is to be used by a non-government entity (private use test) or ten percent of the debt service was secured by property used by a private business (private payment test). The latter test could be met by local governments funding sports venues from tax revenue derived from non-stadium tax revenue, which incentivized local governments to fund sports venues by diverting public revenue from other unrelated sources.

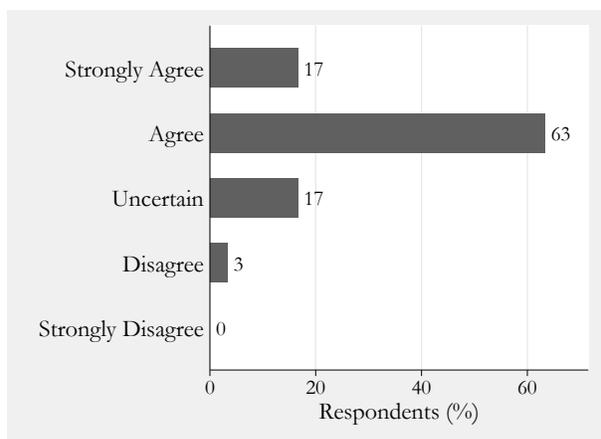
continue to receive substantial funding from local governments even when the public bond financing is not tax exempt.

Though the literature on the economic effects of sports teams and venues has expanded greatly since economists began studying the subject, economists’ opinions regarding the desirability of public subsidization of professional sports has not changed. In 2005, a survey of American Economics Association (AEA) members found that 85 percent of respondents agreed that state and local governments should eliminate subsidies to professional sports franchises, and fewer than five percent disagreed with ending the subsidies (Whaples 2006).

At the time, the strong agreement was noted as an issue where there is exceptional consensus among economists, which has persisted. In 2017, the Initiative on Global Markets surveyed its panel of US economic experts on the costs and benefits of state and local subsidies for constructing stadiums. 80 percent of the responding economists agreed that the costs likely exceed the benefits. The lone dissenting expert justified the subsidies because teams generate public good amenities that are not captured by professional teams—and thus would be underproduced by the market—and not economic development benefits that are often touted by stadium proponents.⁵



(a) Question: Local and state governments in the U.S. should eliminate subsidies to professional sports franchises.



(b) Question: Providing state and local subsidies to build stadiums for professional sports teams is likely to cost the relevant taxpayers more than any local economic benefits that are generated.

FIGURE 4. Economists’ Opinions on Sports Subsidies. (a) 2005 survey of American Economic Association, 210 Ph.D. economist members, 81 respondents (Whaples 2006). (b) 2017 survey of Chicago Booth’s Initiative on Global Markets panel of economic experts, 42 members, 30 respondents (IGM Economic Experts Panel 2017).

⁵Michael Greenstone stated, “Sports teams generate value that they cannot capture thru tixs/tv—Chicagoans benefited from Cubs winning [World Series]. Subsidies are compensation.”

3. EVIDENCE FROM METROPOLITAN AREA DATA

Economic studies of sports venues as drivers of economic activity began in earnest during the stadium construction boom of the 1990s, when a growing number of new stadiums raised concerns over using public funds to subsidize professional teams. Prior to this time, economic impact estimates had been limited to consulting studies, often commissioned by parties with vested interests in stadium projects, using estimation methods of limited credibility. Improved data availability allowed economists to systematically search for evidence of economic effects using more credible statistical methods. Early econometric studies largely used multiple-regression analysis to estimate relationships between the presence of teams/stadiums and economic well-being in metropolitan areas (MSA), which includes the host city proper and its connected surrounding communities.⁶

Much of the early literature on the economic impact of sports facilities is either summarized or included in Noll and Zimbalist (1997), published by the Brookings Institution as a guide for policymakers. The volume includes 15 chapters of analyses using various empirical strategies to assess the economic effects from sports venues. The introduction summarizes the “unattractive economics of stadiums” from the studies’ findings succinctly: “In every case, the authors find that the local economic impact of sports teams and facilities is far smaller than proponents allege; in some cases it is negative. These findings are valid regardless of whether the benefits are measured for the local neighborhood, for the city, or for the entire metropolitan area in which the facility is located” (p. vii–viii).

Findings in papers published in academic journals from that era are similarly dour. In response to what the authors referred to as “stadium mania...sweeping the United States,” with local politicians proposing sports as a channel for economic development, Baade and Dye (1988a, 1990) provide the first empirical analyses of sports stadiums on local economies by examining impacts on a few selected US metropolitan areas extending from the mid-1960s to the early-1980s. Baade (1996) extends this empirical strategy to estimate the relationship between the presence of sports teams and new stadiums and cities’ income per capita and share of state employment in the amusement and recreation sector using data from the late-1950s through the 1980s from a larger sample of metropolitan areas. The estimates do not identify positive impacts on host economies, and

⁶Some early contributions focused on the policy landscape of the era and offer case studies in books. Baim (1994) features several essays that were published as policy reports during the 1980s, and includes detailed financial information on several public stadium projects. Johnson (1995) provides a collection of case studies of minor league baseball stadium development projects.

in some cases the estimates are negative. These studies use multiple-regression analysis to estimate correlations between the presence of teams/venues and economic variables, while controlling for a few other relevant factors. Though the empirical approach is rudimentary by today's standards, the analyses in these papers represents an improvement over prior forecasts generated by regional input-output multiplier models that produced unreliable and unrealistic economic impact estimates.

Rosentraub et al. (1994) uses a comparative case study approach to examine Indianapolis's aggressive sports-focused development strategy in the 1970s and 1980s to evaluate the economic progress of the city relative to nine other similar metropolitan Midwestern areas that lacked a similar sports-focused emphasis. While the comparisons identify some small gains in the sports sector, the improvements were largely inconsequential to the city's development and economic growth—a finding that is not surprising given the relative size of the sports sector to the city's economy (one percent). The authors conclude that Indianapolis's experience indicates sports are unlikely to generate the economic impacts that stadium boosters frequently claim.

Coates and Humphreys (1999) examines the impact of sports teams and stadiums on per capita income level and growth for all US MSAs that hosted major-league teams from the late-1960s through the mid-1990s, finding a negative association between a vector of “sports environment” variables (e.g., the presence of teams, new stadiums, team entry and exit) with income level and no relationship with income growth. The authors postulate that the significant negative correlation may reflect the willingness of residents to accept lower incomes in return for the non-pecuniary benefits of hosting a major-league sports franchises or the opportunity cost of public investments that have higher returns. Coates (2015) revisits Coates and Humphreys (1999), extending the sample by 17 years (1969–2011 total), including all US MSAs, and including NHL and Major League Soccer (MLS) franchises. He finds no effects on wages or income. The findings are similar to earlier estimates, and individual coefficients frequently indicate negative impacts of franchises and stadium construction on metro-area populations.

Hudson (1999) uses techniques developed in the regional growth literature to estimate indirect effects of sports teams on local employment using a sample of US metropolitan areas over 20 years, in which most cities lost or gained major-league sports franchises. The estimates do not identify a positive impact of teams on employment, and the author concludes that, when combined with findings of other studies, available evidence “casts substantial doubt on the ability of a professional sports team to act as an economic engine. Therefore, this justification for access to public

money does not stand up to close scrutiny” (p. 407). Lertwachara and Cochran (2007) employs a unique financial event study methodology to observe the impact of major-league franchise expansions and relocations on host cities’ economies for the last three decades of the twentieth century. The authors find that team acquisitions were negatively associated with income per capita in the short and long run, consistent with Coates and Humphreys (1999).

Coates and Humphreys (2003a) uses a similar empirical approach and sample period as Coates and Humphreys (1999) to examine employment and earning in sectors that ought to be impacted differently by sports, which permits more explicit observation of how sports impact local economies. The estimates suggest that sports are associated with a small positive effect on earnings per employee in the Amusements and Recreation sector, but the effect is offset by decreased earnings and employment in other sectors. The findings are important, because they help explain why commercial sports activity—which is easily observable to the general public, and thus often a source of expectation for positive economic effects—does not translate into increased economic activity in studies of aggregate economic performance.

Sports commerce primarily reflects a transfer of economic activity from other sectors (restaurants, bars, and retail), which is not easily observable. Coates and Humphreys (2003a) represents the first study to document this trade-off empirically, which economists had long-theorized as the most plausible explanation for the limited impacts of sports on the broader local economy. The results also have strong implications for projections of significant economic impacts based on large multipliers, because the findings indicate sports are substitutes rather than complements to other sectors of the economy. Instead of generating positive spillovers, multipliers from sports appear to be no more than one. Jasina and Rotthoff (2008) identifies a similar impact of teams on worker wages in counties that host major-league teams.

Coates and Humphreys (2011) further investigate industry-specific effects by examining the relationship between the presence of major-league franchises in a metropolitan area and earnings of individual males in occupations directly (e.g., athletes, coaches, stadium attendants, etc.) and indirectly (e.g., restaurant and hotel employees) impacted by sports using a sample that extends from the 1980s into the early-2000s. Estimates indicate that some sports-related sectors may benefit from hosting NFL franchises, but the effects for MLB and NBA are not strongly associated with workers being indirectly impacted by sports. Miller (2002) examines the employment effect of two sports venues being constructed in St. Louis, finding no impact on construction jobs or wages,

which is consistent with these projects being substitutes for other construction projects rather than generating new construction work.

Noting that most existing sports venue impact estimates were heavily weighted by baseball and football stadiums, Propheter (2012) focuses on the economic impact of basketball arenas on local economies. Basketball stadiums tend to be cheaper to build and are more multipurpose in function, with the ability to host hockey, concerts, and other events; thus, they may have stronger effects. Using a sample of MSAs that hosted NBA teams from the 1980s through the 2000s, Propheter identifies mixed effects on per capita income, with some positive effects in earlier eras; however, modern basketball-only facilities in the 2000s were associated with income declines. In total, he concludes that, like football and baseball stadiums, basketball arenas are not catalysts for economic development.

Endogeneity represents an obvious concern with empirical approaches using simple indicator variables to identify the impact of team presence in panel regression models. Perhaps the existence of a professional sports franchise in a city reflects something about its depressed economic conditions that is associated with sports commerce but not caused by it. Rather than hindering the local economy, sports teams could be a symptom of other economic maladies and actually keep cities from experiencing even worse economic conditions.

Research casts doubt on the importance of endogeneity in this setting. Coates and Humphreys (2001) exploit plausibly exogenous shocks to local sports markets created by labor strikes and lock-outs (a negative shock) and playoffs appearances (a positive shock) as natural experiments. The authors find labor stoppages in baseball and football did not generate significant impacts on per capita income in host cities. In addition, franchise departures were not associated with negative economic outcomes. Coates and Humphreys (2002) finds no positive impact from postseason participation on per capita income. The limited impacts of external shocks further demonstrates the impotence of professional sports activity in local economies.

Islam (2019) uses the synthetic control method to estimate the extent of development effects of hosting professional sports teams. The synthetic control method is a formalized case study approach, developed in a series of papers summarized by Abadie (2021), designed to infer causal effects in natural experiments, which makes it ideal for analyzing policy choices of local jurisdictions. The analysis compares the economic performance of three cities that received NFL teams in the 1990s to synthetic control cities constructed using data from cities with similar characteristics

that did not gain NFL teams, finding no evidence of either improved income or employment in communities that gained new teams.

Several studies focus on the economic impacts of minor-league baseball, which also receive substantial subsidies from smaller communities, and are more spatially dispersed around the US than major-league teams. Agha (2013) identifies some positive correlations between the presence of minor-league baseball teams and stadiums and local per capita income using data from the mid-1980s to the mid-2000s. This paper does not identify negative relationships found in similar studies of major-league teams. Agha (2013) posits that the difference relative to Coates and Humphreys (1999) may reflect lesser displacement effects from smaller minor league team operations.

Agha and Rascher (2021) examines the impact of both major- and minor-league teams on a large sample of almost 900 metropolitan (MSA) and micropolitan (MiSA) statistical areas from the mid-2000s through the early-2010s using difference-in-differences and panel regression techniques to identify the impact of teams in different-sized markets. The authors find no impact on employment or establishments and conclude that teams tend to move to strong markets rather than teams producing economic development, similar to findings from studies of major-league sports teams.

3.1. Summary of evidence from metropolitan area data. Studies analyzing the economic impact of professional sports on metropolitan areas report little evidence of strong economic impacts in urban areas home to major-league teams. While not surprising in light of the clear importance of displacement effects, the empirical evidence clearly contradicts common claims of large tangible benefits from hosting sports activities made by subsidy proponents.

4. EVIDENCE FROM LOCALIZED DATA

While large metropolitan area wide economic effects from sports venues do not appear to exist, areas in close proximity to stadiums and arenas may experience hosting spillovers that are not apparent in aggregate city and region level data. Even if localized impacts occur, the assumption that sports commerce has positive spillovers on surrounding businesses is naïve, because stadiums can either foster or hinder different types of economic development, depending on the specific characteristics of the host community. While policy debates typically focus on positive externalities, researchers also identifies negative spillovers. Even if localized net effects are positive (or negative) the distribution of the impacts on different sectors is important, because stadium subsidies typically come from broader municipal and state tax jurisdictions.

Humphreys and Zhou (2015b) takes a formalized approach to understanding local agglomeration effects from stadiums by providing a spatial equilibrium model of the interplay of factors that influence business entry to and exit from the area surrounding a stadium, as well as the impact of these changes on local income, employment, business activity, and housing values. Agglomeration economies arise from the ability of professional sports to attract large numbers of consumers at the same time to a particular location, creating an “arena district” where city residents congregate to consume complementary entertainment goods and services. Fan-driven consumer traffic makes it profitable for related businesses to co-locate near sports facilities. However, businesses that lack complementarities to sports may be disadvantaged by taxes levied to fund the project and experience negative spillovers from congestion and crime and thus relocate outside the arena district.

The model predicts that the net impact of sports venues concentrates near the venues and depends on the specific characteristics of host areas. The net impact may be positive or negative, depending on the degree of substitution between the services a business provides and consumers attracted by the venue development. Less-developed areas with low property values are more likely to experience improvement, while perviously-established business and retail centers are prone to induce establishment departures as a result of reduced demand for existing services.

This section summarizes the sub-metropolitan area economic development literature, which examines granular economic impacts of sports within cities motivated by the model developed by Humphreys and Zhou (2015b). Economists have searched for localized development effects using measures of business activity, local sales, and impacts on hotels, which we discuss in separate subsections. Though there is some evidence of positive localized tangible impacts, particularly in the immediate vicinity of venues, overall findings are mixed. The economic development case for subsidizing sports stadiums remains tenuous, as many studies continue to find little-to-no economic impacts, even in areas immediately surrounding stadiums. Stadiums also appear to have distributional impacts with unequal benefits and costs, as predicted by Humphreys and Zhou (2015b).

4.1. Local business location and activity. Harger et al. (2016) examines the impact of new stadiums on nearby business establishments in 10 US cities in the 2000s. Difference-in-difference estimates do not identify any strong effects on the number of new businesses or employment in general; however, the authors estimate small positive effects on employment at eating and drinking establishments within one mile of the stadiums. These localized findings are consistent with

Coates and Humphreys (2003a), which identify positive redistribution effects to sectors that are complementary to sports consumption.

Propheter (2019b) similarly observes employment at two stadium sites in Denver, Colorado following the relocation of the city's MLS team from downtown to a new suburban stadium in 2007. Neither location exhibited relocation effects, indicating limited impacts of the team on the immediate hosting area. Propheter (2020b) examines the impact of Sacramento's NBA arena on nearby businesses' survival time from the 2000s through the 2010s. Stadium proximity was associated with shorter survival time for retail businesses relative to similar establishments located further way from the venue. Other sports-complementary establishments (e.g., restaurants, lodging, etc.) were not affected by the arena. Both findings are inconsistent with the notion that stadiums are magnets for business development.

Bradbury (2022b) uses the synthetic control method to estimate the impact of the relocation of Atlanta, Georgia's MLB team from downtown to a suburban Business Improvement District (BID) in 2017. Commercial property assessments, which should capitalize local business activity, decreased following the stadium's opening relative to other metro-Atlanta BIDs, but the difference was not statistically significant. In contrast, Propheter (2019a) identifies a positive impact on commercial rents following the opening of Brooklyn's NBA arena; however, the sample is limited to commercial lots within one mile of the arena. Whether these higher rents resulted from an increased demand for rental space or a reduction in supply of such space is an open question.

4.2. Local sales. Economists also use local sales and sales tax collections data to estimate economic effects of hosting teams and opening new facilities. If sports events generate net-new revenue, then this should be evident in changes in local purchases, as external consumers transfer their spending to the host jurisdiction. It is somewhat surprising that economists have not analyzed sales or sales tax revenues more often to estimate the economic effects of sports events, because most local jurisdictions raise revenue through sales taxes and collect detailed data on sales and sales taxes. Existing studies in this literature tend to fall into one three groups.

The first group of studies analyzes impacts of hosting specific sports events plausibly associated with a game day influx of visitor spending generated by sports events. Though they do not all focus on the impact of the presence of professional sports teams, the findings are informative in terms of the impact of hosting sports on local sales since the other sporting events analyzed also attract large numbers of fans on game day. Coates (2006) identifies positive impacts on local

sales from hosting the Super Bowl in Houston, Texas; however, Porter (1999) does not identify an effect in Arizona or Florida. No effect is identified from hosting MLB's All-Star Game (Baade and Matheson 2001; Coates 2006). Baade et al. (2011) identifies some positive impacts from hosting college football games, but not basketball games, in Florida college towns; however, Depken and Coates (2009) does not identify a similar effect of football in Texas college towns.

The second group of studies uses the empirical strategy of exploiting the presence of teams and events over a long period of time on sales activity. This facilitates identification of the impact of particular events as well as the presence of professional teams playing home games during the regular and post-season periods. Baade et al. (2008) examines four large Florida cities home to major-league teams and mega-events. These cities also experienced work stoppages, league expansions, new stadiums, and other non-sports-related economic shocks over the sample period. In a similar vein, Depken and Coates (2011) examine a large sample of Texas cities that hosted college games and other sports events outside the commonly analyzed four major professional sports leagues. The results indicate some positive impacts from championship games, but no effects from hosting professional sports teams.

The last group of studies perform formalized case studies of newly-opened sports venues that estimate the impact of new team's arrival on local sales tax revenue. Propher (2014) examines the opening of Toyota Park in the Chicago suburb Village of Bridgeview, Illinois on sales tax revenue. The \$106 million stadium was 100-percent publicly financed by Bridgeview to attract MLS's Chicago Fire. Sales tax receipts did not increase following the stadium's completion in 2006, indicating that the stadium did not increase local economic growth or generate added tax revenue to sufficiently cover the subsidies received. Estimates also show mixed effects on surrounding municipalities.

Mills et al. (2014) estimates the impact of sales taxes levied to fund new MLB and NFL stadiums in Arlington, Texas on local tax revenue. The authors report increased tax revenue from the tax rate increase, which is unsurprising. The authors infer that some tax revenue was exported from outside Arlington following the opening of new facilities, and that added taxes deterred some local business formation. The results indicate an indeterminate impact of the new taxes on the local community.

Stitzel and Rogers (2019) analyze industry-level sales by businesses located near the Chesapeake Energy Arena in Oklahoma City, Oklahoma, where the NBA's Thunder relocated in 2007.

Using a difference-in-differences approach, the authors focus on sales in sports-related industries (i.e., food and drink, entertainment, hotel, and retail) operating within five miles of the arena. They identify a proximity effect with sales being 20 percent higher within one mile of the arena relative to businesses located further away, much like Harger et al. (2016)'s findings on employment in eating and drinking establishments. The authors also find a positive complementary impact on nearby food establishments, but entertainment establishments experienced decreased sales, indicating the impact of a substitution effect. The latter finding supports a key prediction of the model developed by Humphreys and Zhou (2015b) in terms of agglomeration of businesses in complementary industries and exit of businesses in substitute industries.

Depken and Fore (2020) examines the impact of several events in downtown Charlotte, North Carolina using proprietary data from one restaurant located walking distance from several sports venues from 2007 to 2013. Impacts associated with citywide sports and convention events were mixed, but events held at nearby venues hosting the Carolina Panthers (NFL) and Charlotte Bobcats (NBA) were associated with increased sales, again consistent with the expected impact of sports events on a nearby complementary business in the model developed by Humphreys and Zhou (2015b).

Bradbury (in press) employs the synthetic control method to estimate the impact of Cobb County, Georgia's Truist Park and its associated mixed-use development intended to support year-round commerce, on sales tax collections. Though a small increase in tax revenues was evident, particularly during baseball seasons, approximately one-third of the stadium-development's revenue resulted from crowding out of other local economic activity, and the added tax revenue fell well short of covering provided government subsidies.

4.3. Hotels occupancy and room rates. New sports venues are often touted as important catalysts for tourism, generating new spending by visiting patrons who would otherwise not consume local goods and services. Data from individual hotels offers a setting in which to identify spending by visitors who travel to a city to attend games.

Lavoie and Rodríguez (2005) uses the Box-Jenkins method to identify impacts of several league work stoppages on hotel occupancy aggregated to the city level in eight Canadian cities during the 1990s, when the cities also experienced team departures and arrivals. The results do not support the existence of strong impacts of sports on hotel occupancy, though three cities did experience declines in hotel stays during the 1994-1995 lockout.

Depken and Stephenson (2018) estimates the relationship between multiple sports and entertainment events in Charlotte, North Carolina on daily hotel stays, room rates, and revenue. The sample period from 2005 to 2013 includes regular season and post-season NFL and NBA games (both located downtown), as well as college sports, professional golf, auto racing, and non-sports events. NFL regular season and postseason games were associated with increased room rentals, rates, and revenue, with approximately 40 percent of increased room rentals occurring in the city center, and having no impact on the suburbs. This includes a day-prior effect, but not earlier or day-after effects. NBA games were not strongly associated with any hotel outcomes.

The authors find larger positive effects for multi-day events designed to attract out-of-town visitors (e.g., auto races, college basketball tournaments, and a political convention). This is consistent with findings regarding the Super Bowl and NFL regular season games generally increasing hotel rentals, rates, and revenue for host cities over several days (Heller and Stephenson 2021). The estimates also identify spillover effects within the metropolitan area that impact non-funding jurisdictions. Ultimately, the authors conclude the evidence suggests that tourism-related tax revenue is a tenuous reason to justify public subsidies for sports venues and events, because visitor impacts appear to be small.

Stephenson (2021) conducts a similar analysis of hotel stays, room rates, and revenue in St. Louis, Missouri and San Diego, California, which both lost NFL teams in 2016 and 2017, respectively. In St. Louis, MLB and NFL games were associated with small increases in most hotel outcomes, but increased hotel activity was not associated with NHL games. In San Diego, the NFL team and a college bowl game were associated with positive hotel outcomes. San Diego also hosted one MLB All-Star game that was associated with a small increase in hotel revenue, but not hotel stays or room rates, consistent with prior estimates of limited economic impacts of all-star games (Baade and Matheson 2001; Coates 2006).

Chikish et al. (2019) exploit exogenous variation in the timing of events hosted at the Staples Center in Los Angeles, California to analyze how events in the arena affected local hotel outcomes. The authors identify a small positive impact on room revenue at hotels within one mile of the venue; however, hotels located between one to four miles away experienced larger declines in room revenue. NHL events were associated with declines in all hotel outcomes and NBA events were positively related to room rentals and revenue, but negatively related to room rates. Also, during

work stoppages in both professional leagues, hotel rates were higher instead of lower, exceeding off-season rates.

Overall, the results are not consistent with the idea that events in the Staples Center increased demand for nearby hotels over what visitors would have purchased absent events in the arena. Instead, patterns in hotel occupancy reflects significant spatial displacement of substitute economic activity. While nearby hotels may benefit from arena events, demand reductions in less-proximate hotels implies an uncertain total impact on local hotel revenue and tax collections. The findings do not support the use of hotel taxes and fees to fund sports arenas.

Though sports events may be common destinations of visitors, their impact on local hotel activity is limited, which is understandable. Hospitality industry firms typically construct hotels where demand is sufficient to meet capacity year-round; thus, hotel rooms rented by game attendees for infrequent sports events are unlikely to have a large impact on filling otherwise empty rooms. Furthermore, visitors travelling to an area to attend sporting events may crowd out visitors travelling to that area for other reasons, including business travel.

4.4. Summary of localized development effects. Though studies identify some localized positive effects near sports facilities, such findings are not ubiquitous in the literature. In general, when positive effects exist, they occur very close to venues, within one or two miles, and in sectors closely related to sports consumption (e.g., food and beverage). This pattern in the results strongly supports the predictions made by the model developed by Humphreys and Zhou (2015b). The effects likely differ across types of sports facilities and events because of pre-existing characteristics that may or may not complement sports-focused economic development. A key lesson from this literature is that even at the most spatially disaggregated levels, positive economic development effects are not guaranteed, and positive spillovers appear to manifest only in favorable commercial environments. The findings also highlight the potential for negative externalities that may deter business formation, not a prominent argument in public policy debates over stadium subsidies. We further discuss this point in Section 6. Overall, the evidence indicates limited localized economic development halos from stadiums and arenas.

5. POSITIVE EXTERNALITIES FROM INTANGIBLES

Even if sports teams and venues do not generate tangible local economic benefits, public subsidies could be justified if local residents receive sufficient intangible social benefits from their

presence. Teams and venues may produce local public good benefits, such as promoting social cohesion and civic pride, and enhance the host's image as a "big-league city." Sporting events may also generate spillover amenities like pedestrian-friendly areas and entertainment districts that improve the quality of life for nearby residents. These social benefits are not captured in transactions in sports markets. The presence of a professional team or new stadium may increase local social welfare sufficiently to warrant public subsidies to remedy a market failure generated by the presence of these externalities.

Even if the tangible economic benefits are non-existent, intangible benefits may be sufficient to generate a positive return on a public investment in a new sports facility. A body of economic research employs a number of complementary empirical strategies, including the Contingent Valuation Method, analysis of property prices, analysis of voting in referenda on facility subsidies, and estimation of consumer surplus in sports markets, to quantify intangible welfare gains from hosting teams. We next survey this literature.

5.1. Contingent Valuation Method. Noting that governments often justify funding new stadium projects because sports teams generate large positive externalities, Johnson and Whitehead (2000), in a seminal study, use the contingent valuation method (CVM), a stated preference approach, to measure how much residents value the presence of local sports teams in the context of two proposed new sports facilities. Environmental economists developed CVM to quantify individuals' nonuse value of environmental assets. In this literature, nonuse value refers to intangible benefits generated by the presence of environmental assets that individuals may or may not consume or directly experience. Environmental assets valued using CVM include wilderness areas, national parks, endangered species, and others. CVM employs survey questions designed to elicit individual preferences objectively for non-priced goods in hypothetical settings. In the case of sports facilities, CVM studies focus on a different hypothetical: proposed new sports facilities.

Johnson and Whitehead (2000) use surveys of households in Lexington, Kentucky to estimate a nonuse value of a minor-league baseball team and a college basketball team. In this setting, estimated nonuse value represents a small portion of residents' willingness to pay for host sports facilities (10 and 30 percent, respectively), which was not sufficient to justify the estimated public cost of constructing the venues. Similarly, Johnson et al. (2001) use CVM to estimate the nonuse value of Pittsburgh hosting the NHL's Penguins, finding the nonuse value to be 73 percent of the total willingness to pay for a new stadium for the team. The estimated nonuse value (\$17.2–\$48.3

million) fell well short of the \$300 million in public funding used to construct a new arena in 2010. Johnson et al. (2007) examine the nonuse value of Jacksonville hosting the NFL Jaguars and a hypothetical NBA team, finding the nonuse benefits insufficient to cover actual or proposed public facility subsidies.

Other researchers employ CVM to estimate the nonuse value of the NFL's Minnesota Vikings (Fenn and Crooker 2009) and Indianapolis Colts (Swindell et al. 2008), the NHL's Calgary Flames and Edmonton Oilers (Johnson et al. 2012), and a potential new MLB franchise in Portland (Santo 2007). Each study reports estimated nonuse benefits less than the actual or expected public subsidy provided for the respective new sports facility projects.⁷ The mean and median estimated nonuse values, as a percent facility construction costs, are 18 and 12 percent, respectively in these papers. Outside North America, Castellanos et al. (2011) estimates the nonuse value for the Spanish professional soccer club R.C. Deportivo of A Coruña and finds this sufficient to fund a new stadium for the club but not sufficient to cover the club's accumulated debt in 2003.

Though CVM provides a novel approach for estimating intangible benefits in the form of nonuse value, researchers also criticize CVM for producing unreliable estimates of consumer valuation. One criticism notes that survey respondents may not give accurate answers because they lack the proper frame of reference to form meaningful estimates of their willingness to pay when surveyed, called "hypothetical bias" in the literature (Diamond and Hausman 1994). Other criticisms including embedding effects where the wording of survey questions affects nonuse value estimates and ordering effects where the order in which survey respondents receive hypothetical information affects these estimates. Hausman (2012) goes so far as to call CVM's ability to measure nonuse value accurately as "hopeless."

However, other researchers defend the approach (Haab et al. 2013; Kling et al. 2012). Carson (2012) describes CVM as a practical alternative when prices are not observable. Furthermore, CVM adherents have not ignored its potential deficiencies and biases. In light of these criticisms, Johnson et al. (2006) investigates potential biases in a CVM survey valuing sports teams in Jacksonville (see Johnson et al. 2007), finding limited embedding and ordering effects and offering specific guidance on how to avoid biases from these effects. Walker and Mondello (2007) addresses reliability and

⁷Swindell et al. (2008) emphasizes the importance of the estimated positive nonuse value (\$60-85 million), but that estimate falls well below the public subsidy (\$650 million) provided to build the new sports facility analyzed, Lucas Oil Stadium in 2008.

validity CVM for sport valuation. Whitehead et al. (2016) also examines potential biases, reports no evidence bias exists, and suggests corrections in situations where bias might exist.

Though imperfect, CVM provides a reasonable mechanism for quantifying nonpecuniary benefits of hosting sports teams and events, which would otherwise be unobservable. Due to their inherent limitations, CVM estimates should be viewed with appropriate skepticism and complemented with estimates using other methods if possible. The main concern with CVM estimates is that they may overestimate nonuse value; thus, if existing nonuse value estimates from hosting professional sports teams are biased, then they likely overstate individual willingness to pay for hosting sports teams. Overall, the findings of CVM investigations are not supportive of the quality-of-life and civic pride justifications for funding sports venues at typical levels, with estimated average nonuse values typically being less than 20 percent of facility costs. The presence of bias in nonuse estimates for sports only strengthens the case against public subsidization of new sports facility construction.

5.2. Property values. Carlino and Coulson (2004) observe that any external benefits and costs generated by professional sports teams in cities ought to be capitalized into residential property values: “If people like having a professional sports franchise in their community, they are presumably willing to pay for it, if not directly through the purchase of season tickets, then indirectly through an increased willingness to pay for housing in the area” (p. 27). This hypothesis derives from Tiebout (1956) and Oates (1969), who argue that spillover benefits and costs of publicly-provided services should be reflected in local property values. Unlike survey-based evidence from CVM studies, property values reflect revealed preferences. Also, the model developed by Humphreys and Zhou (2015b) predicts that sports facilities will affect nearby residential property values.

Carlino and Coulson (2004) estimate an hedonic housing pricing model accounting for home and city characteristics in several large US metropolitan areas including indicator variables that identify the presence of NFL and MLB teams. The estimates indicate an eight-percent increase in rental prices in cities home to NFL teams, with stronger central city impacts. MLB teams are associated with increased rents in suburban areas. However, Carlino and Coulson (2004) report wages are two percent lower in NFL cities, which the authors interpret as a compensating differential that residents are willing to pay to cover the costs of hosting an NFL team. The authors conclude that their results “are substantial evidence that the quality-of-life benefits associated with hosting an NFL team may justify the seemingly large public expenditures” (p.48).

Coates et al. (2006) re-estimate the Carlino and Coulson (2004) model using several reasonable alternate specifications and find that the estimates are not robust to these alternative specifications. Coates et al. (2006) conclude that cross-city variation in residential rents is consistent with large positive spillovers from hosting sport teams and that spillovers cannot justify large public subsidies. Carlino and Coulson (2006) disagree with the inferences drawn from the alternate model specifications and defend their original estimates.

Tu (2005) uses a hedonic regression difference-in-differences approach to observe changes in home sales prices in distance-bands from a new stadium in Landover, Maryland, which opened in 1997 to host Washington, DC's NFL football team. The estimates indicate negative effects of stadium proximity—property closest to the stadium was valued less than property further away—however, the negative relationship pre-dated the stadium. Before-and-after comparisons of sales find that the proximity discount decreased after the stadium site was announced, and further decreased following the stadium opening. Tu infers that the new football stadium generated positive spillover effects on property surrounding the stadium, contrary to assertions of neighborhood activists who claimed the stadium would adversely impact property values.

However, Coates (2007) notes that proximity to an NBA/NHL arena that closed during the same year is an unaccounted confounding factor in the setting analyzed by Tu (2005) that makes the inferences drawn from property value changes in this case less clear. In addition, the Landover project is somewhat unique in that it was largely privately funded and received only a small state-level subsidy so the team relocation analyzed here did not increase the marginal tax burden to neighborhood residents, which normally accompanies new stadium projects.

Feng and Humphreys (2012) uses a spatial autoregressive hedonic pricing model to estimate the impact of proximity to major-league sports stadiums and arenas on aggregated census block property values in US metropolitan areas for 1990 and 2000. The estimates indicate a positive association between sports facility proximity and housing values, for all venues. The finding is consistent with positive stadium spillovers, but it does not necessarily reflect a causal relationship. It is unclear if teams tended to locate sports stadiums in areas with higher residential property values, or if stadiums caused property values to increase. Assuming sports venues are entirely responsible for property value improvements, reasonable extrapolations from median values generate an estimate of \$254 million in added property taxes, which falls below the \$339 million in construction costs;

thus, even if the sports venues generated positive residential spillovers, increased property values tended not to be sufficient to cover their costs.

Feng and Humphreys (2018) uses the same empirical method to examine the proximity of residential property near two stadiums in Columbus, Ohio, which host MLS and NHL teams. The authors find increased housing values of 1.75 percent for each ten percent decrease in distance from the facilities. The estimates are consistent with substantial intangible benefits from the venues, which were greater than aggregate construction costs within one mile of the facilities. The facilities were privately financed, so they did not directly increase residents' tax burden.

Huang and Humphreys (2014) highlights the danger of inferring causation from correlations between proximity to sports facilities and property values by analyzing variation in mortgage applications in census tracts near new facilities using a difference-in-differences approach. Initial estimates identify substantial increases in mortgage applications following the opening of 56 new sports facilities in US cities during the 1990s and 2000s, consistent with the presence of positive stadium spillovers. Further analysis indicates that much of the relationship can be explained by pre-existing characteristics of new facility locations: the new facilities tended to be located in poor and low-income areas, which experienced increased mortgage applications over the sample period. The relationship between proximity and mortgage applications diminishes and becomes statistically insignificant after controlling for these characteristics, which indicates that much of the redevelopment would have occurred without the construction of new facilities.

Keeler et al. (2021) uses a hedonic spacial difference-in-differences approach to estimate the impact of the opening of Staples Center in downtown Los Angeles, which was announced in 1997 and opened in 1999. The sample period from the mid-1990s to mid-2000s ends before the opening of the nearby L.A. Live entertainment complex; thus, the estimates likely reflect only the impact of the sports venue. Houses within close proximity experienced between eleven and six percent price increases within one to two miles of the venue, respectively. The increased sale prices are consistent with positive spillovers that derive from the arena. The arena analyzed is home to four professional sports teams—NBA (2), NHL (1), WNBA (1)—and hosts concerts and other events, unusually heavy use among sports facilities. The facility was constructed largely using private funds, with the city covering less than 20 percent of the construction costs, so the critique in Coates (2007) also applies here.

Agha and Coates (2015) extends the search for spillover effects in residential property markets to the case of minor-league baseball teams, which are prevalent in mid-sized US cities. Like major-league teams, minor-league teams often seek and receive significant public subsidies for facility construction. The authors use residential rents in a hedonic pricing model, similar to Carlino and Coulson (2004), to estimate the impact of the presence of minor-league baseball teams in over 100 MSAs from the mid-1990s to the mid-2000s. The authors find a positive association between rents and team presence in mid-sized cities, with rents being between six to eight percent higher. Thus, there may be some benefit to hosting a minor-league team, where it brings some respectability to a “big-league” town that might not otherwise be known beyond the area, as well as generating civic pride, which tenants value.

van Holm (2019) uses a difference-in-differences approach to analyze the impact of new minor league stadiums built around 2000 on residential property values in census tracts near the new stadiums, and how these residential property values changed a decade after the stadiums opened. Median home prices were higher in tracts within one-mile of the stadium than in other parts of the city; however, no effect was evident when compared to tracts with similar characteristics in other cities without stadiums. Census tracts near new stadiums also experienced increased housing density and vacancy rates after the stadiums opened. Thus, minor-league baseball stadiums were associated with increased intracity agglomeration of housing but not with increases in citywide residential property values.

Property value impacts have also been identified around sports facilities in Europe. Ahlfeldt and Maennig (2010) uses a hedonic price model to estimate the impact of multipurpose Olympic sports venues on land values in Berlin, Germany. Precise GIS mapping permits controlling for other local amenities and disamenities, and the estimates indicate positive proximity effects for the sports facilities. Ahlfeldt and Kavetsos (2014) analyzes changes in home prices following the replacement of Wembley Stadium (English Football Association, opened in 2007) and Emirates Stadium (Arsenal Football Club, opened in 2006) in London, England. The authors estimate differences-in-differences models to compare changes in residential property values before and after the new stadium announcements and construction.

Sale prices were positively associated with both stadium introductions, and varied according to stadium characteristics, consistent with the presence of positive externalities. The new stadiums were constructed near their predecessors; thus, the changes likely reflect the new stadium

rather than other changes nearby neighborhoods. The responses can only reflect amenity spillovers, because neighborhood taxpayers bore little to no costs for the project.⁸

However, not all research identifies positive impacts on property values. Dehring et al. (2007) conducts an event study using difference-in-differences estimation to observe changes in residential property values in response to several proposed NFL stadium sites in the Dallas-Fort Worth, Texas metro-area during the 2000s. Announcements regarding downtown relocation initially increased nearby property values, and property values declined when the proposal was rescinded. However, subsequent announcements regarding a relocation to suburban Arlington, Texas, where the stadium would ultimately be built, were associated with decreased property values that were commensurate with the added tax burden of the project.

Borges and Whetstone (2022) also finds heterogeneous effects on residential property values associated with the relocation of the NFL's Raiders to Las Vegas, with nearby less-expensive homes benefiting from the stadium's announcement, while more-expensive homes experienced losses. In addition, homes closer to the stadium experienced positive effects, while more distant homes experienced negative effects.

Humphreys and Nowak (2017) examines the impact of two NBA team departures in the 2000s on local property sale prices by analyzing repeat home sales near basketball arenas in Charlotte, North Carolina and Seattle, Washington. Estimates indicate that home prices increased between six and 14 percent following team departures, which is consistent with the teams generating residential disamenities on the host communities (see Section 6). Joshi et al. (2020) similarly analyzes repeat housing sales to estimate the impact of the promotion of the Seattle Sounders to MLS in 2009 and finds a reduced property values with distance-decaying effects following the team's promotion.

Propheter (2021) uses California's uniform tax assessment laws to estimate the impact of proximity to three Los Angeles sports stadiums on assessed residential property value recovery speed after the 2007 Great Recession. Propheter (2021) employs an accelerated failure time estimator to measure how long it took for recession-devalued properties within three miles of the stadiums to return to pre-recession levels, using both residential and commercial parcel assessments. Proximity to Staples Center (NBA/NHL) and Dignity Health Sports Park (MLS) were not associated with

⁸Wembley Stadium (£900 million) was largely privately funded (£600 million), with public contributions from the National Lottery (£120 million), Department of Culture, Media, and Sport (£20 million) and the London Development Agency (£21 million), while Emirates Stadium (£390 million) was privately funded (Conn 2018).

increased recovery time; however, property located close to Dodger Stadium (MLB) recovered more quickly to pre-recession assessed values than property located further away. This finding appears curious, because Dodger Stadium, which opened in 1962, like many older stadiums, is surrounded by parking lots. This result contradicts the assertions of stadium-anchored economic development proponents who frequently argue that a “moat of parking lost” discourages positive local development externalities (Nelson 2001a). Propheter posits that the lack of integration into the neighborhood may instead provide the unseen benefit of insulating the community from negative externalities from the stadium (Section 6).

Bradbury (2022a) employs the synthetic control method to estimate the effect of the intra-metropolitan-area relocation of Atlanta’s MLB team on local property assessments in its new host Cobb County. Comparisons indicate Cobb’s post-stadium property value growth was not extraordinary among metro-Atlanta counties following the stadium-development’s announcement in 2013 or opening in 2017, which are not indicative of the stadium generating positive spillover effects to residents and businesses.

5.3. Voter preferences. Evidence of important intangible benefits may also be discovered through the democratic process, as stadium subsidy projects often must be approved by voter referenda. Voting permits residents to reveal preferences for stadium benefits and costs that are not captured in markets for sports consumption. In addition, patterns in the spatial distribution of votes provides information as to how the community perceives and values any proximity-related intangible benefits.

Of course, referendum voting has a well-known problem: the setting of reversion levels in votes that generally leads to passage of the referendum. Fort (1999) highlights the importance of this in the case of referenda on stadium subsidies. Consequently, while some direct-democracy stadium initiatives fail, most succeed, which may reflect a local willingness-to-pay for sports activities (Brown and Paul 2002) or strategic setting of the referendum reversion level.

Coates and Humphreys (2006) analyzes voting patterns for stadium initiatives in Green Bay, Wisconsin (NFL, 2000) and Houston, Texas (NBA, 1999 and 2000), finding a positive association between voter proximity to the facility in Green Bay and support for a subsidy for renovation of a stadium but no relationship in Houston. This pattern in the results suggests that residents most likely to experience venue spillovers were more willing to fund the cost of projects, consistent with sub-local agglomeration effects being positively associated with proximity to the facility.

Dehring et al. (2008) uses a 2004 Arlington, Texas football stadium funding referendum to host the NFL's Dallas Cowboys—which was approved by 55 percent of voters—to test the “homevoter hypothesis” (Fishel 2001) that homeowners tend to support/oppose public projects that they perceive will increase/decrease their homes' value. The authors use a hedonic price model to estimate the impact of stadium-related announcements on city home prices and then examine how precinct-level vote results relate to housing-price effects from the announcements. The authors find referendum support was positively associated with property values and that homeowners were less likely to support the referendum.

However, the relationship between facility proximity and political support is likely more complex than a simple monotonic rate of decay in support with distance. Ahlfeldt and Maennig (2012) observes voting for Allianz Arena (host to FC Bayern Munich), for which Munich, Germany residents considered the question of providing €107 million public funding to support transportation links for a new soccer stadium in 2001. The authors identify a NIMBY (“not in my back yard”) effect, that though voters supported the new stadium in the city, they preferred stadium sites that were not in immediate proximity to their homes. The finding is consistent with positive metro-area amenities and negative disamenities in host neighborhoods.

Horn et al. (2015) similarly identifies NIMBY preferences for hosting sports teams in a 1997 Seattle, Washington referendum in support of a new NFL/MLS stadium. Support for the stadium was weakest in close proximity to the stadium site, and strongest within short driving distance from the stadium. The results are consistent with a Goldilocks zone, where residents who experience convenience in commuting without the disamenities of hosting games value the stadium the most among area residents. Johnson and Hall (2019) found no evidence that voters living close to a proposed new NFL stadium in downtown San Diego were more likely to vote in favor of a construction subsidy in a 2016 referendum.

5.4. Consumer surplus estimates. Finally, two relatively old papers estimate the consumer surplus generated by the presence of teams in cities based on observed game ticket prices. Monopoly teams cannot fully capture consumer willingness to pay to attend games, and the remaining consumer surplus reflects the willingness to pay to attend games by fans and, under certain conditions, the value of public goods benefits generated by sports teams. Since teams cannot fully capture this fan willingness to pay, teams may not be willing to enter markets with substantial consumer

surplus, providing a reason to subsidize teams. Consumer surplus can be estimated using ticket price and attendance data. Consumer surplus reflects both intangible values and use values.

Irani (1997) estimates consumer surplus associated with attending MLB games over the period 1972 to 1991 by fitting a linear demand curve based on a fixed effects regression model. Irani (1997) reports large estimates of annual consumer surplus, ranging from \$2.2 million per year (in 1982 dollars, about \$6 million in 2022 dollars) in Cleveland to \$54 million dollars per year (\$145 million per year in 2022 dollars) in Los Angeles. Alexander et al. (2000) calculate estimates of consumer surplus from attending games played in the four major US sports leagues based on financial data on gate revenues and assumed price elasticities of demand in 1996. Alexander et al. (2000) report substantially lower estimates of annual consumer surplus based on game attendance, ranging from \$5 million per year in Milwaukee for MLB games (in 1996 dollars, about \$9 million per year in 2022) to \$40 million per year for MLB games in Atlanta (about \$73 million per year in 2022). Both studies report substantial estimates of consumer surplus.

Interestingly, research estimating consumer surplus generated by attending professional sports games completely dried up after the paper by Alexander et al. (2000). The presence of better ticket price data and improved econometric methods in the last 20 years makes the lack of any additional research on this topic difficult to understand. The relatively large consumer surplus estimates reported in these papers makes this a potentially important piece of information for assessing the justifications for public subsidies for new sports facility construction projects.

Both papers have notable empirical limitations. Irani (1997) estimates a linear demand curve, almost certainly an inappropriate model specification. And the price-quantity relationship is the textbook example of an empirical model suffering from endogeneity problems. Irani (1997) makes no attempt to correct for the endogeneity of prices in the regression model. Alexander et al. (2000) undertake a rudimentary analysis using only gate revenue data from a single season, 1996. Alexander et al. (2000) do not estimate a demand curve; instead, they calculate consumer surplus estimates based on different assumed values of the price elasticity of ticket demand. While the results in these papers are suggestive of the possibility that substantial consumer surplus, and thus public good values, exists in these markets, the limitations in the empirical analysis makes the use of these estimates to assess subsidies speculative at best, and wildly inappropriate at worst.

5.5. Summary of intangible benefits. Economists have identified intangible benefits from stadiums hosting professional sports teams using several empirical methods, a notable accomplishment

considering the well-known obstacles to quantifying unobservables. The presence of non-pecuniary social benefits is not surprising given the nature of professional sports. However, we know much less about the magnitude of value of these benefits, which represents important information for policy guidance. CVM surveys identify positive effects; however, the benefits tend to be well-below subsidy levels provided for new sports facilities. The search for intangible amenity and disamenity effects in property values has produced mixed findings. Though some studies identify positive effects, the capitalized improvements generally are not large enough to justify the subsidies received and some research reports negative impacts of sports facilities on property values. Stronger positive effects have been observed for projects that had limited tax consequences.

Voters tend to support stadium subsidies in referendums, and support appears to increase with proximity to the venue; but voters appear to prefer not to be too close to facilities. Majority preferences do not necessarily equal efficiency. Though referendums may be the best public policy tool for collective decision-making regarding stadium subsidies, ignoring minority preferences, rational ignorance, and strategic proposition presentation can undermine market failure corrections through direct democracy. Some relatively old, empirically dubious evidence exists suggesting that attendance at professional sports games generates substantial consumer surplus.

In sum, empirical evidence from peer-reviewed research indicates that individuals do value sports teams and venues beyond their economic development contributions, which may justify a positive level of subsidies even if tangible benefits are not expected. However, the total social benefits tend to be far less than typical subsidies provided for new facility construction projects. The value of intangible benefits alone appear unlikely to justify the ongoing level of subsidization for new sports facility construction projects.

6. NEGATIVE EXTERNALITIES FROM DISAMENITIES

While most debates about sports-driven economic development focus on direct economic impacts and potential positive spillovers, research also identifies considerable negative effects in cities hosting sports events. Estimates of small, limited positive effects appear in the literature and frequently come up in the public debate on subsidies. Hosting games generates nuisances as well as potential benefits. The substantial and robust evidence of negative effects almost never appears in these policy debates. Gameday activities can benefit some nearby businesses and residents, but may also generate disamenities for others. The influx of consumers on game day also brings

unwanted crowding, congestion, and crime. These costs must be weighed against any benefits in welfare assessments.

Negative externalities consist of the typical urban congestion externalities. These include increased crime, increased traffic, and negative health impacts generated by close proximity for fans in and around facilities on game day. In addition, some evidence suggests increases in air pollution generated by game day traffic and increased airborne particulate matter during facility construction projects that has negative health consequences for residents.

6.1. Crime. Crime is the most extensively studied and documented negative externality generated by hosting games. Sports are associated with aggressive fan behavior, frequently combined with alcohol consumption that may catalyze criminal conduct. Marie (2016) develops a conceptual framework identifying three main channels through which sports may impact crime: the concentration of hostile fans, in which fans gather to become targets of or commit crimes; displacement of police to monitor game day events and maintain order and safety; and incapacitation of potential criminals who attend or watch games rather than commit crimes. Using crime data from London boroughs that hosted soccer matches in the mid-1990s, Marie (2016) identifies increases in property crimes in boroughs hosting matches. Crime in boroughs home to travelling teams falls during away matches. This combination of effects highlights the role of displacement of police and incapacitation of criminals on crime in communities. In total, the findings indicate hosting games appears to increase property crime against local residents.

The positive association between crime and sporting events is perhaps the most robust empirical finding in the economic effects of sports literature.⁹ Using a variety of empirical methods, economists clearly identify positive relationships between hosting sports games and crimes in many settings. We briefly discuss several prominent studies in this literature to summarize consensus findings. Researchers identified a positive relationship between hosting sports events and crime for games played by MLB teams (Mares and Blackburn 2019; Pyun 2019), NBA and college basketball teams (Yu et al. 2016), NFL teams (Kalist and Lee 2016), NHL teams (Block 2021), college football teams (Rees and Schnepel 2009), English soccer clubs (Marie 2016), and Spanish soccer clubs (Montolio and Planells-Struse 2016, 2019). Propher (2020a) finds larger displacement effects in

⁹Baumann et al. (2012) is an exception that finds no impact of sports teams on annual MSA crime rates, but there is little expectation that the presence of teams should affect city-wide crime rates over the course of a year, especially if sports events reallocate crime within the region.

downtown areas than in the suburbs during NBA games, indicating that crime impacts differ by neighborhood characteristics.

The crime costs generated by hosting sports games are not trivial, either. Using existing cost-of-crime estimates (Cohen 2005), regular season costs of sports-related crimes have been estimated at \$700,000 for NFL games (Kalist and Lee 2016) and between \$1.2 million (Mares and Blackburn 2019) and \$30 million (Pyun 2019) for MLB games. These estimates ranges for costs are somewhat speculative, but crime is unarguably a substantial local disamenity that neighborhood residents and businesses want to avoid. Negative externalities from hosting sports events are obvious, and thus it is understandable why residents hold NIMBY preferences for sports venues, even if they value having a stadium in the metro area (see Section 5.3).

The clear positive relationship between sporting events and crime also implies increases in policing costs. Humphreys et al. (in press) analyze the impact of sports-related crime on police spending using data from the Annual Survey of Public Employment & Payroll survey over the periods 1979-1995 and 1997-2010 for US municipalities with and without professional sports teams. Their results show that police employment increases with the arrival and departure of an NFL team in a city as well as with the number of postseason games played in MLB. Employment increases range from about 2% to 6% depending on sport and model specification.

6.2. Health, traffic, and pollution. A less obvious spillover from hosting sports games is pollution from congestion when residents travel to games, which contributes to road traffic and air pollution. Congested roads inflict time costs and may be a detriment to public health, particularly for residents with respiratory ailments. Humphreys and Pyun (2018) examines the impact of MLB game attendance on time spent in traffic, and finds a positive effect. The estimates indicate that an MSA with average MLB attendance experiences approximately five million additional miles traveled—which represents just over half-of-one percent of total vehicle-miles traveled—and 28,000 hours per year in delayed traffic. Using air emissions cost of congestion (Mashayekh et al. 2011), this translates to \$7 million per year in social costs from added CO₂ emissions.

Locke (2019) analyzes variation in the daily average concentrations and air quality indices for several common atmospheric pollutants, and identifies a small negative impact of games on air quality. However, though the estimate is statistically significant, the magnitude of the relationship is so small that the damage has little practical significance. Humphreys and Ruseski (2019) identify effects from new stadium construction on infant birth weights. Estimates indicate that between

50 and 4,000 additional low birth weight newborns attributable to increased airborne particulate matter from stadium construction projects in their county of birth.

Stoecker et al. (2016) examines the impact of sports-related social gatherings on disease transmission, analyzing county-level influenza mortality in cities home to NFL teams. The authors find large robust impacts of local team Super Bowl participation on influenza mortality among elderly adults, which increased by 18 percent, and may be explained by game-related gatherings or travel. However, the authors do not identify any effect from hosting the Super Bowl, which suggests that attracting out-of-town spectators does not play a strong role in disease transmission. Cardazzi et al. (2020) similarly analyzes the effect of cities acquiring new professional sports teams on weekly influenza spread, finding increased influenza mortality of between four and 24 percent in cities that gained new professional sports teams, relative to cities with no teams.

6.3. Summary of negative externalities. Researcher reveals strong evidence of negative spillovers in cities that host sports events. In particular, hosting games is associated with increased criminal activity, which may generate considerable costs to area residents and businesses. Other nuisance externalities from congestion, pollution, and public health have also been identified as potential harmful byproducts of sports games. These externalities also imply substantial negative external costs. Policy discussions about the appropriateness of subsidies for new professional sports facilities should include the potential costs and consequences of negative externalities generated by professional sports, and not focus solely on positive direct and indirect impacts.

7. ANTI-CONSENSUS ARGUMENTS

Though most research in this literature does not support the contention that hosting sports teams generates large economic impacts on local communities, some important exceptions should be acknowledged. Skeptics of the consensus in economic research documented above frequently argue that economic outcomes typically used to quantify the impact of sports do not fully capture important holistic, difficult to measure benefits. If stadiums provide unique physical capital that promotes a healthy downtown, for example business and/or entertainment districts, this also may strengthen the commercial and social reputations of host communities, a potentially important but difficult to quantify outcome. The main idea behind these criticisms posits that research focused on common quantifiable economic outcomes (e.g., income, employment, and output) does not capture these other benefits. Important, undetected long-run development effects generated by professional

sports may exist. Critics also argue that idiosyncratic location-specific factors makes comparisons across locations difficult.

Chema (1996) argues that early findings in Baade (1996) of limited economic impacts from sports teams and venues cannot be applied to modern stadiums, because the sample analyzed by Baade (1996) contains many older, non-urban, multipurpose sports facilities which were not designed to be integrated into the surrounding community as part of an urban development strategy. Santo (2005) similarly questions the findings reported in early studies as outdated and advocates the approach used in Baade and Dye (1990) which analyzes a larger sample of MSAs that lost or gained teams from the mid-1980s to the 2000s. Baade and Dye (1990) reports mixed results, identifying positive impacts from new baseball stadiums on aggregate MSA level income and on MSA income as a share of regional income. But Baade and Dye (1990) also find a negative relationship between baseball teams and aggregate MSA income. While this extended sample may be defensible, the outdated empirical strategy used by Santo cannot be easily defended.

The most impressive feature of findings in the early literature is not the results in any one study—most are not notably rigorous—but rather that a large number of studies using different approaches and data generally reach the same conclusion. Baade and Dye (1990) is not an exemplary study that should serve as a guide for empirical analysis in performed in 2005. Santo's concerns have since been refuted by subsequent research on modern stadiums discussed above.

Nelson (2001a) argues that previous research using MSA-level data may not properly capture stadium impacts without taking into account the specific location of sports facilities within an MSA. He posits that downtown facilities likely generate more spillover spending than isolated suburban facilities, which may discourage nearby economic development. In response, he analyzes MSA's share of state income per capita in all MSAs home to at least one major-league team from 1969 to 1994 and accounts for the location of facilities within metro areas with indicator variables. The estimates identify positive associations between income share and centrally-located major-league teams. Nelson suggests that previously reported negative findings may reflect the impact of suburban stadium locations, rather than the presence of teams. However, Wassmer (2001) makes a compelling case that Nelson (2001a) may have the causality reversed in that stadiums locate in central business districts when they contain robust economic activity. Wassmer (2001) also argues that the coefficient estimates reported by Nelson (2001a) likely suffer from omitted variable

bias. Nelson (2001b) concurs that further study with the suggested improved methods are needed. Subsequent studies have not supported his central business district hypothesis.

Urban studies scholar Mark Rosentraub, an early critic of stadium-led economic development (Rosentraub 1997), later became a prominent skeptic of the economic consensus regarding the inefficacy of sports-focused economic development. In the 2000s, Rosentraub published a series of papers, often with coauthors, in which he argues that, while economic benefits may be difficult to quantify in standard economic outcome variables, stadiums ultimately benefit host communities economically, and thus the economic consensus on the inefficacy of sports-focused development is mistaken.

Like Nelson (2001a), Austrian and Rosentraub (2002) posits that the direct impact of sports on economic activity may be irrelevant if the goal of subsidizing a new stadium is revitalization or enhancement of a city's downtown core. The economic relationship between central business districts and suburbs may be integrated, with the health of the outer regions dependent on the city's urban core. Using the experience in two cities with sports-focused downtown development strategies (Cleveland and Indianapolis) and two cities that did not pursue such policies (Cincinnati and Columbus), the authors identify some gains in higher paying service sector jobs in tourism and creation of excitement in downtowns generated by sports-centric economic development policies. However, the basic descriptive comparisons allow for multiple interpretations, fail to carefully address causality, and lack sufficient rigor to inform policy. For example, a competing qualitative analysis by Delaney and Eckstein (2003b) describes Cincinnati as having a powerful local growth coalition advocating for sports-focused development, diametrically opposed to the assertion by Austrian and Rosentraub (2002). Chapin (2004) also finds evidence of a successful sports-focused economic development program in a quantitative analysis using data from Cleveland.

Rosentraub (2006) argues that findings of positive nonuse value of sports (Carlino and Coulson 2006; Swindell et al. 2008), reassessments including newer facilities (Santo 2005), and the importance of downtown central business districts to metropolitan areas (Nelson 2001a; Austrian and Rosentraub 2002) all support the use of public subsidies to build new sports facilities. Rosentraub further expounds on his optimism in a book-length treatment on the topic, in which he argues that academic economists studying sports facilities fundamentally misunderstand the broader long-term economic development impacts of sports-anchored development. He asserts that sports venues represent important financial and civic assets, which stadium development advocates

properly understand. He states, “mayors and community leaders ... ‘got it’ and understood what needed to be done long before many academicians gave them credit” (Rosentraub 2009, p. xiv).

He also argues that downtown amenities fostered by sports, arts, and culture contribute to the attractiveness of a region, and thus produce a healthy city that attracts new residents. If used properly, he argues, sports represent an important tool that promotes urban revitalization and relocation of economic activity to desirable areas. In a recent paper, Arif et al. (in press) report no evidence supporting the idea that new sports facilities increase migration into US MSAs using a large data set of inter-city migration flows over the period 1991-2014.

For example, he writes: “As investments, the tax dollars expended for venues have generated positive net financial returns. Cities can and do win in the sense that the financial returns the public sector receives are more than the funds expended” (Rosentraub 2014, p. xv).¹⁰ These contentions rest on descriptive case studies of six US cities, largely focusing on changes in aggregate economic and demographic metrics without accounting for confounding variables or counterfactual outcomes employed by most economic research in this literature.

Identifying credible conditional correlations requires, at the minimum, properly accounting for the presence of confounding factors. Credible causal inference requires even more attention and methodological rigor. Descriptive case studies are open to subjective interpretation, and to be credible they must be compared to a reasonable counterfactual outcome and not just document observed improvements. For example, in the case of San Diego’s MLB Petco Park development project (a project Rosentraub served as a paid consultant on), Rosentraub rosily concludes “San Diego’s leadership not only created a new model for other cities to follow when dealing with professional sports teams, but it also secured its development goals” (p.164, also see Cantor and Rosentraub 2012).

However, Erie et al. (2010) offers a alternative critical assessment of the Petco Park project, concluding that the ballpark project represents a “net drain” on the city’s finances, which largely benefitted the Padres’ team owner John Moores, who “took advantage of public subsidies and East Village development rights to emerge as a powerful real estate mogul,” while “San Diego taxpayers, the intended beneficiaries of the [public-private partnership], have been left to absorb the fiscal fallout” (p. 670). Furthermore, subsequent rigorous empirical case studies described by Erie et al.

¹⁰Rosentraub’s book was originally published in 2009, and it was significantly revised and published under a new title in 2014.

(2010) do not support the claim that sports venues foster an atmosphere that promotes commerce and raise tax revenue to levels that would justify the subsidies received.

Most recently, Jakar and Rosentraub (2021) acknowledge that, while most research concludes that the return on stadium investments insufficient to cover the subsidies provided, the welfare economics framework employed by economists to assess outcomes generated by sports venue investments contains substantial flaws. Instead, Jakar and Rosentraub (2021) argue that researchers should assess the success of development policy using a “municipal capitalism” framework. Developed by Chapin (2002), municipal capitalism describes competition among entrepreneurial cities in which “the public sector pursues profits on behalf of the private sector, with indirect benefits accruing to the public sector” (p. 567). The public sector plays the lead role by providing investments and continued guidance for local redevelopment in local public-private partnerships to promote regional economic activity and generate important intangible outcomes.

While this alternative approach may offer some new insight as to why local business-focused coalitions consistently advocate for sports-anchored economic development projects (see Section 8.4), it does not represent a normative policy framework for evaluating social welfare. The assumption that certain local constituencies pursue business-focused entrepreneurial goals is not an appropriate basis for assessing the overall desirability of sports venues. Note that this represents a distinct departure from his earlier contention in Rosentraub (2014): “If there are no real economic benefits or financial returns for a city that hosts a professional sports team, then there is no reason for the public sector to invest in a venue” (p. 20).

Subsidy proponents frequently cite Rosentraub’s contentions as an important skeptical counterbalance to the consensus findings of academic researchers. Real estate developers, team owners, and local officials intent on subsidizing new professional sports facilities clearly embrace Rosentraub’s ideas and frequently employ him as a consultant on sports-led economic development projects. However, very little credible empirical evidence supporting his claims exists, which perhaps explains why his arguments have not proved to be convincing or influential in the research literature.

If a credible case for public subsidization of professional sports facilities exists in the research literature, it must be made using evidence on the value of quality-of-life spillovers valued through CVM studies, estimates of consumer surplus, increases in property values, and inferred from patterns of voting, as discussed in Section 5. The total estimated value of these intangible

benefits across a metropolitan area or region could amount to a relatively large sum, even when compared to the typical subsidy provided for new sports facility construction projects.

However, most of these areas of research contain mixed results. The literature on the impact of sports facilities on nearby property values contains no consensus, and some evidence shows property values increase when teams leave an area. While potentially important, the quality and quantity of existing evidence valuing consumer surplus remains poor and dated. Research on referendum voting on sports subsidies also fails to reach a consensus. Furthermore, research identifying positive values associated with intangibles uniformly reports estimated values far below the actual or projected subsidies provided. The case for economic development benefits extending beyond the area immediately surrounding sports stadiums and arenas is tenuous, at best and tangible proximity benefits appear to be small and limited to select complementary industries. No evidence supporting hypothesized long-term positive returns from sports facilities in downtown and metropolitan economies exists. Taken together, the evidence from this large body of research fails to support the existence of a strong, generalizable justification for subsidies.

8. THE PUBLIC FUNDING PARADOX

After decades of study, clear and unambiguous evidence shows that sports stadiums and arenas do not generate strong economic development benefits on host communities. The contrast between the strong consensus null or negative findings of sports venues on local economies in peer reviewed academic research coupled with the continued and growing public subsidization of these facilities creates a seeming paradox: *If sports stadiums are not potent drivers of local economic activity, then why do federal, state, and local governments continue to subsidize sports venues in economic development projects?*

Politicians clearly appear to be more amenable to subsidizing professional sports than other businesses, as the public contribution to sports stadiums and arenas is large relative to other business incentives. Bartik (2019) reports that the average business incentive provided by US state and local governments is equivalent to subsidizing three percent of a firm's wages for 20 years (p. 11). By comparison, the \$300 million subsidy to fund Truist Park as the home of the Atlanta Braves in 2017, a typical example among modern sports facility subsidies, represents approximately eleven

percent of the team's observed and expected post-new-stadium player salaries over the next 20 years.¹¹

Economists have made limited progress understanding why stadium subsidies remain prevalent and persistent components of local economic development policies. Some research in economics, political science, and sociology provide theories explaining professional sport teams continuing success in getting subsidies approved in local democracies, even when the economic evidence is not supportive of the claim that important tangible economic benefits will be generated. We discuss several potential explanations in this section.

8.1. Concentrated benefits and dispersed costs. A common political economy explanation for the prevalence of venue subsidies is the asymmetric bargaining power among interest group constituencies. When subsidy benefits are distributed among a few interested parties, but the tax costs are dispersed widely across an entire polity, the former has a bargaining advantage that will likely yield more favorable political outcomes. The beneficiaries of sports subsidies are heavily concentrated: team owners and proprietors of few complementary activities (e.g., hospitality, recreation, client development, etc.) reap much of the benefits from the hundreds of millions of dollars in venue subsidies. Public funding is spread among a jurisdiction's taxpayers, with each taxpayer bearing a small share of the tax burden.

Even though stadium subsidies may lower the welfare of the average resident, the cost is shared so broadly that individual costs may be small enough (e.g., Baltimore's Camden Yards annual tax cost amounted to \$15 per local household (Hamilton and Kahn 1997)) that it is not worthwhile for voters to organize opposition. In this case, the small group of beneficiaries devote greater resources to promoting stadium subsidies through lobbying and public relations campaigns than the opposition. In addition, residents who value sports teams tend to have strong preferences in favor subsidizing local teams, which enhances the organizational power of pro-stadium voter constituencies (Groothuis et al. 2004). sports facility subsidies may be a foregone conclusion based on rational political incentives faced by both voters and organized interests.

Though a rational ignorance/submission explanation provides intuitive appeal, it is not sufficient to explain why stadium subsidies persist and grow. Perhaps this explanation was appealing prior to the 2000s, when the academic consensus was less apparent and research results were not

¹¹Estimated based on reported team payroll from 2017 to 2021, assuming the same average annual increase in payroll (1.5 percent) over the next 15 years.

known or accessible to the general public. The economic impotence of sports stadiums is now widely acknowledged in public policy debates on subsidies. Though not always the case, media outlets routinely include commentary from academic experts and report their informed skepticism when covering stadium subsidy proposals. Information is spread cheaply and quickly through social media, which can easily be incorporated into opposition campaigns that draw on national political organizations to help counter advocacy campaigns at low cost.¹²

Taxpayer funded subsidy costs have risen to non-trivial levels that appear to be large enough to justify organizing and funding credible opposition campaigns. For example, Arlington, Texas's Globe Life Field, which opened in 2020 as home to MLB's Texas Rangers, received \$500 million in public funding to replace an existing stadium that was less than 25 years old. The public funding translates to a considerable annual tax burden, \$123 per household. Though Arlington stadium proponents received substantially more funding than the opposition, \$1.4 million to \$7,500, total outlays for both sides were quite small, especially relative to the stakes (Formby 2016). In this case, public stadium financing was approved by 60 percent of votes cast in a referendum, and Arlington Mayor Jeff Williams, who was a strong stadium advocate, was twice reelected after the project was approved. The subsidy proposal had strong support from the city's business and political establishments, which has been identified as a key component to success in acquiring public funding for economic development projects (discussed in Section 8.4).

In total, growing evidence verifying sports venues' limited economic impacts, falling costs of disseminating information and organizing political opposition, and continued public support for government funding indicate that sports facility subsidies are not a pure product of financial determinism from the bargaining asymmetry of political interests. Instead, voters have been willing to tolerate large fiscal burdens to fund construction of increasingly expensive venues. The standard political economy model of concentrated benefits and dispersed costs appears inadequate for explaining the continued prevalence of stadium subsidies.

8.2. Bargaining, outside options, and loss aversion. Humphreys and Zhou (2015a) approach the sports facility subsidy issue as a bargaining process between team owners and local officials acting on behalf of taxpayers. While not a formal bargaining process like the collective bargaining

¹²For example, billionaire Richard Scaife played a significant role in organizing "one of the most effective opposition campaigns" for a stadium initiative in Pittsburgh (Delaney and Eckstein 2003b, p. 199), and he also donated to many prominent conservative and libertarian advocacy groups that frequently oppose stadium subsidies around the US.

occurring between unions and employees, the process determining the size of subsidies for new sports facilities resembles bargaining in many important ways. The two sides put forth competing proposals, threats sometimes occur, and in the end some specific outcome, in terms of a “facility deal,” emerges from the process, except in cases where no deal can be reached and the team leaves for another city. Humphreys and Zhou (2015a) develop a formal Nash bargaining model that emphasizes the importance of outside options for the team, in terms of other cities eager to host a professional sports team and willing to provide a subsidy for a new stadium or arena. The model predicts that the better the team’s outside option, the larger the subsidy the team can extract from its current host city in this bargaining process.

Humphreys and Zhou extend this model to include sports fans with reference-dependent loss-averse preferences to the subsidy bargaining process. In this version of the model fans have “gain-loss” utility for sports consumption, which reflect a desire to avoiding experiencing losses, including the loss of the local team to relocation. These preferences are likely applicable to how local residents view their local teams. Teams exploit local resident’s loss aversion with threats of relocation to competing markets and replacing lost franchises with expansion clubs. This allows owners to extract even larger subsidies from taxpayers who highly value hosting a team in their city compared to the subsidies extracted from cities with fans with standard preferences.

The value of the outside option for teams bargaining with cities over subsidies depends on the characteristics of cities with no existing teams interested in attracting a team. In the US, professional sports leagues enjoy either explicit exemptions, in the case of MLB, or implicit exemptions, in the form of antitrust regulators generally uninterested in pursuing cases, from federal antitrust laws. This gives leagues control over the number and location of its teams. Leagues clearly use this power to provide owners with prime outside options when negotiating with cities over subsidies. For example, Los Angeles, the second largest media market in the US, had no NFL team for a 20-year period (1995 –2016).

Los Angeles clearly represented a substantial outside option for teams in the bargaining process and team owners repeatedly used this to their advantage. A simple web search reveals 17 separate occasions over this period when an NFL team owner threatened to move to Los Angeles, some teams on multiple occasions. Absent this special treatment under antitrust law, for example under some form of free entry into the NFL market, a new team would have located in Los Angeles shortly after the Rams left for St. Louis in 1995.

Leagues still employ this strategy. San Antonio, Portland, and Sacramento all currently host only NBA teams and have about 2.5 million residents. All three are larger than cities that currently host multiple teams, including Pittsburgh (NFL, NHL, MLB), Cincinnati (NFL, MLB), Kansas City (NFL, MLB), and Nashville (NFL, NHL). Virginia Beach, VA and Providence, RI, population 1.8 million and 1.6 million respectively, currently host no teams yet the population in both exceeds other cities currently supporting teams, including Jacksonville (NFL), Milwaukee (NBA, MLB), and New Orleans (NFL, NBA). Both these cities have more than half a million more residents than Buffalo, currently home to an NFL and NHL team. Many cities with no teams, or only one, could likely support one or two additional teams.

Teams frequently exploit outside options and loss aversion to enhance subsidies. Leagues control the number of teams and expand infrequently. The allocation of teams across cities suggests strategic behavior by leagues to maintain substantial outside options for teams. Antitrust regulators and Congress show little interest in conducting oversight of de facto monopoly sports leagues. This appears to be an important reason for continuing sports facility subsidization that will persist as a consequence of policy decisions at the federal level.

Though sports franchises frequently use relocation threats to garner large public subsidies, many incumbent teams extract subsidies without relocation threats, which indicates the importance of other relevant factors. For example, in 2017, the NFL's Atlanta Falcons extracted \$700 million in subsidies to construct Mercedes-Benz Stadium as a replacement for the fully functional 25-year-old Georgia Dome on an adjacent plot of land. This mirrors the outcome for MLB's Texas Rangers's stadium replacement in Arlington, discussed above (Tucker 2016).

8.3. High-profile advocacy reports. A common counterargument used against the consensus findings on the inefficacy of sports stadiums in promoting economic development involves commission of a private consulting study to generate favorable findings in terms of forecasted economic benefits. Stadium boosters often hire consultants to conduct economic or fiscal impact analyses that demonstrate the proposed sports development will generate large returns to the community through increased economic activity, creating jobs and wealth in the community while growing the tax base to pay for itself through increased tax collections. These reports are part of what Coates and Humphreys (2008) describe as a "promotional literature." These reports are often released at the same time the stadium project is announced, because economic development justifications are persuasive in fostering favorable public perceptions of sports facility subsidies (Connolly and

Touchton 2020). Delaney and Eckstein (2008) provide examples of how local media outlets often present advocacy studies uncritically or provide false balance to more credible academic studies, which can influence public perceptions.

Instead of providing credible analysis of the potential impact of a proposed new facility project, commissioned reports represent tools of sophistry, intended to create false balance to counter the academic consensus as a viable alternative outcome. Crompton (1995) and Hudson (2001) survey for-hire private impact studies and detail their myriad problems, which persist even though these faults are well-known. Consultant reports frequently claim to document large tangible improvements in economic well-being in terms of jobs and business activity that will more than cover the costs of subsidies by understating costs and inflating benefits flowing from the proposed project.

A common error committed in these reports is to report gross spending estimates that do not account for crowding out of existing local economic spending and assume that all sports-related commerce is net-new economic activity. For example, a previously vacant parcel of land might be viewed as a bustling revitalized commercial hub, without noting that much of the spending at this new commercial hub was reallocated from other local businesses. The returns are often further inflated using fantastical job and income multipliers, which supposedly capture development spillovers in the local economy, using black-box proprietary regional input-output software and models (e.g., IMPLAN, REMI) typically not employed by academic researchers. Using information from commissioned studies for several Super Bowls, Porter (1999) demonstrates how input-output models are inappropriate for this task, because the empirical methods do not account for displaced economic activity from hosting sports events that counteract any increases in economic activity rather than induce the ripple effects assumed by multipliers.

Siegfried and Zimbalist (2002) notes that estimated impacts of sports teams based on standard local expansion multipliers are likely exaggerated. Sports teams import a much higher proportion of labor than most industries, which results in higher than usual revenue leakage from the community. Only 29 percent of NBA players reside in their host region, a figure well below the standard estimate that 93 percent of people live and work in the same metropolitan area. A smaller share of revenues passed to players through wages is likely to be retained in the region than spending by employees in other industries.

These and other basic errors in advocacy reports persist because, unlike academic research, the analyses are not subjected to peer review by disinterested subject experts. However, the biased estimates in these reports are a feature, not a bug, because objective assessment is not their goal. Commissioned economic impact reports are intended to justify proposed funding for a new sports facility projects until they gain formal approval. After that, these reports disappear. Ex-post re-evaluations never take place, because the ex-ante projection served its purpose of securing project approval.

These commissioned reports are likely effective at counteracting the economic consensus because their audience lacks the expertise to differentiate between credible and non-credible analyses. Local taxpayers often accept the findings in promotional reports at face value, or at minimum they generate substantial skepticism about reported findings in the academic literature. Most local residents are not familiar with economic studies and fail to differentiate between findings in peer-reviewed studies and promotional advocacy reports provided by stadium boosters.

Advocacy reports may placate decision-makers, leaders, and voters engaged in motivated reasoning to justify a stadium project that they find antecedently attractive (Rogers 2020). Stadium advocates often emphasize that the promotional analysis is specific to their particular stadium, which accounts for deficiencies in existing research that fail to capture nuances of the project, rendering them inapplicable. “This one will be different” is a common rebuttal from stadium boosters. Such reports are often released as part of a professional public relations campaign that pitches stories to media members. The reports are often accompanied by press releases that include concise summaries of findings and quotes designed to be included in news articles, which are then repeated by politicians, community leaders, and other media outlets. Given that the economic concepts involved in economic impact assessments are complicated, it is understandable why privately-commissioned economic impact reports may be effective at neutralizing existing findings, which likely explains their ubiquity in stadium advocacy campaigns.

Wassmer et al. (2016) posits that these studies may be effective at presenting overly optimistic projections of positive impacts because there are no methodological or reporting standards to follow, yielding bloated impact forecasts. As a potential remedy, Wassmer et al. (2016) provide a list of 20 questions for evaluating commissioned economic impact reports to assess their reliability in order to avoid common mistakes. For example, “[d]emanding a more realistic economic impact

study is perhaps the most important way” to affect public policy debates on venue subsidies (p. 261).

8.4. Local growth coalitions and the media. Research by sociologists Kevin Delaney and Rick Eckstein highlights the importance of influential local insiders in promoting stadium subsidies. Using in-depth interviews with local officials in nine cities seeking stadium subsidies during the 1990s and 2000s, Delaney and Eckstein (2003b) observe that sports teams typically did not lead the public fight for the subsidies they received.¹³ This observation is not consistent with the concentrated benefits and dispersed costs hypothesis, because the chief beneficiary of these subsidies are team owners. The interviews reveal the importance of “local growth coalitions” in successfully garnering stadium subsidies. Sociologist Jay Scherer similarly identifies the importance of a “boosterish” local coalition in overcoming opposition to a subsidy for a new NHL arena in Edmonton, Alberta in the early 2010s (Scherer 2016).

Delaney and Eckstein find local growth coalitions tend to derive from a pre-existing institutional alliance between the local corporate community and local government, which is largely run by business leaders (e.g., chambers of commerce and groups of local CEOs), but it may include other community members, such as politicians, government officials, and members of religious, labor, and media organizations. Though sports franchises are the chief beneficiaries of these subsidies, they rarely play a major role in these coalitions. These groups have a strong influence over all local development policy, which they use to serve their parochial interests. Their detachment from sports franchises permits them to portray their stadium advocacy as being in the best interests of the overall community, and thus their support influences voters. In an environment where the voting public is largely ignorant of the complicated finances of stadium projects, team owners can rely on, or subtly collaborate with, community leaders to build support for subsidies.

Coalition members likely see sports as a way to foster their own interests, such as client development and employee recruitment, even if there is not an economic payoff to the wider community. CEOs use sports as a tool for attracting top executives and qualified workers, for whom the presence of a local team is a desirable quality or signal of available local amenities. While the returns are not sufficient to self-fund a stadium project by coalition members, as long as the tax burden is shared with the general public, the group is willing to support and use their influence

¹³The nine cities studied are Cincinnati, Cleveland, Denver, Hartford, Minneapolis, Pittsburgh, Philadelphia, Phoenix, and San Diego.

to advocate subsidizing stadium projects. Politicians garner credit for “taking action” to stem declining populations and tax bases by supporting a visible activity that is viewed favorably by most community members regardless of political affiliation. Local leaders are inclined to be accommodating to sports franchises, which can provide unique perks through access to luxury stadium amenities (e.g., suites, club seats, complimentary tickets, and concessions) as well as socializing with celebrity athletes and other local power brokers (Delaney and Eckstein 2007).

The coalition has an organizational advantage from its composition of trusted public figures, who have social networks that allow them effectively to obfuscate and distort the costs and benefits to the community, often simply declaring informed critics to be “naysayers” who are acting disingenuously to attract publicity. Critics are in a disadvantaged position where they must “unconvince” the public of a false conventional wisdom that such projects are economically desirable (Delaney and Eckstein 2007). Delaney and Eckstein (2003a) provides examples of how credible academic studies are often neutralized by local growth coalitions to promote stadium benefits to the community. Strategies include ignoring unfavorable studies, counteracting credible studies with commissioned advocacy reports, and pointing to alternate intangible benchmarks (e.g., being a “big-league city”). Though Delaney and Eckstein highlight the success of boosters promoting non-economic factors, our observations of recent stadium campaigns do not support this interpretation: economic development claims remain as strong justifications for public subsidies.

8.4.1. *Favorable local media coverage.* Aligning with politicians and local growth coalitions, often through local media outlets, clearly represents a successful strategy for promoting stadium subsidy initiatives. After reviewing how media coverage impacted several stadium campaigns for public funding, Delaney and Eckstein (2008) conclude “that the local media’s approach can more proactively shape and frame the public’s perception of a stadium initiative and, all other things being equal, significantly affect the outcomes of these initiatives for better or for worse” (p. 91).

Delaney and Eckstein (2008) observe that “an uncritical media often becomes the primary institutional booster of stadium projects in cities with a weak growth coalition” (p.72). Media members may see sports teams as complementary products: residents are more willing to subscribe to local newspapers or watch local broadcasts if they are covering a local team. News media can contribute to public misperceptions of the project by not accurately conveying costs and benefits to consumers, or some members may become active advocates for promoting stadium projects, effectively participating in the local growth coalition. In their research they find: “For the most part,

local newspapers, television, and radio were editorial sycophants for proponents of new publicly subsidized stadiums and ridiculed opponents as shortsighted and selfish. . . In every city we studied, the main local newspaper editorially favored using public dollars for private stadiums” (Delaney and Eckstein 2003b, pp. 18, 193)).

While these findings derive from studying stadium funding campaigns, the discovery of the importance of local growth coalitions likely has applications beyond sports subsidies. Local growth coalitions play large roles in shaping other local policy, and thus are deserving of further scrutiny of public finance researchers in other areas.

8.5. Political pandering. Jensen and Malesky (2018) develop a theoretical framework grounded in the political science literature for understanding a related paradox plaguing local economic development policy, equally applicable to stadium subsidies. Just as elected representatives tend to support subsidizing sports teams and events, politicians often openly promote the use of economic development incentives to attract businesses despite strong evidence of the ineffectiveness of such policies and the fact that most do not pass a cost-benefit test. While rent seeking through campaign donations or other forms of political support—including nefarious exchanges—may play a role, it does not appear to be a major driver in determining economic development policy. These agreements and relationships are not hidden behind closed doors; instead, they are promoted openly and celebrated at press conferences, where politicians claim direct responsibility.

Jensen and Malesky (2018) present an alternate hypothesis: politicians pander to voters by taking credit for attracting desirable new businesses when voters are largely unaware or uncertain about the true costs and benefits of the development deal. They find that US voters tend to support politicians who seek to attract businesses, even when they fail to accomplish state goals. Even though elected representatives are likely aware of the negative cost-benefit calculus, re-election-maximizing politicians have the incentive to exploit voter rational ignorance on the value of economic development projects by supporting economically inefficient projects and policies.

Though the pandering theory was constructed to explain the continuing disbursement of inefficient economic development incentives, its framework is generalizable to stadium subsidies and complements the Delaney and Eckstein (2003b) local growth coalition model. Sports venues are large visible projects that support an activity that is viewed favorably by the public, and local politicians are in positions where they can take credit for the development. By aligning with a community of local insiders, franchise owners may be able to persuade elected representatives and

the public that stadium subsidies are desirable public policy, which encourage politicians to provide public funding.

8.6. Why do local governments continue to subsidize sports venues? Perhaps no line of inquiry in research on public funding of sports stadiums has proved more unsatisfying than the search to understand why local governments continue to fund stadium projects in the face of overwhelming evidence that these subsidies are poor investments. *The public funding paradox* has long eluded a clear, satisfying explanation. The question is not new, either. In 1997, Noll and Zimbalist (1997) asked, “if stadiums are poor investments, why, in the era of limited government skepticism about the nature of public construction projects, are expensive stadiums still being subsidized?” (p. viii). The conjecture at the time was that local politics and sports teams bargaining power offer explanations. Though political and bargaining incentives are no doubt important contributors, they are not sufficient to explain the prevalence and dissemination of public funding. The limited progress and study in this area is concerning given the policy relevance discussed in Section 2. The role of influential local interest groups and leaders, like those identified by Delaney and Eckstein (2003b) and Jensen and Malesky (2018), are difficult to observe and quantify using common empirical methods employed by economists; yet, they appear to be an important causal influence. Research in this area demonstrates the potential of qualitative research methods for studying stadium subsidies may offer insight that existing attempts to understand the widespread use of taxpayer funding to construct stadiums.

9. CONCLUSION

This comprehensive review of the literature on the impact of sports teams and venues on local communities identifies several key findings. Empirical research progressed from early studies of metropolitan areas using multiple regression analysis to rigorous event and case study methods designed to infer causal effects accounting for multiple confounding factors. Even as empirical methods improved, the findings remained largely consistent across this broad and vibrant literature. Our review yields three main conclusions.

First, and perhaps most important, nearly all empirical studies find little to no tangible impacts of sports teams and facilities on local economic activity, and the level of venue subsidies typically provided far exceeds any observed economic benefits. In total, the deep agreement in research findings demonstrates that sports venues are not an appropriate channel for local economic

development policy. Any identified economic effects typically occur in the area immediately surrounding stadiums and arenas; however, spatially concentrated impacts are not always present and thus they can not be generally applied to all stadium projects. No evidence of supporting broad metropolitan-level effects exists, indicating that sub-local (neighborhood) effects are not equally distributed in host jurisdictions. Localized impacts likely reflect intrajurisdictional displacement or crowding out and these transfers in economic activity creates both winners and losers.

Second, economic research clearly identifies evidence of important intangible social benefits from hosting sports activities, which indicates that sports teams do produce positive spillovers through quality-of-life amenities, consumer surplus, and community pride benefits in some circumstances. However, these spillovers are not identified in all communities, and in several cases research identifies the presence of negative effects from associated crime, congestion, and other disamenities. Furthermore, even where positive relationships exist, estimated benefits tend to be insufficient to justify the level of subsidies provided.

Third, despite the consensus findings of economic studies that the benefits of hosting professional sports franchises are not sufficient to justify large public subsidies, taxpayer funding for these subsidies continues to grow. This paradox reveals a disconnect between findings in economic research and policy applications that requires correcting. Most economic contributions to public policy feature economists conducting theoretical and empirical research according to disciplinary standards and presenting their findings and recommendations to policymakers, who are generally amenable to expert recommendations. Sports subsidies represent a curious situation, because actual policy adopted stand in direct opposition to the recommendations of the consensus research findings. Further research is needed to understand why policy choices continue to defy researcher recommendations in this area.

While we encourage researchers to continue studying the impacts of sports venues on host communities, especially using improved empirical methods and evaluating newer facilities, it is important to understand that additional research alone will be unlikely to influence public policy or public policy makers. Our survey reveals that it is not a dearth of results that plagues policymaking, but instead, policymakers are not a receptive audience for this research. The scale is already tipped heavily against the desirability of sports facility projects for improving resident welfare. Additional research seems unlikely to have a wider influence on policy making. It will confirm what is already known to researchers in the field. Researchers seeking to influence stadium policy

discussions may need to seek other outlets to persuade the public and policymakers and employ more than a passive “look to the research” approach. Examples include interacting directly with local community leaders and media members to combat stadium advocacy coalitions which have a strategic advantage in influencing the public narrative.

It is important for local leaders, media members, and taxpayers, and voters to understand why economists have reached such a strong consensus in simple terms easily comprehended by non-economists. We encourage policy makers and media members to use Wassmer et al. (2016)'s critical evaluation of economic impact reports commissioned by boosters as a test of credibility. Most importantly, economists need to effectively communicate why directly-observed sports-related economic activity does not produce additional, broader economic value in the community: economic activity in and around sports facilities on game day represents a transfer from other local commercial activity and comes at the expense of existing local businesses. Overall, consensus findings from economic research demonstrate that public subsidies to fund sports stadiums and arenas likely do not pass a cost-benefit test.

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APPENDIX A. COMPREHENSIVE LIST OF STUDIES

TABLE A1. Economic studies of sports venues and teams (chronological order)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Okner (1974)	Venue Funding	Descriptive presentation of stadium financing arrangements.	Major-league sports venues		“[T]he prime beneficiaries of the local government subsidies are the owners of sports teams—most of whom are extremely wealthy.”
Baade and Dye (1988a)	Teams/Venues	Impact of teams/ venues on manufacturing activity. Multiple regression (separate OLS estimates per MSA).	MSAs (8)	1965-1978 (14 years)	Manufacturing employment (0), Manufacturing value added (0), New capital expenditures (0)
Baade and Dye (1988b)	Survey	Survey of theoretical justifications for stadium subsidies and review of existing evidence.			“The claim is that these public subsidies for private activities will induce a substantial flow of direct and indirect benefits. . . is weak on the premise that spending on stadium events is net new spending for the area.”
Baade and Dye (1990)	Teams/Venues	Impact of teams/ venues on economic activity. Multiple regression (separate and pooled OLS estimates).	MSAs (9)	1965-1983 (19 years)	Aggregate income (0). Regional share of income: stadium(-), football (0), baseball (0). Aggregate retail sales (0). Regional share of retail sales: stadium (-), football (+), baseball (0).
Baim (1994)	Teams/Venues	Case studies of public stadium projects.	Stadiums (15)	1953-1991	“Direct municipal stadium financing almost always involves a transfer of wealth from the taxpayer.”

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Rosentraub et al. (1994)	Teams/ Venues	Case study comparison of city with sports-focused development strategy to cities without this focus.	Indianapolis	1977-1989 (13 years)	Sports sector employment , 1977-1989 (0); Sports sector employment , 1983-1989 (-); MSA employment (0); MSA wages (0).
Crompton (1995)	Survey	Survey of contracted economic impact reports. Descriptive.	Contracted reports (20)		Identifies 11 common errors in for-hire economic impact reports.
Johnson (1995)	Teams/ Venues	Case studies of minor league baseball stadium projects.	Stadiums (15)		“[M]inor league stadiums can play important economic development roles. The critical factor... is how well the stadium serves the community’s nonbaseball recreational and entertainment needs.”
Baade (1996)	Teams/ Venues	Impact of teams/ venues on economic activity. Multiple regression (separate and pooled OLS estimates).	MSAs (48)	1958-1987 (30 years)	Income per capita (0); City’s share of state employment in recreation/ sports (0).
Chema (1996)	Teams/ Venues	Reply to Baade (1996).			Baade (1996) does not properly account for modern stadiums incorporated into urban growth strategies.
Noll and Zimbalist (1997)	Survey	Collected volume of studies.	15 chapters on various subjects	Various	“In every case, the authors find that the local economic impact of sports teams and facilities is far smaller than proponents allege; in some cases it is negative.”

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Irani (1997)	Consumer surplus	Estimate of linear demand curve	MLB Teams	1972-1991	Large annual estimates consumer surplus in MLB attendance markets
Rosentraub (1997)	Teams/Venues	Descriptive.			“The sports welfare system exists. . . because state and local government leaders, dazzled by promises of economic growth from sports. . . have failed to do their homework.”
Swindell and Rosentraub (1998)	Option Value	Telephone survey of Indianapolis households on intangible value of various sports activities.	Indianapolis (1,536 households)	1996	Residents received intangible civic pride benefits from hosting sports teams/events.
Coates and Humphreys (1999)	Teams/Venues	Impact of venue/teams on economic activity. Multiple regression (random effects).	MSAs (37)	1967-1994 (28 years)	Income per capita: level (-), growth (0).
Hudson (1999)	Teams/Venues	Impact of teams/ venues on employment. Multiple regression (fixed effects).	MSAs (17)	(20 years)	Employment (0).
Porter (1999)	Survey	Survey of contracted economic impact reports. Multiple Regression.	Counties (6)	1979-1996 (6 Super Bowls)	Sales (0).
Alexander et al. (2000)	Consumer surplus	Non-econometric estimate of CS using gate revenue data	All pro sports teams	1996	Substantial evidence of CS in sports attendance markets
Johnson and Whitehead (2000)	Option Value	CVM mail survey regarding college basketball and minor-league baseball venues in Fayette County, Kentucky.	Households (230)	1997	Nonuse value is small portion of willingness to pay.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Siegfried and Zimbalist (2000)	Survey	Survey of academic literature on the economic impact of sports facilities.			“[I]ndependent work on the economic impact of stadiums and arenas has uniformly found that there is no statistically significant positive correlation between sports facility construction and economic development.”
Baade and Matheson (2001)	Local Sales	Impact of MLB All-Star game on local employment share and taxable sales.	MSAs (23)	1973-1997 (w/ gaps, 23 years)	Employment share (0); Taxable sales (0).
Coates and Humphreys (2003a)	Teams/ Venues	Impact of work stoppages and team departures on economic activity. Event study. Multiple regression (fixed and random effects).	MSAs (37)	1969-1996 (28 years)	Income per capita : Work stoppage (0), Team departure (0).
Hudson (2001)	Survey	Survey of economic impact reports. Meta-analysis.	Reports (13)	1972-1997	“The studies in this sample tended to use methodologies that would inflate the economic impact of the sports team being studied.”
Johnson et al. (2001)	Option Value	CVM mail/distributed survey regarding funding to support NHL’s Pittsburgh Penguins.	Households (293)	2000	Nonuse value not sufficient to cover subsidy.
Nelson (2001a)	Teams/ Venues	Impact of teams/ venues on economic activity, accounting on metro-area location. Multiple regression.	MSAs (43)	1969-1994 (26 years)	MSA share of state income per capita (+, agglomeration effects weakly associated w CBD stadium location).
Wassmer (2001)	Teams/ Venues	Comment on Nelson (2001a).			Nelson (2001) likely suffers from endogeneity and omitted variable bias.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Austrian and Rosentraub (2002)	Teams/ Venues	Descriptive comparison of cities with (Cleveland and Indianapolis) and without (Cincinnati and Columbus) sports-focused downtown development strategies.	Cities (4)	1992-2000	Sports-focused downtown development strategies helped downtown development.
Chapin (2002)	Teams/ Venues	Case study of San Diego's MLB stadium development project as an example of "municipal capitalism." Descriptive.	San Diego's Petco Park development	1998-2004	"[T]he City of San Diego's Ballpark Project serves as a potential model for realizing downtown redevelopment through investments in large activity generators like sports facilities."
Coates and Humphreys (2002)	Teams/ Venues	Impact of post-season participation on economic activity. Event study. Multiple regression (fixed and random effects).	MSAs (37)	1969-1997 (29 years)	Income per capita: Post-season participation (0), Presence of team (-), Hosting Super Bowl (0), Winning Super Bowl (+).
Miller (2002)	Teams/ Venues	Impact of construction of NHL and NFL venues in St. Louis on construction employment. Multiple regression (time series).	Construction employment	1971-1998 (112 quarters)	Construction: Employment (0), Wages (0).
Siegfried and Zimbalist (2002)	Teams/ Venues	Identifies number of players who live in the same region as their team.	NBA players (220)	1999-2000 season	29% players live in the same or adjacent county their team.
Coates and Humphreys (2003a)	Teams/ Venues	Impact of teams/ venues on sector-level employment. Multiple regression.	MSAs (37)	1969-1996 (28 years)	Earnings per employee in Amusement and Recreation (+). Earnings per employee in other sectors (0/-).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Coates and Humphreys (2003b)	Survey	Survey of academic literature on the economic impact of sports facilities.			“[A] growing body of evidence indicates that professional sports facilities, and the franchises they are home to, may not be engines of economic growth in urban neighborhoods.”
Delaney and Eckstein (2003b)	Venue Funding	Case studies examining how stadiums garner public funding from local governments. Interviews.	Cities (9)	1998-2003	“The easiest path to a new publicly subsidized stadium is to have a strong, clandestine, corporate-driven, local growth coalition that chooses to emphasize ways in which the stadium will enhance community self-esteem and community collective conscience” (p. 42).
Delaney and Eckstein (2003a)	Venue Funding	Explores how academic economic impact studies are neutralized by stadium advocates. Case studies.	Cities (9)	1998-2003	“[P]ro-stadium elites have ignored the studies, criticized them without competing evidence, commissioned contradictory studies, or shifted the debate to non-measurable endpoints” (p. 189), with the latter being most important.
Carlino and Coulson (2004)	Teams/ Venues	Impact of NFL/MLB teams on local rents and wages. Multiple regression (fixed and random effects).	CMSAs (53)	1993 & 1999 (2 years)	Rents: NFL (+ 8%, with stronger effects for central city), MLB (+ in suburbs). Wages: NFL (− 2%). Cumulative findings represent compensating differential.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Chapin (2004)	Teams/ Venues	Case studies of Baltimore's Camden Yards and Cleveland's Gateway development projects. Descriptive.	Cities (2)	1989-2003	"Baltimore's Camden Yards . . . has not been the urban redevelopment catalyst that it has been perceived to be . . . Cleveland's experience indicates that sports facilities can play a role in urban revitalization efforts, catalyzing district redevelopment in the form of hotels, residences, and retail businesses."
Groothuis et al. (2004)	Option Value/ Venue Funding	Explores why local governments subsidize sports venues using Pittsburgh, PA. CVM mail survey.	Households (273)	2000	40% respondents support public funding sports venues. Strong civic pride benefits from sports teams, strongest among game attendees.
Lavoie and Rodríguez (2005)	Hotels	Impact of work stoppages and team arrivals/departures on hotel occupancy in Canada. Box-Jenkins method (separate cities).	Canadian cities (8)	1990-1999 (120 months)	Hotel occupancy: NHL strike (-).
Long (2005)	Venue Funding	Estimates true public cost of sports venues by including costs normally omitted from public subsidy calculations.	Stadiums & arenas (99)	1912-2001	After accounting for routinely unreported costs—land, infrastructure, operations, capital improvements, municipal services, and foregone property taxes—public subsidies are 40% higher than reported subsidies.
Santo (2005)	Teams/ Venues	Impact of teams/ venues on economic activity. Multiple regression (separate and pooled OLS estimates).	MSAs (19)	1984-2001 (18 years)	Aggregate income: Baseball stadium (+), Baseball team (-). Regional share of income: Baseball stadium(+).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Tu (2005)	Property Values	Impact of new stadium on surrounding neighborhood home sale prices. Hedonic pricing model, using difference-in-differences estimation strategy.	Homes sales (35,000)	1992-2001	Property values (+).
Carlino and Coulson (2006)	Property Values	Reply to Coates et al. (2006).	CMSAs (53)	1993 and 1999 (2 years)	Not persuaded by Coates et al. (2006).
Coates (2006)	Local Sales	Impact of hosting Super Bowl and MLB All-Star Game on local sales.	Houston	1991-2006 (182 months); 1991-2005 (60 quarters)	Both events: Monthly sales tax revenue (+); Quarterly (total, retail, and service) sales (0).
Coates and Humphreys (2006)	Voter Preferences	Impact of proximity to stadium sites and referendum support. Multiple regression (OLS).	Green Bay (89 precincts), Houston (894 & 914 precincts)	Green Bay: 2000 , Houston: 1999 & 2000	Referendum support and stadium proximity (-).
Coates et al. (2006)	Property Values	Comment on Carlino and Coulson (2004).	CMSAs (53)	1993 and 1999 (2)	Findings not robust to alternate model specifications.
Johnson et al. (2006)	Option Value	Examines temporal embedding and ordering effects in CVM survey (see Johnson et al. (2007)).	Households (421)	2002	Willingness to pay is sensitive to payment period length. Limited evidence of weak ordering effects.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Rosentraub (2006)	Survey	Positive nonuse and development benefits from sports activity may be sufficient to justify public subsidies. Descriptive.	Cleveland	Prospective	“The decision to invest in a sports facility has both pecuniary and nonpecuniary effects. Only when the decision process involves both can the context of the investment be understood and appreciated. . . the framework proposed can help communities understand the nature of the benefits, risks, and returns.”
Coates (2007)	Survey	Survey of academic literature on the economic impact of sports facilities.			Little of the academic research that investigates effects ex post finds significant increases in income, employment, taxable sales, or tax revenues associated with sports and sports facilities. . . rough calculations [of social benefits] indicate that they are not necessarily large enough to justify subsidies of hundreds of millions of dollars.
Dehring et al. (2007)	Property Values	Impact of stadium proposals on property values. Hedonic pricing model, using difference-in-differences estimation strategy.	Residential property sales (74,412)	2004-2005	Downtown Dallas (+); Suburban Arlington (-).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Delaney and Eckstein (2007)	Venue Funding	Explores why communities view public financed sports stadiums as a wise investment. Case studies of Cincinnati and Minneapolis/St. Paul.	Cites (2)	1990s - mid-2000s	“Governments are predisposed to support publicly financed stadiums despite public opposition, and fail to do so only when the local growth coalition is weak or ineffective” (p. 350).
Johnson et al. (2007)	Option Value	CVM mail survey regarding NFL’s Jacksonville Jaguars and potential NBA.	Households (421)	2002	Nonuse value not sufficient to cover subsidy.
Lertwachara and Cochran (2007)	Teams/Venues	Impact of sports franchise expansions and relocations on income per capita. Financial event study.	MSAs (33)	1969-2000 (32 years)	Income per capita (-).
Santo (2007)	Option Value	CVM telephone survey of Portland residents regarding public funding for MLB stadium.	Adults (365)	2005	Majority of residents not willing to pay higher taxes to fund stadium.
Walker and Mondello (2007)	Option Value	Reviews relevant concerns for researchers employing CVM to estimate nonuse value of sports activities.			“CVM represents an important component of economic valuation . . . [that] can be applicable to recreation, environment, and sport. . . Several authors have questioned its validity, reliability, and survey techniques. However, with some refinement and continued application, CVM could prove a useful valuation tool in the future.”

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Baade et al. (2008)	Local Sales	Impact of various sports teams, events, stadiums on taxable sales in Florida MSAs. Multiple-regression (separate MSA estimates).	MSAs (4)	1980-2005 (306 months)	Mixed findings (0).
Coates and Humphreys (2008)	Survey	Survey of academic literature on the economic impact of sports facilities and mega-events.			“The large and growing peer-reviewed economics literature on the economic impacts of stadiums, arenas, sports franchises, and sport megaevents has consistently found no substantial evidence of increased jobs, incomes, or tax revenues for a community associated with any of these things.”
Dehring et al. (2008)	Voter Preferences	Impact of stadium property values effects and home ownership on stadium referendum support in Arlington, TX. Hedonic price model.	Homes (3,108)	2004	Referendum support and property values (+); Referendum support and home ownership (-).
Delaney and Eckstein (2008)	Venue Funding	Explores media’s role in policy debates over stadium subsidies. Case studies.	Stadiums projects (23) in cities (16)	mid-1990s - 2008	“A relatively critical media can seriously impede a stadium project . . . when the local growth coalition is weak . . . [A]n uncritical media often becomes the primary institutional booster of stadium projects in cities with a weak growth coalition” (p. 72).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Jasina and Rotthoff (2008)	Teams/ Venues	Impact of sports teams on county employment and wages at sector level. Multiple regression (fixed effects).	Counties (58)	1986-2005 (20 years)	Employment and wages for all sectors (mixed/ -).
Swindell et al. (2008)	Option Value	CVM telephone survey of Indiana residents regarding how much they value hosting NFL's Colts.	Households (865)	2004	Nonuse value positive (\$60-85 million), but not sufficient to cover subsidy (\$650 million).
Depken and Coates (2011)	Local Sales	Impact of hosting big college football games in Texas cities (Austin, College Station, Lubbock, Waco). Multiple regression.	Cities (4)	1984-2008 (290 months)	Games and sales tax revenue (0).
Fenn and Crooker (2009)	Option Value	CVM mail survey of Minnesota and Minneapolis-St. Paul MSA regarding NFL's Minnesota Vikings during a relocation threat.	State & MSA (1,200 households, 565 responses)	2002	Nonuse value not sufficient to cover subsidy.
Rees and Schnepel (2009)	Crime	Impact of college football games on crime in campus police jurisdictions. Multiple regression (negative binomial).	Reported offenses (26)	2000-2005 (14,926 days; 1,516 game days)	Assaults (+); Vandalism (+); Alcohol-related (+).
(Rosentraub 2009, 2014)	Teams/ Venues	Case studies of sports as local development policy. Descriptive. (2 editions)	Cities (6)	Various	"As investments, the tax dollars expended for venues have generated positive net financial returns."

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Ahlfeldt and Maennig (2010)	Property Values	Impact of multi-purpose Olympic sports arenas in Berlin on property values. Hedonic pricing model.	Statistical blocks (11,184)	2005	Proximity and property values (+).
Erie et al. (2010)	Teams/Venues	Assesses public-private partnership relating to San Diego MLB stadium. Descriptive case study.	San Diego's Petco Park development	1998-2004	"In all, the ballpark project has been a net drain on the city's . . . finances . . . San Diego's partnership with the Padres has mostly benefitted . . . Padres' owner John Moores [from] public subsidies and East Village development rights . . . San Diego taxpayers, . . . have been left to absorb the fiscal fallout."
Baade et al. (2011)	Local Sales	Impact of hosting college basketball and football games on taxable sales in Florida (Gainesville, Tallahassee). Multiple regression (separate OLS estimates per MSA).	MSAs (2)	1979-2007 (340 months)	Basketball (0); Football (+)
Castellanos et al. (2011)	Option Value	CVM personal interview survey of A Coruña, Spain residents regarding the nonuse value of local soccer club.	Metro-area adults (739)	2003	Nonuse value sufficient to cover replacement stadium but not support club.
Depken and Coates (2011)	Local Sales	Impact of various sports teams, events, stadiums on sales tax revenue. Multiple regression (fixed effects).	Texas cities (23)	1990-2008 (216 months)	Mixed findings for most events (0); Championship games (+).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Coates and Humphreys (2011)	Teams/ Venues	Impact of sports franchise presence on worker wages in occupations directly and indirectly related to professional sports. Multiple regression, with MSA, time, and occupational fixed effects.	Male workers (44,856) in MSAs (251)	1983-2002	Earnings: MLB (mixed), NBA (0), NFL (+).
Ahlfeldt and Maennig (2012)	Voter Preferences	Impact of proximity to stadium sites and referendum support in Munich. Multiple regression (OLS and SAR estimates).	Precincts (261)	2001	Referendum support and stadium proximity (-).
76 Baumann et al. (2012)	Crime	Impact of major-league teams and mega-events on annual crime rate. Multiple regression (fixed effects).	MSAs (56)	1981-2006 (24 years)	MSA annual crime rate: Teams (0), Olympics (+), Super Bowl (-).
Cantor and Rosentraub (2012)	Teams/ Venues	Case study of San Diego's MLB stadium development project. Descriptive.	San Diego's Petco Park development	1998-2009	"[L]ooking at economic integration, the stability of home prices, and the attraction of educated people to a city's center, the Ballpark District should be considered a success."
Feng and Humphreys (2012)	Teams/ Venues	Impact of proximity to sports venue at census block level. Hedonic multiple regression pricing model of cross-sections.	Census blocks: 1990 (28,500); 2000 (30,346)	1990 & 2000 (2 years)	Proximity and property values (+).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Johnson et al. (2012)	Option Value	CVM telephone interview survey regarding downtown stadiums for NHL's Calgary Flams and Edmonton Oilers.	Adults: Calgary (331), Edmonton (339)	2007	Nonuse value not sufficient to cover subsidy.
Propheter (2012)	Teams/Venues	Impact of NBA teams/arenas on personal income. Multiple regression (separate and fixed and random effects).	MSA (24)	1979-2009 (31 years)	Regional income (0). Income per capita: All, 1988-1994 (+); NBA-only, 1985-2009 (+), 2001-2009 (-); Multi-sport (0).
Agha (2013)	Teams/Venues	Impact of minor-league baseball teams on income per capita. Multiple regression (fixed effects).	MSAs (238)	1985-2006 (22 years)	Income per capita (+).
Long (2013)	Venue Funding	Examines the public costs of professional sports facilities. Descriptive.	Major-league sports venues	1876-2010	Provides extensive summary of trends in public financing of sports venues, using detailed cost accounting.
Ahlfeldt and Kavetsos (2014)	Property Values	Impact of proximity to London soccer stadiums. Hedonic price model, difference-in-differences.	Residential property sales: Wembley (5,263), Arsenal (9,933)	1995-2008	Proximity and property values (+).
Huang and Humphreys (2014)	Property Values	Impact of new stadiums on residential mortgage applications. Difference-in-differences.	Census tracts (45,000) in MSAs (56)	1992-2010 (19)	Proximity and residential mortgages (+), but much of it likely would have occurred without the stadium.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Mills et al. (2014)	Local Sales	Impact of two sports stadiums on sales tax revenue in Arlington, TX. Multiple regression.	City	1989-2009 (252 months)	Sales tax and revenue (+), though net benefits unclear.
Propheter (2014)	Local Sales	Impact of MLS stadium opening in Bridgeville, IL on sale tax revenue of host and surrounding municipalities. Multiple regression (fixed effects).	Municipal governments (168)	2005-2010 (128 months)	Sales tax revenue: Bridgeview (0), Other municipalities (0, mixed).
Agha and Coates (2015)	Teams/ Venues	Impact of minor-league teams on residential rents. Multiple regression (fixed effects).	MSAs (138)	1993-2005 (13 years)	Housing rents in mid-sized markets: MLB affiliates (+6-8%), Independent (0).
Coates (2015)	Teams/ Venues	Impact of venue/teams on economic activity. Multiple regression (fixed and random effects).	MSA (366)	1969-2011 (42 years)	Multiple estimates: Income (0, -), Wages (0, -).
Horn et al. (2015)	Voter Preferences	Impact of proximity to NFL stadium and referendum support in King County, WA. Multiple regression (LP and group logit estimates).	Precincts (2,500)	1997	Referendum support and stadium proximity (-, inverted U-shape).
Humphreys and Zhou (2015b)	Teams/ Venues	Theoretical model of how teams use relocation threats to extract public subsidies.			Sports franchises use territorial monopolies to exploit resident reference-dependent loss averse preferences to extract public subsidies.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Humphreys and Zhou (2015a)	Teams/ Venues	Theoretical model of sub-local commercial agglomeration regarding sports commerce.			Sports-focused agglomeration is determined by complementarities and substitutability with sports, which results in entry and exit, respectively. There is no generalized positive or negative outcome, on net.
Harger et al. (2016)	Business Activity	Impact of new stadiums on local business activity. Difference-in-differences.	Nearby establishments: census tracts (7,996) in MSAs (10)	2002 & 2006 (2nd quarter)	Establishments (0). Employment: General (0), Eating/drinking (+, within 1 mile).
Kalist and Lee (2016)	Crime	Impact of NFL games on local crime. Multiple regression (OLS/Negative binomial).	NFL cities (8)	2004-2006 (9,496 days)	Home games and crime (+).
Marie (2016)	Crime	Impact of soccer matches on neighborhood crime in London. Multiple regression (negative binomial fixed effects).	London boroughs (7) hosing soccer teams (9)	1994-1997 (1,147 game-time observations)	Home: Property crime (+), Violent crime (-). Away crime (-).
Montolio and Planells-Struse (2016)	Crime	Impact of FC Barcelona matches on temporal aspects of crime. Multiple regression (negative binomial).	Crimes per hour on game days	2004-2011 (29,121 hours)	Thefts (+); Criminal damage (+); Robberies (+); Gender Violence (+).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Scherer (2016)	Venue Funding	Examines community group organized in opposition to fund NHL arena/entertainment district. Case study.	Edmonton	2011-2013	“Boosterish” coalition of business community, politicians, government officials, and team were able to exploit political opportunity structure to contain community opposition to stadium development.”
Stoecker et al. (2016)	Health	Impact of team Super Bowl participation on influenza mortality rates. Difference-in-differences.	County vital statistics	1974-2009 (36 years)	Super Bowl team participation: Influenza mortality, > age-65 (+).
Wassmer et al. (2016)	Survey	Review of common errors in commissioned economic impact reports and suggests method for standardized evaluation. Descriptive.	Studies (5)	2008-2013	Identifies common errors in commissioned reports and provides 20 questions for evaluating.
Yu et al. (2016)	Crime	Impact of NBA and college basketball games on local robberies. Multiple regression (negative binomial).	Robberies	2010-2011 (16,383 game-time observations)	Robberies: Home (+), Away (0).
Humphreys and Nowak (2017)	Property Values	Estimate of NBA team departures on home sale prices. Repeat sales regression and hedonic price model.	Home sales: King County (191,908), Mecklenburg County (50,002)	Seattle: 2000-2013. Charlotte: 1990-2004	Property values (-).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Propheter (2017)	Venue Funding	Estimate of public subsidies on venue opulence (construction costs per acre). OLS.	Sports venues (105)	1987-2012	Public funding (+).
Depken and Stephenson (2018)	Hotels	Impact of sports and other events on hotel outcomes in Charlotte. Multiple regressions (separate geographic regions).	Hotel rooms	2005-2014 (3,617 days)	Hotel stays, rates, & revenue: NFL (+), NBA (0), Large multi-day events (+).
Feng and Humphreys (2018)	Teams/Venues	Impact of proximity to two sports stadiums on residential property sales. Hedonic price model.	Single-family homes (9,504)	2000	Proximity and property values (+).
Humphreys and Pyun (2018)	Health	Impact of MLB games on traffic congestion. Multiple regression (IV panel estimator).	MSAs (88)	1990-2014 (25 years)	Daily average vehicle miles traveled (+); Annual hours in traffic delay (+).
Chikish et al. (2019)	Hotels	Impact of events on hotel occupancy and rates near Los Angeles's Staples Center. Multiple regression (Regions combined in single estimate).	Hotels near Staples Center (139 hotels in 3 regions)	2002-2017 (> 16,000 days)	NBA: Room rate (-), Stays (+), Revenue (+). NHL: Room rate (-), Stays (-), Revenue (-). Mixed displacement effects from all events.
Humphreys (2019)	Survey	Point/counterpoint article on the case for subsidizing sports stadiums.			"[N]eighborhood revitalization, an urban place-based policy, cannot justify [stadium] subsidies if spatial equilibrium models of the urban economy represent a reasonable description of urban outcomes."

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Humphreys and Ruseski (2019)	Health	Impact of sports facility construction in county on infant health. Multiple regression (difference-in-differences, matching).	Newborns (8.88 million) in counties (62)	1995-2002	Stadium construction: Birth weight (-).
Islam (2019)	Teams/ Venues	Impact of receiving NFL franchise on employment growth in Charlotte, Jacksonville, and Nashville. Synthetic control method.	MSAs (28)	1975-2008 (34 years)	Employment growth (0).
Johnson and Hall (2019)	Voter Preferences	Impact of voter characteristics and referendum support for NFL stadium funding	San Deigo zip codes (34)	2016	Referendum support and stadium proximity (0).
Locke (2019)	Health	Impact of MLB games on local air quality. Multiple regression (fixed effects).	Air quality monitors near MLB stadium (29, excludes Toronto)	2010-2016 (daily)	Air quality (-), but small magnitude.
Mares and Blackburn (2019)	Crime	Impact of MLB games on crime in St. Louis. Multiple regression (negative binomial).	Daily crime counts	1994-2016 (8,217 days)	Crime (+), stronger effects closer to stadium.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Matheson (2019)	Survey	Point/counterpoint article on the case for subsidizing sports stadiums.			Because of neighborhood effects, "one can make a reasonable economic argument that the optimal level of sports facility funding may be higher than zero percent."
Montolio and Planells-Struse (2019)	Crime	Impact of FC Barcelona matches on crime. Exploratory spatial data analysis and spatial regressions.	Whole and census tracts (1,061)	2007-2011 (1,215 days)	Thefts (+); Assaults (+), stronger effect closer to stadium.
Propheter (2019a)	Business Activity	Impact of new NBA arena in Brooklyn on commercial rents. Triple difference-in-differences.	Commercial lots within one mile (1,967)	2006-2015 (10 years)	Commercial rents (+).
Propheter (2019b)	Business Activity	Impact of gaining and losing MLS team in Denver (3-mile radius). Difference-in-differences.	Nearby establishments (1,000–200,000)	2004-2016 (13 years)	Nearby employment (0).
Pyun (2019)	Crime	Impact of MLB team relocating to Washington, DC on crime. Synthetic control method and triple difference-in-differences.	Cities (21)	2000-2019 (120 months)	Assaults (+); Other crimes (0).
Stitzel and Rogers (2019)	Local Sales	Impact of relocated NBA team to Oklahoma City on related-industry establishment sales by type. Difference-in-differences.	Nearby establishments (3,559)	2002-2010 (9 years)	Proximity and related sales (+); Food (+); Entertainment (-).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
van Holm (2019)	Teams/ Venues	Impact of new minor-league baseball stadiums on host communities. Difference-in-differences.	Census tracts (68) near stadiums (16); matched control tracts (272)	1990, 2000, & 2010 (roughly, decade comparisons)	Home value (intracity, intercity) (+, 0); Population density (0, 0); Housing density (+, +); Vacancy rate (0, +).
Cardazzi et al. (2020)	Health	Impact of acquiring new professional sports teams on influenza mortality. Difference-in-differences.	Cities (122)	1962-2016 (weekly)	New team: Influenza mortality (+).
Connolly and Touchton (2020)	Venue Funding	Examines the effectiveness of alternate justifications for subsidizing a minor league baseball stadium. Survey.	US adults (700)	Not reported	“public perceptions of municipal funding for sports stadiums are more favorable when the public is told that doing so will improve economic conditions in the city.”
Depken and Fore (2020)	Business Activity	Impact of events on restaurant activity near sports venues in Charlotte. Case study.	Restaurant near sports/ tourism venues (1)	2007-2013 (2,350 days)	Restaurant sales: NFL games (+); NBA games (+); Other events (mixed).
Drukker et al. (2020)	Venue Funding	Estimates federal subsidies to sports stadiums through municipal bond tax exemption.	Stadiums (57)	2000-2020 (21 years)	Present value of subsidy : \$3.6 billion. Lost revenue to federal government: \$4.3 billion.
Joshi et al. (2020)	Property Values	Estimate of MLS team promotion in Seattle on property values. Repeat sales regression.	Home sales: King County (78,840)	2003-2016	Property values (-), distance decaying effect within one mile.

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Propheter (2020b)	Business Activity	Impact of NBA stadiums on business survival time in Sacramento. Difference-in-differences.	Nearby establishments (8,482)	2004-2018 (15 years)	Proximity and survival time: Retail (-); Other sports-complementary businesses (0).
Propheter (2020a)	Crime	Impact of NBA stadium on police response times in urban and suburban settings following relocation within Sacramento. Doughnut-hole specification, triple difference-in-differences.	Response time to daily police incidents near Golden 1 Center (42,580) and Arco Arena (15,150)	2016	Police response times: Downtown (+), Suburbs (0).
Agha and Rascher (2021)	Teams/Venues	Impact of major- and minor-league teams and new stadiums on establishments and employment. Difference-in-differences. Multiple regression (Fixed, random, & between effects).	MSAs and MiSAs (871)	2004-2012 (9)	Establishments (0); Employment (0)
Block (2021)	Crime	Impact of hosting NHL games on crime in Boston, Chicago, Los Angeles, and Philadelphia. Multiple regression (Poisson).	Nightly crime (1,310 game nights)	2015-2019 (4 seasons)	Property (+); Assaults (+); Alcohol-related (0).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Jakar and Rosentraub (2021)	Survey	Surveys literature on use of public goods framework.	Articles (116)	1984-2019	Sports venue investments are rarely justified from public goods framework. Argues sports venue investments should be judged from an “municipal capitalism” framework.
Keeler et al. (2021)	Property Values	Impact of proximity to Los Angeles NBA/NHL arena on house prices near Staples Center. Hedonic spatial difference-in-differences.	Nearby home sales (15,957)	1995-2004 (10 years)	Proximity and sale price (+), announcement and opening effects.
Propheter (2021)	Property Values	Impact of proximity to sports venue on recession recovery in property assessments in Los Angeles. Accelerated failure time estimator.	Parcels near: Dodger Stadium (43,590), Staples Center (44,566), DH Sports Park (35,491)	2006-2019 (14 years)	Proximity and recovery: Dodger Stadium (+), Others (0).
Stephenson (2021)	Hotels	Impact of losing NFL team on hotel occupancy in St. Louis and San Diego. Multiple regression.	Hotel rooms	StL: 2011-2016 (2,282 days). SD: 2012-2017 (2,282 days).	StL: MLB (+), NFL(+), NHL (0). SD: MLB (0), NFL(+).

Statistically significant (+/-) or null (0) findings in parentheses.

TABLE A1. (continued)

Article	Subject	General Description of Empirical Method	Units (obs)	Period (obs)	Generalized Findings
Bradbury (2022b)	Business Activity	Impact of relocation of Atlanta MLB team/stadium on host Business Improvement District commercial property assessments. Synthetic control method.	Business Improvement Districts (12)	2010-2019 (10 years)	Commercial property assessments (0).
Bradbury (2022a)	Property Values	Impact of relocation of Atlanta MLB team/stadium on host county property assessments. Synthetic control method.	Atlanta MSA counties (27)	1999-2020 (21 years)	Property assessments (0).
Borges and Whetstone (2022)	Property Values	Impact of relocation of Las Vegas Raiders on residential property values. Hedonic difference-in-differences approach.	Home sales near stadium (869,184)	1988-2021	More-expensive (+), less-expensive (-). Proximity (-).
Bradbury (in press)	Local Sales	Impact of relocation of Atlanta MLB team/stadium on host county sales tax collections. Synthetic control method.	Atlanta MSA counties (24)	2010-2019 (40 quarters)	Sales tax revenue per capita (0). Crowding out from stadium development evident.
Arif et al. (in press)	Teams/Venues	Impact of new facilities on migration flows into and out of US MSAs. Difference-in-differences.	439,386 MSA-year pairs	1991-2014	New stadiums (0).
Humphreys et al. (in press)	Crime	Impact of new pro sports teams on police budgets. Difference-in-differences.	52 police jurisdictions	1979-1995, 1997-2010	Police employment: New NFL teams (+), MLB playoff games(+).

Statistically significant (+/-) or null (0) findings in parentheses.