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Loss Aversion, Team Relocations, and Major League Expansion

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Abstract

Professional sports teams receive large public subsidies for new facility construction. Empirical research suggests that these subsidies cannot be justified by tangible or intangible economic benefits. We develop a model of bargaining between local governments and teams over subsidies that includes league expansion decisions. The model features loss aversion by fans that captures lost utility when a team leaves a city. The model predicts that teams exploit this loss aversion to extract larger than expected subsidies from local governments, providing an explanation for these large subsidies and highlighting the importance of anti-trust exemptions in enhancing teams' bargaining positions.

JEL Codes: D42, H25, L12, L83

Key Words: Endowment Effect, Loss aversion, major league sports, bargaining

1 Introduction

In North America, professional sports teams receive large subsidies from federal, state, provincial and local governments. Federal subsidies flow from the financing of new stadium and arena construction with tax exempt bonds, as well as allowing professional sports teams to depreciate the value of contracts as an expense, reducing tax liabilities (Coulson and Fort, 2010). The state, provincial, and local government subsidies typically take the form of public funds for the construction, renovation, and operation of stadiums and arenas, and exemptions from local property and corporation taxes. Long (2005) estimates that the average state and local subsidy for the 99 stadiums and arenas used by teams in the National Football League (NFL), National Basketball Association (NBA), National Hockey League (NHL) and Major League Baseball (MLB) was \$175 million per facility.

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The creation of net new income and jobs by professional sports teams is frequently mentioned as a justification for these subsidies; a large body of evidence suggests that tangible economic benefits like higher local incomes and wages, and sports-led job creation, are negligible and cannot justify these subsidies (Coates, 2007; Coates and Humphreys, 2008). Another line of research values the intangible benefits generated by professional sports teams. These papers estimate the consumer surplus generated by professional sports teams based on ticket prices (Alexander et al., 2000) or use contingent valuation method (CVM) models to value these intangibles (Johnson et al., 2001, 2007; Fenn and Crooker, 2009). The estimates from this line of research, while substantial, do not appear large enough to justify the typical subsidy provided to a professional sports team. A full explanation for these large subsidies appears to lie elsewhere.

In this paper, we examine the role played by bargaining between teams, leagues and local government over the size of the subsidy that will be provided to a professional sports teams. The size of the public subsidy provided by state, provincial, and local governments is typically the result of a sustained period of bargaining between the team and relevant local decision makers. Government officials want to provide as small a subsidy as possible that will keep the local team in town, or attract a team from another city. Team owners want to extract the maximum subsidy possible, and will utilize any and all means possible, including relocation threats, to extract this subsidy.

Other research has examined the bargaining between cities and teams over subsidies (Owen, 2003; Owen and Polley, 2007; Porter and Thomas, 2010). We extend this research by explicitly examining the role played by loss aversion, in the form of reference dependent preferences on the part of fans who experience a larger loss if a beloved local team leaves town than the benefit generated by a new team moving to a city. We also analyze this bargaining in the context of the wider issue of league expansion into open markets. The model developed here predicts that the presence of loss aversion allows teams to extract a larger subsidy than would be possible absent this loss aversion, even when accounting for the presence of outside options in the form of larger cities without teams. The model also predicts that leagues and teams can extract larger subsidies by following a policy of first moving a team out of a city and then placing a new expansion franchise in that city, an increasingly popular strategy followed by teams and leagues. The addition of loss aversion on the part of fans can help to explain why the typical subsidy provided to a professional sports team often exceeds the total tangible and intangible value of a team based on estimates of tangible and intangible economic benefits.

2 Team relocation and league expansion

Bargaining between teams and local governments over subsidies cannot be analyzed in isolation. This interaction takes place in an environment of economic growth, population growth, and growth in the number of teams in professional sports leagues. Each of the four major professional sports leagues in North America has expanded in size since the leagues were formed. In part, this expansion has been driven by population

growth, growth in broadcast media, and improvements in transportation. With the exception of the NFL, in which teams play only one game per week, professional sports leagues have relatively long schedules with games played almost daily, in the case of MLB, or several times per week. When transportation was limited to train or bus travel, the number of teams that a league could support was limited by the ability of teams' ability to travel to away games in time to play, which precluded the placement of teams in cities on the west coast of the US and Canada. The advent of commercial air travel reduced this constraint and opened up new markets for professional sports teams.

There is also a minimum population required for a city to support a professional sports team. While some exceptions exist, few professional sports teams play in cities with a population of less than 1 million people in the metropolitan area. Based on the 2013 estimated population in Designated Market Areas (DMAs), an estimate of the size of local television markets, the largest metro area without a professional sports team in the US is Hartford-New Haven, DMA population 996,550, and the smallest metro area with a professional sports team is Green Bay, Wisconsin, DMA population 441,800, the 69th largest DMA in the US. Green Bay is an unusual case; the next largest US DMA with a team is Buffalo, DMA population 632,150, which has two teams, the Bills (NFL) and the Sabres (NHL).

Long run population growth and inter-regional migration periodically creates new cities capable of supporting a professional sports team. The generation of new viable markets creates opportunities for leagues to increase their profits, either through expanding the league by placing a new team in a city that currently has no team, or by relocating an existing team from a relatively small city to a larger city without a team¹. However, sports leagues in North America also operate as monopolists, and economic theory predicts that monopolists restrict output to generate monopoly rents. This tempers the incentive to expand the number of teams in a league, as leagues must trade-off increases in revenues from new markets with decreases in monopoly power from league expansion.

An examination of previous franchise relocation and league expansion in the four major North American professional sports leagues shows a mix of these outcomes. While many instances of franchise relocation and league expansion take place in isolation, past franchise relocation and league expansion decisions also reveal a common pattern where a team relocates from one city to another and then the league subsequently places an expansion team in the vacated city. The model developed below allows for analysis of both isolated instances where a team and local government bargain over a subsidy with a potential team relocation decision looming, and this two-step "relocation then expansion" strategy, and to compare the team and league outcomes in each case.

Table 1 summarizes the franchise relocations and expansions in Major League Baseball (MLB) since the 1950s. MLB was founded in 1903 when the incumbent National League merged with the rival American League following two years of intense inter-league competition for fans and players. MLB faced several rival

¹The emergence of new cities also creates an incentive for a rival league to form in cities without teams. See Che and Humphreys (2012) for an analysis of rival league formation and incumbent league deterrence.

leagues after forming, notably the Federal League which played in 1914 and 1915, but MLB enjoyed a long period of franchise stability until the early 1950s.

[Table 1 about here.]

A two-step relocation and then expansion strategy appears frequently in the history of professional sports leagues in North America. Under this strategy, a team first relocates from one city to another, and then, a few years later, the league places an expansion team in the city that recently lost a franchise. From Table 1, in MLB, the Brooklyn Dodgers and New York Giants relocated from the metropolitan New York area to the west coast in 1956 and 1957, leaving New York with a single team, the Yankees; in 1962 MLB placed an expansion team, the Mets, in New York. The Washington Senators moved to Minneapolis and became the Minnesota Twins in the 1961 season; MLB placed an expansion team, also called the Senators, in Washington in the 1961 season. The Milwaukee Braves moved to Atlanta in 1965; in 1970, MLB allowed the Seattle Pilots, a 1969 expansion team, to move to Milwaukee. And then in 1977, MLB placed a second expansion team, the Mariners, in Seattle. The Kansas City Athletics moved to Oakland in 1968; in 1969 the MLB placed an expansion team, the Royals, in Kansas City.

[Table 2 about here.]

Table 2 shows the history of franchise expansion and relocation in the NFL since 1930. The NFL was founded in 1920; its first decade saw many franchise bankruptcies, some mid-season, and franchise moves. We document NFL expansion and franchise moves since 1930, when the league stabilized. Two notable features can be seen on Table 2. First, the departure of both NFL teams from Los Angeles in 1994, when the Raiders returned to Oakland after playing in Los Angeles since 1981 and the Rams left for St. Louis after playing in the greater Los Angeles area since 1946. This created an open market for NFL teams, and the Los Angeles market remains open to this date. Second, the NFL has recently begun to employ the two-step “relocation then expansion” strategy. In 1995 the Cleveland Browns moved to Baltimore to become the Ravens; in 1999 the NFL placed an expansion team, again called the Browns, in Cleveland. In 1996 the Houston Oilers moved to Nashville (playing a single season in Memphis before moving to their permanent home); in 2002 the NFL placed an expansion team, the Texans, in Houston.

Table 3 summarizes the franchise relocations and expansions in the NBA, founded in 1949. In its first ten years of operation, the NBA saw a number of franchise moves from smaller cities to larger cities: from Moline-Rock Island IL to Milwaukee, from Milwaukee to St. Louis, from Fort Wayne Indiana to Detroit, from Rochester New York to Cincinnati, and from Syracuse, New York to Philadelphia.

The NBA has used the two-step “relocation then expansion” strategy in two cases, one recently. In 1955 the Milwaukee Hawks left for St. Louis, and ultimately landed in Atlanta in 1969. In 1968 the NBA placed an expansion team, the Bucks, in Milwaukee. In 2002 the Charlotte Hornets (an expansion team in 1989) moved to New Orleans; in 2004 the NBA placed an expansion team, the Bobcats, in Charlotte.

[Table 3 about here.]

Table 4 summarizes the franchise relocations and league expansions in the National Hockey League, founded in 1917 in three Canadian cities (Montreal, Toronto and Ottawa). The early years of the NHL features only expansion (and some contraction of teams, which are not shown). The NHL was reluctant to expand in the 1950s like the other leagues, and as a result faced a serious threat from a rival league, the World Hockey Association, in the 1970s. This happened despite a large expansion in 1967 which added six teams to the league, doubling its size.

The NHL is more of a regional sport than baseball, basketball or football, and the league has employed somewhat different expansion/relocation strategies. The primary feature of the NHL's long-term expansion/relocation strategy was to expand into cities in the southern part of the United States, in an attempt to enlarge the league's media footprint (Cocco and Jones, 1997). Following the WHA merger in 1979, the NHL experienced franchise moves to New Jersey, Dallas, Denver, Phoenix and Raleigh, North Carolina and placed expansion franchises in San Jose Tampa Bay, Nashville and Atlanta. This goal differed from other leagues, and may have led the NHL to employ a different expansion/relocation strategy.

The Winnipeg Jets, a team that came into the NHL in the WHA merger, moved to Phoenix in 1996; in 2011, the Atlanta Thrashers, a 1999 expansion team, moved to Winnipeg. While a considerable amount of time elapsed between the Jets departure and the Thrashers arrival, Canadian hockey fans appear to have considerable stronger preferences for professional hockey than other North American sports fans, this two-step relocation followed by relocation strategy could be thought of as equivalent to the relocation followed by expansion strategy employed by other teams.

[Table 4 about here.]

3 Subsidies for Facility Construction

We develop a model of bargaining between teams, leagues and local governments over the size of the subsidy that will be provided for the construction, and potentially ongoing operation, of a new stadium or arena. The size of these subsidies has been substantial. Table 5 summarizes the total construction cost, and the size of the subsidy, for the 121 new stadiums and arenas built for teams in the NFL, MLB, NBA and NHL since 1970, expressed in millions of real 2010 dollars. The total costs include land, building and infrastructure costs. These data come from Long (2013).

There are six types of facilities shown on Table 5: baseball only stadiums (MLB), football only stadiums (NFL), dual-use baseball and football stadiums (MLB/NFL), basketball only arenas (NBA), hockey only arenas (NHL) and dual-use basketball and hockey arenas (NBA/NHL). Since each type of facility has different requirements in terms of playing area and seating configuration, costs and subsidies are tabulated for each separately.

Baseball only stadiums are generally the most expensive, and hockey only arenas are generally the least expensive facilities to build. There were relatively few dual use football/baseball stadiums built during this period while dual-use basketball and hockey arenas were relatively common. Note that nearly 70% of these facilities were built after 1989, and 25% were built after 1999; a boom in new sports facility construction occurred over the last twenty years.

[Table 5 about here.]

We focus on the size of the public subsidy relative to the total cost of the facility. Again, this subsidy is typically the result of bargaining between the local government (either the city, county, or state/provincial government, and sometimes a combination of these levels of government) and sports teams. Figure 1 summarizes the public subsidy, expressed as a fraction of the total cost, for each of the 121 new sports facilities from Table 5. Note that the outcomes of the bargaining between local government and teams span the entire range, from zero public subsidy to 100% public subsidy. Only about 10% of the construction projects received no subsidy for land, structure and infrastructure; in almost 40% of the cases, all of the costs were paid for by public funds.

[Figure 1 about here.]

Next, we develop a model of the bargaining between local government and teams that explains the outcomes shown on Figure 1. Again, this model emphasizes the role played by loss aversion in this bargaining process.

4 A Model of Fans, Cities, Teams, and Leagues

The bargaining model contains four types of agents: sports fans, local governments, sports teams, and sports leagues. Each type of agent has its own objective function. Sports fans maximize their utility; city governments maximize the total welfare of city residents; sports leagues maximize total league-wide profits; and teams maximize their own profits. The model assumes that cities are homogenous and differ only in their population, and that leagues have ultimate control over franchise location. The key assumption that distinguishes this bargaining model from the models developed by Owen (2003) and Owen and Polley (2007) is that sports fans' preferences are reference dependent (Koszegi and Rabin (2006); Tversky and Kahneman (1991)) and feature loss aversion.

Assume the existence of a large number of cities that differ only in population, N . All information about population and demographics is public and there is no uncertainty about population change. There are two periods in the model. Period 0 represents the past. If a city has a sports team in period 0, then $s_0 = 1$. If not, $s_0 = 0$. We abstract from decision making in period 0 and take s_0 as given. Period 1 features an exogenous population change that induces agents to re-optimize. We assume that the presence of a professional sports

team has no effect on the in-migration of new residents to a city. Despite claims by proponents of subsidies for professional sports facilities, we know of no evidence that a professional sports team is an amenity that would cause people to move to a city.

4.1 Sports Fans

The residents of each city are homogenous and each has identical income y , which can be interpreted as per capita income in the metro area. Without a local sports team, residents consume a composite consumption good x , whose price is fixed by world markets and normalized to 1.

City residents' preferences towards the existing home sports team are reference dependent (Tversky and Kahneman (1991)). Residents get an intrinsic "consumption utility" v that corresponds to the satisfaction generated from having the opportunity to watch live sporting events played by the home team or simply from following the local team. Residents also have "gain-loss utility" w that corresponds to the sensation of gain or loss due to a departure of actual outcomes from a reference point. The reference point is whether a team was present in the city in the past.

Existing evidence about residents' valuation of local professional sports teams suggests that fans have loss aversion. Fenn and Crooker (2009) performed a contingent valuation method study of the willingness of Minnesotans to pay for a new stadium for the Minnesota Vikings, an NFL franchise, in a period when the team was negotiating with the local government for a new publicly financed stadium and had threatened to move to another city if the subsidy was not provided. Fenn and Crooker (2009) found that individuals who believed the team's threat to move was credible were willing to pay significantly more for a new stadium than individuals who did not find the threat credible. This result is consistent with the presence of loss aversion among fans in this population.

To attract a new team, the local government has to pay b to the team in the form of a subsidy. This subsidy will take the form of financing for the construction of a new stadium or arena. b is endogenously determined by negotiations between the local government and a team. Once the city has a team, residents pay p to attend games. Suppose that the subsidy b is financed by a lump-sum tax shared equally by all city residents, so each resident has to pay $\frac{b}{N}$ of the subsidy. The consumption of the composite good is therefore $x = y - \frac{b}{N} - p$. In period 1, the utility of a representative resident of a city with a team, $s_1 = 1$, is

$$U(s_1 = 1 \mid s_0) = (y - \frac{b}{N} - p) + v + w(s_1 = 1 \mid s_0).$$

The utility of a representative resident of a city with no team, $s_1 = 0$, is

$$U(s_1 = 0 \mid s_0) = y + w(s_1 = 0 \mid s_0).$$

Assume that $w(s_1 \mid s_0)$ is piecewise linear, with

$$w(s_1 | s_0) = \begin{cases} \alpha(s_1 - s_0) & s_1 - s_0 > 0 \\ 0 & s_1 - s_0 = 0 \\ \beta(s_1 - s_0) & s_1 - s_0 < 0 \end{cases}$$

where $\alpha > 0$ and $\beta > 0$. α reflects the satisfaction a resident receives from living in a “Major League” city in addition to the live games that fans will be able to watch. β reflects the agony associated with losing the local team to franchise relocation in addition to the live games that fans will miss. We assume that fans have loss aversion (Tversky and Kahneman (1991); Koszegi and Rabin (2006)), which implies that $\beta > \alpha$: the marginal effect of a negative deviation from the reference point is larger than the marginal effect of a positive deviation. In this context, the additional disutility that fans experience from losing their home team to relocation is larger than the additional utility that fans get from getting a new team to move to their city.

4.2 Local Governments

Given residents’ preferences, the local government negotiates with a team to maximize total city welfare. Before the transfer from the local government to the team, the aggregate city-level consumer surplus from having a local sports team is

$$\begin{aligned} TCS &= N [U(s_1 = 1 | s_0) - U(s_1 = 0 | s_0)] + b \\ &= N [(v - p) + [w(s_1 = 1 | s_0) - w(s_1 = 0 | s_0)]] . \end{aligned}$$

The city government negotiates with a prospective team about the size of the subsidy that will be provided to the team, b , if it moves to the city. After the subsidy b , the city’s total welfare is $TCS - b$. The objective of the local government is to maximize $TCS - b$, which, conditioned on getting a team, is to minimize b .

4.3 Sports Teams and Leagues

We make the following assumptions regarding sports teams and leagues:

1. A team incurs a fixed cost of operation f , which does not vary with the population of the city, and a constant marginal cost of production c .
2. A team charges $p = \lambda c$ to each consumer who attends a game where $\lambda > 1$ is a parameter that determined by the substitutability with other entertainment activities.
3. Collective rules of the league:
 - (a) Territorial exclusivity: Leagues maintain agreements that make each team a monopolist in its local market and prohibit other teams from selling tickets or playing games in this exclusive local market

- (b) Revenue sharing: each team keeps ρ of its total revenue (pN) and receives an equal share of revenue collected by the league.
- 4. The league chooses the number of teams to maximize the total profits of all teams.
- 5. The league exercises final control over team location decisions.
- 6. Given the rules of the league, a team chooses strategies to maximize its own profits.

These assumptions reflect the key aspects of team and league goals and the relationship between teams and the league, in the context of bargaining over subsidies. One key assumption is territorial exclusivity. All North American sports league agreements feature territorial exclusivity, which guarantees that each team operates as a monopolist in its local market. The only cases where territorial exclusivity does not take place, in Chicago, which has two MLB teams, New York, which has two NFL, MLB, NHL and NBA teams, and Los Angeles, which has two NBA teams that play in the same facility (the Lakers and Clippers), these arrangements exist only in the largest cities and many were the result of successful rival leagues or inter-league competition; the Chicago White Sox were an American League team and joined MLB in the 1903 AL-NL merger, the New York Jets joined the NFL during the AFL-NFL merger, the New York Mets were added to MLB to deter the formation of a potential rival league, the Continental League, and the New York Islanders were added to the NHL to deter the entry of a team from the rival WHA into the New York market. The San Diego Clippers moved to Los Angeles in 1984 after struggling to draw fans in San Diego, and the move took place only after years of lobbying the league by then Clippers owner Donald Sterling, who was an LA native. Territorial exclusivity is a key feature of all league agreements. In the context of this bargaining model, it limits the options available to cities, and, by including open markets, provides teams with outside options that they can use to extract larger subsidies from local governments.

The assumptions about team operating costs, and team and league objectives, are similar to those used in other models of team and league behavior (Fort and Quirk, 1995).

Suppose there are k teams in the league. Team i 's profits are

$$\begin{aligned}\Pi_i &= [(\rho p - c)N_i - f] + \frac{\sum_{i=1}^k (1 - \rho)pN_i}{k} + b_i \\ &= [(\rho\lambda - 1)cN_i - f] + \frac{(1 - \rho)\lambda c}{k} \sum_{i=1}^k N_i + b_i,\end{aligned}$$

where N_i is the population of city i in period 1. Holding costs constant, teams in larger cities earn larger profits. Teams that can charge higher prices earn higher profits, holding the population of the city constant. Team i chooses its host city, a combination of city size and public subsidy, N_i and b_i , to maximize Π_i . The total profits of all teams in the league are

$$\Pi^L(k) = \sum_{i=1}^k \Pi_i = \sum_{i=1}^k \{[(\lambda - 1)cN_i - f] + b_i\}.$$

The league chooses the number of teams to maximize $\Pi^L(k)$. Note that the collective rules are set by the league to maximize profits as well. In this paper, we abstract from the setting of these collective rules to focus on the role of fans' loss aversion in shaping the behavior of teams and leagues.

5 Population Growth, Team Relocation, and League Expansion

Suppose there are $\bar{k}$ cities in total and $\bar{k}$ does not change across time periods. The time that elapses between period 0 and period 1 is long enough for population growth to take place but not long enough for new cities to appear. In period 0, the league has $k < \bar{k}$ teams. Assume that cities have the same average income y . The allocation of the k teams is according to the ranking of city population, from largest to smallest, in period 0 as follows

$$N_{1,0} \geq N_{2,0} \geq \dots \geq N_{\bar{k},0},$$

and all cities $i \leq k$ have a team in period 0.

In period 1 a new population distribution across cities is revealed. We focus on population growth that changes the rank ordering of city sizes. This can be interpreted as resulting from both differences in birth and death rates and in-migration and out-migration across cities. For example, over the latter part of the 20th century "rust belt" cities like Detroit and Cleveland lost population while "sun belt" cities like Phoenix and Houston gained population. Specifically, we consider the case where two cities, j and m , that did not have a team in period 0 experience population growth such that these two cities become the two largest cities without a team in period 1. The population of other cities remains the same, i.e., $N_i = N_{i,0} \forall i \neq j, m$. Assume city j is (weakly) bigger than city m , i.e., $N_j \geq N_m$. To make team relocation relevant, assume city j has a population larger than the population of some cities with a team, i.e., $N_j > N_i$ for one or more $i \leq k$.

If team i stays in city i , aggregate city-wide welfare is

$$\begin{aligned} TW_i &= TCS_i + [(p - c)N_i - f] \\ &= N_i[(v - p) + w(s_1 = 1 \mid s_0 = 1) - w(s_1 = 0 \mid s_0 = 1)] + [(p - c)N_i - f] \\ &= N_i[(v - p) + 0 - \beta(0 - 1)] + [(p - c)N_i - f] \\ &= N_i(v - c + \beta) - f. \end{aligned}$$

If city j gets a new team, aggregate city-wide welfare is

$$\begin{aligned}
TW_j &= TCS_j + [(p - c)N_j - f] \\
&= N_j[(v - p) + w(s_1 = 1 \mid s_0 = 0) - w(s_1 = 0 \mid s_0 = 0)] + [(p - c)N_j - f] \\
&= N_j[(v - c) + \alpha(1 - 0) - 0] - f \\
&= N_j(v - c + \alpha) - f.
\end{aligned}$$

Notice that β and α are a component of total welfare that is not part of traditional consumer surplus or producer surplus that can be estimated from a demand or supply curve. These factors capture “gain-loss” utility that can be interpreted as the intangible benefits associated with “Major League City” status and losses associated with teams leaving a city.

5.1 Negotiations without league expansion

In period 1, local governments and teams in some cities re-negotiate the size of the subsidy provided to the team. This can be thought of as a stadium or arena lease renegotiation. Teams can relocate, or threaten to relocate, if the negotiations break down; the league retains final control over actual franchise moves, but the team can threaten to move. Recall that City j now is the largest city that does not have a sports team. This city is the best potential option for any existing team because teams cannot relocate or threaten to relocate to large cities that already have a team due to territorial exclusivity. The rule of territorial exclusivity effectively makes it impossible for city governments to use other teams as outside option in the bargaining process. In this sense, it is an exercise of leagues’ monopoly power.

If neither party has an outside option, then a Nash bargaining solution will apply – the local government and the team will split the total gain produced by the team 50-50. For teams in cities with $N_i \geq \frac{2(v-c+\alpha)N_j-f}{v-c+\beta}$, city j is not a relevant outside option because $\frac{1}{2}TW_i \geq TW_j$. After the subsidy b_i , the city gets $\frac{1}{2}TW_i = TCS_i - b_i = \frac{1}{2}\{TCS_i + [(p - c)N_i - f]\}$, which implies a subsidy of

$$\begin{aligned}
b_i &= \frac{1}{2}\{TCS_i - [(p - c)N_i - f]\} \\
&= \frac{1}{2}\{[v + \beta + (1 - 2\lambda)c]N_i + f\}.
\end{aligned}$$

For cities with $N_i \in [\frac{v-c+\alpha}{v-c+\beta}N_j, \frac{2(v-c+\alpha)N_j-f}{v-c+\beta})$, city j is a relevant outside option because $\frac{1}{2}TW_i < TW_j \leq TW_i$. The team can use TW_j as threat point and extract more than half of the total welfare generated by the team. Nash bargaining with an outside option suggests that the team gets $[(p - c)N_i - f] + b_i = TW_j > \frac{1}{2}TW_i$, which implies a subsidy of

$$\begin{aligned}
b_i &= TW_j - [(p - c)N_i - f] \\
&= [N_j(v - c + \alpha) - f] - [(p - c)N_i - f] \\
&= N_j[v - c + \alpha] - (\lambda - 1)cN_i.
\end{aligned}$$

For cities with $N_i < \frac{v-c+\alpha}{v-c+\beta} N_j$, the aggregate city-wide welfare if the team stays in city i is smaller than the aggregate city-wide welfare if it relocates to city j , $TW_i < TW_j$. Given this outside option, the team would be able to extract all the benefits generated if it remains in city i and gets $[(p-c)N_i - f] + b_i = TW_i$, which gives

$$b_i = TCS_i = N_i(v - p + \beta) = N_i(v - \lambda c + \beta).$$

The determination of subsidies to teams are summarized in the following proposition:

- Proposition 1** 1. For cities with a population $N_i \geq \frac{2(v-c+\alpha)N_j-f}{v-c+\beta}$, $b_i = \frac{1}{2}\{[v + \beta + (1-2\lambda)c]N_i + f\}$.
2. For cities with a population $N_i \in [\frac{v-c+\alpha}{v-c+\beta} N_j, \frac{2(v-c+\alpha)N_j-f}{v-c+\beta}]$, $b_i = N_j[v - c + \alpha] - (\lambda - 1)cN_i$.
3. For cities with a population $N_i \leq \frac{v-c+\alpha}{v-c+\beta} N_j$, $b_i = TCS_i = N_i(v - \lambda c + \beta)$.

Note that the discussion of city size above refers to population relative to city j 's population. If N_j is so big that $TW_j > TW_1$, i.e., $N_j > \frac{v-c+\beta}{v-c+\alpha} N_1$, then $b_i = N_i(v - \lambda c + \beta)$ for all $i \leq k$ and the total profits of the league without expansion or relocation will be $\Pi^L = \sum_{i=1}^k TW_i = [N_i(v - c + \beta) - f]$. We believe this is a case that rarely happens in reality; for this to happen, the emerging city j has to have a significantly larger population than the biggest city that currently has a team. Recall that β may be significantly bigger than α . If N_j is so small that $TW_j < \frac{1}{2}TW_k$, i.e., $N_j < \frac{(v-c+\beta)N_k+f}{2(v-c+\alpha)}$, then city j is not an outside option even for the smallest city that has a team. This is not an interesting case as city j plays no role in the negotiation between city governments and teams. No credible relocation or relocation threats exist in this case.

We consider a more likely case where N_j is such that city $i \in [1, k_1]$ has $\frac{1}{2}TW_i \geq TW_j$, city $i \in [k_1 + 1, k_2]$ has $\frac{1}{2}TW_i < TW_j < TW_i$, and city $i \in [k_2 + 1, k]$ has $TW_i \leq TW_j$. In this case, the total profits of the league without expansion or relocation will be

$$\begin{aligned} \Pi^L &= \sum_{i=1}^{k_1} \frac{1}{2} TW_i + \sum_{i=k_1+1}^{k_2} TW_j + \sum_{i=k_2+1}^k TW_i \\ &= \sum_{i=1}^{k_1} \frac{1}{2} [N_i(v - c + \beta) - f] + \sum_{i=k_1+1}^{k_2} [N_j(v - c + \alpha) - f] + \sum_{i=k_2+1}^k [N_i(v - c + \beta) - f] \\ &> \sum_{i=1}^k \frac{1}{2} TW_i \end{aligned}$$

From this expression, loss aversion, captured by β , plays a role in increasing the subsidy provided to teams, and thus league-wide profits. For teams in both relatively large cities, and relatively small cities, the subsidy provided is larger than that generated by the presence of standard consumption utility associated with professional sports teams, v . The presence of loss aversion explains why so much of the probability mass on Figure 1 lies to the right end of the distribution of observed bargaining outcomes.

This bargaining outcome can also be motivated by considering recent events in the National Football League. Los Angeles, the second largest media market in North America, has not had an NFL team since

1994. Cities 1 to k_1 can be interpreted as representing Green Bay, metro Boston, New York, Chicago, Pittsburgh, Dallas, etc. These cities either have a large population (large N) or a successful team (a large β , as the more successful the team, the greater fans' loss aversion), which drives up TW_i in these cities such that $\frac{1}{2}TW_i > TW_j$. Note that even if City j has the same or larger population as cities with an existing team, City j might not be a relevant outside option because β can be much larger than α . However, Los Angeles is clearly a relevant outside option for teams nearing the end of their lease agreement. For example, the Minnesota Vikings recently reached an agreement to remain in Minneapolis in exchange for a \$500 million public subsidy for the construction of a new \$975 million stadium. The Viking's lease for their previous stadium, the Metrodome, expired in 2011, and the team threatened to move to Los Angeles at one point during the negotiations over a new stadium. Also, the St. Louis Rams, Cincinnati Bengals, Kansas City Chiefs, and San Diego Chargers all have clauses in their leases that allow them to break the lease at ten year intervals if their stadiums are not "state-of-the-art" in the NFL (Knauf, 2010), and the Buffalo Bills recently renewed their lease for only 10 years; any of these teams could break their lease and threaten to move to Los Angeles in the next few years. None of these teams have been particularly successful in recent seasons, and Los Angeles is considerably larger than any of these metropolitan areas.

5.2 Expansion Strategies and Decisions

In the second period, the league can also consider placing an expansion team in City j , the largest city that currently does not have a team. Placing an expansion team in City j means other teams will not be able to use it as a threat in their negotiation with the local governments. At the same time, a team in City j will generate a large increase in social welfare that the league will be able to extract at least half of. Whether the league will expand to City j depends on whether the share of the gain from City j is large enough to offset the loss of the option value generated by City j for other teams.

The league has two potential expansion strategies. It can simply expand to City j or it can let an existing team relocate to city j and then place an expansion team in the city that lost its home team. We analyze these two expansion strategies in detail.

5.2.1 Strategy 1: A One-Step Expansion to City j

If the league places an expansion team in City j , the league (or the owner of the expansion team, if an owner has been named) negotiates with City j over the size of the subsidy. The league can either get $\frac{1}{2}TW_j$ or the best outside option value. The largest city without a team now is City m . The outside option value is therefore

$$TW_m = N_m(v - c + \alpha) - f$$

If $N_j \geq 2N_m - \frac{f}{v-c+\alpha}$, the league gets $\frac{1}{2}TW_j \geq TW_m$. The transfer from city j to the league or the new team is

$$b_j = \frac{1}{2} \{ [v + \beta + (1 - 2\lambda)c]N_j - f \}.$$

If $N_j < 2N_m - \frac{f}{v-c+\alpha}$, the league gets $TW_m > \frac{1}{2}TW_j$ because $TW_j > TW_m > \frac{1}{2}TW_j$. The transfer from city j to the league or the new team is

$$b_j = N_m [v - c + \alpha] - (\lambda - 1)cN_j.$$

If the league expands into City j , existing teams cannot use City j as an outside option in negotiations because of territorial exclusivity. If $N_m \leq \frac{(v-c+\beta)}{2(v-c+\alpha)}N_k + \frac{f}{2(v-c+\alpha)}$, then City j is too small to be a relevant outside option for the smallest city because $\frac{1}{2}TW_k \geq TW_m$. If $\frac{(v-c+\beta)}{2(v-c+\alpha)}N_k + \frac{f}{2(v-c+\alpha)} < N_m \leq \frac{v-c+\beta}{v-c+\alpha}N_k$, there exists $k_3 \in (k_2, k)$ such that city $i \in [1, k_3]$ have $\frac{1}{2}TW_i > TW_m$ and $i \in [k_3+1, k]$ have $\frac{1}{2}TW_i \leq TW_m \leq TW_i$. If $\frac{v-c+\beta}{v-c+\alpha}N_k < N_m$, there exists $k_4, k_5 \in (k_2, k)$ such that $i \in [1, k_4]$ has $\frac{1}{2}TW_i \geq TW_m$, city $i \in [k_4+1, k_5]$ has $\frac{1}{2}TW_i < TW_m < TW_i$, and city $i \in [k_5+1, k]$ has $TW_i \leq TW_m$. Let $\Psi(m)$ indicate the total profits of existing teams ($i = 1, \dots, k$) with city m as the outside option. The total profits of the league after expansion into City j are

$$\begin{aligned} \Pi_1^L &= \Psi(m) + \frac{1}{2}TW_j \text{ if } N_j \geq 2N_m - \frac{f}{v-c+\alpha} \\ &= \Psi(m) + TW_m \text{ if } N_j < 2N_m - \frac{f}{v-c+\alpha}. \end{aligned}$$

where

$$\begin{aligned} \Psi(m) &= \sum_{i=1}^k \frac{1}{2}TW_i \text{ if } N_m \leq \frac{(v-c+\beta)}{2(v-c+\alpha)}N_k + \frac{f}{2(v-c+\alpha)} \\ &= \sum_{i=1}^{k_3} \frac{1}{2}TW_i + \sum_{i=k_3+1}^k TW_m \text{ if } \frac{(v-c+\beta)}{2(v-c+\alpha)}N_k + \frac{f}{2(v-c+\alpha)} < N_m \leq \frac{v-c+\beta}{v-c+\alpha}N_k \\ &= \sum_{i=1}^{k_4} \frac{1}{2}TW_i + \sum_{i=k_4+1}^{k_5} TW_m + \sum_{i=k_5+1}^k TW_i \text{ if } \frac{v-c+\beta}{v-c+\alpha}N_k < N_m \leq N_j \end{aligned}$$

5.2.2 Strategy 2: Two-Step Relocation then Expansion

Suppose the league or expansion team owner refuses to negotiate with City j over subsidies for an new facility for an expansion team. City j can approach existing teams about relocation. City j 's first choice will be team k , the home team in the smallest city in the league that could escape their lease. If $N_j \leq \frac{v-c+\beta}{v-c+\alpha}N_k$, City j will not be able to offer a larger subsidy than City k , the smallest city that has an existing home team can offer because $TW_j \leq TW_k$. Even though City j has a population bigger than city k , because fans' loss aversion, city j will not be able to induce team k to relocate.

If $N_j \geq \frac{v-c+\beta}{v-c+\alpha}N_k$, City j will be able to offer the maximum that city k will be able to offer because $TW_j > TW_k$. A relocation of city i 's team to city j is impossible if $N_j < \frac{v-c+\beta}{v-c+\alpha}N_k$.

If $N_j \geq \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$, the team will get $[(p-c)N_j - f] + b_j = \frac{1}{2}TW_j \geq TW_k$, which implies a transfer from City j to the team of

$$b_j = \frac{1}{2}\{[v + \alpha + (1 - 2\lambda)c]N_j - f\}.$$

If $N_j < \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$, the team will get at least $TW_k > \frac{1}{2}TW_j$, otherwise it will not relocate. The relocated team or team j gets $[(p-c)N_j - f] + b_j = TW_k$, which implies a transfer from City j to the team of

$$b_j = TW_k - [(p-c)N_j - f].$$

If the league decides to award City k an expansion team after its home team moves to City j , the outside option for City $i \in [k_3, k]$ will be city m . The total profits of the league from following the two-step relocation then expansion strategy equals

$$\begin{aligned}\Pi_2^L &= \Psi(m) + \frac{1}{2}TW_j \text{ if } N_j \geq \frac{2(v-c+\beta)N_k-f}{v-c+\alpha} \\ &= \Psi(m) + TW_k \text{ if } \frac{v-c+\beta}{v-c+\alpha}N_k < N_j < \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}.\end{aligned}$$

Proposition 2 1. When $N_j \geq \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$ and $N_j \geq 2N_m - \frac{f}{v-c+\alpha}$, neither city k or city m are relevant outside options in the negotiation between City j and a potential home team, the two expansion strategies yield the same profits for the league ($\Pi_1^L = \Pi_2^L$).

2. If $N_m \leq \frac{v-c+\beta}{v-c+\alpha}N_k$ and $N_j < 2N_m - \frac{f}{v-c+\alpha}$, the league gets more profits if it first relocates the home team in City k to City j , then awards City k an expansion team than if it directly expands into city j ($\Pi_2^L \geq \Pi_1^L$).

3. If $N_m > \frac{v-c+\beta}{v-c+\alpha}N_k$ and $N_j < \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$, the league earns higher profits if it simply expands into City j ($\Pi_2^L < \Pi_1^L$).

Proof. See Appendix ■

Note that the larger the loss aversion $(\beta - \alpha)$, the bigger City m needs to be relative to City k to make direct expansion into City j more profitable than the two-step relocation then expansion strategy. Again, loss aversion plays a key role in determining the size of the subsidy.

The league will choose to expand only if expansion leads to higher total league profits. Let $\Delta\Pi^L = \max\{\Pi_1^L, \Pi_2^L\} - \Pi^L$ represent the change in total profits from league expansion.

Proposition 3 If $N_j \in (\frac{(v-c+\beta)N_k+f}{2(v-c+\alpha)}, \frac{v-c+\beta}{v-c+\alpha}N_1]$, $\Delta\Pi^L$ decreases with N_j and increases with N_m .

Proof. See Appendix ■

The league will expand if $\Delta\Pi^L > 0$. Whether City j will get a team or not is related to the difference in its population relative to the next biggest open city, City m . City j is more likely to be awarded an

expansion team if City m is big enough to serve as a viable outside option in the negotiation for relocation of existing teams. One possible reason Los Angeles will not get an NFL team soon may be because it has a very large population and there are no other large cities available to serve as a comparable outside option for existing teams.

6 Conclusion

Sports teams and local governments frequently bargain over the size of subsidies for the construction and operation of new facilities. Teams frequently get the better of local governments in these negotiations, leading to large subsidies for what is essentially a private, profit oriented business. Previous research has debunked the idea that tangible economic benefits like increased local income and new job creation can justify these subsidies. Also, research valuing the intangible benefits of professional sports teams like “world class city status” and a sense of community, along with estimates of the consumer surplus generated by a professional sports team, have not come up with large enough estimates of these intangible benefits to justify the observed subsidies given to professional sports teams in North America.

In order to better understand why local governments continue to give large subsidies to professional sports teams, we develop a model of the bargaining between teams and local governments based on the total value of local welfare generated by professional sports teams. This model features loss aversion by local fans that reflects the large loss in utility experienced by fans of a team that moves to another city. The model shows that teams and sports leagues exploit this loss aversion in order to extract larger subsidies from the local government in the bargaining process. The model also explicitly includes the monopoly power enjoyed by sports leagues in North America, in that leagues exercise this monopoly power by intentionally leaving some large cities without a team to increase the outside option available to teams in existing cities when bargaining over subsidies. If leagues did not enjoy special treatment under anti-trust law, there would not be any open markets that could support a team. The model also shows how this exercise of monopoly power increases the bargaining position of teams and leads to larger subsidies.

The model has important policy implications. First, since loss aversion on the part of sports fans is important, and teams and leagues readily exploit this loss aversion to extract large subsidies from local governments, some additional regulation of the bargaining between teams and local governments may be warranted. Government regulations often require binding mediation adjudicated by professional mediators in bargaining when the parties may have unequal bargaining power, or when one of the parties provides a public good like policing or fire fighting. Given the importance of loss aversion in this case, perhaps independent mediators should be used to determine the size of subsidies given to professional sports teams in North America.

Second, North American sports leagues enjoy special anti-trust status as a consequence of deliberate public policy decisions on the part of politicians. The model clearly predicts that leagues exploit this special

anti-trust status to extract larger than expected subsidies from local governments, and these subsidies often come out of general fund revenues generated from all residents of communities, fans and non-fans alike. Since leagues exploit their special anti-trust status to extract subsidies, it may be necessary for policy-makers to re-examine the special anti-trust protections given to sports leagues. The model points out that this exploitation reduces local welfare, which may be an unintended consequence of the special anti-trust protection given to sports leagues.

The model can be extended in several ways. We do not currently include expansion fees in the model. Leagues award expansion teams through a bidding process where potential owners compete for the team. This bidding involves the payment of an expansion fee by the winning new team owner. Expansion fees can be substantial; the expansion fee paid by the owners of the Houston Texans, the most recent NFL expansion fee, was \$800 million. In future work, we will extend the model to include expansion fees and bidding by rival potential owners of expansion teams.

The model also has testable empirical implications. Reliable MSA population data exists for the US back to at least the 1960s. The model predicts that teams will gain larger subsidies as the outside option, in terms of cities where a team owner could potentially move to, increase. It is possible to determine the size of the outside option, in terms of the population of the largest available open city, at the time any subsidy is determined in any sports league; the outside option will vary across leagues and over time. If larger alternative homes to a team are associated with larger subsidies, then a key prediction of the model will be supported.

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7 Appendix

7.1 Proof of Proposition 2

If $N_j \geq \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$ and $N_j \geq 2N_m - \frac{f}{v-c+\alpha}$, $\Pi_1^L = \Pi_2^L = \Psi(m) + \frac{1}{2}TW_j$.

If $N_m \leq \frac{v-c+\beta}{v-c+\alpha}N_k$ and $N_j < 2N_m - \frac{f}{v-c+\alpha}$,

$$\begin{aligned}\Pi_2^L - \Pi_1^L &= [\Psi(m) + TW_k] - [\Psi(m) + TW_m] \\ &= TW_k - TW_m \\ &= N_k(v-c+\beta) - N_m(v-c+\alpha) \\ &\geq 0\end{aligned}$$

If $N_m > \frac{v-c+\beta}{v-c+\alpha}N_k$ and $N_j < \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$,

$$\begin{aligned}\Pi_2^L - \Pi_1^L &= [\Psi(m) + TW_k] - [\Psi(m) + TW_m] \\ &= TW_k - TW_m \\ &= N_k(v-c+\beta) - N_m(v-c+\alpha) \\ &< 0\end{aligned}$$

7.2 Proof of Proposition 3

If $N_m \leq \frac{v-c+\beta}{v-c+\alpha}N_k$ and $\frac{(v-c+\beta)N_k+f}{2(v-c+\alpha)} < N_j < 2N_m - \frac{f}{v-c+\alpha}$,

$$\begin{aligned}\Delta\Pi^L &= \max\{\Pi_1^L, \Pi_2^L\} - \Pi^L \\ &= \Pi_2^L - \Pi^L \\ &= \left[\sum_{i=1}^{k_3} \frac{1}{2}TW_i + \sum_{i=k_3+1}^k TW_m + TW_k \right] - \left[\sum_{i=1}^{k_1} \frac{1}{2}TW_i + \sum_{i=k_1+1}^{k_2-1} TW_j + \sum_{i=k_2+1}^k TW_i + \frac{1}{2}TW_j \right]\end{aligned}$$

Differentiate $\Delta\Pi^L$ with respect to N_j , we get $\frac{d\Delta\Pi^L}{dN_j} = - \left[\sum_{i=k_1+1}^{k_2-1} \frac{dTW_j}{dN_j} \right] = -(k_2 - k_1 + \frac{1}{2})(v-c+\alpha) < 0$.

Differentiate $\Delta\Pi^L$ with respect to N_m , we get $\frac{d\Delta\Pi^L}{dN_m} = \sum_{i=k_3+1}^k \frac{dTW_m}{dN_m} = (k - k_3)(v-c+\alpha) > 0$.

If $N_m > \frac{v-c+\beta}{v-c+\alpha}N_k$ and $\frac{(v-c+\beta)N_k+f}{2(v-c+\alpha)} < N_j < \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}$,

$$\begin{aligned}\Delta\Pi^L &= \max\{\Pi_1^L, \Pi_2^L\} - \Pi^L \\ &= \Pi_1^L - \Pi^L \\ &= \left[\sum_{i=1}^{k_4} \frac{1}{2}TW_i + \sum_{i=k_4+1}^{k_5} TW_m + \sum_{i=k_5+1}^k TW_i + TW_m \right] - \left[\sum_{i=1}^{k_1} \frac{1}{2}TW_i + \sum_{i=k_1+1}^{k_2-1} TW_j + \sum_{i=k_2+1}^k TW_i + \frac{1}{2}TW_j \right]\end{aligned}$$

Differentiate $\Delta\Pi^L$ with respect to N_j , we get $\frac{d\Delta\Pi^L}{dN_j} = - \left[\sum_{i=k_1+1}^{k_2-1} \frac{dTW_j}{dN_j} \right] = -(k_2 - k_1 + \frac{1}{2})(v-c+\alpha) < 0$.

Differentiate $\Delta\Pi^L$ with respect to N_m , we get $\frac{d\Delta\Pi^L}{dN_m} = \sum_{i=k_4+1}^{k_5} \frac{dTW_m}{dN_m} = (k_5 - k_4)(v - c + \alpha) > 0$.

If $N_j \geq \max\{\frac{(v-c+\beta)N_k+f}{2(v-c+\alpha)}, \frac{2(v-c+\beta)N_k-f}{v-c+\alpha}, 2N_m - \frac{f}{v-c+\alpha}\}$,

$$\begin{aligned}\Delta\Pi^L &= \max\{\Pi_1^L, \Pi_2^L\} - \Pi^L \\ &= [\Psi(m) + \frac{1}{2}TW_j] - \left[\sum_{i=1}^{k_1} \frac{1}{2}TW_i + \sum_{i=k_1+1}^{k_2} TW_j + \sum_{i=k_2+1}^k TW_i \right] \\ &= \Psi(m) - \left[\sum_{i=1}^{k_1} \frac{1}{2}TW_i + \sum_{i=k_1+1}^{k_2-1} TW_j + \sum_{i=k_2+1}^k TW_i + \frac{1}{2}TW_j \right]\end{aligned}$$

Differentiate $\Delta\Pi^L$ with respect to N_j , we get $\frac{d\Delta\Pi^L}{dN_j} = - \left[\sum_{i=k_1+1}^{k_2-1} \frac{dTW_j}{dN_j} + \frac{1}{2} \frac{dTW_j}{dN_j} \right] = -(k_2 - k_1 + \frac{1}{2})(v - c + \alpha) < 0$.

Differentiate $\Delta\Pi^L$ with respect to N_m , we get $\frac{d\Delta\Pi^L}{dN_m} = \frac{d\Psi(m)}{dN_m} = \{0, (k-k_3)(v-c+\alpha), (k_5-k_4)(v-c+\alpha)\} \geq$

0

Table 1: Expansion and Relocation, Major League Baseball (Founded 1903)

Year	Event	Destination Cities
1953	Franchise Relocation	to Baltimore, Kansas City
1956	Franchise Relocation	to Los Angeles
1957	Franchise Relocation	to San Francisco
1960	Franchise Relocation	to Minneapolis
1961	Expansion	in Washington, Los Angeles
1962	Expansion	in Houston, New York
1965	Franchise Relocation	to Atlanta
1967	Franchise Relocation	to Oakland
1969	Expansion	in Kansas City, Seattle, San Diego, Montreal
1970	Franchise Relocation	to Milwaukee
1972	Franchise Relocation	to Dallas
1977	Expansion	in Seattle, Toronto
1993	Expansion	in Miami, Denver
1998	Expansion	in Tampa Bay, Phoenix
2005	Franchise Relocation	to Washington

Table 2: League Expansion and Relocation, National Football League (Founded 1920)

Year	Event	Destination Cities
1931	Expansion	in Cleveland
1932	Expansion	in Washington
1933	Expansion	Philadelphia, Pittsburgh, Cincinnati
1945	Franchise Relocation	to Los Angeles
1950	Rival AAFC	Merged Cleveland, San Francisco, Baltimore
1959	Franchise Relocation	to St. Louis
1960	Expansion	in Dallas
1961	Expansion	in Minneapolis
1966	Expansion	in Atlanta
1967	Expansion	in New Orleans
1970	Rival AFL	Merged Houston, New York, Boston, Buffalo, Miami, Oakland, Kansas City, Denver, San Diego, Cincinnati
1977	Expansion	in Seattle, Tampa Bay
1981	Franchise Relocation	to Los Angeles
1983	Franchise Relocation	to Indianapolis
1987	Franchise Relocation	to Phoenix
1994	Franchise Relocation	to Oakland, St. Louis
1995	Franchise Relocation	to Baltimore
1996	Franchise Relocation	to Nashville
1999	Expansion	in Cleveland
2002	Expansion	in Houston

Table 3: League Expansion and Relocation, National Basketball Association (Founded 1949)

Year	Event	Destination Cities
1951	Franchise Relocation	to Milwaukee
1955	Franchise Relocation	to St. Louis
1957	Franchise Relocation	to Detroit, Cincinnati
1960	Franchise Relocation	to Los Angeles
1961	Expansion	in Chicago
1962	Franchise Relocation	to San Francisco
1963	Franchise Relocation	to Philadelphia
1968	Franchise Relocation	to Atlanta
1968	Expansion	in Milwaukee
1970	Expansion	in Portland, Cleveland, Buffalo
1971	Franchise Relocation	to Oakland, Houston
1972	Franchise Relocation	to Cincinnati
1974	Franchise Relocation	to Washington
1974	Expansion	in New Orleans
1975	Franchise Relocation	to Kansas City
1977	Rival ABA	Merged San Antonio, Denver, Indiana, New York
1977	Franchise Relocation	to New Jersey
1978	Franchise Relocation	to San Diego
1979	Franchise Relocation	to Salt Lake City
1980	Expansion	in Dallas
1984	Franchise Relocation	to Los Angeles
1985	Franchise Relocation	to Sacramento
1989	Expansion	in Miami, Charlotte
1990	Expansion	in Orlando, Minneapolis
1995	Expansion	in Vancouver, Toronto
2001	Franchise Relocation	to Memphis
2002	Franchise Relocation	to New Orleans
2004	Expansion	in Charlotte
2007	Franchise Relocation	to Oklahoma City

Table 4: Expansion and Relocation, National Hockey League (Founded 1917)

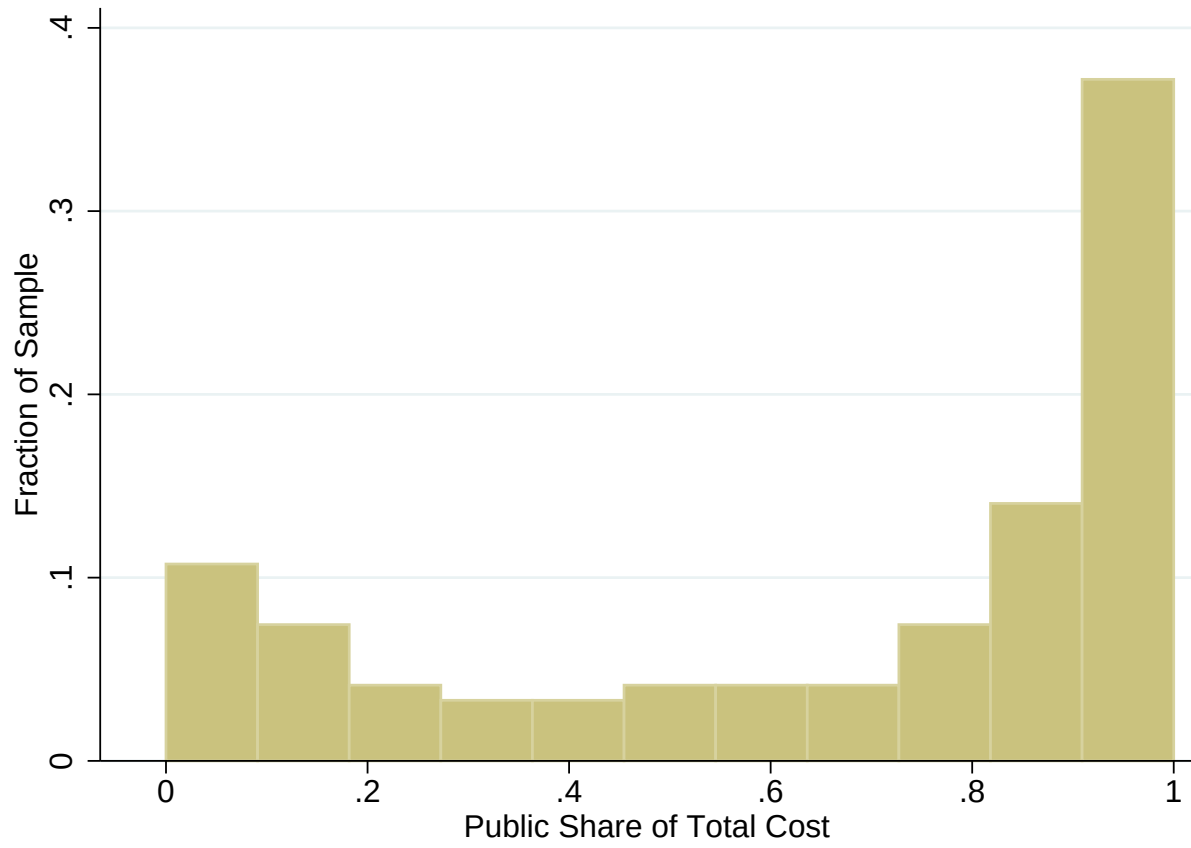
Year	Event	Destination Cities
1924	Expansion	in Hamilton, Boston
1925	Expansion	in Pittsburgh, New York
1926	Expansion	in Chicago, Detroit, Montreal
1967	Expansion	in Los Angeles, Minneapolis, Philadelphia Pittsburgh, San Francisco, St. Louis
1970	Expansion	in Vancouver, Buffalo
1972	Expansion	in Long Island, Atlanta
1976	Franchise Relocation	to Denver
1979	Rival WHA	merged Edmonton, Hartford, Quebec, Winnipeg
1980	Franchise Relocation	to Calgary
1982	Franchise Relocation	to New Jersey
1992	Expansion	in San Jose, Ottawa
1993	Franchise Relocation	to Dallas
1993	Expansion	in Ottawa, Tampa Bay
1995	Franchise Relocation	to Denver
1996	Franchise Relocation	to Phoenix
1997	Franchise Relocation	to Carolina
1998	Expansion	in Nashville
1999	Expansion	in Atlanta
2000	Expansion	in Columbus, Minnesota
2011	Franchise Relocation	to Winnipeg

Table 5: Total Construction Cost and Subsidy since 1970, Millions of 2010 dollars

Facility Type		Number	Mean	SD	Min	Max
MLB	Total Construction Cost	25	545	406	62	1890
	Total Public Subsidy	25	340	198	20	945
NFL	Total Construction Cost	29	461	310	36	1570
	Total Public Subsidy	29	292	171	0	676
MLB/NFL	Total Construction Cost	6	266	61	185	341
	Total Public Subsidy	6	222	124	14	341
NBA	Total Construction Cost	26	226	120	67	562
	Total Public Subsidy	26	153	98	0	330
NHL	Total Construction Cost	20	227	83	76	475
	Total Public Subsidy	20	145	99	0	307
NBA/NHL	Total Construction Cost	15	230	138	49	556
	Total Public Subsidy	15	68	73	0	256

Source: Long (2013)

Figure 1: Public Share of Total New Facility Cost 1969-2010



Source: Based on data in Long (2013)

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