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Competition and Cooperation Between Professional Sports Franchises:
The Impact on Ticket Prices

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Abstract: An important issue in many antitrust lawsuits involving professional sports leagues and their member teams is the extent to which franchises within the same, and across different, professional sports leagues compete with one another for fans and advertisers. Complicating the issue is the fact that some sports franchises also cooperate with other franchises in the same or different leagues by, for example, participating in a joint venture to build and operate the stadium in which they will play their games or a regional sports network joint venture to televise their games. An extreme form of cooperation is common ownership: some franchises in different sports leagues have common ownership. This study investigates the impact of competition and cooperation among the franchises of the four major professional sports leagues (i.e., the National Football League, National Basketball Association, National Hockey League, and Major League Baseball) on ticket prices for the 2008 season. The regression results suggest that the existence of one or more rival sports franchises in the same metropolitan area does not have a statistically significant impact on ticket prices. On the other hand, there is at best weak evidence that cooperation between sports franchises impacts ticket prices. These findings are consistent with a number of alternative hypotheses.

Competition and Cooperation Between Professional Sports Franchises: The Impact on Ticket Prices

Most metropolitan areas that have a major North American professional sports franchise (i.e., the National Football League, the National Basketball Association, the National Hockey League, and Major League Baseball) also have a franchise from at least one of the other leagues. The extent to which franchises from different leagues compete for fans and advertisers is a matter of much dispute, as evidenced by the controversy over the delineation of the relevant product market in antitrust lawsuits involving sports leagues.¹ The defendant league typically argues that it (and its member franchises) operates in a broad “entertainment market” in which it competes against other professional sports leagues, as well as other forms of entertainment such as movies. The plaintiff typically contends that there are no good substitutes for the product produced by the defendant league and thus the relevant market is limited to the league’s product (i.e., the defendant league is a monopoly).

The extent to which major professional sports franchises in the same metropolitan area compete is ultimately an empirical question which has received little attention.² I conduct a cross-sectional regression analysis of average ticket prices in the NBA, NFL, NHL, and MLB and test whether the presence of other franchises in the same metropolitan area is associated with lower ticket prices, as one may expect if franchises compete with one another for fan attendance at home games.

On the other hand, some franchises cooperate with one another. The most extreme form of cooperation is common ownership. Numerous franchises share a common ownership with another franchise in a different league. I test whether franchises with common ownership charge higher ticket prices. If franchises in the same metropolitan area compete for attendance at home games, then placing some of those franchises under common ownership may reduce competition, thereby possibly leading to higher ticket prices. On the other hand, placing some of the franchises under common ownership may produce cost savings and thereby possibly lead to lower ticket prices if a portion of the cost savings is passed on to fans.

Another form of cooperation is the joint venture. Some franchises participate in joint ventures with franchises in different leagues to own the stadiums where they play their home games. Such a joint venture could produce cost savings that may be passed on to fans, but also could reduce competition between the joint venture participants for attendance at home games.

¹ See Pelnar (2007) for a summary of market definition arguments presented in a wide variety of antitrust lawsuits involving sports leagues.

² A notable exception is Winfree *et al.* (2004) which examines competition between nearby MLB teams and finds that (1) “the closer two teams are, the lower the attendance is at each team relative to two teams that are further apart” and (2) “when a new team moves into the area for an existing team, there is an additional initial reduction in attendance for the incumbent team.” (p. 2117)

Other franchises participate in regional sports network (RSN) joint ventures with franchises from the same or different leagues to broadcast their games. Once again, these joint ventures could produce cost savings that are passed on to fans who attend home games in the form of lower ticket prices, but also could reduce competition between the joint venture participants, thereby resulting in higher advertising rates and ticket prices.

The econometric analysis of ticket prices for the 2008 MLB, NFL, NHL, and NBA seasons suggests that ticket prices of a major professional sports franchise are not impacted by the presence of other major professional sports franchises in the same metropolitan area. This finding is consistent with a lack of competition between franchises in different leagues. It is also consistent, however, with the hypothesis that competition from other sources of entertainment, such as movie theaters, is sufficiently intense as to constrain the pricing of tickets to sporting events, making the incremental competitive effect of a rival franchise statistically insignificant. Another possibility is that the sample size is too small to detect the competitive effect.

Likewise, the econometric results suggest that ticket prices to major professional sporting events do not depend on whether several franchises in a metropolitan area have common ownership, whether franchises jointly own the stadium, or whether franchises participate in an RSN joint venture. Once again, these results could reflect the intensity of competition from other sources of entertainment or a failure to detect the competitive effect due to small sample size. A third possibility is that the effect of any reduction in competition is offset by cost savings passed on to fans, so that the net effect on ticket prices is roughly zero.

I. Background and Hypotheses

Assuming that other forms of entertainment do not completely constrain the pricing for professional sporting events, ticket prices for such events should be lower if the franchise faces competition from at least one other professional sports franchise in the same metropolitan area. In fact, the ticket price to a professional sports event may be a decreasing function of the number of professional sports franchises which play their games in the area.

Hypothesis 1: *Ticket prices for a franchise's games will be lower if another franchise plays its games in the same metropolitan area.*

Hypothesis 2: *Ticket prices for a franchise's games will be a decreasing function of the number of other professional sports franchises also playing their games in the same metropolitan area.*

Table I.1 shows groupings of major professional sports franchises by metropolitan area, as of the 2008 MLB season and the 2008-09 NFL, NBA, and NHL seasons. In the absence of data on where each franchise draws its fans, there is a certain amount of subjectivity in assigning franchises to a particular metropolitan area. For example, the NFL's Green Bay Packers formerly played half its home games in Milwaukee, home of the NBA's Bucks and MLB's Brewers. One could argue that the Bucks and Brewers not only compete with each other, but with the Packers as well. I assume, however, that this is not the case. I code Green Bay as a one team market – the Packers – and Milwaukee as

a two-team market – the Brewers and the Bucks. Assumptions also had to be made about the San Francisco/Oakland³, New York/northern New Jersey⁴, and Los Angeles/Anaheim regions⁵. One could reasonably argue that a particular franchise should have been included in a metro area but was not, or should not have been included but was. For the reader who wishes to investigate the impact of alternative assumptions, the appendix contains the data used in the analysis.

³ The NBA's Golden State Warriors currently play in Oakland, but formerly played in San Francisco. I assume that the Warriors draw basketball fans from both San Francisco and Oakland and thus compete in the same market as the NFL's Oakland Raiders and San Francisco 49ers and MLB's Oakland Athletics and San Francisco Giants. However, I assume that football and baseball fans in San Francisco (Oakland) attend 49ers (Raiders) and Giants (Athletics) games. In other words, the 49ers compete for fan attendance with the Giants and Warriors, while the Raiders compete for fan attendance with the Athletics and the Warriors.

⁴ I assume that New York residents attend Knicks, Rangers, and Islanders games, while northern New Jersey residents attend Nets and Devils games, and that both New York and northern New Jersey residents attend the NFL's Giants and Jets games and MLB's Yankees and Mets games. In other words, the NFL's Giants and Jets compete for fans with the NBA's Knicks and Nets, MLB's Yankees and Mets, and the NHL's Rangers, Islanders, and Devils, whereas the NHL's Devils compete for fans with the NBA's Nets (but not the Knicks), the NFL's Giants and Jets, and MLB's Yankees and Mets, but not with either of the "New York" NHL franchises (i.e., the Rangers and Islanders).

⁵ I assume that if a league has both a "Los Angeles" franchise and an "Anaheim" franchise then these franchises do not compete. For example, the NHL's Los Angeles Kings and Anaheim Ducks are assumed to draw fans from Los Angeles and Anaheim, respectively, whereas the NBA's Los Angeles Lakers and Los Angeles Clippers are assumed to draw fans from the entire Los Angeles-Anaheim metro area since there is no specifically "Anaheim" NBA franchise. A problem arises in the case of MLB's Angels, who have at times been named the "California Angels", the "Anaheim Angels", and the "Los Angeles Angels of Anaheim." Given the existence of MLB's Los Angeles Dodgers, I assume that the Angels and Dodgers draw their fans from Anaheim and Los Angeles, respectively, and thus do not compete.

Table I.1: Major Professional Sports Franchises, by Metropolitan Area

<u>Metropolitan Area</u>	<u>NBA</u>	<u>NHL</u>	<u>NFL</u>	<u>MLB</u>
Anaheim (NHL & MLB)	Clippers, Lakers	Ducks		Angels
Atlanta	Hawks	Thrashers	Falcons	Braves
Baltimore			Ravens	Orioles
Boston	Celtics	Bruins	Patriots	Red Sox
Buffalo		Sabres	Bills	
Calgary		Flames		
Charlotte	Bobcats		Panthers	
Chicago	Bulls	Blackhawks	Bears	Cubs, White Sox
Cincinnati			Bengals	Reds
Cleveland	Cavaliers		Browns	Indians
Columbus		Blue Jackets		
Dallas	Mavericks	Stars	Cowboys	Rangers
Denver	Nuggets	Avalanche	Broncos	Rockies
Detroit	Pistons	Red Wings	Lions	Tigers
Edmonton		Oilers		
Green Bay			Packers	
Houston	Rockets		Texans	Astros
Indianapolis	Pacers		Colts	
Jacksonville			Jaguars	
Kansas City			Chiefs	Royals
Los Angeles	Clippers, Lakers	Kings		Dodgers
Memphis	Grizzlies			
Miami	Heat	Panthers	Dolphins	Marlins
Milwaukee	Bucks			Brewers
Minneapolis	Timberwolves	Wild	Vikings	Twins
Montreal		Canadians		
Nashville		Predators	Titans	
New Orleans	Hornets		Saints	
New York & Northern New Jersey (NFL & MLB)	Knicks, Nets	Devils, Islanders, Rangers	Giants, Jets	Mets, Yankees
New York (NBA & NHL)	Knicks	Islanders, Rangers	Giants, Jets	Mets, Yankees
Northern New Jersey (NBA & NHL)	Nets	Devils	Giants, Jets	Mets, Yankees
Oakland (NFL & MLB)	Warriors		Raiders	Athletics
Oklahoma City	Thunder			
Orlando	Magic			
Ottawa		Senators		
Philadelphia	76ers	Flyers	Eagles	Phillies
Phoenix	Suns	Coyotes	Cardinals	Diamondbacks
Pittsburgh		Penguins	Steelers	Pirates
Portland	Trailblazers			
Raleigh		Hurricanes		
San Diego			Chargers	Padres
Sacramento	Kings			
Salt Lake City	Jazz			
San Antonio	Spurs			
San Francisco (NFL & MLB)	Warriors		49ers	Giants
San Francisco Bay area (NBA)	Warriors		49ers, Raiders	Athletics, Giants
San Jose		Sharks		
Seattle			Seahawks	Mariners
St. Louis		Blues	Rams	Cardinals
Tampa		Lightning	Buccaneers	Rays
Toronto	Raptors	Maple Leafs		Blue Jays
Vancouver		Canucks		
Washington, D.C.	Wizards	Capitals	Redskins	Nationals

In some cases, the NHL and NBA franchises not only play in the same metropolitan area, they play in the same stadium during seasons that largely coincide.⁶ Thus, the cost of getting to the stadium is the same whether a fan attends the NBA or NHL game and will not be a determining factor in which game is attended (although it may be a factor in whether any game at all is attended). The NHL and NBA franchises can compete for fan attendance along a number of dimensions, including ticket prices and team quality. Table I.2 lists franchises that played their games at the same stadium during the 2008 season. All else equal, ticket prices may be expected to be lower if another professional sports franchise plays its games at the same stadium.

Hypothesis 3: *Ticket prices will be lower, all else equal, if a franchise plays its games at the same stadium as another franchise, either from the same or a different league.*

Table I.2: Franchises Playing at the Same Stadium

<u>Metro Area</u>	<u>Stadium</u>	<u>NBA</u>	<u>NHL</u>	<u>NFL</u>	<u>MLB</u>
Atlanta	Philips Arena	Hawks	Thrashers		
Boston	TD Garden	Celtics	Bruins		
Chicago	United Center	Bulls	Blackhawks		
Dallas	American Airlines Center	Mavericks	Stars		
Denver	Pepsi Center	Nuggets	Avalanche		
Los Angeles	Staples Center	Clippers, Lakers	Kings		
Miami	Land Shark Stadium			Dolphins	Marlins
Minneapolis	Hubert H. Humphrey Metrodome			Vikings	Twins
New York City	Madison Square Garden	Knicks	Rangers		
Oakland	Oakland-Alameda County Coliseum			Raiders	Athletics
Philadelphia	Wachovia Center	76ers	Flyers		
Toronto	Air Canada Centre	Raptors	Maple Leafs		
Washington, D.C.	Verizon Center	Wizards	Capitals		

There are several areas where some franchises cooperate. Some franchises in different leagues share a common owner. Table I.3 provides a list, as of the 2008 season.⁷ For example, the NBA's Atlanta Hawks and the NHL's Atlanta Thrashers are both owned by Atlanta Spirit LLC and play their games at the same stadium and, therefore, ticket prices for the two teams will be set so as to maximize their joint profits, whereas, for example, the NBA's Boston Celtics and NHL's Boston Bruins, which also play at the same stadium but have different owners, will each set ticket prices to maximize their individual, not joint, profits. To the extent that NBA and NHL games are

⁶ Less commonly, MLB and NFL teams play at the same stadium, although the MLB and NFL regular- and post-seasons overlap for less than two months.

⁷ Note that the owner of the Denver Nuggets and Colorado Avalanche also owns a stake in the St. Louis Rams, but the Rams are not located in the same metro area as the Nuggets and Avalanche. Thus, the Nuggets and Avalanche are coded as having common ownership, but not the Rams. Similarly, Paul Allen owns both the Portland Trailblazers and the Seattle Seahawks, but since the franchises are located in different metro areas, they are not coded as having common ownership.

substitutes, the Atlanta Spirit may be expected to price tickets for Hawks and Thrashers games higher than the Celtics and Bruins, all else equal. On the other hand, if joint ownership results in cost savings, ticket prices for the home games of jointly-owned franchises may be lower than those of other franchises.

Hypothesis 4: *Ticket prices of franchises sharing a common ownership will be higher (lower) than those of other franchises, all else equal, if the effect of the reduction in competition between the franchises is greater (less) than the cost savings produced by common ownership that are passed on to fans.*

Table I.3: Franchises with Common Ownership

<u>Owner</u>	<u>NBA</u>	<u>NHL</u>	<u>NFL</u>	<u>MLB</u>
Atlanta Spirit	Hawks	Thrashers		
Comcast Spectacor	76ers	Flyers		
E. Stanley Kroenke	Nuggets	Avalanche	Rams	
Jerry Reinsdorf	Bulls			White Sox
Madison Square Garden (Cablevision)	Knicks	Rangers		
Maple Leaf Sports & Entertainment	Raptors	Maple Leafs		
Michael Ilitch		Red Wings		Tigers
Paul Allen	Trailblazers		Seahawks	
Tom Hicks		Stars		Rangers

A second area of cooperation between franchises is sometimes joint ownership of the stadium at which the teams play. Table I.4 provides a list. For example, the NBA’s Chicago Bulls and the NHL’s Chicago Blackhawks are joint owners of the United Center, where both franchises play their home games. It may be the case that cooperation between franchises in running the stadiums that they jointly own leads to a reduction in competition for fans. Alternatively, the cost savings from joint ownership of the stadium may be passed on to sports fans in the form of lower ticket prices.

Hypothesis 5: *Ticket prices of franchises which jointly own the stadium at which they play will be higher (lower) than those of other franchises, all else equal, if the effect of the reduction in competition between the franchises is greater (less) than the cost savings produced by joint ownership of the stadium that are passed on to fans.*

Table I.4: Jointly-Owned Stadiums

<u>Metro Area</u>	<u>Stadium</u>	<u>NBA</u>	<u>NHL</u>	<u>NFL</u>	<u>MLB</u>
Chicago	United Center	Bulls	Blackhawks		
Dallas	American Airlines Center	Mavericks	Stars		

Another area of cooperation between franchises is sometimes joint ownership of a regional sports network. Table I.5 provides a list. For example, in Chicago, four of the five major professional sports franchises – MLB’s Cubs and White Sox, as well as the NBA’s Bulls and the NHL’s Blackhawks – participate in an RSN joint venture with

Comcast. The exception is the NFL’s Chicago Bears. The NFL has a rule against franchise-owned RSNs. The impact of joint ownership of an RSN on ticket prices depends on the effect on competition and the magnitude of the cost savings passed on to sports fans in the form of lower ticket prices.

Hypothesis 6: *Ticket prices of franchises which jointly own an RSN will be higher (lower) than those of other franchises, all else equal, if the effect of the reduction in competition between the franchises is greater (less) than the cost savings produced by joint ownership of the RSN that are passed on to fans.*

Table I.5: Jointly-Owned Regional Sports Networks

<u>Metro Area</u>	<u>MLB</u>	<u>NBA</u>	<u>NHL</u>	<u>NFL</u>
Baltimore & Washington, D.C.	Orioles, Nationals			
Boston	Red Sox		Bruins	
Chicago	Cubs, White Sox	Bulls	Blackhawks	

Hypotheses 1-6 are investigated by conducting a cross-sectional regression analysis of average ticket prices across teams in the same league over a single season. Hypotheses 1-3 make definite predictions about the signs of certain regression coefficients, whereas Hypotheses 4-6 do not, although the latter offer guidance on the interpretation of the estimated coefficients. One limitation of the analysis is that, since there are only 32 NFL teams and 30 NBA, NHL, and MLB teams each, the sample size for each cross-sectional regression is quite small.⁸ Therefore, a 10% significance level may be more appropriate for testing the hypotheses than the more commonly used 5% and 1% levels.⁹

The econometric model estimated is:

$$\text{Price} = f(\text{competition, cooperation, product quality, metro characteristics}) + \text{error term.}$$

The linear version of this model is estimated via Ordinary Least Squares (OLS) using the R statistical package.

⁸ Other studies which examine team data for a single season include Fort (2004) and Boyd & Boyd (1998). Some studies examine panel data for teams over a number of seasons, including Brown *et al.* (2006), Winfree *et al.* (2004), and Rishe & Mondello (2003).

⁹ For a discussion of sample size and the choice of significance level for hypothesis testing, see Hendry (1995, p. 490).

II. Data and Sources

The dependent variable in the estimated regression model is average ticket price as reported by Team Marketing Report (TMR) for the 2008-09 NFL, NBA, and NHL seasons and the 2008 MLB season.¹⁰ The average price is a weighted average of season ticket prices for general seating categories, excluding premium seating (i.e., tickets that come with at least one added amenity) and luxury suites. TMR converts the ticket prices for franchises located in Canada to U.S. dollars.

The explanatory variables in the regression model fall into three groups: competition/cooperation variables, control variables for the quality of a franchise's product, and control variables for differences among metropolitan areas. Table II.1 provides more details on each of the variables considered (not all of which are included in the final specifications).¹¹

The 'cooperation' variables indicate whether the franchise in question shares a common owner with another franchise located in the same metropolitan area, whether the franchise participated in a stadium ownership joint venture with another franchise, and whether the franchise participated in a regional sports network joint venture with another franchise, while the 'competition' variables indicate the number or existence of other major professional sports franchises in the same metro area. Data on the ownership structures of sports franchises and their participation in joint ventures with other franchises is hand-collected from Wikipedia entries for each major professional sports franchise, each stadium where a franchise plays its games, and regional sports networks (as well as miscellaneous other websites).

Since franchises with a higher quality product may be expected to charge higher ticket prices, all else equal, a number of quality variables are examined including winning percentage (or, in the case of the NHL, points) in the prior season, player payroll for the prior season, and number of league championships won while the franchise was in its current location.¹² To avoid simultaneity issues, I include quality measures for the 2007 season rather than the 2008 season.¹³

¹⁰ Other studies analyzing TMR average ticket prices include Brown *et al.* (2006) and Rische & Mondello (2003).

¹¹ The Appendix contains both the data for the variables used in the final specifications, as well as other variables which were considered.

¹² The calculation of championships involves a number of subjective judgments. For teams such as the NFL's Oakland Raiders that have moved around, it is assumed that fans care only about the championships won while the franchise was in their current metro area. Thus, although the Raiders have won three Super Bowls in their entire team history, the Raiders have zero championships at their current location because they moved to Los Angeles in 1982, where they won their third Super Bowl, and moved back to Oakland in 1995, and have yet to win a Super Bowl since returning to Oakland. One could argue that the two Super Bowls won while the Raiders were in Oakland (prior to their move to Los Angeles) should be included in the tally, or that all three Super Bowl wins should be included. Also, prior to the first Super Bowl, both the National Football League and the American Football League had respective champions, but I tally only the championships

Control variables for differences across metropolitan areas include population, population per major professional sports franchise in the area, and regional dummy variables (i.e., Northeast U.S., Southeast U.S., Northcentral U.S., Southcentral U.S., West Coast U.S., and Canada). Per capita income data are available for U.S. franchises, but not Canadian franchises.¹⁴

Table II.1: Variable List

<u>Variable</u>	<u>Definition and Source</u>
Dependent variable: AveTick2008	Weighted average ticket price for the 2008 MLB season and 2008-09 NFL, NBA, and NHL seasons. Excludes premium seating (i.e., tickets that come with at least one added amenity) and luxury suites. Source: Team Marketing Report.
Explanatory variables: Attend2007	Attendance for the 2007 season. Source: ESPN website.
Attend_to_capacity2007	Attendance for the 2007 season as a percentage of stadium capacity. Source: ESPN website.
Canada, NE, SE,NC,SC, West	Dummy variable = 1 if franchise is based in Canada, northeast U.S, southeast U.S., north central U.S., south central U.S., or western U.S., respectively.
Championships	Number of league championships won since the franchise has been in its current metropolitan area. Source: Wikipedia.
Franchise_current_city	The year the franchise began playing its home games in its current metropolitan area. ¹⁵ Source: Wikipedia.

of the National Football League franchises due to that league’s long history. One also could reasonably argue that championships won by American Football League franchises prior to the first Super Bowl should be included in the tally.

¹³ For example, player payroll for the 2008 season may be a function of the average ticket price for that season. Thus, I consider player payroll data for the prior (2007) season.

¹⁴ Since the NFL does not have any Canadian franchises, per capita income can be included as an explanatory variable without dropping any observations. Since there is only one MLB and one NBA franchise located in Canada, per capita income can be included as an explanatory variable by reducing the sample size from 30 to 29. However, there are six Canadian NHL franchises so including per capita income as an explanatory variable would reduce the sample size from 30 to 24.

¹⁵ The NFL’s Oakland Raiders moved to Los Angeles in 1982 and back to Oakland in 1995 so the franchise’s current tenure in Oakland is measured from 1995. Also, Hurricane Katrina forced the NFL’s Saints and NBA’s Hornets to move their home games and thus their current tenure in New Orleans is measured relative to the date they resumed playing their home games in New Orleans. One could argue that this measure understates the franchises’ “roots” in these cities.

Table II.1: Variable List

Franchise_current_stadium	The year the franchise began playing its home games in its current stadium. Source: Wikipedia.
Income	Per capita income of the metropolitan area where the franchise operates. (U.S. franchises only) Source: U.S. Census Bureau, <i>State and Metropolitan Area Data Book</i> .
JVstadium	Dummy variable = 1 if franchise plays its home games in a stadium which is the product of a joint venture with another major professional sports franchise. Source: Wikipedia.
MLBexist, NBAexist, NFLexist, NHLexist	Dummy variable = 1 if there exists another MLB, NBA, NFL, or NHL franchise, respectively, in the same metropolitan area.
MLBteams, NBAteams, NFLteams, NHLteams	Number of other MLB, NBA, NFL, and NHL franchises located in the same metropolitan area.
Own_another_franchise	Dummy variable = 1 if Own_NBA = 1, Own_NHL = 1, Own_MLB = 1, or Own_NFL = 1.
Own_NBA, Own_NFL, Own_NHL, Own_MLB	Dummy variable = 1 if franchise shares a common owner with an NBA, NFL, NHL or MLB franchise, respectively, located in the same metropolitan area. Source: Wikipedia.
Payroll2007	Player payroll for the 2007 season. Source: ESPN website.
Points2007	Points at the end of the 2007 NHL season. Source: ESPN website.
Population	Population of the metropolitan area where the franchise operates. Source: U.S. Census Bureau, <i>State and Metropolitan Area Data Book</i> (U.S. franchises); Statistics Canada (Canadian franchises).
Pop_per_team	Population/Totalteams.
RSNJV_NBA, RSNJV_NHL, RSNJV_MLB	Dummy variable = 1 if franchise participated in a regional sports network joint venture with an NBA, NHL, or MLB franchise located in the same metro area, respectively. Source: Wikipedia.
RSNJV	Dummy variable = 1 if RSNJV_NBA = 1, RSNJV_NHL = 1, or RSNJV_MLB = 1.
Share_NBA, Share_NFL, Share_NHL, Share_MLB	Dummy variable = 1 if franchise shares a stadium with an NBA, NFL, NHL or MLB franchise, respectively, located in the same metropolitan area. Source: Wikipedia.
Share_rivalNBA, Share_rivalNFL, Share_rivalNHL, Share_rivalMLB	Dummy variable = 1 if franchise shares a stadium with an NBA, NFL, NHL or MLB franchise, respectively, located in the same metropolitan area with which it does not share common ownership. Source: Wikipedia.
Tenure_in_stadium	Number of consecutive years the franchise has played its home games in its current stadium. (=1+2008-Franchise_current_stadium)
Totalteams	Total number of major professional sports franchises in the metropolitan area. (= 1 + MLBteams + NBAteams + NFLteams + NHLteams)
Winpct2007	Winning percentage at the end of the 2007 NFL, NBA, and MLB seasons. Source: ESPN website.

III. NBA Ticket Prices: Econometric Results

Model III.1 is a regression of average ticket price for each NBA team for the 2008-09 season on population scaled by the total number of major professional sports franchises in the metropolitan area (a proxy for potential demand for attendance at an NBA franchise's home games), player payroll for the 2007 season (a proxy for a franchise's recent quality), and the number of championships the team has won during its current tenure in the metropolitan area (a proxy for a franchise's historical quality). Each of the regression coefficients is positive and statistically significant at the 1% level.

Model III.1

Call:

```
lm(formula = AveTick2008 ~ Pop_per_team + Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-17.6576	-5.9942	-0.3256	6.0763	18.0740

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-2.288e+00	1.171e+01	-0.195	0.84668
Pop_per_team	9.740e-06	3.446e-06	2.826	0.00893 **
Payroll2007	5.363e-07	1.646e-07	3.258	0.00312 **
Championships	1.719e+00	4.877e-01	3.525	0.00159 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.657 on 26 degrees of freedom

Multiple R-squared: 0.6329, Adjusted R-squared: 0.5906

F-statistic: 14.94 on 3 and 26 DF, p-value: 7.456e-06

To test Hypothesis 1, various 'competition' variables are added as regressors to Model III.1. Hypothesis 1 suggests that the coefficients will be negative and statistically significant. Model III.2 adds a dummy variable indicating the existence of a rival NBA team in the same metropolitan area. The regression coefficient has the 'wrong sign' and is not statistically significant at the 10% level.

Model III.2

Call:

```
lm(formula = AveTick2008 ~ NBAexist + Pop_per_team + Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-16.2622	-4.6458	-0.9675	6.2518	17.8471

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.214e+00	1.162e+01	-0.105	0.91757
NBAexist	1.007e+01	8.002e+00	1.258	0.21987
Pop_per_team	8.164e-06	3.631e-06	2.248	0.03362 *
Payroll2007	5.475e-07	1.630e-07	3.358	0.00252 **

Championships 1.527e+00 5.059e-01 3.018 0.00578 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.551 on 25 degrees of freedom

Multiple R-squared: 0.6548, Adjusted R-squared: 0.5996

F-statistic: 11.86 on 4 and 25 DF, p-value: 1.544e-05

Model III.3 adds dummy variables indicating the existence of NHL, NFL, and MLB teams in the same metropolitan area. The coefficients of these dummy variables also are not statistically significant at the 10% level.

Model III.3

Call:

lm(formula = AveTick2008 ~ NBAexist + NHLexist + NFLexist + MLBexist + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-16.095	-5.158	-0.773	5.194	17.302

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.651e-01	1.227e+01	-0.013	0.98938
NBAexist	5.502e+00	9.191e+00	0.599	0.55554
NHLexist	5.886e+00	6.067e+00	0.970	0.34251
NFLexist	-6.049e+00	5.932e+00	-1.020	0.31889
MLBexist	-8.453e-01	6.849e+00	-0.123	0.90289
Pop_per_team	5.773e-06	4.474e-06	1.290	0.21040
Payroll2007	6.054e-07	2.079e-07	2.913	0.00807 **
Championships	1.487e+00	5.294e-01	2.808	0.01025 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.818 on 22 degrees of freedom

Multiple R-squared: 0.679, Adjusted R-squared: 0.5768

F-statistic: 6.648 on 7 and 22 DF, p-value: 0.0002723

Alternatively, Model III.4 includes a dummy variable indicating NBA franchises with no other major professional sports team in the same metropolitan area. Hypothesis 1 predicts the coefficient of the 'single team market' variable will be positive and statistically significant. However, the estimated coefficient is negative, but not statistically significant at the 10% level.

Model III.4

Call:

lm(formula = AveTick2008 ~ Oneteammarket + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-17.8286	-5.8004	-0.4634	6.2689	18.0102

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.639e+00	1.276e+01	-0.128	0.89884
Oneteammarket	-7.617e-01	5.283e+00	-0.144	0.88651
Pop_per_team	1.000e-05	3.947e-06	2.534	0.01793 *
Payroll2007	5.242e-07	1.874e-07	2.798	0.00976 **
Championships	1.703e+00	5.089e-01	3.347	0.00258 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.844 on 25 degrees of freedom

Multiple R-squared: 0.6333, Adjusted R-squared: 0.5746

F-statistic: 10.79 on 4 and 25 DF, p-value: 3.197e-05

Thus, the results of Models III.2-III.4 do not support Hypothesis 1 regarding the impact on ticket prices of competition from other sports franchises.

To test Hypothesis 2, Model III.5 includes as an explanatory variable the total number of major professional sports teams in the metropolitan area. Hypothesis 2 suggests that the coefficient of this regressor will be negative and statistically significant. However, the estimated coefficient is positive but is not statistically significant at the 10% level. Therefore, the results of Model III.5 do not support Hypothesis 2.

Model III.5

Call:

lm(formula = AveTick2008 ~ Totalteams + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-17.4702	-6.3038	0.1442	7.3249	17.4270

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-3.870e-01	1.180e+01	-0.033	0.97410
Totalteams	1.306e+00	1.197e+00	1.091	0.28568
Pop_per_team	9.833e-06	3.435e-06	2.863	0.00838 **
Payroll2007	4.440e-07	1.845e-07	2.406	0.02385 *
Championships	1.588e+00	5.006e-01	3.172	0.00398 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.622 on 25 degrees of freedom

Multiple R-squared: 0.6496, Adjusted R-squared: 0.5936

F-statistic: 11.59 on 4 and 25 DF, p-value: 1.848e-05

To test Hypothesis 3, Model III.6 adds as explanatory variables whether the NBA franchise plays its games in the same stadium as another NBA or NHL team. Hypothesis 3 suggests that the coefficients of these ‘stadium sharing’ variables should be negative and statistically significant. However, the coefficient of neither ‘stadium sharing’ variable is statistically significant at the 10% level and one has the ‘wrong sign’.

Model III.6

Call:

```
lm(formula = AveTick2008 ~ Share_NBA + Share_NHL + Pop_per_team +
    Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-18.6873	-4.8784	-0.0637	5.1427	16.5522

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-3.972e+00	1.191e+01	-0.333	0.74169
Share_NBA	1.168e+01	8.148e+00	1.434	0.16445
Share_NHL	-4.394e+00	4.287e+00	-1.025	0.31555
Pop_per_team	8.845e-06	3.688e-06	2.398	0.02459 *
Payroll2007	5.944e-07	1.692e-07	3.514	0.00178 **
Championships	1.659e+00	5.215e-01	3.181	0.00402 **

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 9.541 on 24 degrees of freedom

Multiple R-squared: 0.6693, Adjusted R-squared: 0.6004

F-statistic: 9.714 on 5 and 24 DF, p-value: 3.595e-05

It may be argued that what matters is the sharing of a stadium with a team not owned by the NBA franchise. Model III.7 replaces the explanatory variable for sharing with any NHL team to one for sharing with a non-owned (‘rival’) NHL team. Once again, the regression coefficients are not statistically significant at the 10% level and one has the ‘wrong sign’. Consequently, the results of Models III.6-III.7 do not support Hypothesis 3.

Model III.7

Call:

lm(formula = AveTick2008 ~ Share_NBA + Share_rivalNHL + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-17.273	-5.107	-1.226	5.825	17.493

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-2.112e+00	1.180e+01	-0.179	0.85945
Share_NBA	1.249e+01	8.773e+00	1.423	0.16748
Share_rivalNHL	-4.252e+00	5.998e+00	-0.709	0.48518
Pop_per_team	8.412e-06	3.685e-06	2.283	0.03157 *
Payroll2007	5.614e-07	1.659e-07	3.385	0.00245 **
Championships	1.708e+00	5.709e-01	2.991	0.00634 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.647 on 24 degrees of freedom

Multiple R-squared: 0.6619, Adjusted R-squared: 0.5915

F-statistic: 9.397 on 5 and 24 DF, p-value: 4.62e-05

To investigate Hypotheses 4-6, Model III.8 adds three ‘cooperation’ explanatory variables – ownership of another major professional sports franchise in the same metropolitan area, participation in a regional sports network joint venture with at least one other major professional sports franchise in the same metropolitan area, and participation in a stadium joint venture with at least one other major professional sports franchise. All three regression coefficients are not statistically significant at the 10% level. The interpretation of these results in the context of Hypotheses 4-6 is discussed below.

Model III.8

Call:

lm(formula = AveTick2008 ~ Own_another_franchise + RSNJV + JVstadium + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-18.3191	-5.5252	-0.1802	5.2207	17.3985

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-3.423e+00	1.366e+01	-0.251	0.80433
Own_another_franchise	-3.306e+00	5.270e+00	-0.627	0.53656
RSNJV	6.420e+00	1.728e+01	0.372	0.71365
JVstadium	8.981e-01	1.166e+01	0.077	0.93928
Pop_per_team	9.720e-06	3.702e-06	2.625	0.01512 *
Payroll2007	5.620e-07	1.984e-07	2.833	0.00942 **
Championships	1.638e+00	5.411e-01	3.028	0.00598 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 10.13 on 23 degrees of freedom

Multiple R-squared: 0.6425, Adjusted R-squared: 0.5492

F-statistic: 6.888 on 6 and 23 DF, p-value: 0.0002777

Overall, the analysis suggests that the cooperation of an NBA team with other major professional sports teams in the same metropolitan area via either common ownership or stadium and/or regional sports network joint venture participation does not have a significant impact on ticket prices for the 2008 season. Nor does competition between an NBA team and other major professional sports teams in the same metro area have a significant impact on ticket prices. These results are consistent with any of three hypotheses: (1) NBA teams face sufficiently intense competition from other sources of entertainment so that the incremental effect of cooperation or competition with other teams is zero; (2) the home games of an NBA team lack good substitutes so that the incremental effect of cooperation or competition with other teams is zero; and (3) any positive impact of cooperation on ticket price is offset by the efficiencies produced by that cooperation and passed on to fans.

IV. NHL Ticket Prices: Econometric Results

The NHL is unique among the four major North American sports leagues because it has more than one franchise based in Canada. As detailed by Wong (2005), hockey was an enormously popular sport in Canada prior to the creation of the NHL, and its popularity spread to the northeastern U.S. Only much later did the NHL expand outside its core region, into the deep southern U.S. One may expect, therefore, that ticket prices to NHL games will be higher, all else equal, in Canada and the northeastern U.S. The results of Model IV.1 are consistent with this hypothesis. The coefficient of the dummy variable indicating franchises located in Canada or the northeastern U.S. is statistically significant at the 1% level and implies that ticket prices are \$9.70 higher in this region relative to the rest of the U.S. where NHL franchises are located. The coefficient of championships is positive and statistically significant at the 10% level.¹⁶ The coefficient of population scaled by the number of major professional sports franchises located in the same metro area as the NHL team is not statistically significant at the 10% level.

Model IV.1

Call:

```
lm(formula = AveTick2008 ~ Pop_per_team + Championships + Canada_and_NE)
```

Residuals:

Min	1Q	Median	3Q	Max
-13.765	-5.520	-1.040	4.661	17.696

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.285e+01	3.364e+00	12.738	1.10e-12 ***
Pop_per_team	9.131e-07	2.569e-06	0.355	0.72516
Championships	6.144e-01	3.529e-01	1.741	0.09348 .
Canada_and_NE	9.723e+00	3.101e+00	3.135	0.00423 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.603 on 26 degrees of freedom

Multiple R-squared: 0.4823, Adjusted R-squared: 0.4226

F-statistic: 8.075 on 3 and 26 DF, p-value: 0.0005777

Hypothesis 1 is tested by adding a dummy variable indicating the existence of a rival NHL team in the same metro area. In Model IV.2, the coefficient of this dummy variable is negative, as Hypothesis 1 predicts, but not statistically significant at the 10% level.

¹⁶ Other proxies for team quality for the 2007 season were examined, such as player payroll and points in the league standings. The coefficients of these explanatory variables were not statistically significant at the 10% level.

Model IV.2

Call:

lm(formula = AveTick2008 ~ NHLexist + Pop_per_team + Championships + Canada_and_NE)

Residuals:

Min	1Q	Median	3Q	Max
-13.6706	-5.2816	0.1624	4.0015	17.8881

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.207e+01	3.436e+00	12.243	4.67e-12 ***
NHLexist	-6.474e+00	6.099e+00	-1.061	0.29864
Pop_per_team	1.650e-06	2.655e-06	0.621	0.53997
Championships	5.438e-01	3.582e-01	1.518	0.14157
Canada_and_NE	1.074e+01	3.240e+00	3.316	0.00279 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.585 on 25 degrees of freedom

Multiple R-squared: 0.5047, Adjusted R-squared: 0.4254

F-statistic: 6.368 on 4 and 25 DF, p-value: 0.001122

Model IV.3 adds dummy variables indicating the existence of NBA, NFL, and MLB franchises in the same metro area as the NHL franchise. None of the coefficients of these 'competition' dummy variables is statistically significant at the 10% level.

Model IV.3

Call:

lm(formula = AveTick2008 ~ NHLexist + NBAexist + NFLexist + MLBexist + Pop_per_team + Championships + Canada_and_NE)

Residuals:

Min	1Q	Median	3Q	Max
-14.338	-4.503	-1.335	3.827	16.610

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.154e+01	5.414e+00	7.673	1.17e-07 ***
NHLexist	-7.096e+00	6.872e+00	-1.033	0.31300
NBAexist	4.570e+00	5.967e+00	0.766	0.45184
NFLexist	-2.557e+00	4.328e+00	-0.591	0.56074
MLBexist	1.160e-01	6.856e+00	0.017	0.98666
Pop_per_team	1.243e-06	3.026e-06	0.411	0.68529
Championships	5.240e-01	3.717e-01	1.410	0.17262
Canada_and_NE	1.068e+01	3.475e+00	3.072	0.00558 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.769 on 22 degrees of freedom

Multiple R-squared: 0.5427, Adjusted R-squared: 0.3972

F-statistic: 3.73 on 7 and 22 DF, p-value: 0.008236

Model IV.4 tests whether NHL ticket prices are higher in ‘single team markets’ (i.e., metro areas with a single NHL team and no NBA, NFL, or MLB teams). Its coefficient is negative, but not statistically significant at the 10% level.

Model IV.4

Call:

```
lm(formula = AveTick2008 ~ Oneteammarket + Pop_per_team + Championships + Canada_and_NE)
```

Residuals:

```
  Min   1Q  Median   3Q   Max
-13.970 -4.581 -0.557  4.368 17.536
```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.274e+01	3.425e+00	12.479	3.09e-12 ***
Oneteammarket	-1.587e+00	3.448e+00	-0.460	0.64922
Pop_per_team	1.252e-06	2.711e-06	0.462	0.64827
Championships	5.952e-01	3.607e-01	1.650	0.11148
Canada_and_NE	1.004e+01	3.225e+00	3.114	0.00458 **

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 7.721 on 25 degrees of freedom

Multiple R-squared: 0.4867, Adjusted R-squared: 0.4046

F-statistic: 5.926 on 4 and 25 DF, p-value: 0.001698

The results of Models IV.2-IV.4 therefore fail to support the prediction of Hypothesis 1.

Hypothesis 2 is tested by including the total number of major professional sports teams in the metro area as an explanatory variable. In Model IV.5, its coefficient has the ‘wrong sign’ and is not statistically significant at the 10% level. Consequently, the results of Model IV.5 do not support Hypothesis 2.

Model IV.5

Call:

```
lm(formula = AveTick2008 ~ Totalteams + Pop_per_team + Championships + Canada_and_NE)
```

Residuals:

```
  Min   1Q  Median   3Q   Max
-13.755 -5.446 -1.012  4.636 17.669
```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.273e+01	4.390e+00	9.733	5.52e-10 ***
Totalteams	3.748e-02	8.202e-01	0.046	0.96391
Pop_per_team	9.161e-07	2.621e-06	0.350	0.72961
Championships	6.151e-01	3.602e-01	1.708	0.10007
Canada_and_NE	9.714e+00	3.167e+00	3.067	0.00514 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.754 on 25 degrees of freedom
Multiple R-squared: 0.4824, Adjusted R-squared: 0.3996
F-statistic: 5.825 on 4 and 25 DF, p-value: 0.001871

Some NHL franchises play their games in the same stadium as an NBA franchise. Hypothesis 3 is tested by adding a dummy variable indicating such NHL franchises. In Model IV.6, the coefficient of the 'stadium sharing' dummy variable has the 'wrong sign' and is not statistically significant at the 10% level.

Model IV.6

Call:

lm(formula = AveTick2008 ~ Share_NBA + Pop_per_team + Championships + Canada_and_NE)

Residuals:

Min	1Q	Median	3Q	Max
-13.3220	-5.3320	-0.4998	4.0486	18.0968

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.271e+01	3.418e+00	12.495	3.01e-12 ***
Share_NBA	1.769e+00	3.083e+00	0.574	0.57117
Pop_per_team	5.947e-07	2.662e-06	0.223	0.82501
Championships	6.389e-01	3.600e-01	1.775	0.08815 .
Canada_and_NE	9.525e+00	3.161e+00	3.013	0.00585 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.703 on 25 degrees of freedom
Multiple R-squared: 0.4891, Adjusted R-squared: 0.4073
F-statistic: 5.983 on 4 and 25 DF, p-value: 0.001609

Model IV.7 restricts the stadium sharing variable to only those where the NHL and NBA teams do not share common ownership. The coefficient is negative, as predicted by Hypothesis 3, but is not statistically significant at the 10% level.

Model IV.7

Call:

lm(formula = AveTick2008 ~ Share_rivalNBA + Pop_per_team + Championships + Canada_and_NE)

Residuals:

Min	1Q	Median	3Q	Max
-14.014	-5.577	-1.290	4.589	17.497

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.274e+01	3.426e+00	12.476	3.11e-12 ***
Share_rivalNBA	-1.769e+00	4.003e+00	-0.442	0.66237
Pop_per_team	1.294e-06	2.749e-06	0.471	0.64182
Championships	5.753e-01	3.692e-01	1.558	0.13174
Canada_and_NE	9.702e+00	3.151e+00	3.079	0.00498 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.724 on 25 degrees of freedom
 Multiple R-squared: 0.4864, Adjusted R-squared: 0.4042
 F-statistic: 5.918 on 4 and 25 DF, p-value: 0.001711

Hypotheses 4-6 are investigated by adding three ‘cooperation’ explanatory variables: a dummy variable indicating whether the NHL franchise shares common ownership with another major professional sports franchise in the same metro area, a dummy variable indicating whether the NHL franchise participates in a regional sports network joint venture with at least one other major professional sports franchise in the same metro area, and a dummy variable indicating whether the NHL franchise participates in a stadium joint venture with at least one other major professional sports franchise. In Model IV.8, the coefficients of all three cooperation variables are not statistically significant at the 10% level.

Model IV.8

Call:

lm(formula = AveTick2008 ~ Own_another_franchise + RSNJV + JVstadium + Pop_per_team + Championships + Canada_and_NE)

Residuals:

Min	1Q	Median	3Q	Max
-13.2649	-5.0811	-0.5646	3.3159	18.3145

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.152e+01	3.620e+00	11.470	5.42e-11 ***
Own_another_franchise	3.067e+00	3.706e+00	0.828	0.4165
RSNJV	9.795e+00	6.881e+00	1.423	0.1680
JVstadium	-7.002e+00	7.321e+00	-0.956	0.3488
Pop_per_team	1.807e-06	2.761e-06	0.654	0.5194
Championships	4.778e-01	3.788e-01	1.261	0.2198
Canada_and_NE	8.709e+00	3.321e+00	2.622	0.0152 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.723 on 23 degrees of freedom
Multiple R-squared: 0.5276, Adjusted R-squared: 0.4044
F-statistic: 4.281 on 6 and 23 DF, p-value: 0.004866

In summary, neither cooperation nor competition between an NHL franchise and other professional sports franchises in the same metro area has a statistically significant impact on NHL ticket prices for the 2008 season.

V. MLB Ticket Prices: Econometric Results

Model V.1 examines the impact on ticket prices of (1) population scaled by the number of major professional sports teams in the same metro area, (2) the number of championships won during a team's current tenure in a metro area, (3) the number of years the team has played its home games at its current stadium, and (4) attendance during the 2007 season as a percent of stadium capacity. The coefficient of each of these explanatory variables is positive and statistically significant at the 10% level in the case of the population variable and at 5% or better in the case of the other three variables.

Model V.1

Call:

lm(formula = AveTick2008 ~ Pop_per_team + Championships + Tenure_in_stadium +
Attend_to_capacity2007)

Residuals:

Min 1Q Median 3Q Max
-6.5655 -2.6620 0.2093 2.2659 7.1200

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.055e+00	3.110e+00	1.625	0.11663
Pop_per_team	2.953e-06	1.545e-06	1.912	0.06741 .
Championships	3.793e-01	1.490e-01	2.545	0.01746 *
Tenure_in_stadium	1.724e-01	3.196e-02	5.394	1.35e-05 ***
Attend_to_capacity2007	1.633e-01	4.236e-02	3.854	0.00072 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.722 on 25 degrees of freedom
Multiple R-squared: 0.8147, Adjusted R-squared: 0.7851
F-statistic: 27.48 on 4 and 25 DF, p-value: 7.888e-09

Model V.2 tests Hypothesis 1 by adding a dummy variable indicating the existence of a rival MLB team in the same metro area. Its coefficient has the 'wrong sign' and is not statistically significant at the 10% level.

Model V.2

Call:

lm(formula = AveTick2008 ~ MLBexist + Pop_per_team + Championships +
Tenure_in_stadium + Attend_to_capacity2007)

Residuals:

Min	1Q	Median	3Q	Max
-6.06018	-2.71072	-0.09261	2.34922	7.11475

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.452e+00	3.443e+00	1.584	0.12637
MLBexist	8.229e-01	2.790e+00	0.295	0.77058
Pop_per_team	2.714e-06	1.771e-06	1.533	0.13847
Championships	3.653e-01	1.589e-01	2.299	0.03055 *
Tenure_in_stadium	1.697e-01	3.384e-02	5.014	4.01e-05 ***
Attend_to_capacity2007	1.619e-01	4.339e-02	3.731	0.00104 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.792 on 24 degrees of freedom

Multiple R-squared: 0.8154, Adjusted R-squared: 0.7769

F-statistic: 21.2 on 5 and 24 DF, p-value: 4.299e-08

Model V.3 adds dummy variables for the existence of teams from the three other major professional sports leagues in the same metro area. None of the coefficients of these competition variables is statistically significant at the 10% level and only one has the 'correct sign'.

Model V.3

Call:

lm(formula = AveTick2008 ~ MLBexist + NFLexist + NBAexist + NHLexist +
Pop_per_team + Championships + Tenure_in_stadium + Attend_to_capacity2007)

Residuals:

Min	1Q	Median	3Q	Max
-5.6670	-1.9193	-0.4339	2.5898	6.8484

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.663e+00	4.906e+00	0.543	0.592925
MLBexist	1.105e-01	3.018e+00	0.037	0.971129
NFLexist	2.446e+00	2.315e+00	1.057	0.302719
NBAexist	1.458e+00	1.899e+00	0.768	0.451255
NHLexist	-1.543e+00	1.761e+00	-0.876	0.390947
Pop_per_team	3.091e-06	1.856e-06	1.665	0.110731
Championships	3.888e-01	1.663e-01	2.338	0.029358 *
Tenure_in_stadium	1.665e-01	3.522e-02	4.726	0.000115 ***
Attend_to_capacity2007	1.658e-01	4.575e-02	3.625	0.001587 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.881 on 21 degrees of freedom
 Multiple R-squared: 0.8308, Adjusted R-squared: 0.7664
 F-statistic: 12.89 on 8 and 21 DF, p-value: 1.546e-06

No MLB franchise is located in a metro area which does not have at least one other major professional sports franchise located there. Therefore, it is not possible to estimate a model analogous to Models III.4, IV.4, and VI.4 which include a ‘one team market’ dummy variable as a regressor.

Overall, the results of Models V.2-V.3 do not support Hypothesis 1.

Model V.5 tests Hypothesis 2 by including the total number of teams in the metro area as a regressor. Its coefficient is negative, as Hypothesis 2 predicts, but not statistically significant at the 10% level.

Model V.5

Call:

```
lm(formula = AveTick2008 ~ Totalteams + Pop_per_team + Championships +
  Tenure_in_stadium + Attend_to_capacity2007)
```

Residuals:

Min	1Q	Median	3Q	Max
-6.7111	-2.6236	0.3552	2.1756	7.1974

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.175e+00	3.268e+00	1.584	0.126385
Totalteams	-8.535e-02	5.581e-01	-0.153	0.879729
Pop_per_team	3.059e-06	1.720e-06	1.778	0.088030 .
Championships	3.913e-01	1.712e-01	2.286	0.031367 *
Tenure_in_stadium	1.733e-01	3.310e-02	5.235	2.29e-05 ***
Attend_to_capacity2007	1.633e-01	4.322e-02	3.779	0.000919 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 3.797 on 24 degrees of freedom
 Multiple R-squared: 0.8149, Adjusted R-squared: 0.7763
 F-statistic: 21.13 on 5 and 24 DF, p-value: 4.434e-08

Model V.6 tests Hypothesis 3 by adding a dummy variable indicating whether the MLB franchise plays its home games in the same stadium as does an NFL franchise. Its coefficient has the ‘wrong sign’ and is not statistically significant at the 10% level.

Model V.6

Call:

lm(formula = AveTick2008 ~ Share_NFL + Pop_per_team + Championships +
Tenure_in_stadium + Attend_to_capacity2007)

Residuals:

Min	1Q	Median	3Q	Max
-6.5739	-2.6801	0.2220	2.2684	7.1683

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.829e+00	3.614e+00	1.336	0.19404
Share_NFL	3.403e-01	2.604e+00	0.131	0.89713
Pop_per_team	2.992e-06	1.603e-06	1.866	0.07429 .
Championships	3.769e-01	1.530e-01	2.463	0.02134 *
Tenure_in_stadium	1.713e-01	3.369e-02	5.085	3.36e-05 ***
Attend_to_capacity2007	1.656e-01	4.693e-02	3.530	0.00171 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.798 on 24 degrees of freedom

Multiple R-squared: 0.8148, Adjusted R-squared: 0.7763

F-statistic: 21.12 on 5 and 24 DF, p-value: 4.448e-08

No MLB and NFL franchises located in the same metro area have common ownership. Thus, Model V.6 also tests the impact of stadium-sharing with a 'rival' NFL team and is analogous to Models III.7 and IV.7. Thus, the results do not support Hypothesis 3.

Model V.8 investigates Hypotheses 4-6 by adding two 'cooperation' variables: (1) common ownership with another major professional sports franchise located in the same metro area and (2) participation in a regional sports network joint venture with at least one other major professional sports franchise in the same area. No MLB franchise participates in a stadium joint venture with another major professional sports franchise. The coefficient of the common ownership variable is negative, but not statistically significant at the 10% level. However, the coefficient of the regional sports network joint venture dummy variable is statistically significant at the 5% level and implies that, all else equal, ticket prices are \$4.80 higher for MLB franchises involved in an RSN joint venture with at least one other major professional sports team.

Model V.8

Call:

lm(formula = AveTick2008 ~ Own_another_franchise + RSNJV + Pop_per_team + Championships + Tenure_in_stadium + Attend_to_capacity2007)

Residuals:

Min	1Q	Median	3Q	Max
-5.160467	-2.654112	-0.003188	2.279326	5.630824

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.017e+00	2.888e+00	1.737	0.095714 .
Own_another_franchise	-2.527e+00	2.216e+00	-1.141	0.265769
RSNJV	4.800e+00	1.956e+00	2.454	0.022144 *
Pop_per_team	2.913e-06	1.450e-06	2.009	0.056449 .
Championships	4.126e-01	1.389e-01	2.971	0.006841 **
Tenure_in_stadium	1.311e-01	3.368e-02	3.893	0.000733 ***
Attend_to_capacity2007	1.678e-01	3.939e-02	4.261	0.000294 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.431 on 23 degrees of freedom

Multiple R-squared: 0.8552, Adjusted R-squared: 0.8174

F-statistic: 22.64 on 6 and 23 DF, p-value: 1.414e-08

To further examine the impact of RSN joint ventures, Model V.9 replaces the RSNJV dummy variable with dummy variables indicating an RSN joint venture with another MLB team and an RSN joint venture with an NHL team.¹⁷ The coefficients of both dummy variables are not statistically significant at the 10% level.

¹⁷ As Table I.5 shows, there are three jointly-owned regional sports networks, none of which involve an NFL franchise and only one of which involves an NBA franchise. The Chicago RSN includes the NBA's Bulls, but the Bulls have common ownership with another of the joint venture's participants, MLB's White Sox. Thus, I do not include a dummy variable indicating the participation of an NBA franchise in an RSN joint venture.

Model V.9

Call:

lm(formula = AveTick2008 ~ RSNJV_MLB + RSNJV_NHL + Pop_per_team + Championships + Tenure_in_stadium + Attend_to_capacity2007)

Residuals:

Min	1Q	Median	3Q	Max
-5.0087	-2.6819	-0.8065	2.8025	5.3459

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	5.681e+00	3.406e+00	1.668	0.10887
RSNJV_MLB	2.541e+00	2.671e+00	0.951	0.35134
RSNJV_NHL	1.696e+00	4.166e+00	0.407	0.68769
Pop_per_team	2.450e-06	1.622e-06	1.511	0.14447
Championships	4.231e-01	1.508e-01	2.806	0.01002 *
Tenure_in_stadium	1.523e-01	4.476e-02	3.403	0.00244 **
Attend_to_capacity2007	1.608e-01	4.677e-02	3.437	0.00225 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.687 on 23 degrees of freedom

Multiple R-squared: 0.8328, Adjusted R-squared: 0.7892

F-statistic: 19.09 on 6 and 23 DF, p-value: 7.06e-08

Overall, it appears that competition between an MLB franchise and other major professional sports franchises in the same metro area does not have a statistically significant impact on MLB ticket prices for the 2008 season. Nor does common ownership between an MLB franchise and another major professional sports franchise in the same metro area appear to affect ticket prices. However, there is some evidence – albeit not particularly robust – that, all else equal, ticket prices are approximately \$4.80 higher if an MLB franchise participates in a regional sports network joint venture with at least one other major professional sports franchise in the same area.

VI. NFL Ticket Prices: Econometric Results

As in Model III.1 for NBA ticket prices, Model VI.1 is a regression of the average ticket price for each NFL team for the 2008 season on population scaled by the number of major professional sports teams in the same metro area, player payroll for the 2007 season, and the number of championships won during the team's current tenure in the metro area. All three coefficients are positive, although the coefficient of championships is not statistically significant at the 10% level.

Model VI.1

Call:

```
lm(formula = AveTick2008 ~ Pop_per_team + Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-15.6345	-7.3285	-0.3334	4.8573	36.4877

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	6.451e+00	2.596e+01	0.248	0.8056
Pop_per_team	1.247e-05	4.630e-06	2.692	0.0118 *
Payroll2007	4.904e-07	2.413e-07	2.032	0.0518 .
Championships	1.028e+00	7.045e-01	1.459	0.1558

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.71 on 28 degrees of freedom

Multiple R-squared: 0.3133, Adjusted R-squared: 0.2397

F-statistic: 4.258 on 3 and 28 DF, p-value: 0.01345

Model VI.2 adds a dummy variable indicating the existence of a rival NFL team in the same metro area. The dummy variable's coefficient has the 'wrong sign', given Hypothesis 1, but is not statistically significant at the 10% level.

Model VI.2

Call:

```
lm(formula = AveTick2008 ~ NFLexist + Pop_per_team + Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-17.9435	-7.3103	-0.8813	3.4925	35.5990

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.245e+00	2.640e+01	-0.047	0.9627
NFLexist	1.367e+01	1.083e+01	1.262	0.2179
Pop_per_team	9.095e-06	5.304e-06	1.715	0.0978 .
Payroll2007	5.997e-07	2.541e-07	2.360	0.0257 *
Championships	8.483e-01	7.115e-01	1.192	0.2435

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.58 on 27 degrees of freedom
Multiple R-squared: 0.3515, Adjusted R-squared: 0.2554
F-statistic: 3.659 on 4 and 27 DF, p-value: 0.0166

Model VI.3 adds dummy variables indicating the existence of NBA, NHL, and MLB teams in the same metro area as the NFL team. Each of the coefficients of these dummy variables has the 'wrong sign' and is not statistically significant at the 10% level.

Model VI.3

Call:

```
lm(formula = AveTick2008 ~ NFLexist + NBAexist + NHLexist + MLBexist +  
    Pop_per_team + Payroll2007 + Championships)
```

Residuals:

Min	1Q	Median	3Q	Max
-15.137	-6.115	-1.353	4.502	33.285

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-5.521e-01	2.663e+01	-0.021	0.9836
NFLexist	1.445e+01	1.119e+01	1.291	0.2091
NBAexist	1.339e+00	4.482e+00	0.299	0.7678
NHLexist	2.008e+00	4.576e+00	0.439	0.6648
MLBexist	7.735e+00	5.918e+00	1.307	0.2035
Pop_per_team	4.878e-06	6.023e-06	0.810	0.4259
Payroll2007	5.627e-07	2.569e-07	2.190	0.0385 *
Championships	7.272e-01	7.295e-01	0.997	0.3288

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.66 on 24 degrees of freedom
Multiple R-squared: 0.4158, Adjusted R-squared: 0.2454
F-statistic: 2.44 on 7 and 24 DF, p-value: 0.04867

Model VI.4 tests whether NFL franchises in 'single team markets' charge higher or lower ticket prices. The dummy variable's coefficient is negative, but is not statistically significant at the 10% level.

Model VI.4

Call:

lm(formula = AveTick2008 ~ Oneteammarket + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-15.9016	-6.6500	-0.7241	6.0887	36.8263

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.763e+01	2.656e+01	0.664	0.5126
Oneteammarket	-1.377e+01	9.401e+00	-1.465	0.1545
Pop_per_team	1.060e-05	4.713e-06	2.250	0.0328 *
Payroll2007	3.999e-07	2.445e-07	1.635	0.1136
Championships	1.446e+00	7.471e-01	1.935	0.0636 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.47 on 27 degrees of freedom

Multiple R-squared: 0.3638, Adjusted R-squared: 0.2696

F-statistic: 3.86 on 4 and 27 DF, p-value: 0.01318

Thus, the results of Models VI.2-VI.4 do not support Hypothesis 1.

Model VI.5 tests whether the total number of major professional sports teams in a metro area impacts an NFL team's ticket prices. The coefficient of total teams has the 'wrong sign', given Hypothesis 2, and is statistically significant at the 10% level. One interpretation of this result is that the total teams variable is acting as a proxy for the demand for attendance at major professional games. Metro areas with greater such demand may attract more major professional sports teams.

Model VI.5

Call:

lm(formula = AveTick2008 ~ Totalteams + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-17.043	-6.502	-1.019	5.003	33.174

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-4.554e+00	2.537e+01	-0.180	0.8589
Totalteams	2.929e+00	1.496e+00	1.957	0.0607 .
Pop_per_team	6.049e-06	5.497e-06	1.100	0.2809
Payroll2007	5.839e-07	2.349e-07	2.485	0.0194 *
Championships	6.174e-01	7.033e-01	0.878	0.3878

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.16 on 27 degrees of freedom

Multiple R-squared: 0.3986, Adjusted R-squared: 0.3095

F-statistic: 4.474 on 4 and 27 DF, p-value: 0.006663

With respect to Hypothesis 3, Model VI.6 examines the impact of stadium sharing, either with another NFL team or an MLB team, on NFL ticket prices. Neither dummy variable is statistically significant at the 10% level.

Model VI.6

Call:

lm(formula = AveTick2008 ~ Share_NFL + Share_MLB + Pop_per_team + Payroll2007 + Championships)

Residuals:

Min	1Q	Median	3Q	Max
-17.768	-7.181	-1.630	4.817	35.023

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-8.219e+00	2.928e+01	-0.281	0.7811
Share_NFL	1.470e+01	1.111e+01	1.323	0.1973
Share_MLB	4.543e+00	7.777e+00	0.584	0.5641
Pop_per_team	9.317e-06	5.383e-06	1.731	0.0953 .
Payroll2007	6.610e-07	2.778e-07	2.379	0.0250 *
Championships	8.721e-01	7.215e-01	1.209	0.2377

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.73 on 26 degrees of freedom

Multiple R-squared: 0.3599, Adjusted R-squared: 0.2368

F-statistic: 2.924 on 5 and 26 DF, p-value: 0.03177

Since no MLB and NFL teams in the same metro area have common ownership, the results of Model VI.6 are unchanged when the 'stadium sharing' variable is restricted to teams without common ownership. Thus, the results of Model VI.6 do not support Hypothesis 3.

Hypotheses 4-6 cannot be investigated. Unlike NBA, NHL, and MLB franchises, NFL franchises have not participated with franchises in other leagues in stadium or regional sports network joint ventures. And as just noted, no NFL team has common ownership with another major professional sports franchise located in the same metro area. In other words, there is no cross-sectional variation in the 'cooperation' explanatory variables across NFL franchises.

In summary, competition between an NFL franchise and another major professional sports team located in the same metro area does not appear to affect NFL ticket prices. Neither does the sharing of a stadium with another NFL or MLB team. Moreover, NFL ticket prices cannot be affected by participation with other major professional sports teams in regional sports network joint ventures or stadium joint ventures since NFL teams do not participate in such joint ventures. Nor can NFL ticket

prices be affected by common ownership with another major professional sports team in the same metro area, since such common ownership does not occur.

IV. Conclusions and Suggestions for Future Research

Intuitively, it appears reasonable to expect that franchises in the same and different major professional sports leagues located in the same metropolitan area compete for attendance at their home games. For example, Chicago fans have the option of attending a Cubs or White Sox baseball game, a Bears football game, a Bulls basketball game, or a Blackhawks hockey game. It appears plausible that the ticket prices for Bears games, say, are constrained by the prices charged by the other franchises for attendance at their games. Yet, an analysis of ticket prices for the 2008 season fails to find a statistically significant impact. This result may occur either because (1) our intuition is wrong and the sports franchises do not compete against one another for fan attendance at home games or, alternatively, (2) ticket prices are constrained by the prices of other forms of entertainment (e.g., movies, concerts) so that the marginal impact of the existence of a rival sports franchise is negligible.

Similarly, one may expect that franchises in the same or different sports leagues located in the same metro area compete less intensely for fan attendance if they ‘cooperate’ via common ownership, a regional sports network joint venture, or a stadium joint venture. In Chicago, for example, the White Sox and the Bulls have common ownership, the Bulls and Blackhawks participate in a stadium joint venture, and these three franchises, along with the Cubs, participate in a regional sports network. Yet, once again, the analysis of ticket prices for the 2008 season fails to find a statistically significant impact of common ownership and joint venture participation. In addition to possible explanations (1) and (2) in the preceding paragraph, this result may occur because such cooperation produces cost savings and franchises pass on just enough of those savings so that the net impact of the cooperation is negligible.

Overall, the econometric results of this study do not provide strong support for the assertion that sports franchises compete intensely with one another for fans. On the other hand, the results also do not provide strong support for the assertion that cooperation between sports franchises harms fans.

Given that the analysis is limited to a single season, one may question the robustness of these findings. One possibility is to construct a panel for each league covering a number of seasons. Team Marketing Report has collected franchise-level ticket price data for the four major professional sports leagues back to the early- or mid-1990s and annually publishes *Inside the Ownership of Pro Sports*, which contains owner profiles and other information. Construction of such a panel dataset for each league could result in better estimates of the impact on ticket prices of competition and cooperation between sports franchises.

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Appendix

NBA Dataset

NBA_Team	AveTick2008	Share_NHL	Own_NHL	Own_MLB	Jvstadium	Share_NBA	RSNJV_MLB
AH	36.9	1	1	0	0	0	0
BC	68.55	1	0	0	0	0	0
CBob	33.25	0	0	0	0	0	0
CBull	64.25	1	0	1	1	0	2
CC	55.95	0	0	0	0	0	0
DM	62.1	1	0	0	1	0	0
DN	47.3	1	1	0	0	0	0
DP	47.5	0	0	0	0	0	0
GSW	39	0	0	0	0	0	0
HR	43.4	0	0	0	0	0	0
IP	41.09	0	0	0	0	0	0
LAC	54.5	1	0	0	0	1	0
LAL	93.25	1	0	0	0	1	0
MG	24.11	0	0	0	0	0	0
MH	58.55	0	0	0	0	0	0
MB	47.86	0	0	0	0	0	0
MT	36.26	0	0	0	0	0	0
NJN	54.98	0	0	0	0	0	0
NOH	25.17	0	0	0	0	0	0
NYK	70.51	1	1	0	0	0	0
OCT	36.35	0	0	0	0	0	0
OM	40.3	0	0	0	0	0	0
P76	43	1	1	0	0	0	0
PS	64.16	0	0	0	0	0	0
PT	61.21	0	0	0	0	0	0
SK	59.8	0	0	0	0	0	0
SAS	56.37	0	0	0	0	0	0
TR	45.31	1	1	0	0	0	0
UJ	43.9	0	0	0	0	0	0
WW	29.14	1	0	0	0	0	0

NBA Dataset (continued)

NBA_Team	RSNJV_NBA	RSNJV_NHL	Attend2007	Winpct2007	Payroll2007	Attend_to_capacity2007
AH	0	0	16280	0.451	58531493	83.7
BC	0	0	18624	0.805	73812248	100
CBob	0	0	14717	0.39	51725077	77.4
CBull	0	1	21987	0.402	62840762	101.3
CC	0	0	20465	0.549	84248364	99.5
DM	0	0	20286	0.622	88423898	98.9
DN	0	0	17364	0.61	81177202	90.6
DP	0	0	22076	0.72	66561030	100
GSW	0	0	19630	0.585	70276090	100.2
HR	0	0	17524	0.671	77637117	94.7
IP	0	0	12221	0.439	66879374	66.6
LAC	0	0	16888	0.28	63202582	88.9
LAL	0	0	18997	0.695	71264184	98.5
MG	0	0	12770	0.268	54472106	69.4
MH	0	0	19463	0.183	74736115	99.3
MB	0	0	15595	0.317	62317859	83.3
MT	0	0	14476	0.268	51128758	76.2
NJN	0	0	15656	0.415	65429187	78.3
NOH	0	0	14181	0.683	60331047	82.4
NYK	0	0	19115	0.28	92817398	99.1
OCT	0	0	NA	0.244	52600205	NA
OM	0	0	17301	0.634	61841463	100.3
P76	0	0	14870	0.488	57777929	72.7
PS	0	0	18422	0.671	71227313	96.8
PT	0	0	19550	0.5	57200851	97.8
SK	0	0	14150	0.463	50531216	81.7
SAS	0	0	18564	0.683	72492015	100.3
TR	0	0	19435	0.5	63762305	98.2
UJ	0	0	19907	0.659	54683522	100
WW	0	0	17962	0.524	61133847	89

NBA Dataset (continued)

NBA_Team	NBAteams	NHLteams	MLBteams	NFLteams	Population	Income	NE	SE	NC
AH	0	1	1	1	5278904	36061	0	1	0
BC	0	1	1	1	4482857	50542	1	0	0
CBob	0	0	0	1	1651568	32245	0	1	0
CBull	0	1	2	1	9524673	41591	0	0	1
CC	0	0	1	1	2096471	37407	0	0	1
DM	0	1	1	1	6145037	39924	0	0	0
DN	0	1	1	1	2464866	44691	0	0	1
DP	0	1	1	1	4467592	38118	0	0	1
GSW	0	0	2	2	4203898	57746	0	0	0
HR	0	0	1	1	5628101	43174	0	0	0
IP	0	0	0	1	1695037	37734	0	0	1
LAC	1	2	2	0	12875587	39880	0	0	0
LAL	1	2	2	0	12875587	39880	0	0	0
MG	0	0	0	0	1280533	35470	0	0	0
MH	0	1	1	1	5413212	40737	0	1	0
MB	0	0	1	0	1544398	39536	0	0	1
MT	0	1	1	1	3208212	44238	0	0	1
NJN	0	1	2	2	4448383	49730	1	0	0
NOH	0	0	0	1	1030363	40211	0	0	0
NYK	0	2	2	2	14367605	49792	1	0	0
OCT	0	0	0	0	1192989	35636	0	0	0
OM	0	0	0	0	2032496	33092	0	1	0
P76	0	1	1	1	5827962	43364	1	0	0
PS	0	1	1	1	4179427	34215	0	0	0
PT	0	0	0	0	2175113	36845	0	0	0
SK	0	0	0	0	2091120	37078	0	0	0
SAS	0	0	0	0	1990675	32811	0	0	0
TR	0	1	1	0	5113149	NA	0	0	0
UJ	0	0	0	0	1099973	35145	0	0	1
WW	0	1	1	1	5306565	51868	1	0	0

NBA Dataset (continued)

NBA_Team	SC	West	Canada	Franchise_current_city	Franchise_current_stadium	Championships
AH	0	0	0	1968	1999	0
BC	0	0	0	1946	1995	16
CBob	0	0	0	2004	2005	0
CBull	0	0	0	1966	1994	6
CC	0	0	0	1970	1994	0
DM	1	0	0	1980	2001	0
DN	0	0	0	1976	1999	0
DP	0	0	0	1948	1988	3
GSW	0	1	0	1962	1997	1
HR	1	0	0	1971	2003	2
IP	0	0	0	1976	1999	0
LAC	0	1	0	1984	1999	0
LAL	0	1	0	1948	1999	14
MG	1	0	0	2001	2004	0
MH	0	0	0	1988	2000	1
MB	0	0	0	1968	1988	1
MT	0	0	0	1989	1990	0
NJN	0	0	0	1976	1981	0
NOH	1	0	0	2007	2007	0
NYK	0	0	0	1946	1968	2
OCT	1	0	0	2008	2008	0
OM	0	0	0	1989	1989	0
P76	0	0	0	1949	1996	3
PS	1	0	0	1968	1992	0
PT	0	1	0	1970	1995	1
SK	0	1	0	1985	1988	0
SAS	1	0	0	1976	2002	4
TR	0	0	1	1995	1999	0
UJ	0	0	0	1979	1991	0
WW	0	0	0	1973	1997	1

NFL Dataset

NFL_Team	AveTick2008	Share_MLB	Share_NFL	Attend2007	Attend_to_capacity2007
AC	65.08	0	0	64580	101.9
AF	63.95	0	0	68395	96
BR	77.2	0	0	71153	103.2
BB	51.24	0	0	71054	88.8
CP	63.32	0	0	73402	100.2
CBears	88.33	0	0	62158	92.9
CBengals	69.85	0	0	65790	100.4
CBrowns	54.41	0	0	73000	101.4
DC	84.12	0	0	63534	96.5
DB	76.75	0	0	76611	100.6
DL	66.39	0	0	61304	94.3
GBP	63.39	0	0	70805	116.5
HT	66.69	0	0	70519	101.5
IC	81.13	0	0	57305	98.8
JJ	55.3	0	0	65301	97.2
KCC	80.69	0	0	76777	96.6
MD	66.11	1	0	72229	94.4
MV	73.23	1	0	63256	98.7
NEP	117.84	0	0	68756	101.1
NOS	62.22	0	0	70004	95.9
NYG	88.06	0	1	78731	100
NYJ	86.99	0	1	77106	97.9
OR	62.23	1	0	59110	93.8
PE	69	0	0	68169	103.3
PS	67.47	0	0	62084	95.5
SDC	81.39	0	0	65502	91.9
SFF	70.55	0	0	68028	96.9
SS	61.25	0	0	68193	101.8
SLR	68.28	0	0	64294	98.4
TBB	90.13	0	0	65316	99.5
TT	58.55	0	0	69143	103.2
WR	79.13	0	0	88090	110

NFL Dataset (continued)

NFL_Team	Winpct2007	Payroll2007	NFLteams	MLBteams	NBAteams	NHLteams
AC	0.5	98694817	0	1	1	1
AF	0.25	83845371	0	1	1	1
BR	0.313	104997764	0	1	0	0
BB	0.438	108875882	0	0	0	1
CP	0.438	93944262	0	0	1	0
CBears	0.438	104151969	0	2	1	1
CBengals	0.438	98529188	0	1	0	0
CBrowns	0.625	102394922	0	1	1	0
DC	0.813	107376072	0	1	1	1
DB	0.438	102152344	0	1	1	1
DL	0.438	106731910	0	1	1	1
GBP	0.813	97653823	0	0	0	0
HT	0.5	98154775	0	1	1	0
IC	0.813	102786398	0	0	1	0
JJ	0.688	94030775	0	0	0	0
KCC	0.25	108482459	0	1	0	0
MD	0.063	92573123	0	1	1	1
MV	0.5	92161921	0	1	1	1
NEP	1	117963182	0	1	1	1
NOS	0.438	110417011	0	0	1	0
NYG	0.625	75755388	1	2	2	3
NYJ	0.25	99971535	1	2	2	3
OR	0.25	90869865	0	1	1	0
PE	0.5	100807309	0	1	1	1
PS	0.625	106293914	0	1	0	1
SDC	0.688	102460685	0	1	0	0
SFF	0.313	106877077	0	1	1	0
SS	0.625	99567188	0	1	0	0
SLR	0.188	100340467	0	1	0	1
TBB	0.563	98105565	0	1	0	1
TT	0.625	97081153	0	0	0	1
WR	0.563	123408019	0	1	1	1

NFL Dataset (continued)

NFL_Team	Population	Income	NE	SE	NC	SC	West
AC	4179427	34215	0	0	0	1	0
AF	5278904	36061	0	1	0	0	0
BR	2668056	43027	1	0	0	0	0
BB	1128183	33803	0	0	1	0	0
CP	1651568	32245	0	1	0	0	0
CBears	9524673	41591	0	0	1	0	0
CBengals	2133678	36650	0	0	1	0	0
CBrowns	2096471	37407	0	0	1	0	0
DC	6145037	39924	0	0	0	1	0
DB	2464866	44691	0	0	1	0	0
DL	4467592	38118	0	0	1	0	0
GBP	301131	33627	0	0	1	0	0
HT	5628101	43174	0	0	0	1	0
IC	1695037	37734	0	0	1	0	0
JJ	1300823	37518	0	1	0	0	0
KCC	1985429	37566	0	0	1	0	0
MD	5413212	40737	0	1	0	0	0
MV	3208212	44238	0	0	1	0	0
NEP	4482857	50542	1	0	0	0	0
NOS	1030363	40211	0	0	0	1	0
NYG	18815988	49789	1	0	0	0	0
NYJ	18815988	49789	1	0	0	0	0
OR	2483842	48577	0	0	0	0	1
PE	5827962	43364	1	0	0	0	0
PS	2355712	38550	0	0	1	0	0
SDC	2974859	42801	0	0	0	0	1
SFF	1720056	70995	0	0	0	0	1
SS	3309347	45369	0	0	0	0	1
SLR	2803707	37653	0	0	1	0	0
TBB	2723949	35542	0	1	0	0	0
TT	1521437	37758	0	0	0	1	0
WR	5306565	51868	1	0	0	0	0

NFL Dataset (continued)

NFL_Team	Franchise_current_city	Franchise_current_stadium	Championships
AC	1988	2006	0
AF	1966	1992	0
BR	1996	1998	1
BB	1960	1973	0
CP	1995	1996	0
CBears	1920	2003	9
CBengals	1968	2000	0
CBrowns	1999	1999	0
DC	1960	1971	5
DB	1960	2001	2
DL	1930	2002	4
GBP	1921	1957	12
HT	2002	2002	0
IC	1984	2008	1
JJ	1995	1995	0
KCC	1963	1972	1
MD	1966	1987	2
MV	1961	1982	1
NEP	1960	2002	3
NOS	2006	2006	0
NYG	1925	1976	7
NYJ	1960	1984	1
OR	1995	1995	0
PE	1933	2003	3
PS	1933	2001	6
SDC	1961	1967	0
SFF	1950	1971	5
SS	1976	2002	0
SLR	1995	1995	1
TBB	1976	1998	1
TT	1998	1999	0
WR	1932	1997	5

NHL Dataset

NHL_Team	AveTick2008	Share_NBA	Own_MLB	Own_NBA	JVstadium
AD	43.5	0	0	0	0
AT	48.51	1	0	1	0
BB	61.4	1	0	0	0
BS	36.43	0	0	0	0
CF	55.81	0	0	0	0
CH	38.38	0	0	0	0
CB	52.22	1	0	0	1
CA	40.62	1	0	1	0
CBJ	47.76	0	0	0	0
DS	37.8	1	1	0	1
DRW	46.4	0	1	0	0
EO	54.17	0	0	0	0
FP	52.61	0	0	0	0
LAK	47.2	1	0	0	0
MW	61.28	0	0	0	0
MC	64.26	0	0	0	0
NP	47.22	0	0	0	0
NJD	57.15	0	0	0	0
NYI	48.84	0	0	0	0
NYR	54.96	1	0	1	0
OS	48.82	0	0	0	0
PF	60.25	1	0	1	0
PC	37.45	0	0	0	0
PP	51.45	0	0	0	0
SJS	43.07	0	0	0	0
SLB	29.94	0	0	0	0
TBL	42.41	0	0	0	0
TML	76.15	1	0	1	0
VC	62.05	0	0	0	0
WC	41.66	1	0	0	0

NHL Dataset (continued)

NHL_Team	RSNJV_MLB	RSNJV_NBA	RSNJV_NHL	Attend2007	Points2007	Payroll2007
AD	0	0	0	17193	102	50769200
AT	0	0	0	15831	76	36580000
BB	1	0	0	15384	94	49501600
BS	0	0	0	19950	90	45954400
CF	0	0	0	19289	94	50934900
CH	0	0	0	16633	92	49948600
CB	2	1	0	16814	88	34800540
CA	0	0	0	16842	95	61290750
CBJ	0	0	0	14823	80	28010000
DS	0	0	0	18038	97	49420000
DRW	0	0	0	18870	115	44633000
EO	0	0	0	16839	88	46915659
FP	0	0	0	15436	85	39749200
LAK	0	0	0	16606	71	40502000
MW	0	0	0	18568	98	46183000
MC	0	0	0	21273	104	42313500
NP	0	0	0	14910	91	30273340
NJD	0	0	0	15564	99	47622511
NYI	0	0	0	13640	79	39007720
NYR	0	0	0	18200	97	56705000
OS	0	0	0	19821	94	49997370
PF	0	0	0	19556	95	56973200
PC	0	0	0	14820	83	35694750
PP	0	0	0	17076	102	41384200
SJS	0	0	0	17411	108	41454800
SLB	0	0	0	17610	79	39047833
TBL	0	0	0	18692	71	38954167
TML	0	0	0	19434	83	46445180
VC	0	0	0	18630	88	45710000
WC	0	0	0	15472	94	44309200

NHL Dataset (continued)

NHL_Team	Attend_to_capacity2007	NHLteams	NBAteams	MLBteams	NFLteams
AD	102.6	0	2	1	0
AT	85.4	0	1	1	1
BB	87.6	0	1	1	1
BS	109.4	0	0	0	1
CF	112.4	0	0	0	0
CH	88.8	0	0	0	0
CB	82	0	1	2	1
CA	93.5	0	1	1	1
CBJ	81.7	0	0	0	0
DS	97.3	0	1	1	1
DRW	94	0	1	1	1
EO	98.5	0	0	0	0
FP	80.2	0	1	1	1
LAK	92	0	2	1	0
MW	102.8	0	1	1	1
MC	100	0	0	0	0
NP	87.1	0	0	0	1
NJD	81.7	0	1	2	2
NYI	83.7	1	1	2	2
NYR	100	1	1	2	2
OS	107.1	0	0	0	0
PF	100.3	0	1	1	1
PC	84.7	0	1	1	1
PP	100.7	0	0	1	1
SJS	99.5	0	0	0	0
SLB	83.9	0	0	1	1
TBL	94.6	0	1	1	1
TML	103.3	0	1	1	0
VC	101.1	0	0	0	0
WC	82.9	0	1	1	1

NHL Dataset (continued)

NHL_Team	Population	Income	NE	SE	NC	SC	West	Canada
AD	2997033	48209	0	0	0	0	1	0
AT	5278904	36061	0	1	0	0	0	0
BB	4482857	50542	1	0	0	0	0	0
BS	1128183	33803	0	0	1	0	0	0
CF	1079310	NA	0	0	0	0	0	1
CH	1047629	37222	0	1	0	0	0	0
CB	9524673	41591	0	0	1	0	0	0
CA	2464866	44691	0	0	1	0	0	0
CBJ	1754337	36109	0	0	1	0	0	0
DS	6145037	39924	0	0	0	1	0	0
DRW	4467592	38118	0	0	1	0	0	0
EO	1034945	NA	0	0	0	0	0	1
FP	5413212	40737	0	1	0	0	0	0
LAK	9878554	37362	0	0	0	0	1	0
MW	3208212	44238	0	0	1	0	0	0
MC	3635571	NA	0	0	0	0	0	1
NP	1521437	37758	0	0	0	1	0	0
NJD	4448383	49730	1	0	0	0	0	0
NYI	14367605	49792	1	0	0	0	0	0
NYR	14367605	49792	1	0	0	0	0	0
OS	1130761	NA	0	0	0	0	0	1
PF	5827962	43364	1	0	0	0	0	0
PC	4179427	34215	0	0	0	1	0	0
PP	2355712	38550	0	0	1	0	0	0
SJS	1803643	55020	0	0	0	0	1	0
SLB	2803707	37653	0	0	1	0	0	0
TBL	2723949	35542	0	1	0	0	0	0
TML	5113149	NA	0	0	0	0	0	1
VC	2116581	NA	0	0	0	0	0	1
WC	5306565	51868	1	0	0	0	0	0

NHL Dataset (continued)

NHL_Team	Franchise_current_city	Franchise_current_stadium	Championships
AD	1993	1993	1
AT	1999	1999	0
BB	1924	1995	5
BS	1970	1996	0
CF	1980	1983	1
CH	1997	1999	1
CB	1926	1994	3
CA	1995	1999	2
CBJ	2000	2000	0
DS	1993	2001	1
DRW	1926	1979	11
EO	1979	1979	5
FP	1993	1998	0
LAK	1967	1999	0
MW	2000	2000	0
MC	1917	1996	23
NP	1998	1998	0
NJD	1974	2007	3
NYI	1972	1972	4
NYR	1926	1968	4
OS	1992	1996	0
PF	1967	1996	2
PC	1996	2003	0
PP	1967	1967	2
SJS	1991	1993	0
SLB	1967	1994	0
TBL	1992	1996	1
TML	1917	1999	13
VC	1970	1995	0
WC	1974	1997	0

MLB Dataset

MLB_Team	AveTick2008	Share_NFL	Own_NHL	Own_NBA	RSNJV_MLB	RSNJV_NBA
AD	15.96	0	0	0	0	0
AB	17.05	0	0	0	0	0
BO	23.85	0	0	0	1	0
BRS	48.4	0	0	0	0	0
CC	42.49	0	0	0	1	1
CWS	30.28	0	0	1	1	1
CReds	19.41	0	0	0	0	0
CI	25.72	0	0	0	0	0
CRockies	19.5	0	0	0	0	0
DT	25.28	0	1	0	0	0
FM	18.69	1	0	0	0	0
HA	28.73	0	0	0	0	0
KCR	17.54	0	0	0	0	0
LAA	20.78	0	0	0	0	0
LAD	29.66	0	0	0	0	0
MB	19.88	0	0	0	0	0
MT	20.68	1	0	0	0	0
NYM	34.05	0	0	0	0	0
NYY	41.4	0	0	0	0	0
OA	29.2	1	0	0	0	0
PPhillies	28.14	0	0	0	0	0
PPirates	17.07	0	0	0	0	0
SDP	27.43	0	0	0	0	0
SFG	22.06	0	0	0	0	0
SM	25.29	0	0	0	0	0
SLC	29.32	0	0	0	0	0
TBR	17.23	0	0	0	0	0
TR	18.01	0	1	0	0	0
TB	28.37	0	0	0	0	0
WN	25	0	0	0	1	0

MLB Dataset (continued)

MLB_Team	RSNJV_NHL	Attend2007	Attend_to_capacity2007	Winpct2007	Payroll2007
AD	0	28708	58.5	0.556	52067546
AB	0	33891	67.7	0.519	87290833
BO	0	27060	56.2	0.426	93554808
BRS	1	36679	101.4	0.593	143026214
CC	1	40153	97.7	0.525	99670332
CWS	1	33140	81.6	0.444	108671833
CReds	0	25414	60.4	0.444	68904980
CI	0	28448	65.6	0.595	61673267
CRockies	0	28978	57.4	0.552	54424000
DT	0	37619	93.8	0.543	95180369
FM	0	16919	46.6	0.438	30507000
HA	0	37288	91.1	0.451	87759000
KCR	0	19961	48.9	0.426	67116500
LAA	0	41551	92.2	0.58	109251333
LAD	0	47617	85	0.506	108454524
MB	0	35421	83.5	0.512	70986500
MT	0	28349	58.2	0.488	71439500
NYM	0	47579	82.9	0.543	115231663
NYY	0	52729	91.7	0.58	189639045
OA	0	23726	54.3	0.469	79366940
PPhillies	0	38374	88.2	0.549	89428213
PPirates	0	22141	57.7	0.42	38537833
SDP	0	34445	81	0.546	58110567
SFG	0	39792	95.8	0.438	90219056
SM	0	32993	69.1	0.54	106460833
SLC	0	43854	93.6	0.481	90286823
TBR	0	17130	40.6	0.407	24123500
TR	0	29795	60.7	0.463	68318675
TB	0	29143	57.7	0.512	81942800
WN	0	24217	53.5	0.451	37347500

MLB Dataset (continued)

MLB_Team	NFLteams	MLBteams	NBAteams	NHLteams	Population	Income
AD	1	0	1	1	4179427	34215
AB	1	0	1	1	5278904	36061
BO	1	0	0	0	2668056	43027
BRS	1	0	1	1	4482857	50542
CC	1	1	1	1	9524673	41591
CWS	1	1	1	1	9524673	41591
CReds	1	0	0	0	2133678	36650
CI	1	0	1	0	2096471	37407
CRockies	1	0	1	1	2464866	44691
DT	1	0	1	1	4467592	38118
FM	1	0	1	1	5413212	40737
HA	1	0	1	0	5628101	43174
KCR	1	0	0	0	1985429	37566
LAA	0	0	2	1	2997033	48209
LAD	0	0	2	1	9878554	37362
MB	0	0	1	0	1544398	39536
MT	1	0	1	1	3208212	44238
NYM	2	1	2	3	18815988	49789
NYY	2	1	2	3	18815988	49789
OA	1	0	1	0	2483842	48577
PPhillies	1	0	1	1	5827962	43364
PPirates	1	0	0	1	2355712	38550
SDP	1	0	0	0	2974859	42801
SFG	1	0	0	0	1720056	70995
SM	1	0	0	0	3309347	45369
SLC	1	0	0	1	2803707	37653
TBR	1	0	0	1	2723949	35542
TR	1	0	1	1	6145037	39924
TB	0	0	1	1	5113149	NA
WN	1	0	1	1	5306565	51868

MLB Dataset (continued)

MLB_Team	NE	SE	NC	SC	West	Canada
AD	0	0	0	1	0	0
AB	0	1	0	0	0	0
BO	1	0	0	0	0	0
BRS	1	0	0	0	0	0
CC	0	0	1	0	0	0
CWS	0	0	1	0	0	0
CReds	0	0	1	0	0	0
CI	0	0	1	0	0	0
CRockies	0	0	1	0	0	0
DT	0	0	1	0	0	0
FM	0	1	0	0	0	0
HA	0	0	0	1	0	0
KCR	0	0	1	0	0	0
LAA	0	0	0	0	1	0
LAD	0	0	0	0	1	0
MB	0	0	1	0	0	0
MT	0	0	1	0	0	0
NYM	1	0	0	0	0	0
NYY	1	0	0	0	0	0
OA	0	0	0	0	1	0
PPhillies	1	0	0	0	0	0
PPirates	0	0	1	0	0	0
SDP	0	0	0	0	1	0
SFG	0	0	0	0	1	0
SM	0	0	0	0	1	0
SLC	0	0	1	0	0	0
TBR	0	1	0	0	0	0
TR	0	0	0	1	0	0
TB	0	0	0	0	0	1
WN	1	0	0	0	0	0

MLB Dataset (continued)

MLB_Team	Franchise_current_city	Franchise_current_stadium	Championships
AD	1998	1998	1
AB	1966	1997	1
BO	1954	1992	3
BRS	1901	1912	7
CC	1876	1916	2
CWS	1901	1991	3
CReds	1890	2003	5
CI	1901	1994	2
CRockies	1993	1995	0
DT	1901	2000	4
FM	1993	1993	2
HA	1962	2000	0
KCR	1969	1973	1
LAA	1961	2004	1
LAD	1958	1962	5
MB	1970	2001	0
MT	1901	1982	3
NYM	1962	1964	2
NYY	1903	1976	26
OA	1968	1968	4
PPhillies	1883	2004	1
PPirates	1887	2001	5
SDP	1969	2004	0
SFG	1958	2000	0
SM	1977	1999	0
SLC	1892	2006	10
TBR	1998	1998	0
TR	1972	1994	0
TB	1977	1989	2
WN	2005	2008	0