

WHAT'S IN A NAME? PRICE VARIATION IN SPORT FACILITY NAMING RIGHTS

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INTRODUCTION

In the United States and Canada new sports facilities costing over \$6 billion are either currently under construction or being planned for the next decade. The financing of these facilities has become an important economic and political issue in many cities across North America. In recent years numerous studies and papers have examined sport facility financing, which have helped to fuel the debate on the use of public money to finance construction. Zimbalist [2000] notes that consulting firms under contract with cities or teams have conducted dozens of studies, and not surprisingly they have generally found that professional sports teams have substantial positive impacts on their cities. In contrast, most academic research in this area, such as Noll and Zimbalist [1997] and Baade [2000], suggest that it is difficult to justify public financing because the quantifiable costs of construction outweigh the benefits. While most papers in this literature have reached similar conclusions there is some disagreement among academics. One of the main reasons for differing conclusions on the use of public funding is the wide range of methods used for measuring the benefits derived from sports facilities. For instance, Irani [1997] estimated net consumer surplus derived from new sports facilities in major league baseball, and his findings supported the use of public funding for a number of facilities. Meanwhile, Johnson and Whitehead [2000] used a contingent valuation method and found that public financing is not justifiable for the facilities they examined. Thus, much of the literature has focused on different ways to measure the benefits derived from facilities while little attention has been paid to the changing structure of sports facility financing. An element of this changing structure is the increasing importance of corporate sponsorship through naming rights.

As facility naming rights prices have increased dramatically in recent years the portion of facility construction costs that must be financed by public and team funds

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has decreased. If the amount that firms are willing to pay to sponsor a sports facility continues to grow, this could have a significant impact on the decisions of numerous cities considering building a new facility. To better measure the need for public financing of sports facilities, therefore, we need to understand what determines the value of potential naming rights deals. The current paper adds to the literature on sports facility financing by identifying the determinants of the value of naming rights thus furthering our understanding of the need for public funding of sports facility construction.

With the rapid expansion of naming rights deals in the mid-1990s, more than half of all major professional sport facilities now bear the name of a corporation. Despite its growing importance with respect to the financing of sports facilities, very little research has examined the naming rights market. The small body of literature analyzing facility-naming rights has primarily focused on the use of naming rights as a marketing tool. McCarthy and Irwin [1998], Welch and Calabro [1997], and Kaydo and Trusdell [1997] all studied the marketing aspects of facility naming rights. For example, McCarthy and Irwin [1998] discussed the marketing methods that corporate sponsors may use to maximize their naming rights investments. McCarthy and Irwin [2000] extended their research by analyzing the corporate motivations behind the acquisition of naming rights. In addition, Team Marketing Report, Incorporated has annually produced a publication entitled *Naming Rights Deals* [1999] that reports on the financial, legal, and marketing aspects of facility naming rights. While the possible factors that influence the price of naming rights are discussed, no attempt is made to empirically study the factors that affect the price paid by corporate sponsors. In fact, an extensive review of the literature found no studies that measure the quantitative relationship between naming rights prices and the factors that influence these prices.

This paper attempts to identify the determinants of the price of stadium naming rights. We develop a model of the naming rights market where the objective of the facility owner is to maximize revenue, and the objective of the sponsor is to allocate its advertising budget efficiently. From the simple theoretical model, we derive reduced-form equations for the owner's reservation price and the sponsor's maximum offer price for naming rights. In developing an econometric model for the naming rights market, perhaps the most critical thing to recognize is that the sample is truncated. For the facilities that are named we observe the characteristics of the facility and the price that sponsors are willing to pay for the naming rights. However, for the unnamed facilities we observe the characteristics of the facility but not the price that potential sponsors are willing to pay. From the econometric literature on limited dependent variables, we know that if this type of truncation is not accounted for, the coefficient estimates for the price determinants may be biased and inconsistent. By using a model developed by Heckman we are able to obtain consistent estimates of the price determinants.¹

The results suggest that the key determinant for whether a facility is named is the extent to which the existing name is recognized. Facilities with widely recognized names are unlikely to be sponsored while newer facilities with little or no name recognition value are likely to be named. In addition, the presence of a new team, either

through expansion or relocation, is positively related to the price paid by a sponsor for the facility naming rights. It appears that corporate sponsors value the additional exposure that will come to a facility due to the arrival of a new team. We also show that the real price of facility naming rights is higher in more populated areas. This is consistent with the belief that sponsors are willing to pay more to advertise to a larger audience. We also show that the average real price for naming rights has increased significantly over time and that this growth has greatly exceeded the rate of growth in prices of other forms of advertising. Somewhat surprisingly we also find that the price for facility naming rights is independent of the number of games played at the facility, the median income in the area around the facility, the on-field success of the teams that play at the facility, the ownership structure of the facility (public vs. private), average attendance at sporting events, and the cost of construction.

THE MARKET FOR SPORTS FACILITY NAMES

The sale of sport facility names in the United States began in 1973 when Rich Products Corporation paid \$1.5 million for the rights to the home of the Buffalo Bills for the next 25 years.² In the 27 years that have followed, corporations have spent over \$2.3 billion to place their names and logos on major professional sport facilities [Bonham, 2000].³ While some consumers still have a distaste for the use of corporate names, the growth in revenue generated by naming rights deals has made corporate sponsorship commonplace. As shown in Appendix A, corporations such as Federal Express, American Airlines, and Staples have recently made considerable investments to acquire naming rights.

The literature on stadium names commonly cites several reasons why companies purchase naming rights. The most important reasons identified by companies appear to be the pursuit of community citizenship and goodwill, and to increase sales/market share [McCarthy and Irwin, 2000]. At the local level, companies benefit from naming a facility for several reasons. People in the area may take a more positive view of a corporation if they believe that the firm played a key role in providing a state-of-the-art facility for the region. In addition, as facility construction has become a significant factor in the location decisions of many pro teams, corporate sponsors may also be credited with retaining the local team or for bringing the new team to town. Lastly, corporations also benefit by simply having their name associated with the city's favorite team.⁴ On the national level, the attraction of naming a sports facility is that it provides very cost-effective advertising and exposure. Several examples help to illustrate the point.⁵ Greenberg [1999] pointed out that when the Phoenix Suns hosted the Chicago Bulls during the NBA finals in 1993, 30-second commercial spots were selling for \$300,000, while that same year America West Airlines paid \$583,495 for the naming rights to the Suns' arena. Thus, for less than the cost of a one-minute advertisement America West had their name mentioned or logo appear repeatedly to a national audience during the series. A second example is offered by Welch and Calabro [1997] who suggest that Pro Player, an athletic apparel company, went from being virtually unknown to being a major national brand largely due to the national exposure gained during broadcasts of Miami Dolphins and Florida

Marlins games. Finally, the naming rights to the Corel Center, home of the NHL's Ottawa Senators, provides the Corel Corporation with an estimated 400 million annual media impressions [Kaydo and Trusdell, 1997]. These examples help to illustrate one of the primary benefits of sponsorship—greater name recognition due to effective media exposure. As with other forms of advertising, corporate sponsors believe this will result in increased sales [McCarthy and Irwin, 2000]. Given this, it is reasonable to view the market for stadium names as a market for advertising space.

We develop a simple model of the market for facility naming rights where we consider the behavior of two agents—the facility owner and the corporate sponsor. The objective of the sponsor is to maximize the number of customer contacts, or “hits”, through advertising subject to some advertising budget constraint. Because firms' short-run objectives for advertising campaigns are varied, we are using the generic term “hits” to represent a general measure of the impact or effectiveness of an advertising expenditure. Depending on the sponsor's short-run goal, hits may be the number of media impressions or they may be the number of sales that result from the advertising. The sponsor has a number of means for advertising that include television, radio, newspapers, and sport facility sponsorship. To simplify the notation we will assume that there are just two choices for advertising, sponsorship (S) and an aggregate alternative (A). For simplicity we will also assume that there is only one facility and thus the sponsor does not have to choose between facilities. The market for the aggregate alternative is assumed to be competitive and thus there is a market price for a unit of advertising denoted P^A . In the market for sponsorship, there are no established prices and thus sponsors must submit bid prices to the facility owner. The sponsor's maximum-offer price, P^O , is determined by the following condition:

$$(1) \quad H^A \left[\frac{B}{P^A} \right] = H^A \left[\frac{B - P^O}{P^A} \right] + H^S$$

where B is the total advertising budget, $H^A[\cdot]$ is an increasing function relating the quantity of alternative advertisements to the expected number of hits from the aggregate alternative, and H^S is the expected number of hits that result from sponsorship. This condition simply states that the maximum bid price is such that the number of expected total hits with and without sponsorships is the same. If the sponsor can buy the naming rights for less than P^O then total hits with sponsorship is greater than without.

To focus on the owner's naming rights decision we will assume that we can separate the naming rights decision from other potentially related decisions the owner may face regarding construction and facility location. Given this, we model the owner's problem as a revenue maximization problem.⁶ Total revenue is the sum of revenue from events and naming rights revenue. Thus revenue is expressed as:

$$(2) \quad R = R^E + P^O$$

where R^E is the revenue from events and P^O is the price received for facility sponsorship. The revenue from events is modeled as follows:

$$(3) \quad R^E = f(N, \mathbf{V})$$

where N is a measure of name recognition or nostalgia associated with the facility, and \mathbf{V} is a vector of other variables that affect revenue such as local population and average income.

Now consider how the naming rights decision affects the revenue stream for the owner. The variables in \mathbf{V} , and the effect they have on R^E , are assumed to be independent of whether or not the facility is named. For instance, population is not affected by the naming rights decision and population should have a positive effect on R^E regardless. However, this is not the case with N , as name recognition is directly affected by the naming rights decision. The premise is that a facility name that is widely recognized is valuable in terms of generating revenue for the owner because a larger N may result in more events and or more tickets sold per event. For instance, for non-sporting events such as concerts, a promoter would prefer to book dates in a famous arena such as Madison Square Garden as opposed to a facility with a widely unrecognized name like Conseco Fieldhouse and thus greater name recognition may lead to more events. For sporting events the logic is similar but nostalgia may play a greater role. For example, a baseball game in Yankee Stadium is special for many baseball fans because of the nostalgia and history associated with the facility. If Yankee Stadium became Reebok Field, much of the historic or nostalgic value of experiencing a game in Reebok field would be lost. Therefore, if sports fans are nostalgic then a reduction in N , all else equal, should reduce revenue from ticket sales at sporting events.

Now consider the owner's decision. The facility owner compares the present value of the revenue streams with and without sponsorship and selects the larger of the two. Let N^S and N^O represent the nostalgic value of the facility when it is sponsored and when it is not sponsored respectively. Therefore, if $f(N^O, V) > [f(N^S, V) + P^O]$, the owner will not sell the naming rights. Another way to think about the owner's problem is that the owner can solve for P^R such that $f(N^O, V) = [f(N^S, V) + P^R]$. This yields the owner's reservation price, P^R , for the naming rights to the facility.

When setting out to identify the determinants of naming rights prices it may be tempting to simply regress price on a set of variables that describe the advertising value of the facility. However, simple ordinary least squares (OLS) regression analysis would be problematic for several reasons. The first, and perhaps most obvious, problem is that prices are determined by the interaction of demand and supply and therefore one needs to consider a system of two simultaneous equations. The second, and more unique, problem with using a simple OLS approach arises from the nature of the type of supply and demand decisions being made in the naming rights market. In most markets we typically think of supply and demand as smooth upward and downward-sloping functions. This is accurate when firms are selecting output levels or prices from a continuum and consumers are selecting quantities from a continuum of possible values. However, the standard supply and demand model does not accurately represent the market for stadium naming rights. In this market the quantity decisions are dichotomous.⁷ For each stadium, the owner chooses to sell or not sell, and thus the quantity supplied is 0 or 1. Likewise, sponsors either purchase the rights ($q = 1$) or they do not ($q = 0$). Therefore, the supply and demand curves for this market are as shown in Figures 1a and 1b.

FIGURES 1a and 1b
Supply and Demand Curves for the
Sport Facility Naming Rights Market

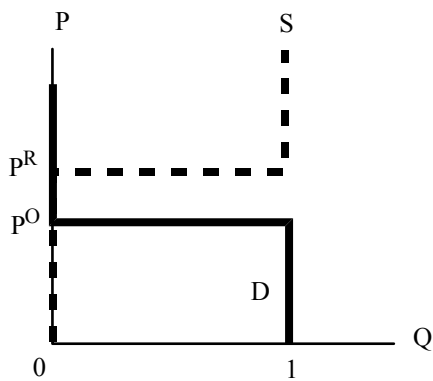


Figure 1a

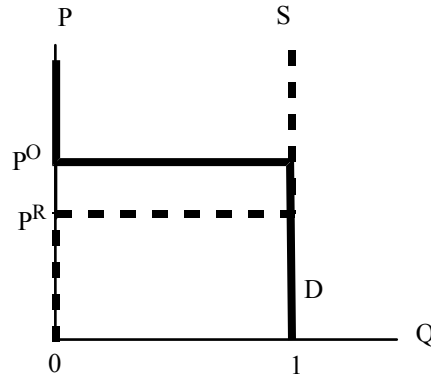


Figure 1b

The supply curves in Figures 1a and 1b show us that owners are willing to supply the advertising space for any price that exceeds their reservation price, P^R , and will supply none at any price less than P^R . Similarly, the demand curves show that at prices greater than their maximum offer price, P^O , firms will not purchase the advertising space and at prices below P^O firms will purchase. Figures 1a and 1b show the two possible outcomes. In Figure 1a we see that if P^R is greater than P^O , $Q = 0$, and thus the stadium is not named. In Figure 1b, P^O is greater than P^R and thus $Q = 1$, and the naming rights are sold.

Figures 1a and 1b help to highlight the third reason why a standard approach like OLS or two-stage least squares is inappropriate for this problem. The figures show that the problem of studying the determinants of naming rights prices is really a study of what determines P^R and P^O in a given market. Given this, two problems emerge. The first is that we do not actually observe P^R and P^O , because we can only observe P^O and whether or not P^O is greater than P^R . The second problem is that for all unnamed facilities depicted in Figure 1a, we do not observe P^R or P^O and therefore these facilities would not be part of the data set if we use a standard simultaneous equations approach. This market is a classic example of a truncated sample because there is a subset of the sample for which we observe all the variables that determine the equilibrium price but we do not observe the price itself. Therefore, to fully exploit the useful data regarding this market, we will need to use an econometric model for a truncated sample.

ECONOMETRIC MODEL FOR SAMPLE SELECTION

The primary econometric challenge in modeling the facility naming rights market is to address the issue of the truncated sample. The basic idea is that the process

that determines whether a stadium is named is likely to be related to the process that determines the price for naming rights. Therefore, having information regarding a set of facilities where we know that $P^O < P^R$ provides additional information about how prices are determined in this market. In other words, the sample selection process is endogenous and must be incorporated into our model.

To make full use of the available data we need to model the demand for naming rights and the process by which facilities are selected for naming. Consider the following system of equations:

$$(4) \quad P_i^O = X_i \mathbf{B} + \varepsilon_{1i}$$

$$(5) \quad S_i = I(P_i^O - P_i^R) = Z_i \gamma + \varepsilon_{2i}$$

where P^O and P^R are as defined above, X_i and Z_i are vectors of explanatory variables, ε_{1i} and ε_{2i} are error terms, I is an indicator function, S_i is an indicator variable that is equal to 1 when $P^O > P^R$ and 0 otherwise, and \mathbf{B} and γ are vectors of parameters to be estimated. Equation 4 is the inverse demand equation and thus the variables in X_i determine what a sponsor is willing to pay for naming rights. Equation 5 is the selection equation and thus Z_i contains the demand variables and the supply determining variables. These variables are discussed in greater detail below. The error terms ε_{1i} and ε_{2i} have a bivariate normal distribution as follows:

$$(6) \quad g(\varepsilon_i) \sim N(0, \Omega)$$

where

$$\Omega = \begin{bmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{bmatrix}$$

The key parameter here is ρ , which is the correlation between the error terms in equations 4 and 5. This parameter helps to illustrate why the unnamed stadiums can provide useful information. The error terms in the demand equation will be correlated with the error terms from the selection equation if there are random shocks that affect both P^O and $(P^O - P^R)$. This correlation will be positive if the shock only affects P^O but it could be positive or negative if the shock affects both P^O and P^R . If the error terms are correlated and it is ignored, the estimates of \mathbf{B} will be biased. Heckman [1979] shows that the sample selection bias may be thought of as an omitted variable problem. He develops a two-step estimation procedure where the selection bias is estimated first. In the second step, the selection bias term is added to the equation of interest thus making consistent estimation of the parameters possible. A version of Heckman's model is described below.⁸

From equation 5 we see that when $(P^O - P^R) > 0$ the facility is named and thus P^O is observed. When $(P^O - P^R) < 0$ the facility is not named and therefore P^O is not observed. From equation 5 it may be noted that $(P_i^O - P_i^R) > 0 \rightarrow \varepsilon_{2i} > -Z_i \gamma$ and thus we may express the probability that P^O is observed as:

$$(7) \quad P((P^O - P^R) > 0) = \Phi\left(\frac{Z_i \gamma}{\sigma_2}\right),$$

where Φ is the cumulative density function of the standard normal distribution. In addition, since equation 4 is incidentally truncated and the error terms from equations 4 and 5 are bivariate normal, then we may express the conditional expectation of P^O as:

$$(8) \quad E[P_i^O | (P^O - P^R) > 0] = X_i B + \rho \sigma_1 \lambda_i$$

where λ_i is the inverse Mills ratio and is given by:

$$(9) \quad \lambda_i = \phi(-Z_i \gamma / \sigma_2) / [1 - \phi(-Z_i \gamma / \sigma_2)]$$

and ϕ is the probability density function of the standard normal. Therefore, the second term on the right-hand side of equation 8 measures the bias introduced by the endogenous selection process. Equations 7 and 8 form the two-equation system that we estimate. Equation 7 is the selection equation and measures the probability that a given facility is named. Equation 8 represents the price that sponsors are willing to pay for naming rights conditioned on the fact that the sponsor's offer price exceeds the owner's reservation price.

To obtain unbiased estimates of the coefficients we use the following 2-step estimation procedure. We first estimate γ/σ_2 by performing probit estimation on equation 7. Then we can compute λ_i and estimate equation 8 using OLS.⁹ Therefore, by incorporating the unnamed facilities in our sample and using Heckman's estimation procedure we are able to measure the bias introduced by the endogenous selection process. By estimating equations 7 and 8, as opposed to just estimating equation 4, we are able to obtain consistent estimates of the parameters of interest.

DESCRIPTION OF DATA

Data were collected on all current North American sports facilities, named and unnamed, that are the home site for at least one team that plays in a traditional major professional sports league (NBA, NFL, NHL and MLB). While naming rights are sold to minor league and collegiate sport facilities, the sample was limited to major professional sports for this study. Altogether, data were collected for 56 facilities where naming rights were sold and 42, which were unnamed thus giving us a total of 98 observations.

The dependent variable for the price equation is the average annual amount paid by the corporate sponsor, adjusted for inflation.¹⁰ The dependent variable for the selection model is a dummy variable with a value of 1 if the naming rights were sold, 0 otherwise. Based on our model, a review of the literature, and the availability of usable data, we identified a set of independent variables that may affect the naming rights decisions of facility owners and potential sponsors. The following explanatory variables are used: (For a more detailed explanation of these variables see Appendix C.)

Supply Variables (elements of Z only)

<i>YEAR</i>	The year the facility was built. <i>YEAR</i> serves as a proxy for name recognition. Older established names are more widely recognized. Therefore name recognition is inversely related to <i>YEAR</i> .
<i>OWNER</i>	Ownership dummy variable (1 = private ownership, 0 otherwise).
<i>COST</i>	The original construction cost for the facility, adjusted for inflation and reported in U.S. dollars.

Demand Variables (elements of both X and Z)

<i>GAMES</i>	The number of regular season games played by the major professional teams that are tenants. ¹¹
<i>INCOME</i>	The median real household income of the metropolitan statistical area, adjusted for inflation, in which the facility is located.
<i>MSAPOP</i>	Total population in metropolitan statistical area.
<i>ATTEND</i>	Average game attendance of tenants.
<i>FACTYPE</i>	Dummy variable representing indoor and outdoor facilities (1 = outdoor, 0 otherwise).
<i>OTHFAC</i>	Dummy variable representing the presence of other major pro sport facilities in the market (1 = the presence of at least one other facility in the market, 0 = no other facilities in the market).
<i>SPONYEAR</i>	The year the sponsor acquired the naming rights. Serves as a time variable in the pricing equation.
<i>TEAMSUCC</i>	The winning percentages of tenant teams over the previous five years as a measure of on-field success. Given the existence of multiple tenants, <i>TEAMSUCC</i> is calculated as the mean of the winning percentages for each team over 5 years prior to the year in which the facility was named. The result is then weighted based on the number of games played by each tenant annually.
<i>POSTSUCC</i>	A second measure of on-field success. It is the number of times over the previous seven years that facility tenants qualified for the postseason. The variable is reported as a percentage. ¹²
<i>NEWTEAM</i>	Dummy variable representing the presence of a new team in a facility where there was an opportunity to sell naming rights (1 = an expansion team or a team that has relocated to a facility where there is an opportunity to sell naming rights, 0 = all others).

ESTIMATION AND RESULTS

The results from estimating equations 7 and 8 using Heckman's two-step procedure are reported in Table 1.¹³ The table reports results for the "selection equation", which measures how the independent variables affect the probability that a facility will be named, and the "price equation", which measures the direct effect that variables have on the price sponsors are willing to pay.¹⁴ The results from the selection

TABLEe 1
Heckman 2–Step Model

Selection Equation : Dependent Variable is the sale of naming rights (0=no; 1= yes)

Variable	Coefficient	Standard Error	z	P>z
OWNER	-.284	.328	-.86	.387
COST	-1.49E-9	1.86E-9	-.80	.424
YEAR	.057	.015	3.87	.00
TEAMSUCC	.194	2.36	.082	.935
FACTYPE	.044	.453	.098	.922
ATTEND	-2.33E-6	1.3E-5	-.179	.858
MSAPOP	-2.32E-8	4.19E-8	-.554	.580
INCOME	2.42E-5	3.32E-5	.73	.466
GAMES	.0048	.0082	.585	.559
NEWTEAM	-.064	.425	-.15	.88
POSTSUCC	.244	.643	.38	.704
OTHFAC	.10	.438	.23	.818
Constant	-113.8	29.43	-3.87	.00

Price Equation: Dependent Variable is average annual price

Variable	Coefficient	Standard Error	Z	P>z
SPONYEAR	.256	.076	3.38	.001
TEAMSUCC	2.66	3.53	.753	.452
FACTYPE	-.312	.583	-.534	.593
ATTEND	1.18E-5	1.85E-5	.638	.523
MSAPOP	8.63E-8	5.46E-8	1.58	.114
INCOME	3.14E-5	3.94E-5	.796	.426
GAMES	-.002	.01	-.181	.857
NEWTEAM	.933	.536	1.74	.082
POSTSUCC	.153	1.01	.151	.88
OTHFAC	.87	.617	1.41	.159
Constant	-512.4	150.8	-3.39	.001
Athrho cons	-.606	.339	-1.79	.074
Lnsigma cons	.36	.133	2.69	.007
Rho (ρ)	-.542			
Sigma (σ)	1.43			
Lambda (λ)	-.776	.42		

equation are rather interesting in that the only significant variable is the name recognition variable. The coefficient is positive and highly significant, which suggests that facilities with well-known names are less likely to be named. This result is consistent with our theoretical model as the owner's reservation price is increasing in N . Perhaps the most important aspect of this result is that it highlights the fact that sponsorship comes with a cost. When the opportunity cost is too large, as it may be with facilities such as Madison Square Garden and Fenway Park, it does not make

sense for owners to sell their names. If not for this name recognition effect owners would have no incentive to decline sponsorship.

From the price equation we see that several variables have a significant effect on price. The coefficient on the year variable is .256 and significant at the .01 level. This suggests that, all else equal, average annual sponsorship prices increased by \$256,000 a year during the sample period. Given that the dollar figures are all real values, we did not have any prior beliefs about the sign of the year variable, but it was included to capture any potentially important time effects. We will discuss some possible implications of this result below. Another variable that has a significant effect on price is the arrival of a new team to the facility. This coefficient is equal to .933 and has a *p*-value of .082. This suggests that sponsors of facilities with a new expansion team or a newly relocated team pay \$933,000 more per year compared to facilities that do not house a “new” team. This new team premium may reflect the sponsors’ anticipation that they will have above average exposure because of the new team to the region or league. The coefficient on population is marginally significant as it has a *p*-value of .114.¹⁵ As anticipated, the population variable is positive suggesting that sponsors are willing to pay more for facilities in areas with larger populations. This is consistent with the notion that firms purchasing naming rights in highly populated areas are effectively buying additional advertising. The other variables in the price equation generally have the correct sign but are statistically insignificant.¹⁶

It is interesting to note that the year of sponsorship is highly significant while many of the variables one might think would be important such as the on-field success of teams, the ownership structure of the facility, the average attendance per game, the number of games played per year, and median income in the surrounding area all have little or no effect on the price of naming rights. One possible explanation for the significance of time and the insignificance of many of the explanatory variables is that what we have observed thus far is a market in its infancy. Perhaps one of the reasons that sponsors are now willing to pay more for the naming rights is that over time demand has increased significantly as firms have learned about the value and effectiveness of naming a facility. To investigate this we looked at the growth in naming rights prices and the growth in average prices for other advertising media. It is interesting to note that prices in the facility naming rights market have grown at a much faster rate than several other traditional forms of advertising. Since 1988, naming rights prices have grown annually at a rate of 14.57 percent, adjusted for inflation. Over the same time period, network television and magazine advertising rates have grown at rates of 2.19 percent and 8.46 percent, respectively [www.tvb.org, 2000].¹⁷ These growth rates are consistent with our hypothesis that price variation in naming rights is largely explained by sharp increases in the sponsors’ perceived value of naming a facility as opposed to the underlying facility and team characteristics.

Lastly, we note that the estimate for ρ , which measures the correlation between the error terms in equations 4 and 5, is $-.542$ with a *p*-value of .074. This last result is important because it suggests that there indeed is a statistically significant relationship between the shocks that affect the error terms in equations 4 and 5. There-

fore, there is information from the unnamed facilities that may be exploited in estimating the price equation.

CONCLUSION

In this paper we examine the price determinants in the growing market for sport facility naming rights in North America. In this market, sample selection bias is a problem and therefore we use an econometric model with an endogenous selection process. We use an estimation procedure developed by Heckman that enables us to include information from all facilities, named and unnamed, to derive unbiased estimates of the price determinants.

Our results seem to be consistent with the model of the naming rights market discussed above. One key result is that the name recognition effect is significant. The data suggests that the most important factor in determining whether a facility will be named is the age of the existing name. From the selection equation we see that facilities with older, widely-recognized names are less likely to be named because the opportunity cost of selling the name apparently becomes quite substantial.

Our results also indicate that sponsors are willing to pay more to name a facility that is home to a "new" team. This may indicate that sponsors expect that expansion teams and relocating teams will receive above-average media exposure. Similarly, we note that population in the area around the facility has a positive effect on price. One interpretation of this may be that firms that buy naming rights for a facility in a populated area must pay more because they are effectively paying for additional advertising that they would not receive from a facility in a less populated area. These results seem to be consistent with the existing literature on facility naming rights as many authors have suggested that the prime motivation for sponsorship is cost-effective advertising.

Somewhat surprisingly we found that other than population and the new team effect, the only variable that significantly affects the naming rights prices is the year the facility's naming rights were sold. Our analysis shows that as time has passed the real prices for naming rights have increased and that the growth in these prices has significantly outpaced the growth in prices for other forms of advertising. One possible explanation for this rapid growth in prices is that the market for naming rights was not a mature market in the 1990s. Therefore, we did not observe prices fluctuating around an equilibrium level but instead witnessed a strong upward trend as sponsors became aware of the cost effectiveness of facility sponsorship. If our hypothesis is correct, one would expect to see real prices leveling off in the future as the market converges to more of a steady state. Thus in future research it may be interesting to see if the statistical significance of time lessens and other explanatory variables such as attendance and on-field success have a more measurable effect on price.

APPENDIX A
Naming Rights Deals

Name	Location	Year of Sponsorship	Price (in mill.\$)	Number of Years	Average Price
Arrowhead Pond	Anaheim, CA	1993	15.00	10	1.50
Edison International Field	Anaheim, CA	1998	50.00	20	2.50
Philips Arena	Atlanta, GA	1999	180.00	20	9.00
PSINet Stadium	Baltimore, MD	1999	105.00	20	5.20
FleetCenter	Boston, MA	1995	30.00	15	2.00
Marine Midland Arena	Buffalo, NY	1996	15.00	20	0.75
Can. Airlines Saddledome	Calgary, AB	1995	C\$10.00	20	0.50
Ericsson Stadium	Charlotte, NC	1996	20.00	10	2.00
United Center	Chicago, IL	1994	36.00	20	1.80
Cinergy Field	Cincinnati, OH	1996	6.00	6	1.00
Gund Arena	Cleveland, OH	1994	14.00	20	0.70
Jacobs Fields	Cleveland, OH	1994	13.90	20	0.70
American Airlines Center	Dallas, TX	2000	90.00	20	4.50
Coors Field	Denver, CO	1995	15.00	10	1.50
Pepsi Center	Denver, CO	1998	68.00	20	3.90
Comerica Park	Detroit, MI	2000	66.00	30	2.20
Cont. Airlines Arena	East Rutherford, NJ	1996	29.00	12	2.42
Skyreach Center	Edmonton, ON	1998	C\$5.00	5	1.00
Compaq Center	Houston, TX	1997	5.40	6	0.90
Enron Field	Houston, TX	2000	100.00	30	3.33
Conseco Fieldhouse	Indianapolis, IN	1999	40.00	20	2.00
RCA Dome	Indianapolis, IN	1994	10.00	10	1.00
Alltel Stadium	Jacksonville, FL	1997	6.20	10	0.62
Corel Center	Kanata, ON	1996	C\$26.00	20	1.30
Staples Center	Los Angeles, CA	1999	116.00	20	5.53
American Airlines Arena	Miami, FL	1999	42.00	20	2.10
Pro Player Stadium	Miami, FL	1996	20.00	10	2.00
Miller Park	Milwaukee, WI	2000	41.20	20	2.06
Target Center	Minneapolis, MN	1990	18.75	15	1.25
Molson Center	Montreal, QE	1996	20.00	21	1.05
Adelphia Coliseum	Nashville, TN	1999	30.00	15	2.00
Gaylord Center	Nashville, TN	1999	80.00	20	4.00
Network Associates Col.	Oakland, CA	1998	6.00	5	1.20
TD Waterhouse	Orlando, FL	2000	7.80	5	1.56
First Union Center	Philadelphia, PA	1996	40.00	29	1.38
America West Arena	Phoenix, AZ	1989	26.00	30	0.87
Bank One Ballpark	Phoenix, AZ	1998	66.0	30	2.20
Mellon Arena	Pittsburgh, PA	1999	18.00	10	1.80
PNC Park	Pittsburgh, PA	2001	20.00	40	2.00
Ford Stadium	Pontiac, MI	1996	40.00	40	1.00
Arco Arena	Sacramento, CA	1997	10.00	7	1.43
Delta Center	Salt Lake City, UT	1991	25.00	20	1.25
Qualcomm Stadium	San Diego, CA	1997	18.00	20	0.90
3Com Park	San Francisco, CA	1995	4.00	5	0.80
Pacific Bell Park	San Francisco, CA	2000	50.00	24	2.08
Key Arena	Seattle, WA	1995	15.10	15	1.01
Safeco Field	Seattle, WA	1999	36.00	20	1.80
TransWorld Dome	St. Louis, MO	1995	36.70	20	1.84
Tropicana Field	St. Petersburg, FL	1998	46.00	30	1.53
National Car Rental Center	Sunrise, FL	1998	25.00	10	2.50
Raymond James Stadium	Tampa Bay, FL	1998	55.00	18	3.06
Air Canada Center	Toronto, ON	1999	C\$45.00	15	3.00
General Motors Place	Vancouver, BC	1995	C\$18.5	20	0.93
FedEx Field	Washington, DC	1999	205.00	27	7.40
MCI Center	Washington, DC	1998	44.00	20	2.20

C-Canadian Dollars

APPENDIX B
Unnamed Facilities

Facility	Location	Year of Construction	Type of Ownership
Charlotte Coliseum	Charlotte	1988	Public
Madison Square Garden	New York City	1925 ^a	Private
Palace of Auburn Hills	Auburn Hills, MI	1988	Private
Alamodome	San Antonio	1993	Public
Reunion Arena	Dallas	1980	Public
Rose Garden	Portland	1995	Private
Georgia Dome	Atlanta	1992	Public
Giants Stadium	East Rutherford, NJ	1976	Public
Lambeau Field	Green Bay	1957	Public
H.H. Humphrey Metrodome	Minneapolis	1982	Public
Silverdome	Pontiac, MI	1975	Public
Soldier Field	Chicago	1924	Public
Sun Devil Stadium	Tempe, AZ	1958	Public
Superdome	New Orleans	1975	Public
Texas Stadium	Irving, TX	1971	Private
Veterans Stadium	Philadelphia	1971	Public
Arrowhead Stadium	Kansas City	1972	Public
Paul Brown Field	Cleveland	1999	Public
Foxboro Stadium	Foxboro, MA	1971	Public
Kingdome	Seattle	1976	Public
Mile High Stadium	Denver	1948	Public
Three Rivers Stadium	Pittsburgh	1970	Public
Ice Palace	Tampa Bay	1996	Private
Nassau County Coliseum	Uniondale, NY	1972	Public
Raleigh Sports Arena	Raleigh	1999	Public
Joe Louis Arena	Detroit	1979	Public
Kiel Center	St. Louis	1994	Private
San Jose Arena	San Jose	1993	Public
Yankee Stadium	New York City	1923	Public
Fenway Park	Boston	1912	Private
Skydome	Toronto	1989	Private
Camden Yards	Baltimore	1992	Public
Comiskey Park	Chicago	1991	Public
Kauffman Field	Kansas City	1973	Public
Ballpark at Arlington	Arlington, TX	1994	Public
Turner Field	Atlanta	1997	Private
Olympic Stadium	Montreal	1977	Public
Wrigley Field	Chicago	1916	Private
Milwaukee County Stadium	Milwaukee	1953	Public
The Arena	Oakland, CA	1966	Public
Dodger Stadium	Los Angeles	1962	Private

a. The current MSG was actually built in 1968 but there has been an MSG in New York City since 1925. We estimated the model using both dates and the results are essentially identical.

APPENDIX C

Explanatory Variables

Number of games played (GAMES) – This variable was defined as the number of regular season games played by the tenant teams from the four major professional leagues that are housed in the facilities studied. All of the facilities hosted at least one team, and some have additional tenants.¹⁸ It was expected that corporate sponsors would be willing to pay a higher price for naming rights in facilities that hosted more sporting events; therefore a positive relationship was expected.

Median real household income (INCOME) – The median real household income of the metropolitan statistical area, adjusted for inflation, in which the facility is located. It is expected that a positive relationship exists between this variable and the naming rights price.

Total population in metropolitan statistical area (MSAPOP) – It is anticipated that as the number of potential consumers who are exposed to the named facility increases, the amount that firms are willing to pay for the advertising opportunity will also increase. Also, while firms receive a large amount of national exposure through the media, both Irwin & Sutton (1995) and Schlossberg (1996) cite the local marketing opportunities as a motivation for the acquisition of naming rights. It is expected that the naming rights price and MSA population will have a positive relationship.

Average game attendance of tenants (ATTEND) – Companies that acquire naming rights want their name exposed to the maximum number of consumers possible. Obviously, companies want their name attached to a facility that has a high number of consumers attending events each year. The average attendance was selected instead of total attendance because total attendance depends on the number of games played in the facility, which is also included in the model. Thus, average attendance is a more appropriate measure of attendance because it is independent of the number of games played. It is difficult to predict future attendance, so the average of game attendance of the tenants over the seven years prior to the acquisition of naming rights was calculated. It is anticipated that a positive relationship will exist between average annual attendance and naming rights price.¹⁹

Ownership dummy (OWNER) – All of the facilities included in the sample are owned by either a private corporation (ex. First Union Center in Philadelphia is owned by ComcastSpectacor) or a government entity (ex. Alltel Stadium is owned by the City of Jacksonville).²⁰ A dummy variable was used to capture the ownership status of the facilities (0 = public ownership, 1 = private ownership). It is expected that the private ownership groups may be more profit motivated than government entities and therefore it is anticipated that a positive relationship exists between the ownership variable and naming rights price.

Type of facility (FACTYPE) – All of the facilities were separated into two types, indoor and outdoor (1 = outdoor, 0 = indoor). Generally, there are some important differences between the types of facilities. Indoor facilities are usually smaller in size. In our sample most indoor facilities had a capacity of 18,000 to 24,000 seats. Indoor facilities can also be used during all months of the year, regardless of location. In contrast, outdoor, or open air, facilities are usually large, capacity of 40,000 to 75,000 seats. While these additional seats will expose more consumers to a named facility, the possibility of poor weather during the winter months in many locations may lead to a smaller number of events. Lastly, while an indoor facility may have tenants from any of the four major professional sports leagues, an outdoor facility can only house a NFL or MLB team.²¹

Other facilities (OTHFAC) – All of the facilities were separated into two categories (1 = the presence of at least one other facility in the market that houses a team from the four major sports, 0 = there are no other facilities in the market that host a major professional sport team). The additional supply of other facilities may affect the price that prospective sponsors are willing to pay. A negative relationship between this variable and the price paid by a sponsor is expected.

Real construction cost (COST) – The original construction cost for each facility was included in the model. The cost was adjusted for inflation and reported in US dollars. It is expected that a positive relationship will exist between this variable and the naming rights price, as additional revenue sources may be necessary as costs increase. Therefore, owners may be more willing to sell naming rights as construction cost increases.

Construction year (YEAR) – The construction year serves as a proxy for name recognition. The names of older facilities are more widely recognized than the names of newer facilities. All else equal, greater name recognition should lead to larger revenues from events for the facility owner. Given this we would expect that newer facilities are more likely to be named.

Sponsorship year (SPONEYEAR) – The year that the naming rights deal began serves as a time variable in the price equation. Sponsorship year should identify any important trends over time in the naming rights market.

Tenant playing success (TEAMSUCC) – The tenants (teams) of these facilities have varying levels of on-field success. Given all else equal, a corporation would rather have their name attached to a facility with a team that has a .900 winning percentage as compared to a team with a .100 winning percentage. It is expected that a positive relationship would exist between the on-field success of tenants and the price of naming rights. Not only is the corporation's name attached to a winning organization, but a winning team should receive more media exposure than a losing team. The additional team exposure should also lead to additional exposure for the company whose name is attached to the home facility of that team. Unfortunately, it is difficult to predict the future success of professional sports teams. Due to this, our study used the winning percentages of tenant teams over the previous five years as a measure of on-field success. In addition, the existence of multiple tenants resulted in some problems when developing a variable to measure tenant playing success. Given the existence of multiple tenants, the mean of the winning percentages for each team over 5 years prior to the year in which the facility was named were calculated. The result was then weighted based on the number of games played by each tenant annually. For example, if a facility housed both an NBA and NHL team (both leagues play 41 home dates) then the mean winning percentages over the previous 5 years were equally weighted. The weighted products for each team were then averaged to result in a weighted mean winning percentage for the tenants of the facility.²²

Postseason success (POSTSUCC) – A measure of the on-field success of facility tenants. Intuitively, we would expect that corporate sponsors have a higher demand for facilities that house teams that qualify for the playoffs. Therefore, the expectation was for a positive relationship between this variable and the price paid by corporate sponsors. The variable was calculated by determining the number of times that the facility's tenant(s) qualified for the postseason in the 7 seasons previous to the naming of the facility.²³ For example, for a facility that has a single tenant that qualified for the postseason in 5 of the 7 years prior to the naming of the facility, the variable has the value of .714.

Presence of a new team (NEWTEAM) – A dummy variable representing the presence of a new team to a facility where there is an opportunity to sell the naming rights. The naming rights price may be affected by the presence of a new team, either through expansion or relocation, to a market. A sponsor may be willing to pay a higher price for the name of a facility that will house a new team. A new team may bring interest and excitement to the local market that is not present if a sponsor purchases the name of a facility that houses an existing team. This variable is coded as a 1 for facilities where there was a new team that moved into the facility since 1988 and there was an opportunity to sell the naming rights when the new team arrived. For all other facilities, the variable has a value of 0. A positive relationship between this variable and price is expected.

NOTES

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1. See Heckman [1976; 1979]
2. Facilities such as Wrigley Field in 1926 and Busch Stadium in 1953 were named after the corporations that owned the tenant teams. While these were not naming rights deals, the placement of the corporate names was seen as an advertising tool [McCarthy and Irwin, 1998].
3. For our purposes major professional sports in North America includes the National Football league (NFL), National Hockey League (NHL), National Basketball Association (NBA), and Major League Baseball (MLB).
4. Welch and Calabro [1997] point out that it is possible that local residents may resent a corporation for renaming their stadium. However, as it has become commonplace it seems that people have grown to accept it and thus the negative repercussions seem to be diminished.
5. These examples are discussed in McCarthy and Irwin [1998].
6. Revenue maximization is approximately true in this case because the major cost associated with a facility is the fixed cost of building the facility. In addition, the revenues gained from sponsorship are generally far greater than any change in facility operating costs due to changes in attendance result-

- ing from a decision regarding naming rights. If we had considered profit maximization, the model itself would be slightly more complicated but it would not affect any of the results.
7. If one wanted to study the sale of parts of a facility, then something other than dichotomous demand and supply would probably be necessary. Deals that only include the sale of entrances/portals/concourses constitute a different market due to their lack of national media exposure. Since our focus is on the overall facility name, our dichotomous representation seems appropriate.
 8. The econometric model we present is described in Cramer [1986].
 9. See Heckman [1976; 1979] for more details on the Heckman two-step procedure.
 10. Most sponsorship deals differ a bit in terms of payment schedules. As a result, the use of annual average price is, of course, an approximation for the real price paid by the firm. Ideally we would like to have the exact information on payment schedules from the actual contracts but, given the proprietary nature of the contracts, the information is simply not available for our total data set. Our research suggests that most deals are similar in structure and thus average annual price is an appropriate approximation. Larger variations in schedules will result in larger residuals but this should not be a problem as long as the variations in schedules are not correlated with our explanatory variables.
 11. We attempted to obtain data on the number of non-sporting events at each facility but we were unable to get the data. From the sponsor's point of view, non-sporting events are probably not important as they usually don't receive national media coverage as sporting events do. However, these events may be important to the owner's revenue stream. This would be particularly true for well-known, indoor facilities in bigger cities where they are likely to have a significant number of non-sporting events. Given this, it may be that our indoor /outdoor dummy, population, and name recognition variables will pick up much of the effect of non-sporting events.
 12. Given that there is no previous data for expansion teams, they were coded as .00. Intuitively, consumers expect expansion teams to have minimal on-field success.
 13. Estimates were obtained using the Heckman two-step estimation procedure in STATA.
 14. Almost all naming rights deals also include some auxiliary benefits for the sponsor such as luxury boxes. Since the sponsorship deals are based on private contracts, prices broken out for auxiliary benefits versus naming rights are generally not observable. However, as long as the primary objective of sponsors is national media recognition the price associated with the deal should primarily reflect the advertising value of the naming rights. If one thinks of the level of auxiliary benefits as an omitted variable then this may lead to omitted variable bias in our estimates. As long as the level of auxiliary benefits is not correlated with our explanatory variables then our results should still be unbiased.
 15. We should note that in other specifications we examined, population was significant at the .01 level. A number of other specifications were considered but the results are not reported because these specifications suffered from multicollinearity problems. The purpose of the population variable is to measure the size of the market. Other measures that we considered for this purpose were the number of firms with over 500 employees in the MSA and the number of TV households in the designated market area. These variables were dropped because they were highly correlated with population and median income, and because these data were not available for the 8 Canadian facilities.
 16. We also attempted to measure the effect of having to "rename" a facility. One might suspect that there is less advertising value in paying to rename an existing facility as opposed to putting a name on a new facility because when a facility is renamed there may be some people who continue to use the original name. To check this, we included a dummy variable to distinguish between new names and renames. The rename effect was highly insignificant and the inclusion of the variable did not significantly alter any of our other results. The reason we do not include the rename variable in our reported results is that there are problems with trying to include that variable in the model. The problem is that for some of the unnamed facilities we cannot classify them as either requiring a name change or not requiring a name change because their status changed during the period of our sample. For example, Camden Yards was built in 1992 and at that point in time a sponsor could have named the park without a name change. However, after 1992 a name change would be required and thus there is not a way to classify this facility as being in just one category. Because of this difficulty and the insignificance of the variable in the price equation we dropped it altogether.
 17. We should note that we were unable to obtain data on the cost of advertising by city as it appears that this information is not publicly available. We also tried to obtain data on prices for local broadcast rights for baseball, hockey and basketball but these were also unavailable.

18. The Staples Center in Los Angeles is the only facility that has more than two tenants (Los Angeles Kings, Lakers, and Clippers).
19. We should note that for the unnamed facilities, attendance figures from the mid-1990s are used to calculate average attendance.
20. A number of facilities are owned by quasi-government authorities. For example, Continental Airlines Arena in East Rutherford, NJ is owned by the New Jersey Sports and Exposition Authority (NJSEA). The NJSEA was established by the State of New Jersey for the purpose of operating and managing the facility complex. These types of ownership arrangements are categorized as public ownership for this study.
21. Retractable roof and domed facilities are categorized as indoor facilities.
22. Once again, the team records from the mid-1990s are used for those facilities that are not named. In addition, for expansion teams with no previous record, the team's playing record in their first season was used as a measure of playing success.
23. Once again, postseason success from the mid-1990s is used for those facilities that are not named.

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