New Stadiums and Concession Prices in Professional Football and Baseball

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Abstract

This paper investigates the impact of new stadiums on the prices of certain concessions. The empirical analysis is guided by the possibility that a new stadium not only increases demand, envisioned as a shift in the demand curve, but also might rotate demand, thereby increasing the willingness to pay for some and perhaps reducing the willingness to pay for others. The net effect of a demand shift and demand rotation on price is ambiguous, and is therefore an empirical question. Using data describing professional football (NFL) and baseball (MLB) teams from 1991 through 2003, it is shown that concession prices tend to increase after a team moves into a new stadium predominantly because of attendance increases. Only in a few cases does a new stadium contribute a separate influence on price, that is, a new stadium does not seem to cause demand to rotate. However, for tickets and parking, the two goods where a team owner is most nearly a monopolist, a new stadium does correspond with a large and persistent increase in price, suggesting a demand shift is accompanied by a demand rotation.

JEL Classifications: L13, D43, L83

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1. Introduction

Previous studies of new sports arenas have generally taken one of two approaches. Either the focus is on the claims of public-subsidy proponents about the impact of the new venue on the host-city, including such issues as employment, per-capita income, tourism rates, and quality of life, or the focus is on the team that plays in the new arena. The majority of the latter type investigate the so-called "novelty effect" or changes to attendance attributed to the new stadium itself, in addition to or despite the quality of the team. Previous research has shown the novelty effect to be most prominent in Major League Baseball (MLB), often attributed to an increased fan interest in experiencing a game in the new venue (for its own sake) and the rarely binding capacity constraint facing most professional baseball teams. The greater frequency of sellouts in the other three major sports - football, basketball, and hockey - seems to dampen the novelty effect, at least as it is reflected in attendance.

The novelty effect of a new stadium has implications for team revenues (Depken, 2003), how cities negotiate revenue-sharing agreements to finance stadium construction costs (Levine, 2002), or how much host-cities can expect new stadiums to increase economic activity relative to the stadium replaced (Coates and Humphreys, 2003). Furthermore, the novelty effect may change team-owner behavior if a new stadium allows the team to substitute away from higher quality, and more expensive, players and not suffer a significant reduction in attendance and revenues.

The impact of a new stadium on team demand is of interest, but equally important might be some understanding of how a new stadium influences the prices charged by a team. Surprisingly, little attention has been paid to the impact of a new stadium on the prices charged by teams, although Quirk and Fort (1997) briefly mention that a new stadium might increase prices. In the popular press, anti-stadium subsidy activists often claim that new stadiums cause prices to increase sufficiently to price some individuals out of the market for live sporting events. If this is the case, activists claim, a new stadium might provide a subsidy to wealthier fans that attend games in the new arenas.

Although anti-subsidy activists may not care about the true cause of (any) price increases after a new stadium opens, it is important to isolate as much as possible the various possible influences on prices. For completeness, prices might increase after a team moves into a new stadium for at least four reasons. If the new stadium provides a boost to attendance, as predicted by previous studies of the novelty effect, concession prices might naturally increase as they ration the market. Prices might increase because of greater complementarity between viewing the game in the new stadium and the concession goods sold at the event, e.g., beer or soda are purchased because of souvenir cups commemorating the new stadium. Third, prices might increase if concessions become greater complements to each other, regardless of their relationship with the event itself, e.g., beer and hotdogs are more valuable consumed in a domed stadium. Finally, prices might increase because viewing a game in the new stadium carries greater overall value to consumers, which a team owner tries to extract through a combination of ticket and concession sales. Any or all of these reasons could contribute to an increase in prices after a team moves into a new stadium.

If a new stadium allows a team owner to increase prices, the additional revenue is a windfall for the team owner if she holds rights to these revenues and substantial public subsidies contributed to the construction of the stadium. From 1991 through 2001, the National Football League and Major League Baseball each opened twelve new stadiums, the majority of them built with significant amounts of public subsidies; over this period, team owners generally demanded and obtained property rights to large if not dominant shares of the revenues generated within the stadium, including naming rights, in-arena advertising, and concession sales.

The trend of cities spending millions of dollars to retain (or attract) a professional sports franchise while not sharing in any increased revenues generated by the stadium could be considered a "winner's curse" (Rosentraub and Swindell, 2002). Many host cities feel hostage to team owners, especially when (perhaps veiled) threats are made to relocate the team if a new stadium is not forthcoming; city leaders may face increased political costs if it is perceived that quality of life will be significantly reduced if the team moves away. It can be difficult to quantify how civic pride and cultural life of a city is impacted if a sports franchise leaves (see Johnson, et al, 2001, and

Rappaport and Wilkerson, 2001), yet it seems that political leaders are reluctant to provoke team owners into relocation by demanding a greater share of in-arena revenues.

However, for several reasons cities may have more negotiating power than they perceive. First, there are fewer viable host-cities that do not have major sports franchises, thus the perceived increased competition for sports franchises may be exaggerated (Rosentraub and Swindell, 2002). Second, host-cities could follow the lead of a growing number of cities that have provided less sizable subsidies for stadiums, including Atlanta (Turner Field), San Francisco (SBC Park), and Foxboro (Gillette Stadium). In these cases, stadiums were built with primarily private funds, with public dollars dedicated to minor infrastructure improvements such as roads and sewer connections. Finally, if a new stadium provides substantial increases in in-arena revenues, host-cities might negotiate for a larger share of these revenues, thereby helping to service any debt incurred for stadium construction. In the past, cities have failed to secure any sizeable portion of in-arena revenues generated by a new stadium, however in many cases it seems that cities simply failed to include this possibility in their negotiations with the team owners.

This paper extends the literature on the novelty effect of a new stadium on attendance by investigating whether there exists a stadium effect on concession prices in the National Football League (NFL) and Major League Baseball (MLB). Specifically, prices for parking, beer, soda, hot-dogs, programs, and baseball caps for 34 professional football and 28 U.S. baseball teams from 1991 through 2001 are combined with additional data on team, host-city, and stadium characteristics to test the impact of attendance and new stadiums on concession prices. Because attendance is likely influenced by a new stadium, the empirical analysis accommodates the potential endogeneity by using a two-stage fixed-effects estimator.

The empirical results suggest that a) all prices included in the sample (except soda and ballcaps in the NFL and ball caps in MLB) increase with attendance, which is expected, and b) only in a few instances, most notably parking, can price increases be attributed to a new stadium alone.

It is not immediately clear if this is bad news for anti stadium-subsidy advocates. That any increases in concession prices can be attributed to a new stadium might be enough to convince

some that stadium subsidies "double tax" the local population, once for servicing debt and second by making events in the new stadium more expensive. However, price increases may be caused by increases in attendance that arise for reasons other than a new stadium, e.g., team quality.

The empirical results suggest that in the first year of a new stadium, the total impact of the stadium increases the price of parking, beer, soda, and hotdogs in the NFL by \$4.72, \$0.25, \$0.45, and \$0.21, respectively, and in MLB by \$1.74, \$0.12, \$0.15, and \$0.16, respectively. As for programs and ballcaps, these two concessions increase in price by \$0.39 and \$0.35 in the NFL, respectively, and by \$0.82 and \$0.00 in MLB. While such price increases might influence the marginal fan, it seems that concerns that events become prohibitively costly are overstated. On the other hand, the aggregated impact of these price increases on team revenues can be substantial. While accurate data on the quantity of concessions sold by the various professional teams is not publicly available, plausible simulations indicate that the additional revenue to a team owner from just four of the six concessions investigated here can be more than a million dollars in each of the first five years of a new stadium.

The remainder of this paper is structured as follows. The next section provides an overview of the existing literature on the various effects of a new stadium on professional sports franchises. Section 3 derives testable hypotheses concerning the impact of a new stadium on concession prices. Section 4 describes the empirical methodology and the data employed. Section 5 discusses the estimation results and their implications for the debate over public funding for new stadiums. The final section offers concluding remarks.

2. The Novelty Effect of a New Stadium: A Literature Review

Team owners probably recognized the novelty effect of a new stadium on attendance long before sports economists came on the scene. Noll (1974) seems to be the first to directly mention in the literature the possibility of a novelty effect of a new stadium on in-arena attendance. Since then, several authors have used different methodologies to investigate the novelty effect in various sports. The most common approach is to arbitrarily define a new stadium as less than a certain number

of years old and to test for significant differences in attendance relative to older stadiums. While not universal, many authors control for team quality and other demand-side influences in order to reasonably isolate the impact of a new stadium on attendance.

Using a difference-in-means approach, Quirk and Fort (1997) found the novelty effect on attendance to Major League Baseball (MLB) teams to be significant after five years. Others have found the novelty effect in professional baseball at three years (Kahane and Schmanske, 1997), four years (Coffin, 1996), and ten years (Coates and Humphreys, 1999 and 2001). While Noll and Quirk and Fort mention the potential impact of a new stadium on attendance in the other three major U.S. sports, Coates and Humphreys (2003) find a significant novelty effect in baseball and basketball but a rather short-lived effect in football since 1969. The general lack of evidence of a novelty effect in football might be attributed to the larger proportion of sellouts caused by fewer home games, and/or a more popular sport, which might preclude a novelty effect in attendance.

The simple dummy variable or difference-in-means test is a reasonable methodology to test for the existence of a novelty effect on attendance but imposes untested assumptions. Specifically, using a dummy variable that takes a value of one when a stadium is "new" implicitly assumes that any novelty effect is the same every year the stadium is new. Additionally, the single dummy variable approach may cause one year's novelty effect to mistakenly indicate statistically significant impacts in other years; in other words, a stadium may not be 'new" even if the dummy variable's statistical significance indicates that it is.

Coates and Humphreys (2003) investigate the dynamic nature of the novelty effect on attendance in three of the four major U.S. sports - baseball, football, and basketball- by including multiple dummy variables for up to ten years and testing whether the novelty effect follows a more dynamic process than that assumed by simple "young vs. old" dummy variables. They find that the novelty effect is most pronounced and long-lived in baseball and basketball, and is practically non-existent in football. However, the increase in attendance for recently built stadiums seems to be less long-lived than in the past. Coates and Humphreys conclude that the general lack of a sustained novelty effect on attendance in recent years makes a significant increase in economic development around

new stadiums relative to older stadiums unlikely.

Although most studies investigate the impact of a new stadium on attendance, there have been a few studies investigating the impact of a new stadium on other aspects of franchise performance. Focusing on baseball stadiums constructed in the 1990s, Depken (2003) shows that a new baseball stadium enhances attendance, winning percentage (slightly), and the financial performance (including gate revenue, concession revenue, total revenue, player payroll, operating profits, and book value) of baseball franchises. However, a new stadium does not have a statistically significant impact on the local (non-shared) media revenues, perhaps indicating that a new stadium does not dramatically alter the division between in-arena and television/radio audiences.

There has been some investigation of the impact of a new stadium on team performance, mostly concerned with "home field advantage." It has been hypothesized that home field advantage is impacted by crowd noise, which might enhance home-team performance, reduce visiting-team performance, and alter officiating (Nevill et al., 1999); and venue familiarity, wherein intimate knowledge of the unique characteristics of the stadium can provide an advantage to home team players (Kauss, 1980).

Moore and Brylinsky (1995) found no reduction in home-field advantage for two college basketball teams that played in several different "home" venues during the 1992-1993 season. However, Mizruchi (1985) documented that when professional basketball teams relocate to a new host city their performance drops relative to the last year in their previous city. Quinn et al. (2003), using data from the four major U.S. professional sports, show that a new stadium enhanced short-term (three and seven year) team performance in professional baseball only. On the other hand, Pollard (2002) finds statistical evidence that professional baseball teams perform worse the year after they move into a new stadium.

In sum, the evidence suggests that a new stadium does provide a novelty effect on attendance, above and beyond the influence of team quality, whereas the evidence for new stadiums improving winning is mixed. The variety of issues investigated in connection with new stadiums suggests that the impact of a new stadium on concession prices fits nicely in the existing literature.

3. New Stadiums and Concession Prices: Testable Hypotheses

If there exists a novelty effect of a new stadium on attendance then an increase in concession revenues may be a natural result: more people in the stands leads to more concession demand and hence the potential for higher prices. However, there may be more than one influence on concession demand.

While the demand for concessions obviously depends in part on the number of people who attend a sporting event, it also depends on other factors, including concession prices, weather conditions, complementarities between concessions and the stadium and/or the sporting event itself, and the total value that consumers place on attending the event in person. Arguably the market for concessions within the stadium is not perfectly competitive, therefore the team owner enjoys some level of market power, which would indicate a downward sloping demand for concessions, ceteris paribus. Given knowledge of demand and cost, the profit maximizing team-owner can price concessions according to canonical techniques.

Consider the quantity of any concession sold to be proportional to the number of people who attend an event, measured as the quantity of tickets sold, i.e., $Q_C = \alpha Q_T$, where $\alpha \geq 0$ is per-attendee demand. The demand for tickets is a function of the ticket price, quality of play, and other team, city, and stadium characteristics, i.e., $Q_T = Q_T(P_T, T, C, S)$, where T is a vector of team characteristics, C is a vector of city characteristics, and S is a vector of stadium characteristics.

Per-attendee demand is assumed to be a function of the concession's price and a vector of stadium characteristics, i.e., $\alpha = \alpha(P_C, S)$. Therefore, total quantity of concessions sold can be formalized as $Q_C = \alpha(P_C, S)Q_T(P_T, T, C, S)$. Given the cost of providing a particular concession, w, the team owner maximizes profit by setting marginal revenue equal to marginal cost, given that the quantity of tickets sold is predetermined. This yields the equilibrium price and quantity of concessions sold, P_C^*, and Q_C^*, respectively.

As the demand for tickets changes or the per-capita consumption of a concession changes, the profit maximizing price and quantity of concessions sold will also change, yielding a firm "supply"

curve for a concession, $P_C = f(Q_C, S, w) = f(Q_T(P_T, T, C, S), S, w)$. If the technology for preparing and delivering concessions does not exhibit increasing returns to scale in the relevant quantity range, the supply curve is weakly increasing in Q_C, i.e., $\partial f/\partial Q_C \geq 0$.

Of interest is what impact a new stadium has on the equilibrium price of concessions. Differentiating the firm's supply curve with respect to a stadium characteristic yields

$$\frac{\partial P_c}{\partial S} = \frac{\partial f}{\partial Q_c}\frac{\partial Q_T}{\partial S} + \frac{\partial f}{\partial S}, \tag{1}$$

which is ambiguous in sign. The first term in equation (1) is coined the Attendance Effect, and reflects the impact of stadium characteristics on attendance (for example a novelty effect of a new stadium) and the effect of attendance on concession prices. The second term in equation (1) is coined the Stadium Effect, and reflects the aggregate impact of a change in stadium characteristics on a concession's equilibrium price, including the aforementioned complementarities. Note that a concession's price can decline even if a change in a stadium's characteristics has a significant impact on paid attendance through a novelty effect, which could occur if the stadium change has a dampening influence on price, i.e., $\partial f/\partial S$ is sufficiently negative. Alternatively, a concession's price might increase in the absence of a novelty effect on attendance if $\partial f/\partial S > 0$.

A complete empirical analysis of the impact of a new stadium on concession prices would identify the two separate and potentially offsetting impacts of a new stadium. To accomplish this, three elements must be identified: the impact of a new stadium on attendance, the impact of attendance on concession prices, and the impact of a new stadium on concession prices.

4. Empirical Methodology and Data Description

The Data

The data employed to investigate the impact of a new stadium on concession prices comprise two sub-samples describing twenty-eight U.S. based Major League Baseball teams and thirty-four National Football League teams from 1991 through 2001; teams that relocated (in football) are

included as separate teams. Nominal concession prices for beer, soda, hotdogs, programs, ball caps and parking were obtained from various issues of the Team Marketing Report. The TMR reports concession prices at the beginning of the season, therefore the prices are appropriately viewed as predetermined. While prices may change occasionally over the course of a season, for example "dollar dog night," the TMR does not identify those dates in which prices change; therefore prices are considered constant over the course of a season.

Furthermore, the TMR reports beer and soda prices for different sized drinks, for example one team may report the price for a 20 oz soda while another team reports the price of a 16 oz soda. Therefore, soda and beer prices are normalized to reflect price per 20 ounces. Team attendance, winning percentages, and playoff appearances were obtained from Major League Baseball and the National Football League. Host-city population and income were obtained form the Census Bureau's Regional Economic Information Service, and stadium information was obtained from Munsey and Suppe's ballpark information at www.ballparks.com. All dollar amounts are converted to constant 2000 dollars using the annualized consumer price index reported by the Bureau of Labor Statistics.

Between 1991 and 2001, the NFL and MLB each opened 12 new stadiums. In the NFL, on average public monies accounted for 81% of construction costs for new stadiums. In MLB, new stadiums were subsidized with approximately 76% of construction costs. In football, the twelve new stadiums are all single purpose stadiums, two are domed or retractable roof stadiums, and seven replaced multipurpose stadiums built in the 1960s. In professional baseball, all of the new stadiums are single purpose, eight replaced multipurpose stadiums, and four are domed or retractable roof stadiums.

Table 1 reports descriptive statistics of the variables used in the study. The upper panel reports the data for the NFL with the lower panel reporting the data used for MLB. The descriptive statistics indicate that in both sports the variance in real concession prices was smallest for soda and greatest for parking. The average real price of a 20-ounce beer was \$5.32 in the NFL and \$5.24 in MLB over the sample period. The average real price for a 20-ounce soda was \$2.73 in the NFL

and $2.61 in baseball. In the NFL (MLB) approximately 14% (15%) of the 325 (290) observations in the sample corresponded with teams playing in a new stadium less than six years old, herein considered new.

<Insert Table 1 about here>

Table 2 presents two sets of difference-in-means tests comparing concession prices after a team moves to a new stadium in both the NFL, presented in the upper panel, and MLB, presented in the lower panel. The first set of tests (columns two and three) includes the entire sample of teams in each league, regardless of whether the team moved to a new stadium during the sample period. These tests compare teams that play in older stadiums to those that play in newer stadiums. The second set of tests (columns four and five) includes only those teams that moved to new stadiums during the sample period. These tests therefore compare teams before and after they moved to a new stadium (as a group).

<Insert Table 2 about here>

For the majority of concessions, there is a statistically significant difference in price after moving into a new stadium. The only concessions that do not statistically differ in price from old to new stadiums in the NFL are the price of beer (per ounce) and the price of ball caps, or more generally league-sanctioned apparel. The latter may be less responsive after moving to a new stadium as the NFL central office regulates the price for ball caps. The results are basically the same for MLB prices, presented in the lower panel of Table 3. In baseball, new stadiums do not seem to influence the price of beer, sodas, or ball caps. The remaining concessions all increase after a team moves into a new stadium.

The Empirical Methodology

Difference-in-means tests indicate that there is a correlation between moving to a new stadium and an increase in several concession prices. For anti stadium-subsidy advocates, this may be all

the proof required to confirm their suspicions that events in new stadiums become more expensive. However, the test results in Table 2 reflect aggregate changes and do not differentiate between those price changes that occur because of changes in attendance, in which price simply rations the market for concessions, and any changes caused by the new stadium itself.

To decompose the various impacts of a new stadium on concession prices, the empirical methodology entails estimating, for each of the $j = 1, \ldots, 6$ concessions included in the sample, the following two-equation system:

$$ATT_{kt} = \alpha_k + \tau_t + C_{kt}\beta + T_{kt}\delta + S_{kt}\gamma + u_{kt}, \quad (2)$$

$$P_{jkt} = \xi_k + \mu_t + ATT_{kt}\theta + S_{kt}\phi + \epsilon_{jkt}, \quad (3)$$

where $(\alpha, \tau, \beta, \delta, \gamma, \xi, \mu, \theta, \phi)$ is a vector of parameters to be estimated, and α_k and ξ_k are team fixed effects, τ_t and μ_t are year fixed effects, and u_{kt} and ϵ_{jkt} are independent, white noise error structures.

The composite error structure u_{jkt} is assumed to be comprised of a year specific component, common to all teams in a league, and a city-team specific component, unique to each team over time, and a white noise component. The two-way fixed effect approach allows flexibility in the estimation. For example, the 1994 baseball season, shortened by a player's strike, might have had a common impact on the demand for baseball in subsequent years. Such a common influence on the overall demand for the sport is captured in the time-specific effect. On the other hand, some teams may have enjoyed strong demand over the sample period, for example the Atlanta Braves, and these influences, not easily quantified in continuous variables, are captured in the team effect. For example, there is no high-quality single metric for a team's ticket prices - all teams offer a variety of prices for different seats, depending on where the seats are located and the time of purchase. Therefore, the team-fixed effect is also intended to capture the difference in ticket pricing across teams. The estimation accommodates the time and team components of u_{kt} by including year and team dummy variables.

In a similar fashion, the composite error structure ϵ_{jkt} is expected to have a team specific component for each concession j, and a white noise component. The inclusion of a time specific effect added no statistical value to the model, which is not unexpected in that all concession prices have been converted to real figures. However, the heterogeneous weather in which teams play, the different preferences of teams' fan bases, and the potentially different production costs for each team, all of which are difficult to consistently measure over the sample period, are reasons for including the team-specific effect. As in the structure for u_{kt}, team-specific dummy variables are included in the estimation of equation (3).

In equation (2) the dependent variable is per-game attendance for team k in year t (ATT_{kt}). The independent variables are thought to help explain attendance and reflect city characteristics (C), team characteristics (T), and stadium characteristics (S), and follow Coates and Humphreys (2003). The city characteristics include the host-city's Metropolitan Statistical Area (MSA) population (POP), the once-lagged MSA real per-capita income ($INCOME$), and the number of other professional sports franchises in the team's MSA ($OTHFRANCH$)[1]; the team characteristics include lagged winning percentage ($LAGWIN$), a dummy variable if the team played in the previous year's playoffs ($LAGPLAY$), and a dummy variable if the team is an "expansion team" in that it is less than three years old ($EXPANSION$); the stadium characteristics include a time trend that measures the age of the stadium in years ($STAGE$), and five dummy variables that take a value of one, alternatively, for each of the first five years after stadium opens ($NEWSTAD1$ - $NEWSTAND5$). It is anticipated that population, income, and the number of other franchises have non-negative impacts on football/baseball attendance; higher quality teams, as reflected in both lagged win percentage and lagged playoff appearances, experience greater attendance; expansion teams enjoy greater attendance; older stadiums reduce attendance; and teams in newer stadiums enjoy greater attendance.

In equation (3) the dependent variable is the price of concession j for team k in year t (P_{jkt}). The independent variables include the team's attendance, treated as a stochastic regressor, and the the five dummy variables for new stadiums ($NEWSTAD1$ - $NEWSTAD5$). Alternative

specifications included additional stadium characteristics including whether the stadium was a dome or retractible-roof stadium and whether the stadium was single purpose. These additional variables did not improve the statistical model and were therefore dropped from the final specifications.

An instrumental variables fixed-effects estimator is employed in estimating Equations (2) and (3). To ensure accurate statistical inference, the standard errors are appropriately adjusted in the second stage according to Hsiao (1986). The empirical specification is applied to each concession separately for both leagues.

Two influences of a new stadium combine to determine it's net impact - the Attendance Effect, which incorporates any novelty effect of the new stadium on attendance, and the Stadium Effect, which reflects other influences on concession prices not directly related to attendance. Thus, the parameters of interest in equation (2) are the elements of γ, which reflect the influence of a new stadium on attendance ($\partial Q_T/\partial S$ in equation (1)). The parameters of interest in equation (3) include θ, which indicates any Attendance Effect on concession prices, and, when combined with the sign of the elements of γ, determines the sign of $\partial f/\partial Q_c$ in equation (1). Any Stadium Effect is represented by the parameter estimates of the new stadium dummy variables, the elements of ϕ in equation (3), which reflect the sign and significance of $\partial f/\partial S$ in equation (1) for each of the first five years of a stadium's existence. With these estimates in hand it is possible to estimate the net impact of a new stadium on each concession price during the first five years of a stadium's existence.

5. New Stadiums and Concession Prices: Empirical Results

While initial statistical tests indicate that in many cases concession prices increase after moving to a new stadium (see Table 2), the unconditional tests are not able to differentiate between the Attendance Effect and the Stadium Effect. Both effects combine to provide additional revenues to team owners, *ceteris paribus* on the quantity of concessions sold. As host cities often forego a share of any additional revenues generated within the new stadium, the additional revenues that can be attributed to the new stadium alone should be included in the total public subsidy provided team

owners. The Stadium Effect is caused by the attributes of the stadium alone. The Attendance Effect is reflected by the novelty effect of the new stadium on attendance. Any changes in attendance that are not directly attributable to the new stadium should not be considered part of the public subsidy to the team owner from a new stadium.

Table 3 reports the results for estimating equation (2) for both the NFL and MLB. Recalling that equation (2) includes year and team fixed effects, in both leagues the null hypothesis that the slope coefficients are jointly equal to zero is soundly rejected. Moreover, in both leagues the hypothesis that the year and city-team fixed effects are jointly equal to zero is likewise rejected, supporting the two-way fixed effects model.[2]

In both the NFL and MLB neither population nor lagged income are statistically significant. Including current-year income did not alter the statistical results, and lagged income was used in the final specifications given endogeneity problems that might arise using current-year income (see Coates and Humphreys, 2003). The results herein differ a bit from those in Coates and Humphreys, but this might be explained by the relatively shorter time frame of this study; Coates and Humphreys include an additional 21 years of data in their estimation of a single equation model similar to that specified in equation (2). The number of other professional sports franchises in a team's city does not significantly enhance the demand for professional football teams but has a positive and statistically significant impact on baseball demand.

In both sports, per-game attendance is positively related to lagged win percentage, consistent with previous studies of sports demand (see citations in Section 2), but only in baseball do teams that played in the previous season's playoffs experience greater than average per-game attendance; a MLB playoff appearance correlates with approximately 3,000 more fans per-game than the league average. A similar result prevails with respect to expansion teams: expansion teams in professional baseball attract almost 11,000 more fans per game, consistent with Depken (2003), but in football expansion teams do not enjoy above average per-game attendance.

Older stadiums tend to correlate with a slightly lower per-game attendance in professional baseball but have no impact on attendance in professional football. This can be explained by the

fact that in professional baseball, older stadiums tend to be much smaller than newer stadiums, for example Chicago's Wrigley Field, built in 1914, has a capacity of 39,000 whereas the Ballpark in Arlington, built in 1994, has a capacity of 50,000. An alternative explanation is that older stadiums are not as attractive to fans as the new stadiums and therefore attendance is slightly lower. For example, some of the multipurpose stadiums built in the 1960s are relatively generic and often place fans further from the field of play. In contrast, older stadiums in professional football are not significantly smaller than their new counterparts and with the limited number of home games characteristics affiliated with a stadium's age may have less of an impact on attendance.

The dummy variables for the first five years of a stadium's existence indicate that there is a novelty effect of a new stadium in both leagues, reflected in higher per-game attendance, although the impact is longer lived for baseball. In the first year of a new stadium, a professional football team enjoys approximately 4,300 more fans per game. In professional baseball, the analogous impact is approximately 5,400 fans per game. Given baseball's longer season, the total impact on season attendance is much greater in baseball. In football, season attendance would increase approximately 35,000, whereas in baseball season attendance would increase approximately 440,000.

Compared to baseball teams, football teams enjoy larger per-game attendance boosts in the second and third years of a new stadium, but the novelty effect disappears in the fourth, fifth (and subsequent) years. In baseball, on the other hand, the novelty effect of a new stadium persists through the fifth year, although the parameter estimates decline after the third year and become less significant. Over the first five years of a new stadium, a professional football team might expect a total increase in attendance of approximately 140,000, whereas a baseball team might experience an increase in attendance of approximately 1.5 million. These results are generally consistent with Coates and Humphreys (2003).

The fitted values of attendance from the first-stage regressions presented in Table 3 are used as consistent estimates of attendance in the second stage which estimates equation (3). The results of these estimations, in which the team fixed effects are not reported, are presented in Tables 4a and 4b for the NFL and MLB, respectively.

For each of the concessions in professional football (Table 4a), except for soda and ball caps, an increase in attendance correlates with an increase in price. For example, the average price for parking increases by approximately thirty six cents for every one thousand people in attendance. As for the other concessions that respond to attendance changes, beer prices increase approximately \$0.06, sodas \$0.01, hotdogs increase \$0.05, programs increase \$0.09, and ball caps increase \$0.08 for every 1,000 fans in attendance. In football, five of the six concessions respond to attendance changes in a statistically significant fashion (only soda responds at the 10% significance level).

As for a Stadium Effect, in the case of parking, a new stadium correlates with an increase in prices in the first, second, and fourth years of a stadium's existence; in these three years prices are approximately \$3 greater per car. In the third and fifth years the estimated parameters are positive and of similar magnitude but are not significant at conventional levels. Therefore, the evidence suggests that team owners can increase the price of parking after a new stadium increases, beyond the impact of the new stadium on attendance. As mentioned earlier, there are a number of possible reasons for the stadium itself to cause an increase in prices. In the case of parking, perhaps a new stadium is located away from private parking alternatives increasing the demand for parking at the stadium itself, which is the case with the new stadium for the Washington Redskins.

In the case of beer, the Stadium Effects actually indicate that prices drop in the second and fourth years of a new stadium. Perhaps beer becomes less desirable in a new stadium, however this seems unlikely. A more plausible explanation is that team owners engage in nonlinear pricing schemes, which might become more feasible after moving into a new stadium. Team owners may be able to increase (decrease) the prices of tickets and parking while reducing (increasing) the price of concessions within the stadium and enhance profits consistent with nonlinear pricing theory developed by Forbes (1988) and Armstrong (1991), among others. Unfortunately, the data required to identify a structural model to analyze these tradeoffs are not available. However, Depken and Grant (2004) discuss an alternative empirical methodology with which to determine the extent to which non-linear pricing schemes contribute to the relationships between prices charged within the stadium. Their evidence suggests that non-linear pricing cannot be considered trivial.

In the case of soda, prices increase in the first and second years of a new stadium. After the second year, however, there is no difference in the real price of soda between new and old stadiums. In the case of the price of a hotdog, new stadiums have no influence on prices beyond attendance except for the fifth year. Finally, programs increase in price during the fourth and fifth years of a stadium whereas the prices of ball caps actually decline in the third and fifth years of a new stadium.

Overall, the evidence suggests that for four of the six concessions in the NFL a significant and positive Attendance Effect exists, the other two cases provide weaker statistical support for an Attendance effect. On the other hand, only in the case of soda and programs does there appear to be a Stadium Effect, i.e., one can reject the hypothesis that the five stadium-age dummy variables are jointly equal to zero (although individual dummy variable parameters may seem statistically significant according to t-tests). Thus, during the 1990s in the National Football League, it seems that real concession prices increased mainly in response to changes in attendance.

The results of estimating equation (3) for professional baseball are reported in Table 4b. In many cases the results are similar to those in the NFL, although there are some noticeable differences. In baseball, there is a positive and statistically significant Attendance Effect for each concession, except for ball caps. For every concession, the Attendance Effect is less (numerically) than the corresponding effect in football. This might be explained by the longer season in professional baseball.

In the cases of parking, soda, and ball caps there is a noticeable Stadium Effect, in the sense that one can reject the hypothesis that the stadium-age dummy variables are jointly equal to zero; additionally, there are some significant differences from football. Parking prices increase for four of the first five years of a new stadium (the third year being the exception), and ball caps increase in price during the second and third years. As in the case of beer in football, soda prices in baseball reflect a negative Stadium Effect. Further analysis beyond the scope of this current project is required to pinpoint the exact cause of this negative Stadium Effect.

Overall, the results in Table 4b suggest that in baseball an Attendance Effect exists for five of

the six concessions (ball caps is the exception) and that a Stadium Effect exists for three of the six concessions (in the case of Soda the Stadium Effect is negative). Similar to the NFL, it seems that the majority of price increases in baseball are caused by changes in attendance, which could be influenced by a new stadium. However, outside of parking and ball caps there seems little evidence that new stadiums cause an increase in concession prices beyond attendance.

The results in Table 4a and 4b reflect the decomposed influences of new stadiums on concession prices - one part is the Attendance Effect and the other the Stadium Effect. To gauge the total effect of a new stadium on concession prices, it is possible to use the point estimates in Tables 3, 4a, and 4b to calculate the expected impact of a new stadium on each concession price in each sport for each of the first five years of a stadium's existence. The expectation is calculated, holding all other factors constant, by taking the product of the estimated novelty effect of a new stadium on attendance (for example, 4,351 fans per-game in the first year of a football stadium) and the estimated parameter of the Attendance Effect in Table 4a or 4b (for example, \$0.366 for parking in football) plus the estimated Stadium Effect for that sport, concession, and year in Table 4a or 4b (for example \$3.127 for parking in football the first year of a new stadium).

The calculated impacts of a new stadium on the prices of concession in each sport are reported in Table 5. As can be seen, the largest numerical estimates are for parking, which for many fans may be a more commonly incurred cost of attendance than, say, a ball cap. For the most part, the impact of a new stadium is greater in professional football than in professional baseball. To put the estimates in perspective, the average football stadium had approximately 12,000 on-site parking spots in 2004. If the team expected to sell 10,000 parking spots per game, for a total of 80,000 parking spots during the regular season, and if a football team sold one million beers, one million sodas, and one million hotdogs in the first year of a new stadium, the *increase* in revenues from these staple concessions would be approximately \$1.38 million (\$471,000 from parking, \$248,000 from beer, \$453,000 from soda, and \$213,000 from hotdogs); in the next two years these same concession items, sold in the same quantities, would yield \$1.15m and \$1.02m in *additional* revenue, respectively. In the case of baseball, the analogous scenario would yield approximately \$1.8 million

($1.4 million from parking, $120,000 from beer, $147,000 from soda, and $164,000 from hotdogs) in *additional* parking and concession revenue the first year; in the next two years, these simulations yield $1.8m and $430,000 in additional revenue.

Thus, from the point of view of team owners, new stadiums dramatically increase the total revenue of the team and perhaps enhance the team's profitability, as the vast majority of today's stadium contracts stipulate that the team owner keeps most if not all concession and parking revenue. It is apparent why team owners are quick to take strong negotiating stances with host-cities when it comes to the division of in-arena revenues, including concession revenues. While team owners often justify these price and revenue increases by promising local fans more high quality, and expensive, players to contend for a championship, the evidence does not support these justifications. For instance, the hard salary cap in professional football might preclude the ability to hire more expensive players. In professional baseball, recent evidence provided by Depken (2003) and Quinn, et al (2004) suggests that team quality does not substantially increase after moving into a new stadium.

One aspect in the debate over public money dedicated to a stadium is concern that price increases might be sufficient to push some tax-paying fans out of the market. It is difficult to estimate how the price increases caused by a new stadium would impact any particular fan. However, the Team Marketing Report annually reports its so-called Fan Cost Index, an ad hoc measure of what the hypothetical family of four would spend attending a sporting event and purchasing two beers, four sodas, four hotdogs, two program, and two ball caps.[3] Using the results in Table 5, the NFL's Fan Cost Index (measured in 2000 dollars and not including ticket price changes) would increase by $9.36 in the first year of a new stadium; MLB's Fan Cost Index would increase by $4.87 in the first year of a new stadium. Whether these price increases alone are enough to push significant numbers of potential customers out of the market is still an empirical issue, the price changes documented here seem relatively minor (approximately 3.3% in the NFL and 3.6% in MLB).[4] However, it should be noted that this study has not investigated the impact of new stadiums on ticket prices and therefore most assuredly understates the impact of a new stadium on the Fan Cost Index. [5]

6. Conclusions

This paper investigates whether new stadiums in professional football and baseball provide an opportunity for team owners to raise the prices of concessions. There are multiple reasons why concession prices might increase after a team moves to a new stadium, however these can be loosely sorted into two predominant influences. The Attendance Effect includes price increases caused by changes in attendance, which may be cause by a new stadium, a better team, or other marketing efforts. The remaining influences on prices are reflected, in reduced form, by the Stadium Effect. In theory, either or both Effects can have a positive, negative, or zero influence on concession prices. Therefore, the true magnitudes and signs of these effects comprise an empirical question. Data reported by the Team Marketing Report on concession prices are combined with additional city, team, and stadium characteristics to test whether Attendance and Stadium Effects are apparent in concession prices.

The results consistently support an Attendance Effect for the majority of the concession prices investigated, the sole exception being ball caps in baseball. On the other hand, only in the case of soda and programs in football and parking and ball caps in baseball, can price increases be attributed to a Stadium Effect. For the majority of the concessions investigated in both sports, real price increases seem predominantly caused by increases in attendance.

In the case of soda in baseball it seems that there is a negative Stadium Effect, although the Attendance Effect is positive. What can explain this seemingly counterintuitive result? One possibility is that team owners use different second degree pricing schemes when moving into a new stadium. If the new stadium increases attendance, team owners might extract consumer value by raising ticket prices and lowering concession prices, even while attendance is increasing. This has been initially supported by Depken and Grant (2004) but deserves further scrutiny.

The empirical results suggest that in the first year of a new stadium, the increase in parking and concession prices from the combined Attendance and Stadium Effects might easily yield an additional $1 million per year in professional football and perhaps $1.5 million per year in baseball.

These additional revenues are often tacitly recognized in the debate over public funding for a new stadium, however the impacts of new stadiums on concession prices have not previously been formally addressed. This paper addresses this gap in the literature and suggests that the impact of a new stadium on concession revenues can be dramatic.

Notes

[1]This variable measures the number of professional franchises in the other four major sports: professional baseball, football, hockey, and basketball.

[2]Omitting ticket prices, because of possible endogeneity problems (see Coates and Humphreys, 2003), changed the statistical significance of several of the parameters in the first stage regression. However, the qualitative results presented in Table 4a and Table 4b were little changed. Therefore, consistent with the simple model presented in Section 3, the final specification includes ticket price.

[3]The Team Marketing Report annually reports their Fan Cost Index for each of the four major professional sports (football, baseball, basketball, and hockey); the index is commonly used in the popular press to compare the cost of attending games in different cities.

[4]In 2000, the average Fan Cost Index in the NFL was $279.90 and in MLB it was $132.44.

[5]The impact of new stadiums on ticket prices requires an empirical analysis beyond the scope of this study. It will be a topic of future research.

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Table 1a: Descriptive Statistics of the Data

National Football League (N=325)

Variable	Description	Mean	Std. Deviation	Minimum	Maximum
PARKING	Real Price of Parking ($)	10.41	4.82	2.92	29.17
BEER[a]	Real Price of 20oz Beer ($)	5.32	1.04	3.51	9.58
SODA	Real Price of 20oz Soda ($)	2.73	0.47	1.49	5.28
HOTDOG	Real Price of Hotdog ($)	2.51	0.56	1.10	4.00
PROGRAM	Real Price of Program ($)	4.42	1.14	2.38	10.00
BALLCAP	Real Price of Ball Cap ($)	13.97	3.09	2.75	25.35
ATT	Per-Game Attendance (10,000s)	61.31	9.86	28.05	80.93
PTIX	Per-game real ticket price ($)	40.96	9.49	22.97	81.89
POP	Host-city Population (millions)	4.78	4.99	0.19	21.31
LAGINC	Lagged Per-capita Income ($1000)	30.33	4.49	23.18	47.18
OTHFRANCH	Other Pro Franchises in Host City	2.17	1.53	0.00	6.00
LAGWIN[b]	Lagged Winning Percentage	494.02	192.84	0.00	937.00
LAGPLAY	Previous Year's Playoff (1=Yes)	0.40	0.49	0.00	1.00
EXPANSION	Expansion Team (1=Yes)	0.02	0.15	0.00	1.00
STAGE	Stadium Age (Years)	24.46	16.66	0.00	77.00
DOMED	Domed Stadium (1=Yes)	0.24	0.43	0.00	1.00
SPURPOSE	Single Purpose Stadium (1=Yes)	0.49	0.49	0.00	1.00
NEWSTAD1	New Stadium (1=Yes)	0.04	0.20	0.00	1.00
NEWSTAD2	New Stadium (one lag)	0.03	0.17	0.00	1.00
NEWSTAD3	New Stadium (two lags)	0.03	0.16	0.00	1.00
NEWSTAD4	New Stadium (three lags)	0.02	0.15	0.00	1.00
NEWSTAD5	New Stadium (four lags)	0.02	0.13	0.00	1.00

Notes: Price data obtained from various issues of the Team Marketing Report, team specific data obtained from the National Football League, stadium specific data obtained from Munsey and Suppes, city specific information from the Census Bureau. Data describe 34 NFL teams from 1991 through 2001. All dollar figures converted to 2000 dollars. [a] Four observations were omitted for teams playing in college stadiums in which beer was not sold. [b] Average is not 500 because first year expansion teams are included in the sample with a zero lagged win percentage.

Table 1b: Descriptive Statistics of the Data

Major League Baseball (N= 290)

Variable	Description	Mean	Std. Deviation	Minimum	Maximum
PARKING	Real Price of Parking ($)	7.00	2.49	2.92	17.88
BEER	Real Price of 20oz Beer ($)	5.24	0.83	3.29	10.53
SODA	Real Price of 20oz Soda ($)	2.61	0.47	1.48	4.11
HOTDOG	Real Price of Hotdog ($)	2.28	0.48	1.07	3.87
PROGRAM	Real Price of Program ($)	3.56	1.07	1.00	7.75
BALLCAP	Real Price of Ball Cap ($)	12.18	2.08	7.51	20.00
ATT	Season Attendance (10,000s)	27.52	9.03	11.17	55.35
PTIX	Per-game real ticket price ($)	13.65	3.89	8.68	33.89
POP	Host-city Population (millions)	6.23	5.47	1.60	21.31
LAGINC	Lagged Per-capita income ($)	30.59	3.61	25.631	47.18
OTHFRANCH	Other Pro Franchises in Host City	2.56	1.74	0.00	7.00
LAGWIN[a]	Previous Year's Win Percentage	493.11	88.26	0.00	704.00
LAGPLAY	Previous Year's Playoff (1=Yes)	0.18	0.39	0.00	1.00
EXPANSION	Expansion Team (1=Yes)	0.06	0.23	0.00	1.00
STAGE	Stadium Age (Years)	29.85	24.35	0.00	89.00
DOMED	Domed Stadium (1=Yes)	0.14	0.35	0.00	1.00
SPURPOSE	Single Purpose Stadium (1=Yes)	0.61	0.49	0.00	1.00
NEWSTAD1	New Stadium (1=Yes)	0.04	0.20	0.00	1.00
NEWSTAD2	New Stadium (one lag)	0.04	0.19	0.00	1.00
NEWSTAD3	New Stadium (two lags)	0.03	0.16	0.00	1.00
NEWSTAD4	New Stadium (three lags)	0.02	0.15	0.00	1.00
NEWSTAD5	New Stadium (four lags)	0.02	0.14	0.00	1.00

Notes: Price data obtained from various issues of the Team Marketing Report, team specific data obtained from Major League Baseball, stadium specific data obtained from Munsey and Suppes, city specific information from the Census Bureau. Data describe 28 U.S. MLB teams from 1991 through 2001. All dollar figures converted to 2000 dollars. [a] Average is not 500 because two Canadian teams are not included and first year expansion teams are included in the sample with a zero lagged win percentage.

Table 2: Differences in Average Prices in Older and Newer Stadiums

National Football League

	Unrestricted Sample (N=325)		Restricted Sample (N=117)	
Variable	Old Stadiums	New Stadiums	Old Stadiums	New Stadiums
Price of Parking	$9.72	$14.09*	$8.74	$14.09*
Price of a 20 oz. Beer	$5.37	$5.08*	$4.83	$5.07*
Price of a 20 oz. Soda	$2.71	$2.86*	$2.49	$2.86*
Price of a Hotdog	$2.48	$2.66*	$2.12	$2.66*
Price of a Program	$4.35	$4.82*	$4.05	$4.76*
Price of a Ball Cap	$14.04	$13.59	$13.36	$13.59

Major League Baseball

	Unrestricted Sample (N=290)		Restricted Sample (N=134)	
Variable	Old Stadiums	New Stadiums	Old Stadiums	New Stadiums
Price of Parking	$6.76	$8.18*	$6.35	$8.18*
Price of a 20 oz. Beer	$5.23	$5.26	$5.14	$5.26
Price of a 20 oz. Soda	$2.60	$2.71	$2.65	$2.71
Price of a Hotdog	$2.25	$2.42*	$2.21	$2.42*
Price of a Program	$3.50	$3.90*	$3.53	$3.90**
Price of a Ball Cap	$12.18	$12.18	$12.41	$12.18

Notes: Prices obtained from various issues of the Team Marketing Report from 1991 through 2001 and converted to 2000 dollars. A new stadium is defined as less than six years old. Restricted sample includes only those teams that played in a "new" stadium between 1991 and 2001. * (**) Average in new stadiums is statistically different from average in old stadiums at the five (ten) percent level.

Table 3: First-Stage Estimation Results
(Dependent Variable: Per-Game Attendance in Thousands)

Independent Variable	NFL	MLB
PTIX	0.170*	0.752*
	(2.21)	(4.99)
POP	2.922*	-0.151
	(2.18)	(0.10)
LAGINCOME	0.160	-0.144
	(0.46)	(0.49)
OTHFRANCH	0.947	2.559
	(0.89)	(1.42)
LAGWIN	0.007*	0.006**
	(2.43)	(1.68)
LAGPLAY	1.363	3.034*
	(1.30)	(3.16)
EXPANSION	4.783	10.932*
	(1.28)	(4.51)
STADIUM AGE	0.012	-0.038*
	(0.06)	(0.98)
NEWSTAD1	4.351*	5.471*
	(2.89)	(3.17)
NEWSTAD2	6.749*	4.695*
	(2.29)	(2.59)
NEWSTAD3	6.585*	4.918*
	(2.20)	(2.60)
NEWSTAD4	1.423	4.142**
	(0.49)	(2.08)
NEWSTAD5	-2.047	2.955
	(0.74)	(1.42)
Observations	325	290
H_0: Zero Slopes	6.33*	14.63*
H_0: Equal Fixed Effects	15.04*	14.53*

Note: Results include team and year fixed-effects not reported. Absolute values of t-statistics reported in parentheses. * (**) Indicates significance at the five (ten) percent level.

Table 4a: New Stadiums and Concession Prices: The National Football League

Independent Variable	Parking ($)	Beer ($/20oz)	Soda ($/20oz)	Hotdog ($)	Program ($)	Ball Cap ($)
ATT	0.366*	0.057*	0.012**	0.049*	0.089*	0.081**
	(5.38)	(4.35)	(1.73)	(6.25)	(5.27)	(1.63)
NEWSTAD1	3.127*	-0.377	0.401*	0.053	-0.034	-0.548
	(2.4)	(1.53)	(2.84)	(0.35)	(0.11)	(0.58)
NEWSTAD2	2.862**	-0.521**	0.346*	-0.002	-0.135	-0.690
	(1.91)	(1.86)	(2.12)	(0.01)	(0.36)	(0.63)
NEWSTAD3	2.565	-0.308	0.101	-0.075	-0.070	-2.327*
	(1.60)	(1.03)	(0.58)	(0.40)	(0.18)	(1.97)
NEWSTAD4	2.697**	-0.579**	0.120	0.183	0.864*	-1.286
	(1.62)	(1.86)	(0.66)	(0.95)	(2.09)	(1.05)
NEWSTAD5	2.290	-0.147	0.212	0.469*	0.916*	-2.413**
	(1.34)	(0.46)	(1.14)	(2.36)	(2.16)	(1.92)
H_0 : Zero Slopes	11.64*	3.47*	3.51*	9.57*	7.645*	1.36
H_0 : Equal Fixed Effects	6.78*	12.73*	3.61*	8.97*	5.25 *	2.76*
Observations	325	321[a]	325	325	325	325
Attendance Effect	POS	POS	NO	POS	POS	POS
Combined Stadium Effect $F(5, 285)$	NO(1.72)	NO(1.19)	POS(2.14*)	NO(1.38)	POS(1.97**)	NO(1.37)

Notes: [a] Four observations lost correspond to teams playing in a college stadium in which beer was not sold. Data describe National Football League teams from 1991 through 2001. Results include team-specific fixed effects not reported. Per-game attendance in thousands treated as a stochastic regressor; the fitted value from the first-stage estimation reported in Table 3 is used as a consistent instrument for attendance. A new stadium is considered less than six years old. All dollar amounts converted to 2000 dollars. t-statistics reported in parentheses. * (**) Indicates statistical significance at the 5% (10%) level.

Table 4b: New Stadiums and Concession Prices: Major League Baseball

Independent Variable	Parking ($)	Beer ($/20oz)	Soda ($/20oz)	Hotdog ($)	Program ($)	Ball Cap ($)
ATT	0.088*	0.022*	0.027*	0.030*	0.033*	-0.035
	(3.80)	(2.21)	(4.71)	(6.15)	(2.76)	(1.27)
NEWSTAD1	1.263*	-0.061	-0.171	-0.023	0.641*	-0.870
	(2.39)	(0.27)	(1.30)	(0.21)	(2.30)	(1.37)
NEWSTAD2	1.882*	-0.098	-0.398*	-0.044	0.325	1.157**
	(3.32)	(0.24)	(2.83)	(0.37)	(1.09)	(1.69)
NEWSTAD3	0.797	0.393	-0.309**	-0.042	-0.257	1.371**
	(1.22)	(1.42)	(1.90)	(0.31)	(0.74)	(1.74)
NEWSTAD4	1.348*	0.277	0.009	0.103	0.300	0.162
	(1.96)	(0.95)	(0.05)	(0.48)	(0.83)	(0.20)
NEWSTAD5	1.365**	0.206	0.047	-0.012	0.017	0.786
	(1.89)	(0.68)	(0.26)	(0.08)	(0.05)	(0.91)
H_0 : Zero Slopes	9.26*	1.81**	4.54*	7.96*	4.06*	1.86**
H_0 : Equal Fixed Effects	14.22*	6.72*	5.18*	11.04*	6.53*	2.33*
Observations	290	290	290	290	290	290
Attendance Effect	POS	POS	POS	POS	POS	NONE
Combined Stadium Effect $F(5, 256)$	POS(3.18*)	NO(0.76)	NEG(2.28*)	NO(0.19)	NO(1.58)	POS(1.98**)

Notes: Data describe Major League Baseball teams from 1991 through 2001. Results include team-specific fixed effects not reported. Per-game attendance in thousands treated as a stochastic regressor; the fitted value from the first-stage estimation reported in Table 3 is used as a consistent instrument for attendance. A new stadium is considered less than six years old. All dollar amounts converted to 2000 dollars. t-statistics reported in parentheses. * (**) Indicates statistical significance at the 5% (10%) level.

Table 5: New Stadiums and Concession Prices: Estimated Price Increases

National Football League

Stadium Age	Parking ($)	Beer ($/20oz)	Soda ($/20oz)	Hotdog ($)	Program ($)	Ball cap ($)
First Year	$4.72	$0.25	$0.45	$0.21	$0.39	$0.35
Second Year	$5.33	-$0.13	$0.43	$0.33	$0.60	$0.54
Third Year	$2.41	$0.38	$0.08	$0.32	$0.59	-$1.79
Fourth Year	$2.70	-$0.58	$0.00	$0.00	$0.00	$0.00
Fifth Year	$0.00	$0.00	$0.00	$0.00	$0.00	-$2.41

Major League Baseball

Stadium Age	Parking ($)	Beer ($/20oz)	Soda ($/20oz)	Hotdog ($)	Program ($)	Ball cap ($)
First Year	$1.74	$0.12	$0.15	$0.16	$0.82	$0.00
Second Year	$2.30	$0.10	-$0.27	$0.14	$0.15	$1.16
Third Year	$0.43	$0.11	-$0.18	$0.15	$0.16	$1.37
Fourth Year	$1.71	$0.09	$0.11	$0.12	$0.14	$0.00
Fifth Year	$1.36	$0.00	$0.00	$0.00	$0.00	$0.00

Notes: Values are estimated impact of a new stadium on the price of each concession during the first five years of a stadium's existence. Dollar values reflect the total impact of the stadium, accounting for both the Stadium Effect, as reported in Table 4a and Table 4b, and the Attendance effect determined by the product of the impact of a new stadium on per-game attendance and the impact of per-game attendance on concession price.