

Research Note

What Takes Them Out to the Ball Game?

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The game of baseball was an integral part of life in 20th-century America. The relation baseball had with its fans, though, evolved as the game moved from quiet pastime to a multibillion dollar business. As the presented evidence will suggest, consumer demand at the close of the 20th century was less about loyalty to 'our team' and more about winning. Possible explanations for this trend are greater competition, labor-management strife, free agency, and a general change in the focus of sports away from simple quiet pastimes to one of profit-maximizing business.

Keywords: *demand; attendance; structural change; Major League Baseball*

The story of the United States of America in the 20th century cannot be told without reference to the uniquely American game of baseball. Although games such as soccer have occupied the imagination of many in the world, and although football and basketball have recently rivaled baseball in America's attention, it is baseball that was the one constant throughout the century. Consequently, the game of baseball, more than any other, has been the subject of numerous books, movies, documentaries, and not a small number of economic articles.

The interest by academic economists has generally been motivated by the nature of the worker-productivity data collected by Major League Baseball (MLB). In no other industry, including the other professional team sports, is the productivity of the individual measured with such precision. Such data has allowed writers to investigate a variety of issues, including the extent and persistence of racial discrimination,¹ the impact changing institutions have on the compensation received by workers (see Blass, 1992; Cassing & Douglas, 1980; Hill, 1985; Hill &

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Spellman, 1983; Medoff, 1976; Raimondo, 1983; Scott, Long, & Sompai, 1985; Scully, 1974; Zimbalist, 1992), and the quality of managerial decision making.²

Perhaps the first article within the field of sports economics was Rottenberg's (1956) "The Baseball Player's Labor Market." Scully's (1974) seminal examination of exploitation in MLB, published 18 years after Rottenberg, cites less than a half dozen articles, suggesting a relative dearth of academic inquiries. Since the work of Scully, though, the literature examining the economics of sports has dramatically increased. One may wonder if the explosion in the academic literature coincides with a changing view of fans (i.e., although, in the past, sports may have been regarded purely as entertaining pastimes, sports may be increasingly viewed as a business).

If the interest of academic economists is any indicator, one might suspect that there has been a change in the public's perception of MLB. For example, consider the recent concern on competitive balance. In general, most economic studies suggest that competitive balance has increased in the latter three decades of the 20th century.³

The view of both the general public and industry insiders, however, seems to be that competitive balance in the MLB has never been worse.⁴ One explanation may be that the public has only recently become concerned on the issue and, hence, may lack knowledge of the history of competitive balance in the sport. Consequently, the frame of reference is the ideal level of competitive balance, rather than the historical trend.

This brings to mind a simple question: What takes the customers of baseball out to the ball game? More specifically, we seek to chart how the perceptions of fans with respect to baseball have evolved across time. Theoretically, fans' attitude toward the game may have changed as both owners and players have begun to view the sport as a business. With the advent of free agency, stadium initiatives, and billion-dollar broadcast deals, the attitudes of customers may have shifted from the perception that baseball is simply a quiet pastime to one where baseball is a business. Hence, fan interaction may have become less about "my team" and more about winning. In other words, as the sport has become more of a business to players and owners, fans may have reacted by treating MLB similarly.⁵

EMPIRICAL APPROACH

To examine the issues raised above, we require a measure of individual MLB team attendance. These were obtained from the *Sporting News Complete Baseball Record Book* (2002). One difficulty with using the raw total attendance figures is that each team does not play the same number of games. In addition, MLB increased the total number of games from 154 to 162 in 1962. We, therefore, calculated individual per game attendance by dividing total team attendance by the number of home games.

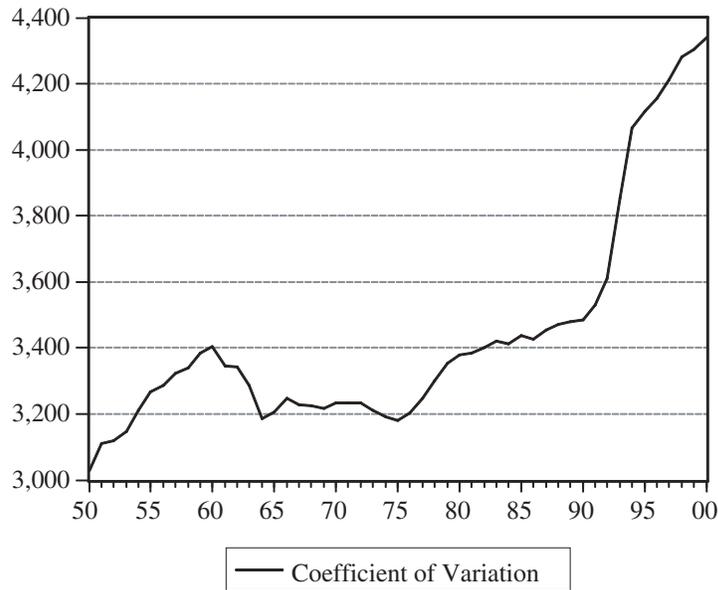


Figure 1: Individual Team Attendance—Per Game

As an initial examination, Figure 1 reports a scaled variance measure (i.e., the coefficient of variation) for individual team attendance. The variance measure was computed on a rolling basis for all MLB teams. The approach is desirable because the impact of a single year outlier is muted, and the general trend behavior is enhanced. More specifically, the initial data point represents the coefficient of variation for the sample period 1905-1950. Each additional point represents starting and ending dates that have been adjusted forward by one period. This process was continued throughout the entire sample to produce a time series of estimates ranging from 1950-2000.⁶

A cursory examination of Figure 1 reveals that individual team attendance has become increasingly more erratic across the past 50 years. Specifically, although the 1950s report a small rise in the variance measure, the 1960-1975 period suggests a leveling or even a small decline. The behavior in the post-1975 period, however, indicates that a change occurred. The significance of the change is further highlighted by the ordinary least squares results presented in Table 1. These preliminary results suggest that the variance measure remained relatively constant during the pre-1975 period and was an increasing function during the post-1975 period. Finally, a Chow breakpoint test argues that a structural change in the series occurred around 1976.

As the measure is an outgrowth of movements in individual team attendance, low values of CV_t are associated with conditions where individual team attendance

TABLE 1: OLS Estimates Dependent Variable

Sample—1950-2000 ^a		Sample—1950-1975 ^b		Sample—1976-2000 ^c	
Constant	Time	Constant	Time	Constant	Time
2096.46 ^d (13.446)	17.932 ^d (8.784)	3161.10 ^d (21.866)	1.230 (0.535)	-510.225 (-1.387)	47.308 ^d (11.359)

NOTE: OLS = ordinary least squares; CV = coefficient of variation. Dependent variable: CV(attendance)_{*t*}. Chow Breakpoint Test (1976): 59.420 (0.00).

a. Adjusted $R^2 = .604$, $t = 51$.

b. Adjusted $R^2 = -.029$, $t = 26$.

c. Adjusted $R^2 = .849$, $t = 25$.

d. Rejection of H_0 at the 1% level.

is relatively constant and stable around the average growth rate. In contrast, high values of CV_t are associated with greater dispersion around the trend. This suggests that in the post-1975 period, winners and losers, in terms of attendance, have become more volatile. Specifically, variability in individual team attendance rose nearly 40% from 1975 to 2000. In which case, it appears that although individual teams used to be able to count on a solid level of support, this no longer appears to be the case.

One might note the significance of the mid-1970s within MLB history. Specifically, during the period, the era of the reserve clause came to an end with the advent of free agency. After 1976, players with more than 6 years of experience could sell their services in a free market when their contract had expired. Consequently, the era of the great players playing for and being identified by one team came to an end. In which case, fan disenchantment and enchantment could follow these players and the teams that the players moved from and to, which would create such volatility.

However, such an interpretation would be a bit premature. The rolling regression approach averages out behavior across time, and, therefore, the impact of the sudden introduction of free agency would be felt as time went by. Therefore, although the variance measure provides cursory evidence of a change in fan attitude, a more formal approach is required. One approach would be to build an attendance equation and examine the relative importance of the various measures across time. To do this, we follow the literature, and estimate Equation 1 (Schmidt & Berri, 2001),

$$y_{jt} = a_j + \sum_{k=1}^h \alpha_{kj} * x(\text{DF})_{jt} + \alpha_{gt} * z(*)_{it-1} + \varepsilon_{jt} \quad (1)$$

where the dependent variable, y_{jt} , represents the individual (j)th team attendance during period (t) and $X(\text{DF})$ represents the various (h) team demand factors. Specifically, we included the individual team winning percentage, the number of games the individual team finished behind (included to capture the fact that fan interest

may be raised when their team has a greater chance of making the playoffs), a time trend, a dummy for moving to a new park, and a dummy for moving to a new city.⁷

In addition to the standard list of independent variables, we also note the possibility that excess demand exists for the individual teams. To partially control for this, we included a variable that measured the availability of seats (i.e., excess capacity). In the aggregate, the variable was constructed by multiplying stadium seating capacity by total games played and dividing total team attendance by this number (both are available from ballpark.com). This number was subtracted from (1) to create a measure of available seating. An interesting finding was that only two teams, Toronto in 1994 and San Francisco in 1999, had total attendance equal to capacity. All other teams had attendance rates smaller than capacity. However, many teams sell out a large number of their games. In which case, an increase in seating capacity would free up seats (especially for the most popular visiting teams; i.e., the Yankees, Dodgers, Red Sox) and would, therefore, increase attendance. One would, therefore, expect team attendance and the variable to be positively related.⁸

Finally, following the work of Schmidt and Berri (2002), we also include, where necessary, strike and strike-recovery dummy variables (i.e., $z_{i[t]}$). The variables are included because of the large impact of the 1981 and 1994 to 1995 players strike. Additionally, we include a dummy variable for the recovery in attendance, which follows immediately in the next period (i.e., $z[82]$ and $z[96]$).⁹ Finally, team attendance was influenced by a large outlier—1946. The period represents the end of World War II and the return of U.S. soldiers. In 1946, total MLB attendance increased by more than 20%. To control for this outlier, we included a dummy variable (i.e., $z[46]$).

The unbalanced panel data was estimated using weighted generalized least squares, which incorporated team-specific fixed effects.¹⁰ The results for three subperiods are reported in Table 2. In general, the results are consistent with expectation. Consider, for example, the 1905-1950 results. Specifically, although a higher winning percentage increases team attendance, the further back a team is in the pennant race, the lower the team's attendance. In contrast, neither moving to a new city nor moving to a new ballpark increased team attendance. However, one should recognize that team movement and new stadiums were a relatively rare occurrence in the pre-1960 period.

The results for the three subperiods highlight a change in the importance of winning to team attendance. Specifically, as an additional win is worth approximately 0.006 in team winning percentage, an additional win was worth just more than 57 additional fans per game in 1950. Across a season, the additional win would increase total attendance by about 4,400. For the 1930-1975 period, the value of the additional win nearly doubled to 108 fans per game and just more than 8,700 per season. Finally, for the 1955-2000 period, the win was worth nearly 202 more fans per game and almost 16,400 per season.

TABLE 2: MLB—Panel Estimates

	<i>Time</i>	<i>Winning %</i>	<i>Games Back</i>	<i>Excess Capacity</i>	<i>Dummy: New Park</i>	<i>Dummy: New City</i>
Sample—1905-1950 ^a	209.15 ^b (20.950)	9236.81 ^b (3.523)	-5716.50 ^b (-2.267)	0.1856 ^b (13.259)	175.59 (0.565)	1639.77 (0.723)
Sample—1930-1975 ^c	207.94 ^b (21.160)	17412.91 ^b (4.924)	-4676.82 (-1.427)	0.146 ^b (9.091)	3742.88 ^b (10.824)	523.34 (0.750)
Sample—1955-2000 ^d	319.30 ^b (30.506)	32714.44 ^b (8.844)	3280.75 (0.947)	0.400 ^b (-30.40)	1690.01 ^b (4.837)	-231.81 (-0.259)

NOTE: MLB = Major League Baseball. Each equation contains constant and relevant dummies (i.e., strike, strike recovery and World War II). Dependent Variable: $y_{it} - (\text{attendance})_{it}$.

a. Adjusted $R^2 = .710$.

b. Rejection of H_0 at the 5% level.

c. Adjusted $R^2 = .718$.

d. Adjusted $R^2 = 0.870$.

Another way to look at the results is to compare the worst and best teams during the individual subperiods. In 1950, the New York Yankees won 98 games, whereas the Philadelphia Athletics won 52. The additional 46 wins were worth about 2,200 more per game and just more than 200,000 per season. In 1975, the Oakland Athletics (the Athletics moved to Oakland in 1967) won 98 games, whereas the Detroit Tigers won only 57. The additional 39 wins were worth nearly 4,200 per game or 340,000 per season. For the final period, the San Francisco Giants won 97 games and both the Chicago Cubs and Philadelphia Phillies won only 65. The results in Table 2 suggest that the difference in attendance because of the additional 32 wins was nearly 525,000 fans per season. This accounts for nearly all of the difference between the Giants and the Cubs and nearly a third of the difference between the Giants and the Phillies.

In addition to the increased importance of winning to attendance, the excess capacity coefficient also suggests a change in fans' responses. The increase in this coefficient across the three subperiods suggests that excess capacity has become a more important issue across time. More specifically, the coefficient attempts to describe the impact on attendance of increasing capacity. In which case, the rise in the coefficient's value suggests that if a team could increase capacity for its games, per game attendance would rise. On average, these results indicate that roughly 20% of the additional seats would be filled in 1950 and 40% in 2000. Finally, because the games that we are talking about are most likely for the most popular

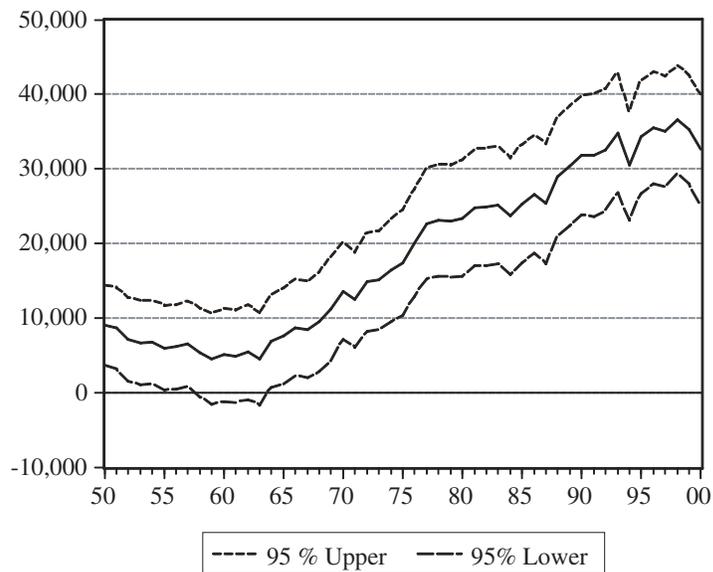


Figure 2: Estimated Winning % Impact on Team Attendance—Rolling Regression and Fixed Effects

teams, one might argue that for many teams it is more about the visiting team today than in the past.¹¹

Figure 2 reports the estimated impact of winning percentage on individual team attendance for each of the subsamples. As before, the time series of estimates was produced by estimating Equation 1 from the sample period 1905-1950, with each additional successive point representing starting and ending dates which have been adjusted forward by one period. Finally, we report the coefficient with its 95% confidence intervals.

Consistent with the results described in Table 2, a distinct relative increase in the estimated coefficient exists. Specifically, the series appears to change during the late 1960s. At this time, the impact that winning and, conversely, losing has on attendance appears to increase dramatically. In essence, baseball's customers appear to be moving from the view that baseball is merely an entertaining pastime to a perspective that the team must be successful on the field if it wishes to consistently attract the fans.

In a similar vein, Figure 3 reports that the estimated coefficient once fixed effects have been removed and a common constant term is introduced. Although there is no appreciable change in its behavior, the constant term may provide additional evidence of the decline in fan interest. One interpretation of the constant term is that it may capture the level of fan loyalty. By fan loyalty, we mean the part of fan

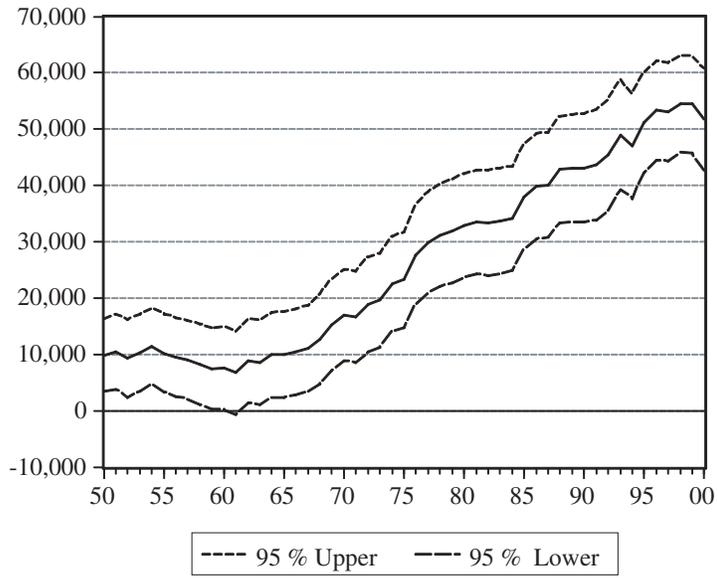


Figure 3a: Estimated Winning % Coefficients Rolling Regression: Winning % Coefficients

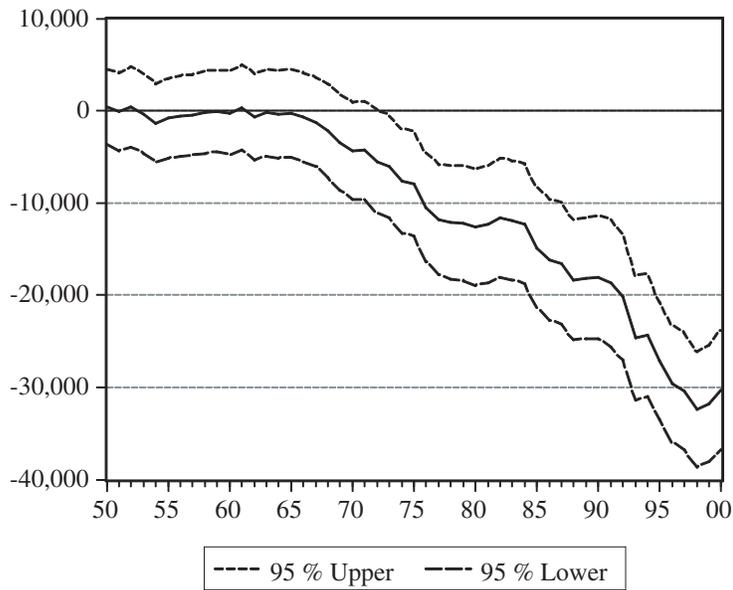


Figure 3b: Estimated Winning % Coefficients Rolling Regression: Constant

interest or support that is not associated with the demand factors. Rather, it is simply the part of attendance that exists only because this is 'my team' regardless of how well they are doing or the event of going to see a winning team.

The estimated constant and associated 95% confidence intervals are represented in Figure 3. As with the earlier winning percentage coefficient, there is a discernable change in the estimated time series beginning in the late 1960s. The downward trend in the series continues throughout much of the subperiods. This suggests that the base, or fan loyalty, that teams may count on for support has dwindled considerably across the past 30 to 40 years.¹²

The above results suggest that a structural change occurred within MLB, and most likely all sports, during the mid- to late 1960s. We hypothesize that the structural change may have its roots in the introduction of a new era into MLB, which began during the post-1950s. Specifically, the period introduced greater competition within MLB both on the field (i.e., expansion and team relocation). There was also an increase in competition off the field from other sports, such as the NBA and the NFL, not to mention other competitors for the entertainment dollar.

During the post-1950 period, the business of the game also began to change. The period introduced the beginnings of the labor-management strife because of free agency. The period also reflects a change in the makeup of owners and in the requirement of local communities. Prior to the 1970s, individual owners were thought to own teams for enjoyment purposes. However, recently, as exemplified by the purchase and sale of the Anaheim Angles, professional sports ownership may be seen as more profit motivated. The situation is also seen in the push for public funding for facilities, which has recently come en vogue. All of this may give the impression that baseball is no longer a game but a business.

CONCLUDING OBSERVATION

What takes the fans out to the ball game? In the early part of the 20th century, baseball grew despite the New York Yankees' dominance. Baseball's customers appeared to be less concerned with their team's winning or losing, and teams could rely on the loyalty of their fans. Beginning in the late 1960s, though, this perception seemed to change. In the latter 20th century, winning was necessary if a team wished to consistently attract the fans. In essence, America has moved from an innocent view of a national pastime to the view that baseball is but one more form of entertainment. If the entertainment fails to provide satisfaction, the fickle customer quickly moves on to more satisfying forms of recreation.¹³

NOTES

1. For a review of the literature prior to 1990, see Kahn (1991). More recent studies of discrimination were conducted by Bodvarsson and Brastow (1999), Hanssen (1998), Hanssen and Anderson (1999), Hoang and Rascher (1999), Jenkins (1996), among others.

2. Notable articles examining the role of baseball managers include Horowitz (1997), Kahn (1993), Porter and Scully (1982), Ruggiero, Hadley, Ruggiero, and Knowles (1997), and Scully (1994). Coaching in the National Football League was examined by Hadley, Poitras, Ruggiero, and Knowles (2000). College-basketball coaching has been examined by both Clement and McCormick (1989) and Fizek and D'Itri (1997). Finally, coaching in the National Basketball Association has been previously analyzed by McCormick and Clement (1992) and Pfeffer and Davis-Blake (1986).

3. A representative sample of this literature would include Butler (1995), Horowitz (1997), Quirk and Fort (1992), Schmidt (2001), Schmidt and Berri (2001), and Vrooman (1995).

4. The issue of competitive imbalance in baseball was recently addressed by the Commissioner's Blue Ribbon Panel (BRP) on Baseball Economics. The panel's stated purpose was to "examine the question of whether baseball's current economic system has created a problem of competitive imbalance in the game" (Levin, Mitchell, Volcker, & Will, 2000, p. 59). The BRP primarily examined the relationship between team payroll and both playoff appearances and postseason performance. The BRP examined the years 1995-1999 and noted that in these seasons only teams ranked in the upper 25% in terms of payroll managed to win a World Series game. Furthermore, no team in the lower 50% of the payroll rankings managed to appear in a single postseason game (Levin, Mitchell, Volcker, & Will, 2000).

5. The importance of winning to fans' team association has been the subject of numerous studies within the psychological literature (see Wann, Melnick, Russell, & Pease, 2001). Their study suggests that association with a winning team increases self-esteem and ranks just below entertainment and group affiliation in importance.

6. Although the choice is somewhat arbitrary, we do desire to remove much of the short-run movements in individual team attendance, which may primarily be because of nontrend factors. Other long period choices produced qualitatively similar results.

7. The data on winning percentage and games behind came from www.baseball-almanac.com/. The stadium data on capacity came from www.ballparks.com/baseball/.

8. Before moving on, there exists a concern on the stationarity of the dependent variable (i.e., individual team attendance). In general, the means of these series do suggest an upward trend. We, therefore, performed individual Augmented Dickey-Fuller (ADF) tests on each team's average attendance. As might be expected, the tests produced a variety of results. Specifically, although 13 of 26 teams that were investigated rejected a unit root, exactly 13 failed to reject the unit root. We proceed under the assumption of stationarity and include a time trend in Equation 1. We do so for several reasons: The first is that only one of the "fail to rejects" came from a sample that had more than 38 observations. Unit roots are a long-run concept, and these tests are known to have low power within small samples. The second reason follows Im, Pesaran, and Shin (2003), who have proposed a *t*-bar statistic based on the average of the individual cross-sectional ADF test statistics. The authors show that the *t*-bar test has substantially more power than the individual time-series ADF tests. In addition, the authors use Monte Carlo simulations to obtain 1%, 5%, and 10% critical values for the *t*-bar distribution (i.e., -1.73, -1.67, and -1.64, respectively). In the present context, a *t*-bar statistic of (-3.031) was obtained, which rejects the presence of the unit root. Finally, to examine the sensitivity to the choice, we reestimated Equation 1 by replacing individual team attendance with its first difference. These results were qualitatively similar to those obtained with the level of team attendance and are available from the author upon request.

9. Schmidt and Berri (2002) argue that although most protracted periods of labor discord have short-term immediate impacts on attendance, there is no evidence of any long-term effects (i.e., beyond the initial strike impact).

10. We include individual fixed effects to capture the multitude of individual factors that may cause city-to-city fan preferences to differ.

11. One issue that is neglected here is that the 1970s was a period where multipurpose stadiums became popular. These stadiums had larger capacity than earlier stadiums. The late 1990s reversed this trend by moving back to single-use stadiums with smaller capacities.

12. The results from incorporating the first difference of individual team attendance provide a clearer picture of the result. Specifically, these results suggest that it is not until 1977 that attendance is signifi-

cant. Prior to this period, winning percentage was never significant in explaining changes in individual team attendance. Moreover, the impact continues to grow over time. The coefficient on winning percentage was 5,233.12 in 1977 and 21,350.44 in 2000. These results are available from the author upon request.

13. The sports psychology literature has recently highlighted the phenomena of "basking in the glory" or BIRGing (End, Dietz-Uhler, Harrick, & Jacquemotte, 2002). This phenomena suggests that fans choose teams in such a way as to maximize their chances of rooting for winners.

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