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FOR INFORMATION ON MEMBERSHIP, PLEASE WRITE TO

Association Internationale des Economistes de Sport
Centre de Droit et d'Economie du Sport
4, place du Presidial
87031 LIMOGES cedex, FRANCE
Phone: 33(0) 5.55.43.56.40
Or e-mail monna@drec.unilim.fr

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Articles

Home Run or Wild Pitch?

Assessing the Economic Impact of Major League Baseball's All-Star Game

ROBERT A. BAADE
VICTOR A. MATHESON
Lake Forest College

Major League Baseball has rewarded cities that build new baseball stadiums with the chance to host the All-Star Game. Although the league asserts a significant boost to metropolitan economies due to the game, are these economic impact estimates published by the league credible? In two separate economic impact models, the authors find that All-Star Games since 1973 are actually associated with worse than expected economic performance in host cities.

Major League Baseball (MLB) estimated an economic impact of \$62 million from the 1999 All-Star Game on the Boston economy, whereas estimates from officials at the Boston Chamber of Commerce and MLB Commissioner Bud Selig ranged from \$65 million to \$75 million (Associated Press, 1999; Selig, Harrington, & Healey, 1999; Walker, 1999). MLB projects that the 2002 All-Star Game will generate, conservatively, an economic impact in excess of \$70 million for the city of Milwaukee (MLB, 1999). If those numbers are accurate, the game is certainly an All-Star event for the economy of the host city.

Few sporting events can seriously propose an impact of such magnitude for a short-term event, and MLB uses the promise of a future All-Star Game as an enticement for cities to build new baseball stadiums. In the words of National League President Len Coleman, "The National League has decided the All-Star Game should be played in new facilities, except in special circumstances" (Associated Press, 1998). Indeed, of the 15 new major league stadiums built between 1970 and 1997, 13 were selected by MLB to host an All-Star Game within 5 years of their construction. Of the remaining 2 stadiums, the new Comiskey Park in Chicago was

passed over because the old Comiskey Park had hosted an All-Star Game less than 10 years prior to the construction of the new stadium, and Pro-Player Stadium in Miami was denied an opportunity to host the 2000 All-Star Game after originally being awarded the Game in 1995 because of “uncertainty in the Florida Marlins franchise” and because Pro-Player Stadium is not a baseball-only stadium. Apparently MLB agrees with Marlins owner John Henry that Miami “needs a baseball-only stadium to make the Marlins an economic success in south Florida” (Associated Press, 1998). By awarding the All-Star Game to south Florida before the area is committed to the construction of a new stadium, MLB would have lost a potential carrot to dangle in front of hesitant city officials.

MLB understands that it is competing for the sports entertainment dollar, and the League believes that stadiums factor prominently into consumer decisions relating to leisure spending. The construction of the popular Camden Yards Stadium in Baltimore in 1992 has prompted a boom in stadium construction that has seen 14 new stadiums being completed during the 1992 to 2002 period, with new stadiums being proposed for another 11 cities (Munsey & Suppes, 2000). This substantial transformation of MLB infrastructure has been accomplished in part through league incentives that include hosting an All-Star Game and a requirement that new expansion franchises have access to a baseball-only stadium.

Modern sports facilities are generally financed with some form of public funding, and MLB at least implies that public financial support for a new stadium is a good investment for a city on the grounds that a single All-Star Game generates enough economic activity within the metropolitan area to compensate for a substantial portion of the cost of building a new stadium. Reasons for skepticism, however, abound, and one must ask whether a study either commissioned or performed by MLB can be an objective examination of the true economic impact of the game. The purpose of this study is to estimate the economic impact of All-Star Games from 1973 through 1997. The results indicate that the economic impact of the All-Star Game on the host city could be negative and is certainly likely on average to be much lower than the magnitude of the most recent MLB estimate.

REVIEW OF THE ALL-STAR GAME AND MEGA-EVENT ECONOMIC IMPACT STUDIES

The All-Star Game began in 1933 as an event to showcase the most talented and most popular players in the league. Like the Super Bowl for the National Football League (NFL), MLB selects a host city several years in advance of the game. This allows potential visitors to plan their attendance and allows the host city to make extensive preparations. Unlike the Super Bowl, which alternates only among a small number of host cities due to weather considerations, the All-Star Game takes place during a break in the middle of baseball's summer season, and therefore nearly every city with a MLB team has hosted an All-Star Game at one time or another. During the past decade, MLB has expanded the scope of the All-Star Game

to include numerous events besides the actual game itself. The game has expanded to a 5-day event that includes a home-run hitting contest and the All-Star FanFest, a type of baseball convention featuring sporting goods vendors, baseball memorabilia, virtual reality games, and autograph sessions with former All-Star players.

MLB and host city officials offer a variety of appraisals of the economic impact of the game, but all of them are significantly positive. For the 1999 game in Boston, Mayor Tom Menino predicted an impact of \$40 million to \$60 million, Greater Boston Convention and Visitor's Bureau Chief Pat Moscaritolo predicted an impact of more than \$50 million, and American League President Gene Budig predicted an impact "significantly better than" \$50 million. Budig went so far as to say that Mayor Menino was "an interesting politician because [he] understated how good it is going to be, because it is off the charts" (Ryan, 1998). The most optimistic appraisal came from Baseball Commissioner Bud Selig, who said, "This All-Star Game will inject, and I suppose one can debate the dollars, but I'm going to say \$75 million into the Boston economy. The psychological value, and what it's done for the community you can put aside" (Selig et al., 1999).

The numbers quoted above envision a horde of affluent spendthrifts descending on the host city. In fact, Boston reported that about 110,000 people visited the FanFest and more than 225,000 attended some portion of the activities during the 5-day All-Star celebration. A reported 14,000 hotel rooms were used in Boston for the event (Associated Press, 1999). The numbers quoted by MLB and city officials are generated using a standard expenditure approach to estimating the direct economic impact of the event. The numbers are derived by estimating the number of visitor days as a result of the game and multiplying that statistic by the average estimated per diem expenditures per visitor. Once an estimate of direct impact is obtained, the total economic impact is estimated by applying a multiplier, which typically doubles the direct economic impact. Using this technique, if a mistake is made in estimating direct expenditures, those errors are compounded in estimating indirect expenditures. The secret to generating credible economic impact estimates using the expenditure approach is to accurately estimate direct expenditures.

Precisely measuring changes in direct expenditures is fraught with difficulties. Most prominent among them is an assessment of the extent to which spending in conjunction with the event would have occurred in the absence of it. For example, if an estimate were sought on the impact of a professional sporting event on a local economy, consideration would have to be given to the fact that spending on the event may well merely substitute for spending that would occur on something else in the local economy in the absence of the event. Therefore, if the fans are primarily indigenous to the community, an event like the All-Star Game may simply yield a reallocation of leisure spending while leaving total spending unchanged. This distinction between gross and net spending has been cited by economists as a chief reason why professional sports in general do not seem to contribute as much to metropolitan economies as boosters claim (Baade, 1996).

One of the attributes of a mega-event is that gross and net spending changes induced by the event are more likely to converge. Spending at a mega-event is more likely to be categorized as export spending because most of it is thought to be undertaken by people from outside the community. Whereas 5% to 20% of fans at a typical MLB game are visitors from outside the local metropolitan area, the percentage of visitors at an event like an All-Star Game or the Super Bowl is thought to be much higher (Siegfried & Zimbalist, 2000). Skilled researchers will often ignore or eliminate the spending undertaken by local residents at a mega-event because of substitution effects and because spending by local residents is likely to be inconsequential relative to that consumption which is undertaken by those foreign to the host community (Humphreys, 1994).

Eliminating the spending by local residents would at first blush seem to eliminate a potentially significant source of bias in estimating direct expenditures. Surveys on expenditures by those attending the event, complete with a question on place of residence, would appear to be a straightforward way of estimating direct expenditures in a manner that is statistically acceptable. However, although surveys may well provide insight on spending behavior for those patronizing the event, such a technique offers no data on changes in spending by residents not attending the event. It is conceivable that some residents may dramatically change their spending during an event to avoid the congestion in the venue's environs. Similarly, although hotel rooms during a mega-event may be filled with baseball fans, if hotels in the host city are normally at or near capacity during the time period in which the event is held, it may be that mega-event visitors are simply crowding out other potential visitors. In general, a fundamental shortcoming of economic impact studies is not with information on spending for those who are included in a direct expenditure survey, but rather with the lack of information on the spending behavior for those who are not.

A second potentially significant source of bias in economic impact studies relates to leakages from the circular flow of spending. For example, if the host economy is at or very near full employment or if the work requires specialized skills, it may be that the labor essential to conducting the event resides in other communities. To the extent that this is true, then the indirect spending that constitutes the multiplier effect must be adjusted to reflect this leakage of income and subsequent spending.

Labor is not the only factor of production that may repatriate income. For example, even if hotels experience higher than normal occupancy rates during a mega-event, then the question must be raised about the fraction of increased earnings that remain in the community if the hotel is a nationally owned chain. In short, to assess the impact of mega-events, a balance of payments approach must be utilized. Because the input-output models used in even the most sophisticated *ex ante* analyses are based on fixed relationships between inputs and outputs, such models do not account for the expenditure complications associated with full employment and capital ownership noted here.

As an alternative to estimating the change in expenditures and associated changes in economic activity, those who provide goods and services directly in accommodating the event could be asked how their activity has been altered by the event. In summarizing the efficacy of this technique, Davidson (1999) opined:

The biggest problem with this producer approach is that these business managers must be able to estimate how much "extra" spending was caused by the sport event. This requires that each proprietor have a model of what would have happened during that time period had the sport event not taken place. This is an extreme requirement which severely limits this technique. (p. 15)

Of course, other investigators have used different approaches to estimate the impact of mega-events. On the other end of the scholarly debate, economists examining similar sporting mega-events have typically found much smaller economic impacts. For example, Phil Porter (1999) used regression analysis to determine that the economic impact of the Super Bowl on the host city was statistically insignificant, that is, not measurably different from zero. After reviewing monthly data on sales receipts for several Super Bowls, Porter concluded:

Investigator bias, data measurement error, changing production relationships, diminishing returns to both scale and variable inputs, and capacity constraints anywhere along the chain of sales relations lead to lower multipliers. Crowding out and price increases by input suppliers in response to higher levels of demand and the tendency of suppliers to lower prices to stimulate sales when demand is weak lead to overestimates of net new sales due to the event. These characteristics alone would suggest that the estimated impact of the mega-sporting event will be lower than the impact analysis predicts.

Likewise, Baade and Matheson (2000) challenged an NFL claim that as a result of the 1999 Super Bowl in Miami, taxable sales in South Florida increased by more than \$670 million dollars. Their study of taxable sales data in the region concluded that the NFL has exaggerated the impact of the Super Bowl by a factor that in some instances could approximate 10.

Because the expenditure approach to projecting the economic impact of mega-events is most commonly used by league and city officials to generate economic impact estimates, we will be comparing the results generated by our model to the estimates quoted by league officials that were derived using an expenditure approach. In the next sections of this article, the models that are used to estimate the impact of the All-Star Game are detailed.

MODEL 1

The economic activity generated by the All-Star Game is likely to be small relative to the overall economy, and isolating the event's impact, therefore, is not a trivial task. To this end, we have selected explanatory variables from past models to

help establish what employment would have been in the absence of the All-Star Game and then compare that estimate to actual employment levels to assess the contribution of the event. The success of this approach depends on our ability to identify those variables that explain the majority of observed variation in growth in employment in those cities that have hosted the All-Star Game.

One technique is to represent a statistic for a city for a particular year as a deviation from the average value for that statistic for cohort cities for that year. Such a representation over time will in effect factor out general urban trends and developments. For example, if we identify a particular city's growth in employment as 10% over time, but cities in general are growing by 5%, then we would conclude that this city's pattern deviates from the norm by 5%. It is the 5% deviation that requires explanation and not the whole 10% for our purposes in this study. Furthermore, if history tells us that a city experiences a growth in employment that is 5% above the national average both before and after a mega-event, then it would be misguided to attribute that additional 5% to the mega-event. If, after the game, the city continued to exhibit employment increases 5% above the national norm, the logical conclusion is that the All-Star Game simply supplanted other economic developments that contributed to the city's above-average rate of growth.

Given the number and variety of variables found in regional growth models and the inconsistency of findings with regard to coefficient size and significance, criticisms of any single model could logically focus on the problems posed by omitted variables. Any critic, of course, can claim that a particular regression suffers from omitted-variable bias. It is far more challenging to address the problems posed by not including key variables in the analysis.

In explaining regional or metropolitan growth patterns, at least some of the omitted variable problem can be addressed through representing relevant variables as deviations from city norms. This leaves the scholar with a more manageable task, namely that of identifying those factors that explain city growth after accounting for the impact of those forces that generally have affected national, regional, or metropolitan statistical area (MSA) growth. For example, a variable is not needed to represent the implications of federal revenue sharing if such a change affected all cohort cities in similar ways.

Following the same logic, other independent variables should also be normalized, that is, represented as a deviation from an average value for MSAs or as a fraction of the MSA average. For example, a firm's decision to locate a new factory in city i depends not on the absolute level of wages in city i , but city i 's wage relative to those of all cities with whom it competes for labor and other resources. What we propose, therefore, is an equation for explaining metropolitan employment growth that incorporates those variables that the literature identifies as important, but specified in such a way that those factors common to MSAs are implicitly included.

Everything discussed in this section of the paper to this point is intended to define the regression analysis that will be used to assess changes in employment

attributable to the All-Star Game in host cities between 1973 and 1997. Equation (1) represents the model used to predict changes in employment for host cities:

$$\begin{aligned} \partial N_t^i = & \beta_0 + \beta_1 \sum_{i=1}^n \frac{\partial N_t^i}{n_t} + \beta_2 \partial N_{t-1}^i + \beta_3 \partial N_{t-2}^i + \beta_4 \partial N_{t-3}^i \\ & + \beta_5 \text{Pop}_t^i + \beta_6 y_t^i + \beta_7 W_t^i + \beta_8 T_t^i + \beta_9 \text{BOOM}_t^i \\ & + \beta_{10} \text{BUST}_t^i + \beta_{11} \text{REG}_t^i + \beta_{12} \text{ASG}_t^i + \beta_{13} \text{MSA}_t^i + \beta_{14} \text{TR}_t^i + \varepsilon, \end{aligned} \quad (1)$$

where for each time period t ,

∂N_t^i = % change in employment in the i th MSA,

n_t = number of cities in the sample,

Pop_t^i = log of the population of the i th MSA,

y_t^i = real per capita personal income in the i th MSA as a percentage of the average for all cities in the sample,

W_t^i = nominal wages in the i th MSA as a percentage of the average for all cities in the sample,

T_t^i = state and local taxes in the i th MSA as a percentage of the average for all cities in the sample,

BOOM_t^i = a dummy variable for oil boom and bust cycles for selected cities and years,

BUST_t^i = a dummy variable for oil boom and bust cycles for selected cities and years,

REG_t^i = dummy variables for eight geographical regions within the United States,

ASG_t^i = dummy variable for the All-Star Game,

MSA_t^i = dummy variable for i th MSA,

TR_t^i = annual trend, and

ε = stochastic error.

For the purposes of our analysis the functional form is linear in all the variables included in Equation 1.

As mentioned previously, rather than specifying all the variables that may explain metropolitan growth, we attempted to simplify the task by including independent variables that are common to cities in general and the i th MSA in particular. In effect, we have devised a structure that attempts to identify the extent to which the deviations from the growth path of cities in general ($\Sigma \partial N_t^i / n_t$) and city i 's secular growth path (∂N_{t-1}^i , ∂N_{t-2}^i , and ∂N_{t-3}^i) are attributable to deviations in certain costs of production (wages and taxes), demand-related factors (population, real per capita personal income), and dummy variables for oil boom and bust periods as well as the region in which the MSA is located. Equation 1 was used to predict the growth path for employment, and this predicted value was compared to the

actual growth in employment to formulate a conclusion with regard to the effect the All-Star Game had on employment in All-Star Game host cities between 1973 and 1997. Of course, the credibility of this procedure depends on a robust equation for predicting employment growth.

Relative values of population, real per capita personal income, wages, and tax burdens are all expected to help explain a city's growth rate in employment as it deviates from the national norm and its own secular growth path. As mentioned above, past research has not produced consistency with respect to the signs and significance of these independent variables. As a consequence, we do not have, with one important exception, a priori expectations with regard to the signs of the coefficients. That should not be construed as an absence of theory about key economic relationships. As noted earlier, we included those variables that previous scholarly work found important.

The one exception is our expectation regarding the coefficient on the All-Star Game variable. If, as MLB suggests, the All-Star Game has a significant positive economic impact on the host city, we would expect this event to translate into an increased demand for labor in the host city during the All-Star Game year. Hence, the All-Star Game coefficient would be positive. On the other hand, if the All-Star Game primarily crowds out other economic activity, the coefficient should be zero.

THE RESULTS OF MODEL 1

We examined the economic impact of 23 All-Star Games during the period 1973 through 1997. The time period was chosen due to the availability of city by city employment data. The All-Star Games of 1982 and 1991 were excluded from the analysis because they were held in Canadian cities (Montreal and Toronto, respectively) for which no data were available. Fifty-seven cities constituted our sample, representing all MSAs that were among the 50 largest by population in the United States in either 1969 or 1997. The cities used are listed in the appendix along with other information regarding the availability of data. The results of a regression for the city of Cleveland using Equation 1 are represented in Table 1. Although each All-Star Game city will have slightly different regression results, Cleveland, the site of the 1997 game (the most recent game for which data are available), was used for illustrative purposes.

A brief examination of the coefficients in Table 1 reveals some interesting facts about metropolitan area employment growth. The negative Population coefficient shows that large cities have grown more slowly than small cities, the negative Wage coefficient demonstrates that high wage cities have grown more slowly than low wage cities, the positive Trend coefficient suggests that employment growth has become more rapid toward the end of the sample period, the negative Cleveland coefficient shows that employment in Cleveland itself has grown more slowly than in the cohort group of 57 cities, and finally, the negative coefficient on Cleveland All-Star shows that employment in Cleveland grew more slowly than expected in

TABLE 1: Regression Results for Pooled Metropolitan Statistical Area (MSA) Data for a Cleveland All-Star Game

<i>Statistic/Value</i>	<i>Coefficient Value (t statistic)</i>	
b_0 (constant)	-0.412	(-3.68) ^a
b_1 ($\partial N_t^i / \partial \Sigma \partial N_t^i / n_t$)	0.885	(32.81) ^a
b_2 ($\partial N_t^i / \partial \partial N_{t-1}^i$)	0.380	(17.68) ^a
b_3 ($\partial N_t^i / \partial \partial N_{t-2}^i$)	-0.112	(-4.81) ^a
b_4 ($\partial N_t^i / \partial \partial N_{t-3}^i$)	0.130	(6.89) ^a
b_5 ($\partial N_t^i / \partial Pop_t^i$)	-0.0081	(-4.87) ^a
b_6 ($\partial N_t^i / \partial y_t^i$)	-0.0011	(0.31)
b_7 ($\partial N_t^i / \partial W_t^i$)	-0.0065	(-1.67)
b_8 ($\partial N_t^i / \partial T_t^i$)	0.0041	(1.20)
b_9 ($\partial N_t^i / \partial BOOM_t^i$)	0.0125	(3.97) ^a
b_{10} ($\partial N_t^i / \partial BUST_t^i$)	-0.0250	(-7.30) ^a
b_{11} ($\partial N_t^i / \partial REG_t^i$)	-0.0100	(-7.24) ^a
b_{12} ($\partial N_t^i / \partial Cleveland\ All-Star\ Game$)	-0.0030	(-0.28)
b_{13} ($\partial N_t^i / \partial Cleveland$)	-0.0037	(-1.17)
b_{14} ($\partial N_t^i / \partial TR_t^i$)	0.0002	(4.13) ^a
R^2	0.707	
Adjusted R^2	0.703	
F statistic	166.60 ^a	

a. Result was significant at the 99% level.

1981 and 1997, the years during the examined period in which Cleveland held the All-Star Game. We must also report one unusual result. The coefficients on the lagged employment growth rates suggest that high employment growth in 1 year is associated with high employment growth in the following year, declining employment growth in the subsequent year, and back to higher employment growth in the third following year. Three years of lagged growth rates for employment were used to account for estimation problems created by a single aberrant year that could occur for a variety of reasons to include a natural disaster or a change in political parties with accompanying changes in fiscal strategies. Technically speaking, the model was most robust with this specification and the values for the cross correlation coefficients did not suggest a multicollinearity problem. The interpretation of the cyclical nature of employment growth on future employment growth, however, is admittedly difficult.

The key statistic for our purposes is the difference between the actual growth in jobs that predicted for the city hosting the All-Star Game. According to the Economic Report of the President in 1997, the U.S. economy produced roughly one job for every \$60,000 in economic activity. If one divides the \$60 million impact touted by MLB by the average dollar output of each employed worker, one would expect that the All-Star Game should produce roughly 1,000 new jobs in the host city during the year of the Game.¹ Because the level of employment in the cities hosting the All-Star Game ranged from about 700,000 workers to just more than 4,000,000

workers, a gain of 1,000 workers will be a small impact in relation to the whole city-wide economy, representing a percentage gain of between 0.14% and 0.023% for the cities hosting games between 1973 and 1997. A complete listing of each city's expected employment gains, realized employment gains, and job gains above or below expected numbers is shown in Table 2. Expected employment gains are calculated using Model 1 with the All-Star Game dummy variable removed.

As shown in Table 2, in only 1 year (Houston in 1986), did the All-Star Game emerge as a statistically significant event, and in this case the effect on employment was negative. In 13 out of 23 cases, the increase in employment in the host city was higher than expected, whereas employment gains were below the expected amount in the remaining 10 cases. On average, the model predicted an increase in employment in host cities of 2.11% during All-Star Game years while the observed gains in employment averaged just 1.73%. Instead of producing an increase in jobs of roughly one tenth of a percentage above what would be expected, the All-Star Game appears to have resulted in job growth 0.381% below the expected growth in employment. Although a gain of 1,000 jobs is still well within a 90% confidence interval for the predicted employment gains, the evidence clearly points against an economic impact that is "off the charts," as claimed by American League President Gene Budig (Ryan, 1998). In fact, one can reject the hypothesis that the All-Star Game contributed a net gain of at least 1,000 jobs beyond model expectations with a p value of 5.15%. Although this is only on the borderline of being an accepted level of statistical confirmation of the hypothesis that the MLB estimates of the economic impact are overstated, it does suggest that a net impact of \$60 million is likely to be very generous.

It could be argued that the high job losses that occurred in several years such as in Houston in 1986, San Diego in 1992, and New York in 1977 can be explained by factors that are not addressed by the model. For example, in 1986 Houston was suffering through the effects of the oil bust and the savings and loan collapse. Although the *BUST* variable was designed to compensate for this occurrence, Houston appears to have been particularly hard hit, at least in 1986. San Diego's economy in 1992 was hurt by the reduction in military base activity following the conclusion of the Gulf War in the previous year. New York in 1977 was in the midst of fiscal crisis during which the city declared bankruptcy. These three examples could lend support to an explanation that other economic factors caused the lower than expected growth in employment and that the growth would have been even worse if not for the presence of the All-Star Game.

This argument clearly has an important element of truth to it. The R -squared statistic from Model 1 shown in Table 1 implies that only 70% of the year-to-year and city-to-city variation in annual employment growth is explained by variables appearing in the model. A great deal of employment variation remains unexplained despite the numerous significant predictors included in the model; however, even if the three cases mentioned above are excluded from the analysis, the average employment growth in All-Star Game host cities is still below that expected by the

TABLE 2: Actual Versus Predicted Employment Growth in Host Cities, 1973 to 1997

<i>Year</i>	<i>Host City</i>	<i>Actual Growth (%)</i>	<i>Predicted Growth (%)</i>	<i>Difference (%)</i>	<i>t Statistic</i>	<i>Employment</i>	<i>Job Gains</i>
1973	Kansas City	4.563	4.427	0.136	0.09	699,402	953
1974	Pittsburgh	1.091	0.401	0.691	0.48	1,134,477	7,837
1975	Milwaukee	-2.214	-2.283	0.069	0.05	699,828	482
1976	Philadelphia	0.766	-0.321	1.087	0.75	2,153,495	23,401
1977	New York City	-0.257	1.175	-1.431	-0.99	4,213,813	-60,307
1978	San Diego	7.937	7.099	0.838	0.58	885,447	7,421
1979	Seattle	8.659	6.854	1.806	1.25	930,073	16,793
1980	Los Angeles	1.312	1.891	-0.579	-0.40	4,333,393	-25,094
1981	Cleveland	-1.723	-1.123	-0.599	-0.41	1,148,260	-6,883
1982	Montreal						
1983	Chicago	-0.592	-0.745	0.153	0.11	3,673,659	5,615
1984	San Francisco	2.920	4.206	-1.285	-0.89	1,129,498	-14,517
1985	Minneapolis	3.831	5.187	-1.356	-0.94	1,460,850	-19,806
1986	Houston	-4.486	-0.709	-3.777	-2.60	1,727,972	-65,266
1987	Oakland	4.014	3.362	0.652	0.45	1,048,510	6,838
1988	Cincinnati	3.561	4.012	-0.451	-0.31	846,545	-3,818
1989	Anaheim	2.475	4.735	-2.260	-1.56	1,531,022	-34,601
1990	Chicago	1.113	0.939	0.174	0.12	4,375,968	7,633
1991	Toronto						
1992	San Diego	-1.881	0.763	-2.644	-1.82	1,408,772	-37,248
1993	Baltimore	0.603	0.515	0.088	0.06	1,353,701	1,190
1994	Pittsburgh	1.441	1.050	0.391	0.27	1,264,254	4,944
1995	Ft. Worth-Arlington	3.160	4.079	-0.918	-0.63	1,487,234	-13,656
1996	Philadelphia	1.531	1.132	0.399	0.28	2,685,727	10,722
1997	Cleveland	1.954	1.896	0.058	0.04	1,352,336	783
	Average	1.730	2.110	-0.381	-0.26		-8,112

model (2.32% vs. 2.36%), albeit by a much smaller percentage than with these cases included. Furthermore, on the whole it would be expected that economic factors not included in the model would be just as likely to improve employment growth as to reduce growth. Certainly during numerous years, employment growth was buoyed by unexpected economic events that had nothing to do with the presence of the All-Star Game. Seattle's better than expected economic performance in 1979 is more likely attributable to growth in the aerospace industry than an unusually successful All-Star weekend. Similarly, the bicentennial celebrations in Philadelphia during 1976 were likely a much larger mega-event than any sporting event played in the city during that year.

MODEL 2

An examination of sales tax data permits further scrutiny of MLB's claims. As with Model 1, the key to calculating the impact of an event is to isolate which factors are common to the economy as a whole and which factors are specific to the city being studied. To accomplish this, we calculate the ratio of a host city's taxable sales to the taxable sales of the rest of the state in which the city resides. Whereas numerous factors such as inflation, population, the economic business cycle, expectations about the future, and seasonal variations can affect taxable sales in a city, most of these factors will affect taxable sales in surrounding areas in a similar manner. Therefore, although it may be difficult to predict taxable sales in a city, if economic factors affect all cities in a given state in the same way, then the ratio of a particular city's taxable sales to the taxable sales of the state as a whole should remain unchanged. If an event such as the All-Star Game significantly increases economic activity in the host city, then the host city's taxable sales as a percentage of taxable sales in the rest of the state should increase. By comparing the city/rest-of-state ratio in an All-Star Game time period to other time periods, an increase in taxable sales can be inferred.

Several known variables will serve to shift a city's ratio and must be accounted for when estimating a city's ratio. First, if the economy of a city is growing at a faster rate than the state's economy, then the taxable sales ratio will grow over time. Thus, it is reasonable to include a time trend variable in the model. This time trend variable can be inserted either as a linear or a quadratic variable. Next, seasonal variations affect some cities more than others. For example, during winter taxable sales in warm weather, vacation-destination cities tend to increase as compared to other cities. Therefore, seasonal dummy variables should be included in the model. Equation 2 represents the model used to predict the taxable sales ratio for a given host city with a linear trend variable. A model with a quadratic time trend would simply include a seventh predictor, $\beta_7(TR_t)^2$:

$$R_t = \beta_0 + \beta_1 Q1_t + \beta_2 Q2_t + \beta_3 Q3_t + \beta_4 TR_t + \beta_5 R_{(t-1)} + \beta_6 ASG_t + \varepsilon, \quad (2)$$

where for each time period t ,

- R_t = the city's ratio of taxable sales to the taxable sales in the entire state;
- Q_{it} = seasonal dummy variables for quarters 1, 2, and 3;
- ASG_t = dummy variable for the All-Star Game;
- TR_t = annual trend; and
- ε = stochastic error.

A seasonal dummy variable for quarter 4 is not included in the regression equation to avoid perfect colinearity. Because the All-Star Game only occurred once in each city during the time period examined, the dummy variable for the All-Star Game is simply equal to the residual in the quarter in which the All-Star Game took place.

If the All-Star Game has a significant economic impact on the host city as MLB claims, then this economic impact should be revealed by an increase in the host county's taxable sales compared with taxable sales in the rest of the state. Therefore, the sign on the All-Star dummy variable should be positive. On the other hand, if the congestion caused by the event simply displaces local residents and other tourists who would otherwise visit the city as suggested by Porter (1999) and Baade and Matheson (2000), then the expected value of the All-Star game variable would be zero. In other words, if All-Star Game visitors supplant rather than supplement tourism in the host cities, this would lead to no net change in taxable sales in the host city. In fact, it is even possible that taxable sales could fall with the presence of the All-Star Game. If there are more local residents or regular visitors attempting to avoid the congestion than there are visitors to the event, taxable sales will fall, leading to a negative coefficient on the All-Star Game dummy variable. In addition, if All-Star Game attendees tend to make purchases from vendors who travel to the All-Star Game from outside of the host city, when these vendors repatriate their earnings back to their home communities the economic multiplier effect is lowered as compared to purchases made by regular tourists from local retail outlets, again leading to a negative coefficient.

THE RESULTS OF MODEL 2

Using county-by-county quarterly taxable sales data from California, we examined the effects of the All-Star Game on taxable sales for three separate games in three different cities: San Diego (San Diego County), 1992; Anaheim (Orange County), 1989; and Oakland (Alameda County), 1987. California is examined for several reasons. First, because California is home to several MLB teams, this single data set can be used to examine the economic impact of several All-Star Games in the recent past. Next, sales tax data are readily available from the first quarter of 1986 through the second quarter of 2000, a longer period than data from many other states are easily accessible. Most important, California provides quarterly tax data

in addition to annual data. The use of quarterly data is important. If the researcher can compress the time period, then it is less likely that the impact of the event will be obscured by the large, diverse economy within which it took place. The use of annual data (as in the first model) has the potential to mask an event's impact through the sheer weight of activity that occurs in large economies during the course of a year. Annual data were used in Model 1 simply because of the availability of data rather than a preference for annual numbers.

For Anaheim and San Diego the inclusion of the quadratic time variable slightly improved model fit, whereas the model fit was unchanged for Oakland with the inclusion of this variable. The regression results for both models for each city are shown in Table 3.

In each of the three cities, the All-Star Game emerged as having a negative, although statistically insignificant, impact on taxable sales in the county in which the All-Star Game was held during the third quarter of the year in which the game was held. The third quarter was examined because the All-Star Game takes place during the middle of July every year. On average, the presence of the All-Star Game correlated to a 0.048% drop in the percentage of California's taxable sales accounted for by the host city. Because statewide taxable sales in California were roughly \$60 billion per quarter in the late 1980s and early 1990s, the two models suggest that Oakland suffered a drop in taxable sales of between \$28.5 million to \$29.0 million, Anaheim suffered a drop of between \$22.5 million and \$38.2 million, and San Diego suffered a drop of between \$21.5 million and \$39.8 million for an average drop in taxable sales of \$29.9 million.

The fact that the effect of the All-Star Game was negative in all three host cities supports the hypothesis that spending by All-Star visitors simply crowds out other spending that would have taken place in the absence of the game. MLB would likely argue that other economic factors caused the drop in taxable sales and that the drop would have been even worse if not for the presence of the All-Star Game. Although this explanation cannot be discounted, the model was designed specifically to minimize the chance of this problem occurring. Furthermore, the fact that the taxable sales data echo the results of the employment data from Model 1 suggests that another explanation is necessary. Another solution that might be offered by MLB is that economic activity has increased but is simply not reflected in taxable sales. The taxable sales data for California, however, specifically include sales of food and beverages in restaurants as well as sales by specialty stores and gift shops as well as car rental agencies. The only large visitor expense that is not included under taxable sales is hotel rooms, which are not subject to the state sales tax in California. In the absence of another compelling explanation, we are left to conclude that, at best, the All-Star Games leads to little or no net economic benefit to the host city. At worst, hosting the All-Star may lead to lower economic activity than a city would normally expect during the summer.

TABLE 3: Regression Results for Model 2 for Three California Host Cities (*t*-values in parentheses)

<i>Host City (year)</i>	<i>Constant</i>	R^{1-1}	TR^t	$(TR^t)^2$	Q_1^t	Q_2^t	Q_3^t	ASG^t	<i>F statistic (R²)</i>
Oakland	1.314	0.731	0.005	—	-0.080	-0.074	-0.001	-0.052	119.07
(1987)	(3.07)	(8.07)	(2.86)		(-2.44)	(-2.32)	(-0.26)	(-0.58)	(0.935)
Oakland	1.303	0.733	0.005	-0.000	-0.080	-0.074	-0.009	-0.051	100.03
(1987)	(2.86)	(7.76)	(1.63)	(-0.08)	(-2.41)	(-2.29)	(-0.26)	(-0.55)	(0.935)
Anaheim	1.891	0.844	-0.000	—	-0.130	-0.227	-0.206	-0.061	28.61
(1989)	(2.34)	(11.4)	(-0.02)		(-2.84)	(-5.07)	(-4.57)	(-0.50)	(0.774)
Anaheim	3.042	0.747	-0.008	0.000	-0.115	-0.218	-0.202	-0.036	26.44
(1989)	(3.09)	(8.54)	(-1.90)	(1.95)	(-2.54)	(-5.00)	(-4.60)	(-0.30)	(0.791)
San Diego	1.952	0.757	0.003	—	0.193	-0.091	0.177	-0.063	51.85
(1992)	(2.59)	(8.28)	(1.90)		(5.10)	(-2.47)	(4.47)	(-0.61)	(0.862)
San Diego	2.641	0.681	-0.002	0.000	0.187	-0.091	0.165	-0.034	46.10
(1992)	(3.06)	(6.65)	(-0.69)	(1.57)	(4.99)	(-2.51)	(4.15)	(-0.33)	(0.868)

NOTE: A *t*-value greater than 1.99 indicates that the result was significant at the 5% level.

CONCLUSIONS AND POLICY IMPLICATIONS

MLB has used the promise of hosting an All-Star Game as an incentive for cities to construct new stadiums at considerable public expense. Recent MLB studies have estimated that All-Star Games increase economic activity by about \$60 million in cities fortunate enough to host them. Our analysis fails to support MLB claims. Our detailed regression analysis reveals that during the period 1973 to 1997, All-Star Game cities had employment growth below that which would have been expected. Instead of an expected gain of around 1,000 jobs in the year a city hosts an All-Star Game, employment numbers in host cities have actually fallen more than 8,000 jobs below what would have been expected even without the promised \$60 million All-Star boost.

In analyzing the impact of All-Star Games in San Diego, Oakland, and Anaheim, an examination of taxable sales data reveals that taxable sales in host cities have not only failed to increase during All-Star Games, but have on average fallen nearly \$30 million below what would have normally been expected in these host cities.

Cities would be wise to view with caution the All-Star Game economic impact estimates provided by MLB. Although MLB claims that the All-Star Game is an economic home run, our analyses suggest that MLB's economic impact estimates of the game are a wild pitch.

APPENDIX
 Cities and Years Used to Estimate Model in Tables 1 and 2

<i>City Name</i>	<i>1969 Population</i>	<i>1969 Rank</i>	<i>1997 Population</i>	<i>1997 Rank</i>	<i>Wage Data Availability</i>	<i>Region</i>
Albany, NY	797,010	50	873,856	57	1969-1997	Mideast
Atlanta, GA	1,742,220	16	3,634,245	9	1972-1997	Southeast
Baltimore, MD	2,072,804	12	2,475,952	18	1972-1997	Mideast
Bergen, NJ	1,354,671	26	1,335,665	43	1969-1997 (state data 1969-1997)	Mideast
Boston, MA	5,182,413	4	5,826,816	4	1972-1997	New England
Buffalo, NY	1,344,024	27	1,163,149	47	1969-1997 (average of cities)	Mideast
Charlotte, NC	819,691	49	1,351,675	42	1972-1997	Southeast
Chicago, IL	7,041,834	2	7,883,452	3	1972-1997	Great Lakes
Cincinnati, OH	1,431,316	21	1,607,001	32	1969-1997	Great Lakes
Cleveland, OH	2,402,527	11	2,227,495	22	1969-1997	Great Lakes
Columbus, OH	1,104,257	33	1,456,440	41	1972-1997	Great Lakes
Dallas, TX	1,576,589	18	3,123,013	10	1972-1997	Southwest
Dayton, OH	963,574	42	952,060	55	1969-1997	Great Lakes
Denver, CO	1,089,416	34	1,901,927	26	1977-1997	Rocky Mountains
Detroit, MI	4,476,558	6	4,468,503	7	1976-1997	Great Lakes
Fort Lauderdale, FL	595,651	55	1,472,927	38	1969-1997 (state data 1988-1997)	Southeast
Fort Worth, TX	766,903	51	1,554,768	33	1976-1997 (state data 1976-1983)	Southwest
Greensboro, NC	829,797	48	1,153,447	48	1972-1997	Southeast
Hartford, CT	1,021,033	39	1,106,695	50	1969-1997	New England
Houston, TX	1,872,148	15	3,846,996	8	1972-1997	Southwest
Indianapolis, IN	1,229,904	30	1,504,451	36	1989-1997	Great Lakes
Kansas City, MO	1,365,715	25	1,716,818	28	1972-1997	Plains
Las Vegas, NV	297,628	57	1,262,427	45	1972-1997	Far West
Los Angeles, CA	6,989,910	3	9,116,506	1	1969-1997 (state data 1982-1987)	Far West
Louisville, KY	893,311	43	994,537	54	1972-1997	Southeast

(continued)

APPENDIX Continued

<i>City Name</i>	<i>1969 Population</i>	<i>1969 Rank</i>	<i>1997 Population</i>	<i>1997 Rank</i>	<i>Wage Data Availability</i>	<i>Region</i>
Memphis, TN	848,113	45	1,082,526	53	1972-1997	Southeast
Miami, FL	1,249,884	29	2,128,987	24	1969-1997 (state data 1988-1997)	Southeast
Middlesex, NJ	836,616	47	1,105,804	51	1969-1997 (state data 1969-1997)	Mideast
Milwaukee, WI	1,395,326	23	1,459,760	40	1969-1997	Great Lakes
Minneapolis, MN	1,991,610	13	2,794,939	13	1972-1997	Plains
Nashville, TN	689,753	53	1,136,607	49	1972-1997	Southeast
Nassau, NY	2,516,514	9	2,660,623	16	1969-1997	Mideast
New Haven, CT	1,527,930	19	1,626,327	30	1969-1997 (average of cities)	New England
New Orleans, LA	1,134,406	31	1,308,127	44	1972-1997	Southeast
New York, NY	9,024,022	1	8,650,425	2	1969-1997	Mideast
Newark, NJ	1,988,239	14	1,943,455	25	1969-1997 (state data 1969-1997)	Mideast
Norfolk, VA	1,076,672	36	1,544,781	34	1972-1997 (state data 1973-1996)	Southeast
Oakland, CA	1,606,461	17	2,273,911	21	1969-1997 (state data 1969-1987)	Far West
Orange County, CA	1,376,796	24	2,663,561	15	1969-1997 (state data 1982-1987)	Far West
Orlando, FL	510,189	56	1,462,958	39	1972-1997 (state data 1988-1997)	Southeast
Philadelphia, PA	4,829,078	5	4,939,783	5	1972-1997	Mideast
Phoenix, AZ	1,013,400	40	2,842,030	12	1972-1997 (state data 1972-1987)	Southwest
Pittsburgh, PA	2,683,385	8	2,359,824	19	1972-1997	Mideast
Portland, OR	1,064,099	37	1,789,790	27	1972-1997	Far West
Providence, RI	839,909	46	904,301	56	1969-1997	New England
Riverside, CA	1,122,165	32	3,047,741	11	1969-1997 (state data 1982-1987)	Far West
Rochester, NY	1,005,722	41	1,084,215	52	1969-1997	Mideast
Sacramento, CA	737,534	52	1,503,900	37	1969-1997 (state data 1982-1987)	Far West
St. Louis, MO	2,412,381	10	2,559,065	17	1972-1997	Plains
Salt Lake City, UT	677,500	54	1,250,854	46	1972-1997	Rocky Mountains
San Antonio, TX	892,602	44	1,506,573	35	1972-1997	Southwest
San Diego, CA	1,340,989	28	2,723,711	14	1969-1997 (state data 1982-1987)	Far West

San Francisco, CA	1,482,030	20	1,669,697	29	1969-1997 (state data 1982-1987)	Far West
San Jose, CA	1,033,442	38	1,620,453	31	1972-1997 (state data 1982-1987)	Far West
Seattle, WA	1,430,592	22	2,279,236	20	1972-1997 (state data 1982-1997)	Far West
Tampa, FL	1,082,821	35	2,224,973	23	1972-1997 (state data 1988-1997)	Southeast
Washington, DC	3,150,087	7	4,609,414	6	1972-1997	Southeast

NOTE: Complete data on population and employment were available for all cities from 1969 to 1997. This implies that data on employment growth and employment growth lagged from 1 to 3 years were available from 1973 to 1997. Data regarding state and local taxes as a percentage of state gross domestic product (GDP) were available for all cities from 1970 to 1997, and were obtained from the Tax Foundation in Washington, D.C. Wage data from the Bureau of Labor Statistics were available for cities as described above. When city data were not available, state wage data were used in its place. When possible, the state wage data were adjusted to reflect differences between existing state wage data and existing city wage data. For metropolitan statistical areas (MSAs) that included several primary cities, the wages of the cities were averaged together to create an MSA wage as noted. The Boom and Bust dummy variables were included for cities highly dependent on oil revenues including Dallas, Denver, Fort Worth, Houston, and New Orleans. The Boom variable was set at a value of 1 for the years 1974-1976 and 1979-1981, and the Bust variable was at a value of 1 for the years 1985-1988. Each city was placed in one of eight geographical regions as defined by the Department of Commerce. The region to which each city was assigned is shown. Employment, income, and population data were obtained from the Regional Economic Information System at the University of Virginia, which derives its data from the Department of Commerce statistics.

NOTE

1. It should be noted that the prediction that the All-Star Game would create 1,000 jobs for a full year is, in itself, difficult to imagine. This number implies that either the 3-day event created 1,000 year-round jobs, or the event created 12,000 jobs for a month, or the event created 100,000 short-term jobs for the duration of the event. Each implication strains credibility.

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Robert A. Baade has been the James D. Vail Professor of Economics at Lake Forest College since 1986. He earned his Ph.D. in economics from the University of Wisconsin at Madison. He has published approximately 40 scholarly articles, book chapters, and monographs relating to international finance, international trade, and a variety of topics relating to the economics of professional and intercollegiate sport. In addition to his work as a scholar, he has been involved in numerous state, county, and city deliberations relating to large public projects to include stadiums, arenas, and convention centers.

Victor A. Matheson has been an assistant professor in the Department of Economics and Business at Lake Forest College since 1997. He earned his Ph.D. in economics from the University of Minnesota. In addition to the field of professional sports, in which he has published several arti-

cles, his research interests include state lotteries and state and local taxation. He also works as a soccer referee for various organizations including the Big Ten Athletic Conference and Major League Soccer.

The Pricing of a Round of Golf

The Inefficiency of Membership Fees Revisited

JAMES G. MULLIGAN

University of Delaware

This article argues that the use of membership fees at shared facilities, such as private golf courses, is not per se evidence of inefficient pricing as implied by the club theory literature on variable usage. The author reconciles the inconsistency between the predictions of existing models and empirical evidence by accounting for members' opportunity cost of time and the effect of congestion on members' utility. In particular, this research shows that the simplified nature of congestion assumed in the literature ignores the positive externalities that members receive from a members-only club.

An extensive literature on the theory of clubs has developed since the seminal contribution of Buchanan (1965).¹ As indicated by Sandler and Tschirhart (1997), most contributions to the club literature have been theoretical in nature:

Although club theory has been profitably applied to a host of economic problems, an important agenda still exists in terms of empirical testing of club models, where direct measures of congestion are used. Most empirical work has not developed good tests of the basic ingredient of club theory—its congestion function and the membership condition. (p. 353)

This article considers the congestion function and the membership condition for a specific application of club theory: private golf courses. The private golf course has been singled out in the literature as a leading example of the inefficient use of membership fees for a club good when usage is variable (e.g., Cornes & Sandler, 1996; Scotchmer, 1985). Although the congestion function and membership conditions of existing theoretical models imply the efficiency of per-use fees to internalize the congestion externality due to variable usage, a number of clubs, such as private golf courses, use membership fees rather than per-use fees (Berglas, 1976; Helsley & Strange, 1991). The literature's two explanations for the prevalence of membership fees as opposed to per-use fees are monopoly power and high transactions costs.

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This article makes two specific contributions. First, it shows that the monopoly power and transactions costs explanations for the widespread use of membership fees are not supported empirically. Second, it reconciles the inconsistency between the predictions of existing models and the empirical evidence by accounting for members' opportunity cost of time and the effect of congestion on members' utility. The article is organized as follows. The next section summarizes the nature of the congestion function and membership condition of existing club models when members' usage is variable. The third section presents empirical evidence that is inconsistent with the monopoly power and transactions costs explanations for the use of membership fees at private clubs. The fourth section discusses the problems with the assumptions in the theoretical literature and proposes a positive externalities explanation for the use of membership fees at private golf courses, followed by concluding comments.

THE CONGESTION FUNCTION AND MEMBERSHIP CONDITION

Buchanan (1965) argued that club members determine the optimal size of the club by equating the marginal reduction in overall operation cost due to the addition of a new member with the negative effect that the new member has on existing members' level of consumption of the club good. Buchanan did not address explicitly the nature of this negative effect: "Sharing here simply means that the individual receives a smaller quantity of the service" and "this quantity will be related functionally to the number of others with whom he shares" (p. 3). In his model all members are assumed to be identical with congestion a function of the number of members, not the aggregate number of visits to the facility. The cost of club membership is implicitly a membership fee, because he defined the price to be paid as the total cost of the club's operation divided by the number of members. Exclusion of nonmembers is assumed to be costless.

Starting with Berglas (1976), the club good literature has focused on the role of per-use fees to internalize the congestion externality when usage is variable. According to Berglas, when usage can vary, the club arrangement with membership fees is inefficient. Because members of most clubs visit them more than once, this line of research also implied that the original Buchanan (1965) model is no longer relevant. For example, Scotchmer (1985) wrote, "If the intensity of use per unit of time is variable, however, the Buchanan model does not apply. The number of people with access to a golf course is in itself irrelevant; what counts is how many rounds of golf members play" (p. 456).²

To arrive at these conclusions, these authors departed from Buchanan's (1965) assumption that members know the impact that a new member will have on congestion and the utility of other members, while implicitly retaining the costless exclusion assumption. They explicitly assume that potential members separate the joining decision from the participation decision by deciding whether to join based on the total cost of membership (fixed plus variable fees) while determining their

usage based only on the per-use fee. For members of a private golf course, this assumption means that golfers consider membership fees and per-use fees in determining whether to join. The decision concerning the annual number of rounds actually played is then based only on the per-use fee, if any. According to this literature, if the private club charges no green fees or other per-use fee, members will play a number of rounds of golf where the marginal utility of the last round played equals zero and the number of rounds played will be inefficiently large relative to the socially optimal number.

In Berglas's (1976) model, clubs compete in a competitive market. Scotchmer (1985) maintained the same essential assumptions concerning members' utility functions and the definition of congestion, but changed the nature of competition. In her model, shared facilities can charge both membership and per-use prices. The innovation in her article was the use of a game theoretic model with a symmetric Nash equilibrium in these two prices for a finite number of profit-maximizing golf courses and utility-maximizing consumers.

More specifically, Scotchmer (1985) specifies a separable utility function for each of N identical consumers as $U[m, X, c] = m + h(X) - f(c)$, where m is a homogeneous private good, c is the level of congestion (assumed to be the total number of visits per year to the facility), and X is the number of visits (annual rounds of golf) per member. When there is a fixed number of homogeneous clubs, s , each club has N/s members. In equilibrium, the profit-maximizing firms charge a per-use fee that equals the marginal cost (including congestion cost and wear and tear) and charges a lump-sum annual membership fee to capture consumer surplus. Each club's prices are a best response to the other clubs' pricing strategies, because any deviation from these prices that gives consumers an incentive to go to a different club affects the level of congestion at each club and lowers the club's profits as a result.

According to Scotchmer (1985), the implications of her model are essentially the same as in Oi's (1971) classic article on two-part pricing. Although Oi assumed that the firm was a monopolist, Scotchmer suggested that the size of the fixed fee in her model is a direct measure of the degree of the firm's market power. According to Scotchmer, "As the economy is replicated, each firm loses its market power. The equilibrium membership fee converges to zero, and the per visit revenue paid by each patron converges to the 'competitive' visit price. In this sense the lump-sum fee is a measure of market power" (p. 468).

One other explanation in the literature for the prevalence of membership fees at private clubs is large transactions costs of monitoring use. For example, Helsley and Strange (1991) make a distinction between coarse (membership fees) and fine pricing (membership and per-use fees). The absence of fine pricing is due to the transaction costs of monitoring use. Although Helsley and Strange do not mention golf or skiing as examples, Cornes and Sandler (1996) in an extensive survey of the literature apply Helsley and Strange's result to golf and suggest that private golf courses use an inefficient pricing system:

Many real-world clubs, such as country clubs, use membership fees rather than visitation fees and are, in the absence of exclusion costs or some other form of transaction costs, inefficient. This arrangement may be justified, however, when the exclusion costs of collecting visitation fees are included. . . . If these exclusion costs exceed the loss in efficiency associated with collecting membership fees, then the membership fee approach is best. (p. 397)³

EMPIRICAL EVIDENCE

This section provides empirical evidence at odds with the market power and transactions costs arguments of the previous section. The main points are that (a) private golf courses are unlikely to have the market power implied by the Scotchmer model and (b) it is unlikely that private golf courses have transactions costs that are so high as to preclude the use of per-use fees if clubs would like to do so.

Market Power

Scotchmer (1985) claimed the following empirical support for her model:

The pricing behavior of our model appears in at least some shared facilities of the economy. Certainly in the case of private golf courses, which have strong local monopolies, there is a large membership fee which precedes [*sic*] the right to use the golf courses by paying a visit fee. . . . In the case of ski slopes, however, there is almost never a membership fee. The fee structure usually resembles something closer to a visit price. . . . Conditional on the clientele that travels to the mountains to ski, each ski slope has little market power because there are many ski slopes. Thus one would expect a low membership (or "season") fee and a visit price to cover the congestion cost imposed on the slope. (p. 468)

The implication of this line of reasoning is that a membership fee (or season pass) indicates market power, whereas exclusive use of a per-use price (daily lift ticket in the case of skiing) is indicative of a competitive market. In Scotchmer's (1985) model, the market power premium embodied in the membership fee should disappear as the number of firms increases, with the clubs charging only a per-use fee.

Scotchmer (1985), however, does not explain why the private golf course does not also charge a per-use fee to cover congestion and wear and tear in addition to the membership fee as implied by her model. In her model, clubs in a competitive market charge a per-use fee that would not only cover the cost of congestion and wear and tear on the margin but also cover its average cost of operation in long-run equilibrium. Because Scotchmer's model also implies that even monopolistic golf courses would charge a per-use price that includes congestion and wear and tear, the lack of a per-use fee at the private club undermines the empirical relevance of the model.

As a further indication of confusion concerning the relevance of the model, Cowen and Glazer (1991), writing in support of the empirical relevance of Scotchmer's (1985) model, argued that

membership fees for clubs are analogous to ticket prices for the ski lift. The number of rides that skiers obtain is analogous to congestion in club theory; congestion reduces each user's utility as the number of people who visit the facility increases. . . . Scotchmer demonstrates that, in general, efficiency requires imposing a price for each ride. (pp. 376-377)

As a result, using the same model as Scotchmer (1985), Cowen and Glazer (1991) imply that the use of lift ticket pricing is an indicator of market power, whereas Scotchmer implies that lift ticket pricing is an indicator of competitive pricing.

More fundamentally, the application of this model to skiing and golf is at odds with the organization of these markets. Scotchmer's (1985) distinction between a private golf course and a ski area is an artificial construction that ignores the alternatives available to potential members. In fact, there is no essential difference between the pricing options available to skiers and golfers once one accounts for the similarity in the market structure of these two industries.

There are approximately 400 ski areas and 16,000 golf courses in the United States. Both types of facilities fall into four general categories: (a) national resorts that attract large numbers of visitors from other regions of the country; (b) local or regional privately owned facilities with public access; (c) local publicly owned facilities, such as municipal golf courses and ski areas, with public access; and (d) local privately owned facilities with access limited to members and their guests.

Resort ski areas are open to the public even if the skier plans to ski only 1 day in the year. However, these ski areas also offer a wide array of pricing options including season passes and multiday packages. Golf resorts follow the same pricing plan. There are season passes for local residents intending to play more frequently and multiday and single-day rates. Ski areas and golf courses that draw from primarily local populations offer the same pricing options, usually season and daily passes. In other words, there is no fundamental difference in the pricing options offered at these public golf and ski facilities.⁴

Although less common than private golf courses, private ski areas also exist. In fact, many public ski areas started as private clubs and switched to open facilities due to advances in lift technology and lower transportation costs. Both private ski areas and private golf courses restrict access to a membership who pay membership and initiation fees. The difference between the number of private ski areas and golf courses can be largely explained by the relative cost of operation and number of potential members needed to cover operating costs. The average skier skis approximately 5 days per season, whereas the average golfer plays approximately 22 rounds per year. Many ski areas are located in relatively remote areas that involve significant transportation and lodging costs for visitors, which restricts the number

of visits per year of most potential members. These costs, along with the high fixed cost of chairlifts, imply a relatively larger number of members needed to cover the costs of a private ski area relative to that of a private golf course.⁵

The conclusion that membership fees are a measure of market power is further weakened empirically by the presence of a wide range of golfing facilities with comparable aggregate numbers of rounds per year within close proximity of one another but with different pricing options. Existing club models with variable usage define congestion (i.e., intensity of use) as the number of visits per year. However, one can find an abundance of examples where golf courses with the same number of rounds per year coexist in local markets despite different pricing structures. Take the example of four golfing facilities within approximately 30 minutes of driving time of one another in the vicinity of Wilmington, Delaware: Newark Country Club, Three Little Bakers Golf Course, Hartefeld National Golf Course, and Wilmington Country Club. All four courses reported approximately the same number of rounds played for the 1999 golfing season, yet two are private country clubs and two are public golf courses. Hartefeld National, a public course, charged \$110 per round (including mandatory cart) in 2000, whereas Three Little Bakers, the second public course, charged \$52 per round on weekends and \$47 on weekdays. Three Little Bakers Golf Course is of similar quality to that of Newark Country Club, a private club, whereas the other two are of comparable quality. Golfers willing to pay the membership and initiation fees can join either private club. Anyone willing to pay the green fees can play at the two public courses and at the many other public courses in the area. In addition, golfers can choose a membership fee option that allows them to play throughout the season with no per-use fee at these public courses.

The coexistence of public facilities with different green fees and private facilities with different membership fees is indicative of differences among golf courses due to a number of factors in addition to the level of congestion, such as physical setting of the course, complexity of the course, and number of amenities. Similarly, ski areas vary by the quality of the skiing experience with vertical drop and difficulty of the trials likely to be the most important indicators.⁶ Golfers and skiers can thus choose among different quality levels, number of visits per year, and between being a member of a private facility or a visitor/member of a facility open to the public. Golf course membership fees also may vary due to the members' preferences for greater exclusivity that is independent of the congestion implied by the number of rounds played. For example, Buchanan (1965) indicated that the optimal number of members will "tend to become smaller as the real income of an individual increases" (p. 12). Buchanan's example was swimming pools, with lower income communities more likely to have cooperative arrangements and individuals in wealthier communities owning their own pools. Some wealthy individuals, such as actor Clint Eastwood, even have their own golf courses for private use, just as some individuals own their own swimming pools.

Transactions Costs

A second explanation for the exclusive use of membership fees and the absence of per-use fees is the claim of significant transaction costs at private golf courses. As mentioned above, public golf courses coexist with private golf courses. Public golf courses charge players by the round but also offer membership fees as an alternative for frequent visitors. Although some private golf courses allegedly practice exclusion by refusing membership based on gender, race, and ethnic background, these practices have become less widespread in the United States over time. In the absence of a mechanism of this type for excluding nonmembers, initiation and membership fees coupled with waiting lists serve as the sole means of limiting membership size. How the club could remain private without charging a membership fee is not addressed in this literature.

More important, payment of initiation and membership fees implies a minimum usage of the facility. If we assume that individuals' utility functions differ based on income or preference for the number of rounds per year, there will be some individuals who would prefer to play only one round of golf per year at the market determined per round fee. If a golf course chooses to charge only per-use fees, there is no way in a competitive market to exclude individuals who will join the club to play one round and only pay the per-round fee. They have been implicitly excluded in the literature by the maintained assumption that all consumers are identical with each golfer playing the same number of rounds per year conditional on the pricing mechanism used by a group of homogeneous clubs. There must, however, be some mechanism for excluding nonmembers. According to Buchanan (1965), "The theory of clubs developed in this paper applies in the strict sense only to the organization of membership or sharing arrangements where 'exclusion' is possible" (p. 13).

Even if one is willing to accept the assumption that there is another mechanism for limiting membership at a private golf course apart from a membership fee, it is unlikely that private clubs avoid charging members per-use fees due to high transactions costs. If limiting the number of rounds played by members were an objective for internalizing a negative externality, it would most likely be easier to do it at a private club than at a public club, primarily because there are fewer users to monitor. In addition, there is already in place a system at these clubs that could be used to charge the member an additional fee for each use with little extra cost. All private golf clubs monitor the number of rounds played by asking members to sign in, while members are known to the staff and are already billed on a monthly basis for purchases in the pro shop, dining room, and bar. As a result, there is already in place a mechanism for billing members for each round played if so desired, so that transactions costs are likely to be low on the margin and unlikely to be larger than the cost of monitoring and charging one-time visitors at a public course.

In addition, exclusion of nonmembers is likely to be less costly for similar reasons. Members have special tags on their bags identifying them as members, plus, more important, their relatively frequent use of the facility over time makes them

well known to the pro shop staff and other members. As a result, golfers attempting to use the facility without paying are more easily identifiable than they would be at a public facility with a larger number of golfers, even holding the aggregate number of rounds constant. This implies that preventing use by nonpaying golfers is likely to be less costly for the members-only club, not more costly as implied by the literature.

THEORETICAL CONSIDERATIONS

The previous section suggests little empirical support for the market power and transactions costs explanations for the widespread use of membership fees at private clubs. A significant problem with the application of these models to private golf courses is the unrealistic assumption that the private golf course can limit its membership size without requiring members to pay a membership fee. This issue aside, there are still theoretical problems with the assumptions of existing models that lead to an overstatement of the inefficiencies attributed to membership fees. In this section, I argue that the alleged inefficiency results from a lack of an explicit recognition of the opportunity cost of a member's time and the assumption that the member's utility function is separable. In addition, the literature has ignored the benefits of limiting the number of golfers who use the course. Because a membership fee implies a minimum expected usage per golfer, the membership fee pricing system raises the average number of rounds played per golfer at the club. I argue that members receive positive externalities as a result.

Opportunity Cost of Time and Separability of the Utility Function

Even if one is willing to accept the fact that the club can limit the size of its membership by some other mechanism, the existing models overstate the negative externality implied by using membership fees. Existing models of variable usage do not explicitly account for the time cost of each visit to the facility. Unlike visits to other potentially congestible facilities, a round of golf can take 4 to 5 hours to play during daylight hours. Although the opportunity cost of the first round of golf per year may be quite low, it eventually increases significantly, especially for someone with a full-time job. Although some rounds can be played on weekends during the golf season, additional rounds are at the expense of at least half a day off from work or time spent with family members. As a result, whereas a per-use fee raises the marginal cost of a round of golf, the rapidly rising opportunity cost of time is likely to be a much greater disincentive on the margin.

More important, given the rapidly rising opportunity cost of an additional round of golf per year, potential members are quite likely to forecast with some certainty both the nature of the time constraint that they face when joining and the maximum number of rounds that they are likely to play during the year. Even

though unplanned events, such as changes in the weather, will affect the exact days that these rounds are played in any given year, they are unlikely to affect in a significant way the total number played per year.

Although Scotchmer (1985) states that “none of our results depends on either transferability or separability (implied by this specification),” the separability assumption is critical to her result concerning membership fees: “Separability between X and c means that individuals consider the congestion when deciding whether to use a facility, but once they have decided, the intensity of use depends only on the price for the visit” (p. 458). If we assume, instead, that a new member on joining knows (a) the number of other members of the club, n ; (b) the expected value of congestion, $c(n)$; and (c) the effect congestion has on the time cost of a round of golf at different levels of X , each member will choose X so as to equate the marginal utility of a round of golf to the marginal time cost of the additional round. Given the rapidly increasing opportunity cost of an additional round, there is likely to be a much smaller difference in the member’s choice of rounds prior to and after joining the club than implied by the literature. As a result, the congestion and wear and tear on the course associated with the aggregate number of rounds played is unlikely to be much different given either a membership fee or a per-use fee pricing structure.

Positive Externalities of Restricting the Number of Golfers

Given that per-use fees, as opposed to membership fees, alter the marginal cost to the golfer of an additional round, the marginal effects of these two pricing methods are still not exactly equal. However, even if there is a somewhat greater number of aggregate rounds played at a club charging a membership fee compared to one charging only a per-use fee, holding total revenue generated constant, the coexistence of private and public courses of comparable quality suggests that there must be benefits from club membership that compensate members for this additional small congestion cost. Stated otherwise, if club members make this mistake on paying their initial annual membership fee and all that they care about is the aggregate number of rounds played, why would they continue to pay this membership fee in subsequent years if they could experience lower congestion at the same average price per round at a public club?⁷ In the remainder of this section I suggest that there are positive externalities due to the limitation on the number of golfers at the club, holding the aggregate number of rounds constant. These benefits are due to (a) an implicit code of conduct that affects both speed of play and the level of courtesy of fellow golfers, (b) a lower probability of being unable to play on any given day, and (c) lower maintenance costs.

An implicit code of conduct. Existing club models of variable usage are limited by the use of total visits per year as the only measure of potential congestion. It is noteworthy that while Berglas (1976) acknowledged a number of possible mea-

asures for the degree of members' intensity of use, he used total visits per year only as an example.

Intensity can be affected in various ways. In the case of swimming pools, the club member can change the number of times he visits the place, the length of his stay, and the use of the pool's various services. . . . In the following analysis, however, just one variable represents intensity of use; this will suffice to show the similarity between the club case and the private good case. (p. 118)

Ever since, theorists have continued to use total visits as the only measure of intensity without regard to the specific application of the model.

Whereas the number of rounds played is one measure of congestion, the speed of play is mostly a function of the golfers who are playing directly ahead. Although the current literature implicitly models a club as a space that everyone occupies at the same time, golf can be thought of as a parade with each golfer occupying a place in the parade. Even if the entire course is empty except for the players immediately in front, one cannot play any faster than those playing ahead, unless allowed to play through. In addition, the behavior of players immediately behind or on adjoining holes can affect one's enjoyment of the round. Unlike a course at which a large number of players play less frequently, the members-only club creates a social environment that can impose criticism and sanctions for slow or inconsiderate play either directly to the members themselves or indirectly through the club staff. Thus, there is an implicit code of conduct that depends on repeated contact among members over time. Whereas at public and resort courses slow play is mitigated to some extent by marshals who patrol the course, the self-policing nature of members-only arrangements reduces the need for and cost associated with employees serving these functions.

Lower probability of being unable to play on any given day. Both private and public courses use reservation systems during peak time periods to reduce the congestion cost associated with waiting to tee off. Sign-up or call-in reservations with a set time is one method of securing a tee time without costly negotiation or time spent waiting in line. On the other hand, if the number of potential golfers exceeds the number of tee times available on any given day, golfers who value playing on that day the most may not necessarily secure a reservation. On the other hand, if the total number of annual visits is the same at two courses but one course charges membership fees and the other per-use fees, the maximum number of golfers who may want to play on any one day at the members-only club is less. Even if the average number of rounds per day is the same at the two clubs, the variance is likely to be greater at the club with more potential players. More important, the effect of this larger variance is not symmetric. The addition of one more golfer wanting to play on a day with a relatively light turnout will have relatively little effect on the margin compared to that of an additional golfer on a day with a heavier turnout.

Although the main sources of financing the private club's operation are initiation and membership fees, private clubs often do impose indirect per-use fees for play during peak demand time periods. For example, participation in club-sponsored tournaments on weekend mornings and holidays is another way of securing a tee time. In this case, tournament fees (including, at times, mandatory use of a cart) are an indirect means of raising the marginal cost that shifts the playing time of those members who value these time periods less highly to other time periods. Although this pricing method does not necessarily affect a member's aggregate number of rounds played per year, it will affect the day and time that these rounds are played. In addition, guests fees at private clubs (often with the additional requirement of a cart) are also often higher during weekends and holidays. Even though the transactions cost of charging members an additional per-use fee for rounds played is likely to be quite small, as argued earlier, the general absence of these fees at private clubs at other time periods is more likely evidence of the small benefit to be gained from doing so than the high transactions costs argument made in the literature.

Lower maintenance costs. Finally, there is also a potential implicit cost savings in the maintenance of the facility at a private club of comparable quality to that of a public course with the same aggregate number of rounds played per year. Increasing the number of golfers who play infrequently at a course, even given the same aggregate number of rounds per year, can increase the wear and tear on the course, regardless of the club's pricing structure. Repeated use of the facility by the same golfers increases the likelihood that members will be more likely to maintain the quality of the course (i.e., replace divots and rakes, not drive carts close to the greens or over plants, etc.) relative to the infrequent, nonmember golfer due to their long-term planned use of the facility and the implicit code of behavior mentioned above.

CONCLUSION

This article has the limited objective of showing that the use of membership fees at shared facilities, such as private golf courses, is not per se evidence of inefficient pricing as implied by the club theory literature on variable usage. The alleged inefficiency stems from an assumed separation of the joining and use decisions of members and the definition of congestion used. The literature has ignored the importance of the opportunity cost of time in limiting the number of visits per year and aligning the joining and use decisions of potential members. By assuming that consumers are identical, the literature on variable usage has also implicitly ignored the role served by membership fees in excluding consumers who would choose to use the facility on an infrequent basis if allowed to pay a per-use fee. In addition, the simplified nature of congestion assumed ignores the positive externalities that members receive from a members-only club, even if the number of aggregate visits are the same as at a public facility of comparable quality.

Although a nonrefundable initiation fee is a true sunk cost, the membership fee is only fixed for the golfing season. Payment of an initiation fee, which is normally nonrefundable, implies an even longer commitment to the club and its members.⁸ Willingness to make this long-term commitment to the club, despite the possibility of somewhat higher per round costs due to the congestion associated with a higher aggregate number of rounds played, implies that there are other benefits from restricting the number of members that are missing from the current models. Membership and initiation fees signal to potential members that these characteristics will be a part of the golfing experience. Given the wide range of pricing options available, golfers who value these characteristics of a private club, want to play at least the minimum number of rounds implied by paying the fixed fees of membership, and have the income, will self-select this option among the many types offered by the market.

This article does not attempt to construct a complete model of a private golf course that accounts for related services subject to congestion, such as swimming pools, tennis courts, locker rooms, and dining facilities. My focus has been on the limitation of the club literature's definition of congestion to the aggregate number of rounds of golf. Prior to building a more general model that incorporates all of the related services provided by a club, one must first have a clear understanding of the nature of congestion that occurs for the use of each of the individual services. By accounting for the exclusionary role of a membership fee, incorporating the opportunity cost of time, refining the nature of congestion assumed, and focusing on the positive externalities intrinsic to limiting use of the course to golfers who use the golf course repeated times, one can explain much of the use of membership fees in practice at private clubs without having to resort to market power and transactions costs explanations. As Buchanan (1965) wrote, "The theory of clubs is, in one sense, a theory of optimal exclusion, as well as one of inclusion" (p. 13).

More generally, this research implies that there is value in accounting for the importance of time costs and detailing the nature of congestion for specific club goods. Although an all-inclusive model with a generic definition of congestion fitting all applications of club goods is a worthy objective, it should not be at the expense of being able to explain the real-world applications that the model claims to incorporate. This point, I believe, is at the heart of Cornes and Sandler's (1996) concern about the need for testing club theoretic models' relevance to the applications being modeled.

NOTES

1. Detailed surveys of the entire literature on club goods can be found in Cornes and Sandler (1996) and Sandler and Tschirhart (1997).

2. Actually, Buchanan (1965) did address the issue of variable usage in a footnote:

The model applies equally well, however, for those cases where cost shares are allocated proportionately with predicted usage . . . membership in the swimming club could, for example, be

defined as the right to visit the pool one time each week. Hence, the person who plans to make two visits per week would in this modification hold two memberships. (p. 8)

3. This overall assessment of the role of membership fees can also be found in Sandler and Tschirhart's (1997) survey of the literature.

4. The pricing options are even more varied at some public courses with the additional option of paying a fixed, annual fee along with a lower per-use fee. At some courses one can pay a fixed fee to have preferred tee times during peak periods. More important, these pricing options are available to anyone wishing to choose them. On the other hand, there is also the option of paying only a per-use fee. See Shmanske (1998) for a complete discussion of the various pricing options available at public golf courses.

5. The typical private golf club with 18 holes has approximately 650 members. On the other hand, a new ski area, Bear Creek Mountain Club in Plymouth, Vermont, advertised in the Fall of 2000 that it plans to operate as a private club of no more than 2,650 members. The ski area will operate similarly to a private golf club, with an initiation fee and annual dues.

6. See Shmanske (1999) for a more detailed discussion of golf course quality and pricing and Mulligan and Llinares (2000) for a comparable discussion for ski areas.

7. As in the case of Buchanan (1965), I ignore the social reasons for joining an exclusive club and focus instead on the market reasons: "The individual remains indifferent as to which of his neighbours or fellow citizens join him in such arrangements. In other words, no attempt has been made to allow for personal selectivity or discrimination" (p. 13).

8. The opportunity cost of time varies over the life cycle with teenage, college-age, and retired golfers likely to have lower time costs and, thus, likely to play more often. However, even these groups have alternative uses for their time. Although retirees are likely to play more often than those with full-time jobs, they are also more likely to face physical limitations that curtail the number of rounds played. Counter to the implications of this literature, both public and private golf facilities usually charge these groups of golfers relatively lower per-use and annual membership fees than those in the prime working ages, despite their lower opportunity cost of time and their increased frequency of play.

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James G. Mulligan is a professor in the Department of Economics at the University of Delaware.

Major League Baseball

Monopoly Pricing and Profit-Maximizing Behavior

DONALD L. ALEXANDER

Western Michigan University

This article presents evidence that team owners in Major League Baseball (MLB) set ticket prices as profit-maximizing monopolists. However, the evidence also indicates that the cost of other forms of entertainment affects the demand for baseball tickets as economic theory would predict. The interpretation is that team owners face negatively sloped demand curves for baseball tickets but they must compete for the consumer's entertainment dollar in a broader market for entertainment services. The recent change in MLB's territorial restrictions also had some impact on ticket pricing. The impact, however, is inconsistent with the hypothesis that it enhanced the team owners' market power. Instead, the evidence is consistent with the hypothesis that the change increased the demand for baseball tickets. One plausible explanation is that it provided greater incentive for individual team owners to promote their teams against other forms of entertainment. This argument merits additional consideration in future research and may provide some insight into how nonprice vertical restraints in other markets affect economic performance.

In a recent issue of *Sports Illustrated*, E. M. Swift (2000) reports that average ticket prices in the four professional sports (i.e., baseball, football, basketball, and hockey) have increased by 80% since 1991, whereas the Consumer Price Index (CPI) has increased by only 20% during this same period.¹ Indeed, the average ticket price has increased by 92.7% in Major League Baseball (MLB) alone. He laments that Joe Fan is no longer able to afford to take the family to see the home team, but team owners (who enjoy the economic benefits generated from having new stadiums) and players (who are being paid the high salaries) are both getting richer at the expense of the new “corporate fans” who are still willing to pay the higher ticket prices. Swift then offers two competing explanations for this emerging

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trend in professional sports. First, the players are partially responsible because he argues that team owners must raise ticket prices to cover escalating players' salaries. By contrast, the new corporate fans are also responsible because they are willing to pay higher ticket prices for the game and the more expensive stadium amenities that many teams now offer. Consequently, in the latter explanation it is the fans' willingness to pay the higher ticket price that is driving the increase in salaries paid to the current and future superstars. Although this debate can be easily resolved in terms of the underlying economic logic, it does raise other issues that would interest economists and sports fans alike. For instance, what economic factors determine the extent to which team owners can raise ticket prices without reducing profits (or revenues)? Do team owners set ticket prices to maximize profits or to maximize attendance and hence revenues? Are the observed ticket prices consistent with monopoly pricing? Does baseball compete against other forms of entertainment for the consumer's dollar? Finally, do territorial restrictions in MLB increase ticket prices?

The purpose of this article is to address several of the aforementioned questions empirically using annual data for 26 MLB teams.² In the first section, I estimate a demand function for baseball tickets, which allows me to determine whether team owners maximize profits or alternatively maximize revenue. Economic theory suggests that ticket prices should be set in the elastic range of demand if team owners act like profit-maximizing monopolists. In previous research, Noll (1974), Scully (1989), Coffin (1996), and Irani (1997) all find evidence that prices are set in the inelastic range of demand, and then each offers various reasons why this still may be consistent with profit-maximizing behavior.³ The major criticism with those studies is that the authors treat price and quantity (attendance) as exogenous variables in the estimation procedure, which casts some doubt on the reliability of the estimates reported. In the estimation procedure described below, I treat price and quantity (attendance) as endogenously determined by the interaction of demand and cost factors. The empirical evidence that I present in this article indicates that ticket prices are set in the elastic range of demand. Moreover, the elasticity estimates also differ widely across the various teams (i.e., cities) and in a systematic pattern consistent with the view that baseball is part of a broader, monopolistically competitive market for entertainment. In this type of market structure, team owners face very elastic and negatively sloped demand curves for their particular form of entertainment because consumers view the different forms of entertainment (including attending a baseball game) as imperfect substitutes. This evidence is also consistent with the finding that professional sports teams have a negligible impact on local economies because consumers spend fewer entertainment dollars on nonsports entertainment and spend those dollars on the new sports team.⁴

In the second section, I examine whether recent changes in a team's territorial restrictions have affected ticket prices. In 1995, MLB amended league rules that expanded the geographic territories in which each team operates.⁵ Since 1910, MLB has granted team owners an exclusive territory in a particular city, which, in

effect, provides the incumbent team owner with a monopoly franchise in that location. MLB prohibits a new or existing team from locating in that geographic area unless the new team owner obtains permission from three fourths of the current owners. This new change, which went into effect in 1996, expanded the team's exclusive territory to a 25-mile radius of the team's current stadium location, essentially changing the respective geographic size of the team's exclusive territory. In addition, MLB granted exclusive territories to all minor league franchises in their respective locations as well. Because MLB currently enjoys antitrust immunity,⁶ this particular change offers a unique opportunity to test empirically several competing hypotheses regarding the economic impact of this type of non-price restraint on market price and quantity.⁷ The evidence presented in this article indicates that the change did increase ticket prices but by a small percentage. However, the evidence also shows that the demand for tickets became more elastic after the change went into effect, which is inconsistent with anticompetitive behavior. This evidence is tentative, however, because the change had been in effect for only 2 years during the sample period.

MONOPOLY PRICING AND PROFIT-MAXIMIZING BEHAVIOR

I will assume that MLB is a collection of individual franchises (i.e., teams) that offer a specific form of entertainment called *team competition*. Although team owners have a monopoly MLB team in a particular city, they must compete against other forms of entertainment for the consumer's dollar.⁸ This approach will allow me to address two questions that are unresolved in the sports economics literature. First, do team owners set ticket prices to maximize profit? We know from basic price theory that if owners are maximizing profits, then they will be setting price in the elastic part of the demand curve.⁹ Second, do team owners operate in a broader entertainment market where baseball is one of many forms of entertainment competing for the consumer's dollar? I will also test this hypothesis when estimating the demand for baseball tickets.

The sample is a panel of cross-sectional and time-series (annual) team data for the 26 National League (NL) and American League (AL) teams for the period 1991 through 1997. The appendix describes each variable and the respective data sources.

The basic empirical model is the inverse market demand function:¹⁰

$$PRICE = \beta_0 + \beta_1 QUANTITY + \beta_2 INCOME + \beta_3 PRENT + \beta_4 GBACK + \beta_5 DUMMIES + \epsilon. \quad (1)$$

I use the average ticket price (*PRICE*) reported in the *Team Marketing Report* as the dependent variable in the demand equation. Admittedly, this measure does not reveal the range of prices team owners charged for various seat locations in a partic-

ular stadium, and it certainly does not reflect any discounts fans enjoy when they purchase a ticket. Nevertheless, these are the only ticket price data that are available from a single source. To account for the effect of inflation during the sample period, I deflated the average ticket price by the *CPI for All Items* index, which is reported for the various Metropolitan Statistical Areas (MSA) in which MLB teams are located. Thus, *PRICE* is the inflation-adjusted, average ticket price measured in terms of an overall basket of goods and services that varies across the different teams and across time.

The independent variables in the demand equation are as follows: First, I use the team's total attendance per year, normalized by the population in that MSA, to measure *QUANTITY*. The inverse market demand is the aggregation of all households in a city that may purchase a ticket and thus it follows that we should normalize attendance by a city's population. Normalization also controls for potential differences in demand that may arise between small- and large-market teams. Second, I use real, per-capita income (*INCOME*) to control for income differences across cities and because previous studies have found that income is an important economic determinant of demand or attendance decisions.¹¹ Third, I include the variable *PRENT* in the demand function to test whether variations in the cost of other forms of entertainment affect the market demand for baseball tickets. This variable is the *Entertainment Price Index* for each MSA deflated by the *CPI for All Items* in that MSA.¹² I would expect that this variable would have a positive impact on the demand for baseball tickets if baseball does indeed compete against other forms of entertainment for the consumer's entertainment dollar. Fourth, I include the variable *GBACK* to control for the impact of a team's performance on demand, and it is measured as the number of games back a team finished in the standings during the previous season. A team that had a good season in the previous year will likely face an increase in demand in the following year, whereas a team that performed poorly may experience a drop-off in demand in the following year. Furthermore, this measure seems reasonable because a significant fraction of a team's ticket sales is composed of season tickets and those fans are likely to base their purchase decision on the team's performance in the previous season. One could argue, however, that those fans are the most loyal and are not likely to place much weight on past team performance when purchasing their season tickets.

I also include a vector of dummy variables (*DUMMIES*) to account for other team or league-specific factors that may affect the demand for tickets. The first is an indicator variable (*TWO*) that is equal to 1 if the team is located in a city in which there is another MLB team and 0 otherwise. Competition between the two MLB teams should limit the ability of either team owner to raise ticket prices and thus we expect the sign of this variable to be negative. Granted, teams in those cities have a loyal fan following, that is, not likely to switch allegiances based on an increase in ticket prices. Nonetheless, it is equally likely that there are baseball fans in each city who, at the margin, might be willing to choose to attend a game based on ticket prices and the fact that they wish to view an MLB game.

The second is an indicator variable (*STRIKE*) that is equal to 1 for the years 1994 to 1995 and 0 otherwise to control for the baseball strike. The strike shortened the 1994 season and this may have affected ticket demand in 1995, especially if baseball fans were disillusioned with the events that unfolded in the previous year.

The third is an indicator variable (*ET*) that is equal to 1 during the years when the team's new geographic territories were in effect (1996 to 1997) and equal to 0 for all other years (1991 to 1995). The expected impact of this change is uncertain. For example, expanding the exclusive territory may have increased the team owners' ability to raise ticket prices in those cities in which there is only one MLB team present and where there is a minor league team located nearby. However, *ET* may pick up the effect of the baseball strike on ticket demand because many believe that the strike adversely affected demand in the following years.¹³ Given the limited data availability, it might be difficult to disentangle the strike effect from the effect of the change in territorial limits.

The fourth is an indicator variable (*NL*) that is equal to 1 for all NL teams and 0 otherwise. The rationale for including this variable is to control for the factors that are league specific, but not team specific, that may possibly affect ticket demand. For example, the AL uses the designated hitter (DH) rule, whereas the NL does not. The impact of this difference on demand, however, is uncertain. On one hand, baseball purists may object to the DH and express their objection by reducing their demand for tickets. On the other hand, fans may like to see more hitting and prefer to see the designated hitter used. Thus, *NL* is included to pick up any league-specific differences that may affect ticket demand.

The fifth is an indicator variable (*EXPANSION*) to account for the entry of two expansion teams (Colorado and Florida) and the potential that the new team will have a higher demand, *ceteris paribus*.¹⁴ Because it is unclear how long this "expansion team" effect lasts, I conservatively let this variable equal 1 during the first year and 0 otherwise.

The sixth is an indicator variable (*NEWPARK*) to control for the fact that several teams built new stadiums during this period (1991 to 1997), which may have increased ticket demand as well.¹⁵ Again, because it is unclear how long this "new stadium" effect lasts and because the time-series data are limited, I conservatively let this variable equal 1 during the first year the new stadium opened and 0 otherwise.

In the empirical model, Equation 1 and the marginal revenue (MR) equals marginal cost (MC) equilibrium condition determine *PRICE* and *QUANTITY* endogenously. The MR function is derived easily from Equation 1 and is shown as

$$MR = \beta_0 + 2\beta_1 QUANTITY + \beta_2 INCOME + \beta_3 PRENT + \beta_4 GBACK + \beta_5 DUMMIES. \quad (2)$$

The MC function is shown as

$$MC = \alpha_0 + \alpha_1 AGE + \alpha_3 INPUT. \quad (3)$$

TABLE 1: Summary Statistics

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Maximum</i>	<i>Minimum</i>
<i>PRICE</i>	6.95	1.13	10.54	5.18
<i>QUANTITY</i>	0.54	0.38	2.09	0.06
<i>INCOME</i>	17,151.00	1,548.50	21,592.00	14,247.00
<i>PRENT</i>	103.14	6.86	120.00	84.50
<i>GBACK</i>	13.44	10.77	44.00	0.00
<i>ET</i>	0.29	0.46	1.00	0.00
<i>NL</i>	0.49	0.50	1.00	0.00
<i>TWO</i>	0.24	0.43	1.00	0.00
<i>STRIKE</i>	0.29	0.46	1.00	0.00
<i>EXPANSION</i>	0.01	0.11	1.00	0.00
<i>NEWPARK</i>	0.03	0.17	1.00	0.00
<i>AGE</i>	31.63	23.64	86.00	1.00

NOTE: See the appendix for a description of these data and their sources.

The costs of running a team are fixed in the short run and, in many instances, are not fully borne by the team owners but by the taxpayers in a specific location.¹⁶ Moreover, the marginal cost of admitting an additional fan is probably constant and relatively low for all teams, at least up to stadium capacity, and therefore is not likely to vary with changes in *QUANTITY*. However, marginal cost is likely to vary across teams for other reasons. For example, the age of the ballpark (*AGE*) is likely to affect costs because older ballparks may have higher marginal costs for reasons including routine maintenance and the provision of additional ancillary services such as concessions and parking. The vector *INPUT* will include other factors that will likely create variations in MC across teams as well. Unfortunately, I am unable to find suitable measures to use in the regression analysis because of data limitations. Nonetheless, the important point is that *AGE* will likely capture some variation in costs across teams and therefore is a reasonable instrumental variable to include with the other exogenous variables (*INCOME*, *PRENT*, *GBACK*, and *DUMMIES*) in the first-stage estimation of *QUANTITY*. *QUANTITY* will vary with *AGE* because of the $MR = MC$ equilibrium condition. The second-stage estimation of Equation 1 uses the predicted values for *QUANTITY* instead of *QUANTITY* as one of the explanatory variables.

Table 1 shows the summary statistics for the variables used in the regression analysis, whereas Table 2 presents the results for the various models estimated using the two-stage least squares procedure in *SHAZAM*. I did not include team-specific dummy variables in the demand model because they would be perfectly collinear with the time-invariant *TWO* variable. It is impossible to estimate separate team fixed effects when the regression includes a variable that varies

TABLE 2: Two-Stage Least Squares Regression Results: Inverse Demand Functions Panel Data From 1991 to 1997

Variable	1	2	3	4
CONSTANT	3.45 (1.67)	3.33 (1.69)	3.24 (1.73)	2.51 (1.51)
QUANTITY	-2.48 (-2.15) ^b	-2.50 (-2.07) ^b	-2.48 (-2.14) ^b	-2.94 (-3.51) ^a
QUANTITY*TWO		-1.68 (-0.53)		
TWO*OTHERPRICE			-0.04 (-0.54)	
QUANTITY*ET				1.59 (3.62) ^c
INCOME	0.00004 (0.44)	0.00003 (0.28)	0.00005 (0.51)	0.00003 (0.30)
PRENT	0.04 (2.94) ^a	0.05 (2.80) ^a	0.04 (2.94) ^a	0.06 (3.05) ^a
GBACK	-0.04 (-4.36) ^a	-0.04 (-4.19) ^a	-0.04 (-4.42) ^a	-0.03 (-4.14) ^a
TWO	-0.30 (-0.55)			
ET	0.85 (3.59) ^c	0.86 (3.56) ^c	0.85 (3.57) ^c	
STRIKE	0.31 (1.42)	0.30 (1.26)	0.31 (1.44)	0.30 (1.46)
EXPANSION	2.09 (2.04) ^b	2.11 (1.96) ^b	2.10 (2.01) ^b	2.75 (2.59) ^a
NEWPARK	1.17 (2.68) ^a	1.22 (2.74) ^a	1.17 (2.69) ^a	1.04 (2.48) ^a
NL	-0.39 (-1.84)	-0.39 (-1.84)	-0.38 (-1.78)	-0.46 (-2.38) ^d
R ²	0.06	0.04	0.05	0.05

NOTE: These estimates are obtained using *STATA* with the robust standard error option and using *AGE* as one of the instrumental variables.

a. 1% significance level (one-tailed) = 2.36.

b. 5% significance level (one-tailed) = 1.66.

c. 1% significance level (two-tailed) = 2.63.

d. 5% significance level (two-tailed) = 1.98.

across teams but is constant over time for each team.¹⁷ In addition, I tested for heteroskedasticity using the Breusch-Pagan-Godfrey test in *SHAZAM* and found evidence that it was present in the four regression models shown in Table 2. I then reestimated the models in *STATA* using the Huber-White sandwich estimator of the variances, and the results are presented in Table 2.

Column 1 shows the results from estimating a simple specification of the inverse demand function. Several of the economic variables have the expected sign and are significant at conventional levels. The *QUANTITY* variable, for example, has a negative sign and is significant at the 5% level. More important, the estimated elasticity (evaluated at the means) is approximately 5.19, which indicates that team owners are pricing in the elastic region of the demand curve.¹⁸ The results in column 1 also indicate that income (*INCOME*) has no statistically significant effect on demand, which is interesting because several other studies have reported a negative income effect. The estimated coefficient for *PRENT* is positive and significant at conventional levels. This suggests that the relative cost of entertainment does affect the demand for baseball tickets in a particular MSA. Apparently, consumers view baseball as one form of entertainment among many, and although team owners have a monopoly position in MLB in a particular city, they are nevertheless competing for the consumer's dollar in a broader entertainment market. This result also supports

the rationale given in other studies for why a professional sports team has a negligible impact on a local economy.

The results also show that team performance matters because *GBACK* has a negative impact on ticket demand in the current season. The implication is that a team that performs poorly in the previous season will experience a lower ticket demand in the current season, *ceteris paribus*. This result is consistent with the view that many fans believe a team's performance will not change significantly from year to year. If a team finishes way behind in a pennant race this year, the chances are the team will not do very well the following year. This result is also consistent with the fact that season-ticket holders purchase many of the tickets before the start of a new season, and those fans are likely to base their purchase decision on team performance in the previous season.¹⁹

Finally, four of the six indicator variables performed as anticipated. The *ET* variable indicates the change in exclusive territories has had a positive impact on price. I will discuss the implication of this result in the next section. The *NL* variable indicates the ticket demand is lower in NL cities.²⁰ Perhaps baseball fans prefer to see the potential for more offense when the DH is used.²¹ The *EXPANSION* variable indicates that ticket demand is higher in the first year for an expansion team, *ceteris paribus*, whereas the *NEWPARK* variable reveals that a new stadium increased ticket demand as well. By contrast, the *STRIKE* variable is insignificant, which is interesting because many believe that the 1994 strike had diminished the popularity of baseball among its fans. The variable *TWO*, which I included to determine whether pricing differs in cities with two MLB teams, is also insignificant. This result is somewhat surprising because it is plausible to expect that prices would be lower when there is a competing form of MLB entertainment. However, because *TWO* is time invariant it may be picking up the effect of some other factor that is specific to a city with two major league teams.

In column 2, I interacted *TWO* with *QUANTITY* to test whether having two MLB teams affects the price elasticity of demand. One hypothesis suggests that demand is more elastic given the presence of a second team. The regression results, however, indicate that the presence of a second team does not matter. This may mean that team allegiances are so strong in those cities (e.g., New York, Chicago, and Los Angeles) that one team's ticket demand is largely unaffected by the other team's presence. Moreover, the pattern of results for the other variables reported in column 2 was unaffected by including this interaction term.

In column 3, I interacted *TWO* with the ticket price of the second team to test whether variations in the second team's ticket price affects the first team's ticket demand.²² The regression results reveal that it is not a significant factor in the demand relationship. Again, this may mean that team allegiances are unresponsive to cross-price effects. Alternatively, the *TWO* variable may be picking up factors specific to the two-team cities or specific to those teams that might be offsetting the cross-price effect.

TABLE 3: 1993 Team Elasticity Estimates

Anaheim Angels	15.37
Los Angeles Dodgers	11.69
Chicago White Sox	10.82
Chicago Cubs	10.50
Oakland As	9.33
Detroit Tigers	7.35
Boston Red Sox	7.16
San Francisco Giants	6.41
Baltimore Orioles	5.74
Texas Rangers	5.04
Houston Astros	4.80
San Diego Padres	4.40
Philadelphia Phillies	4.15
Pittsburgh Pirates	4.06
Seattle Mariners	3.46
Minnesota Twins	3.45
Cleveland Indians	3.33
Florida Marlins	3.07
Milwaukee Brewers	2.70
St. Louis Cardinals	2.36
Atlanta Braves	2.29
Kansas City Royals	2.28
Cincinnati Reds	1.79
Colorado Rockies	1.12

NOTE: New York Yankees and New York Mets were omitted because the estimates seemed to be unusually large.

Next, I wanted to examine whether demand elasticity varied by team in a systematic fashion. I used the value -2.48 , which is the parameter estimate for *QUANTITY* in column 1 of Table 2, and the team-specific mean values for *PRICE* and *QUANTITY* to compute demand elasticity estimates for each team. Table 3 presents the results for 1993, and several interesting patterns emerge from the estimates shown in this table.²³ The first is that the teams with the largest elasticities are located in what many would classify as large-market cities, and the teams with the smallest elasticities are located in small-market cities.²⁴ The large-market cities are likely to have many other forms of entertainment competing against MLB for the consumer's entertainment dollar, whereas in small-market cities there are fewer alternatives available. Hence, it is plausible to expect a very elastic demand facing those team owners in large-market cities.

The second interesting pattern is that the top 10 cities include all those cities in which there are two MLB teams located in the same city (e.g., New York, Chicago, and Los Angeles). Again, it is not surprising that team owners in those cities face a very elastic demand curve because they may be competing against each other for fans that do not have well-defined team allegiances. This, however, raises the following question: Why is *TWO* and its interaction with *QUANTITY* insignificant in

columns 1 and 2 in Table 2? One explanation may be that given the data used in this research, there is insufficient variation in these data to estimate any effect on demand. Unless we estimated demand curves for each team or included team-specific dummy variables, which is not possible, we would be unable to pick this variable's effect on demand.

The results presented in columns 1, 2, and 3, taken together, suggest that team owners are setting ticket prices in the elastic range of negatively sloped demand curves as theory would predict. Furthermore, the results also indicate that the cost of other forms of entertainment affect ticket demand, which suggests that MLB competes in a much broader market for entertainment. The next section examines how the recent change in a team's exclusive territories has affected ticket prices.

THE EFFECT OF EXCLUSIVE TERRITORIES ON BASEBALL TICKET PRICES

The effect of vertical price and nonprice restraints on market performance has been without question one of the most controversial areas in antitrust economics during the past several decades. Before 1970, many legal scholars and economists believed that vertical restraints reduced competition in the relevant upstream or downstream market, which consequently reduced overall consumer welfare.²⁵ Indeed, several early antitrust cases decided by the Supreme Court before 1970 expounded this view.²⁶ After 1970, however, economists and legal scholars (mainly associated with the Chicago School) challenged the view that vertical restraints are necessarily anticompetitive. Instead, they argued that firms use vertical restraints to correct potential incentive or externality problems that often arise in the relationship between an upstream firm(s) and a downstream firm(s). Consequently, vertical restraints serve to improve the efficiency of the market.²⁷ Furthermore, proponents of the Chicago School argue there are relatively few situations in which the use of vertical restraints can reduce consumer welfare.²⁸

The theory of vertical restraints predicts that the change in territorial limits might affect the demand curve facing team owners in the following ways. On one hand, the procompetitive rationale suggests that demand will increase because team owners are able to internalize the benefits of team promotion, which, all factors considered, will increase baseball ticket prices. On the other hand, the anticompetitive rationale suggests that the change will enhance the market power of a team owner in that location and, consequently, raise ticket prices because the demand elasticity decreases (i.e., becomes more inelastic). Thus, the procompetitive hypothesis suggests that price will increase because demand shifts, whereas the market-power hypothesis suggests that price will increase because demand elasticity changes.

The variable of primary interest in Table 2 is *ET*. In columns 1, 2, and 3, the results indicate that the change in each team's exclusive territory has a positive impact on market demand, which is consistent with the procompetitive (or effi-

ciency) hypothesis mentioned above. To test the market-power hypothesis, I interacted *QUANTITY* with *ET* to determine whether the change in exclusive territories had any impact on demand elasticity. The results in column 4 show that it did, but the effect is in the opposite direction of what was expected.

To determine this result, first take the partial derivative of *PRICE* in column 4 with respect to changes in *QUANTITY*, which yields

$$\partial PRICE / \partial QUANTITY = -2.94 + 1.59ET. \quad (4)$$

Second, multiply Equation 4 by the appropriate ratio of mean values and then invert the product; the result shows that the elasticity increases in absolute value from 4.38 before the change to 9.53 after MLB expanded the exclusive territory for each team. More important, this evidence is not consistent with the hypothesis that the change increased the market power of team owners because it limited competition. The evidence does suggest, however, that the demand facing team owners became more elastic after MLB changed its territorial restrictions. One explanation may be that *ET* is picking up the effect of the baseball strike in 1994 to 1995. If fans became less interested in attending baseball games and found other forms of entertainment more appealing, then the demand for tickets could have become more elastic. Unfortunately, the data do not allow me to discriminate between these possible effects.

SUMMARY AND CONCLUSIONS

This article presents estimates that support the hypothesis that MLB team owners set ticket prices as profit-maximizing monopolists. However, the evidence also indicates that the cost of other forms of entertainment affects the demand for tickets as economic theory would predict. The interpretation is that team owners face a negatively sloped demand curve for baseball tickets but compete for the consumer's entertainment dollar in the broader market for entertainment services. I find that income has no significant impact on ticket demand, unlike other studies that have reported a negative effect. Finally, team performance matters at the gate, which should be of no surprise to economists and sports fans alike.

This research shows that economic factors help to explain the pattern of ticket prices in MLB. Although the evidence is not conclusive, the research indicates that change in territorial restrictions had some impact on ticket pricing. However, the impact is inconsistent with the hypothesis that it enhanced the team owners' market power. Instead, one could argue that the change provided greater incentive for individual team owners to promote their individual teams against other forms of entertainment. This argument merits additional consideration in future research and may provide further insight into how nonprice vertical restraints in other markets affect economic performance.

APPENDIX

PRICE: The average ticket price per team for each year (1991 to 1997) as reported in the Major League Baseball (MLB) Fan Cost Index, *Team Marketing Report*. I deflate *PRICE* using the Consumer Price Index (CPI) for All Urban Consumers, All Items, for selected Metropolitan Statistical Areas (MSAs) as reported by the U.S. Department of Labor, Bureau of Labor Statistics at <http://www.bls.gov/sahome.html>. I use the Los Angeles index for Anaheim and the Philadelphia index for Baltimore.

PRENT: The entertainment price index for All Urban Consumers, All Items, for selected areas as reported by the Bureau of Labor Statistics, *CPI Detailed Report Data*, various issues. I deflate *PRENT* using the CPI for All Urban Consumers, All Items, for selected MSAs as reported by the U.S. Department of Labor, Bureau of Labor Statistics at <http://www.bls.gov/sahome.html>.

QUANTITY: The total home attendance per team for each year (1991 to 1997) as reported on *Sean Lehman's Baseball Archive*, MLB Attendance at <http://www.baseball1.com/bb-data/>. *QUANTITY* is normalized by the total population per MSA or CMSA for each year as reported by the U.S. Census Bureau, Population Estimates for Metropolitan Areas and Components: 1990 to 1998, (MA-98-3a) Population Estimates for Metropolitan Areas and Components, Annual Time Series, at <http://www.census.gov/ftp/pub/population/www/estimates/metropop.html/>.

INCOME: Nominal per capita income per SMSA for each year (1991 to 1997) as reported by the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data at <http://www.bea.doc.gov/bea/regional/reis/>. *INCOME* is deflated using the CPI for All Urban Consumers, All Items, for selected MSAs as reported by the U.S. Department of Labor, Bureau of Labor Statistics at <http://www.bls.gov/sahome.html>.

GBACK: Each team's finish in its division from the previous year as reported on *Sean Lehman's Baseball Archive*, MLB Standings, at <http://www.baseball1.com/bb-data/>.

TWO: This variable is equal to 1 for teams located in cities that share the same territory and 0 otherwise. I use the territorial designations as reported in Major League Rules, Attachment 52, *Major and Minor League Territories*, to determine whether two teams share the same territory: New York, Chicago, and Los Angeles.

ET: This variable is equal to 1 for the years 1996 and 1997 (when MLB changed the territorial limits) and 0 for all other years.

STRIKE: This variable is equal to 1 for the years 1994 and 1995 and 0 for all other years.

NL: This variable is equal to 1 if the team is a National League team and 0 otherwise.

EXPANSION: This variable is equal to 1 for Colorado and Florida for 1993 and 0 otherwise.

NEWPARK: This variable is equal to 1 for Atlanta, Baltimore, Chicago, Cleveland, and Texas for the first year in which the stadium was opened and 0 otherwise.

AGE: The age of each team's stadium or ballpark as reported by *Sean Lehman's Baseball Archive*, Major League Stadium History, at <http://www.baseball.com/bb-data/>. In a city where a new stadium was constructed, I use the date when the new stadium opened.

NOTES

1. See "Hey Fans: Sit on It!" (Swift, 2000, p. 73).
2. I omit the two Canadian teams (Montreal and Toronto) because of data limitations.
3. Bruggink and Eaton (1996) found that prices are set in the elastic range in the demand for individual games. This result is questionable given that the authors did not appear to treat price as an endogenous variable in the regression equation.
4. See, for example, Siegfried and Zimbalist (2000) for a summary of this literature.
5. See Fatsis (1995).
6. In 1922, the Supreme Court ruled that baseball was not a form of interstate commerce and was therefore immune from the antitrust laws.
7. Sass and Saurman (1993), Culbertson and Bradford (1991), and Jordan and Jaffee (1987) are the only empirical articles to my knowledge that examine how exclusive territories affect market performance. However, those estimates are from the malted beverage (beer) industry, and it is not clear their findings would generalize to other markets.
8. There are a few cities where there are two Major League Baseball (MLB) teams located. The Yankees and Mets are located in New York, the Cubs and White Sox are located in Chicago, the As and Giants are located in the San Francisco/Oakland area, and the Dodgers and Angels are located in Los Angeles. One can argue that because the Dodgers are located in Los Angeles and the Angels are located in Anaheim that these teams are in separate cities. However, according to the Major League rules, Attachment 52, *Major and Minor League Territories*, the Dodgers and Angels share the same geographic territory, as do the Mets and Yankees and the Cubs and White Sox. In addition, this document indicated that the Giants (located in San Francisco) and the As (located in Oakland) have separate territories.
9. See Salant (1992) for a discussion of this hypothesis in the context of price setting in professional sports.
10. I decided to estimate an inverse market demand for the following reason. It is likely there is some measurement error in the average ticket price given the various promotional programs team owners use to price tickets. By contrast, it seems reasonable to believe that there is less measurement error in the team's total attendance data. Therefore, the measurement error in the ticket price data will be part of the error term in estimating the demand function and will not affect the parameter estimates of the other explanatory variables.
11. Bruggink and Eaton (1996) find a negative income effect, whereas Coffin (1996) reports a positive and negative effect.
12. The one problem with using the entertainment part of the Consumer Price Index (CPI) is that it includes the purchase of professional sporting events and thus may include baseball.
13. See Bruggink and Eaton (1996) and Staudohar (1997).
14. I thank the two referees who suggested this variable.
15. Again, I thank the two referees who suggested this variable.
16. See, for example, Alexander, Kern, and Neill (2000).
17. See Greene (2000, p. 572) for more details.
18. Because this is an inverse demand function, we must take the inverse elasticity estimate to obtain the own price elasticity.

19. According to Salant (1992), a major source of gate receipts for professional sports teams is season ticket sales.
20. This variable is significant at the 10% level.
21. There may be other differences between the two leagues that this variable is picking up as well.
22. An anonymous referee kindly suggested this third regression model.
23. I used 1993 data because the baseball strike likely affected the 1994 and 1995 elasticity estimates and because 1993 was close to the middle of the time period used in this sample.
24. I regressed the elasticity estimates against population (*POP*) and found that *POP* had a positive and statistically significant effect on the team's elasticity. Although this could be interpreted to mean that population size is driving the elasticity estimates, it could also be interpreted to mean that larger markets have more entertainment alternatives compared to smaller markets.
25. See Kaserman and Mayo (1995) and the excellent discussion in Posner (1976) and Bork (1978).
26. See Posner (1976) and Bork (1978).
27. See Kaserman and Mayo (1995).
28. Recently, several articles have shown that these conditions are not as rare as one would be led to believe. See, for example, Bernheim and Whinston (1998) and Whinston (1990).

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Donald L. Alexander is an associate professor of economics at Western Michigan University. In 1983, he earned his Ph.D. in economics from Penn State University. Before joining WMU in 1991, he held faculty positions at The College of William and Mary and Penn State University and professional positions at the Federal Trade Commission, Capital Economics (a consulting firm), and the International Trade Commission. He has published articles in the areas of industrial organization, antitrust economics, and regulation in professional journals such as the Southern Economic Journal, Applied Economics, The Review of Industrial Organization, Journal of Economics and Business, and Economics Letters. His current teaching and research interests include the pharmaceutical and telecommunications industries, and he has contributed an article that was published in the American Enterprise Institute's Competitive Strategies in the U.S. Pharmaceutical Industry. In addition, he is the coeditor of Networks, Infrastructure, and the New Task for Regulation (with Werner Sichel) and editor of Telecommunications Policy: Have Regulators Dialed the Wrong Number? He is a past recipient of the Philip S. McKenna Fellowship for the Study of Market Economics.

Racial and Ethnic Employment Discrimination

Promotion in Major League Baseball

FRED A. BELLEMORE

Employment discrimination is studied by examining the performance of baseball players at the highest minor league level in the 1960s, 1970s, and 1990s. Both Blacks and Hispanics face discrimination in promotion to the major leagues. Blacks faced it in the 1960s and 1970s and still did in the 1990s, but it subsided in years when jobs were created through expansion in the number of teams. Hispanics faced discrimination in the 1960s and 1970s that abated in years of expansion, but there is no significant evidence that they did in the 1990s.

Labor analyses that attempt to study worker promotion are often less than ideal because a uniform measure of performance with which to judge candidates does not exist. In addition, they often examine only those workers who have been promoted—studying promotion of CEOs by analyzing CEOs, for example—without access to the pool of candidates from which those promoted were chosen. Consequently, they are unable to gauge the extent of any discrimination involved in the selection.

Measuring promotion in sports is one area that does not necessarily suffer from either of these problems. However, most studies completed have focused on the players that have already been promoted (Brown, Spiro, & Keenan, 1991; Jiobu, 1988; Johnson & Marple, 1973; Kahn & Sherer, 1988), rather than on the potential pool of players for promotion (Spurr & Barber, 1994). No consideration is given to those passed over in the process. This analysis uses the performances of minor league baseball players to determine if discrimination occurs in promotion to the major leagues. In studying this group, one gets both the uniform standard of measurement and a large pool of candidates (rather than only the group that was selected).

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Furthermore, unlike many other studies of employment discrimination, in this analysis wage discrimination¹ is essentially untangled from any employment discrimination. Endogeneity between wage and employment discrimination exists in most labor market situations, making it difficult or impossible to examine either individually. But endogeneity is not a concern here because players promoted from the minor leagues generally make the major league minimum salary or close to it in the year they are promoted. Salary differences are so small that labor decisions would not be affected by them. Consequently, wages for promoted players are essentially exogenous, and if teams discriminate they do by affecting the racial/ethnic composition of the players on their teams rather than the wages of these players.

The article examines whether Black and Hispanic players face discrimination in promotion from the highest minor league level (AAA) to the majors, whether the discrimination has persisted over time, and whether it abates in years when more jobs are created (through league expansion). Data on batters from 11 years are used in the analysis—1968 to 1969, 1976 to 1977, and 1991 to 1997. The major leagues expanded by four teams after the 1968 season and by two after each of the 1976, 1992, and 1997 seasons.

The results indicate that Black and Hispanic players face discrimination in promotion. For all the years examined, a Black player is 8.7% less likely to be promoted than a White of equal performance and a Hispanic player 7.5% less likely. Blacks faced discrimination in the 1960s and 1970s and still faced it in the 1990s. The discrimination subsided in years when the league expanded and more jobs were created. Hispanics faced discrimination in the 1960s and 1970s that abated in the years of expansion, but there is no significant evidence that they did in the 1990s.

The discrimination in promotion is present even controlling for positional discrimination. Blacks are extremely underrepresented in the infield and Hispanics in the outfield, and both are underrepresented at catcher. But in examining outfielders and infielders separately, Blacks and Hispanics face discrimination at both positions.

These results mean that discrimination in promotion is still a problem faced by Blacks. The excuse for why there are so few Black managers in baseball and coaches in pro football has been that the pool of eligible Blacks—those managing in the minors or assistant coaches—is so small that consequently few are chosen. This cannot be said for players. Given the large group of available candidates, Blacks were 9.3% less likely than Whites to be promoted in the 1960s and 1970s and 8.1% less likely in the 1990s.

The results also mean that the discrimination that existed against Hispanics in promotion in the past has now largely subsided. There may be several partial explanations for why this has occurred. Baseball has made attempts to attract Hispanic American fans during the past decade, particularly in Florida and Arizona where teams have been added in Miami, Tampa, and Phoenix. International efforts to sign promising young players has increased substantially and occurred predominantly,

if not exclusively, in the Dominican Republic, Panama, and Puerto Rico, as well as in Mexico, Venezuela, and when possible, Cuba. Teams have many more scouts looking for talent in the Caribbean–Central American region than they did 10 years ago.²

What may be the most interesting finding is that the discrimination that exists for Blacks and Hispanics abates in years in which the league expands. Approximately 64 new jobs were created for batters after the 1968 season and about 30 after each of the 1976, 1992, and 1997 seasons.³ The first expansion represented a 20% increase in jobs, whereas the past three were in the 8% range. In the expansion years there is no evidence of discrimination—whatever existed goes away. The implication is that when the league expands and the new teams have to be stocked, none of the teams in the league has the luxury of discriminating.

The idea that discrimination subsides when an industry expands can be applied to sports but also more broadly to other highly skilled professions. The creation of a new sports league would have the effect of diminishing any player promotion discrimination that might exist in the profession at least for a period. But it also means that firms in a highly skilled industry that is expanding quickly—undergoing, say, an 8% expansion in employment in a given year—would not have the luxury of practicing employment discrimination that year. The sections of the article that delineate these findings are a brief overview of analysis-relevant issues, a description of the data and model used, a presentation of the results, conclusions, and a summary.

OVERVIEW

There are essentially four levels of minor leagues. Each major league team has one team in each of the top two levels (AAA and AA) and multiple teams in each of the bottom two levels (A and Rookie) from which to draw players. Successful players generally work their way up the system, with the last promotion from AAA to the majors.

It should be made clear that discrimination in promotion could occur at any point up the line from Rookie to A to AA to AAA to the majors. Because of discrimination at earlier stages, there may be Blacks and Hispanics who should have—but did not—advance to the AAA level. Overall discrimination in promotion is therefore at least as great as what the analysis finds for players from AAA to the majors.

However, the discrimination ought to be greatest from AAA to the majors. Major league organizations do not care about minor league attendance and whether their minor league teams win games. They are concerned with player development for their major league team. With different objectives in the minors and majors, discrimination would not be uniform at each level. Player personnel decisions at lower levels are superseded by the AAA-to-majors decisions. The AAA-to-majors jump directly affects the major league team, so discrimination, if it exists, would be greatest at this decision point.

TABLE 1: Percentage Breakdown by Race/Ethnicity

	<i>All Years</i>	<i>1968 to 1969</i>	<i>1976 to 1977</i>	<i>1991 to 1997</i>
White	60.4	68.9	65.8	56.7
Black	22.0	17.7	22.6	22.9
Hispanic	17.6	13.4	11.6	20.4
Total	100.0	100.0	100.0	100.0
Observations	2,762	434	535	1,793

The percentage of Black and Hispanic players in the major leagues and in minor league systems has increased over time, although the majority of players have always been White. An illustration of the increase from the 1960s to the 1990s is given in Table 1, using the data collected for the article on AAA-level hitters in the years 1968 to 1969, 1976 to 1977, and 1991 to 1997. The large percentage increase for Blacks was between the 1960s and 1970s, whereas for Hispanics it was between the 1970s and 1990s.

A consideration with regard to racial/ethnic composition is player field positions. Of the nine positions on a team, difficulty and specialty can be thought of in four areas—pitcher, catcher, infielder (second baseman, third baseman, and short-stop), and first baseman—outfielder (first baseman, leftfielder, centerfielder, rightfielder).⁴ First basemen are grouped with outfielders because the positions are of similar difficulty. Many players play both positions and only these positions. During a game, the most work and decision making is done by the pitcher, the next most by the catcher, then the infielders, and the least by the first basemen and outfielders. Blacks are underrepresented in the infield, Hispanics in the outfield, and both at catcher (Christiano, 1988; Hill & Spellman, 1984).

A breakdown of Whites, Blacks, and Hispanics by position for the 11 years of data illustrates the underrepresentation, which is especially large for Black catchers and infielders. AAA-level minor league teams generally carry about five or six outfielders, four or five infielders, and two catchers, so percentages for each race/ethnicity should be roughly 45% outfielders, 37% infielders, and 17% catchers. Table 2 gives the breakdown by position for each of Whites, Blacks, and Hispanics. Only the percentages for Whites are close to what equal representation would suggest. Blacks are essentially excluded from positions with the most decision making,⁵ a result similar to that found by Medoff (1986).

Economic theory suggests that firms in more highly concentrated industries may be more likely to practice discrimination (Becker, 1957). Empirical evidence at the industry level supports the theory. Haessel and Palmer (1978) found that firms in more highly concentrated industries discriminate more, and Comanor (1973) found that discrimination is positively correlated with monopoly power. Medoff (1980) determined that the number of employees in a firm had a significantly posi-

TABLE 2: Percentage Breakdown for Each Race/Ethnicity by Position

	<i>Outfielder</i>	<i>Infielder</i>	<i>Catcher</i>	<i>Total</i>	<i>Observations</i>
All years					
White	42	38	20	100	1,668
Black	75	22	3	100	608
Hispanic	38	51	11	100	486
1968 to 1969					
White	44	38	18	100	299
Black	78	18	4	100	77
Hispanic	28	60	12	100	58
1976 to 1977					
White	41	40	19	100	352
Black	71	22	7	100	121
Hispanic	47	47	6	100	62
1991 to 1997					
White	41	38	21	100	1,017
Black	75	23	2	100	410
Hispanic	38	51	11	100	366

tive effect—and market power a significantly negative effect—on the employment of Black men.⁶

In professional sports, as a league expands the number of its teams or a new league of teams is created, the ability to discriminate should decrease. This is what essentially happened in pro football in the 1960s when a new league of eight teams began drafting many more players from Black colleges and employing a much higher percentage of Black players than the established National Football League (NFL).⁷

A similar process occurred in pro basketball in the late 1960s with the creation of the American Basketball Association (ABA) to compete with the established National Basketball Association (NBA). The ABA innovated in a number of areas that helped Black players. For example, college players with personal economic difficulties were allowed to apply for early entry into the league draft rather than having to wait through 4 years of collegiate play (called hardship cases). Most, if not all, of the hardship cases were Black players.

League expansion is often a strategic reaction to the threat of a rival league. The expansion in baseball in the early 1960s—the first increase in the number of teams since the beginning of the century—was due in part to the threat of a potential rival (the proposed Continental League). The NFL expansion into Minneapolis–St. Paul and Dallas in 1960 was done to preempt the new rival American Football League (AFL) from moving into those markets.⁸ There are many examples, but the point is that the ability to practice discrimination will decline in a year of expansion as many

new jobs are created that need to be filled. As evident from the cases of the AFL and ABA, the decline may continue beyond the actual year of expansion.

The data provide an illustration of the increase in the number of promotions that occur after an expansion. Major League Baseball expanded by four teams after the 1968 season and by two each after the 1976, 1992, and 1997 seasons. Of AAA players who batted at least 300 times in the given years, 61 were promoted after the 1968 season but only 42 after the 1969 season, 72 after the 1976 season but only 44 after the 1977 season, 63 after the 1992 season but only 48 after the 1993 season, and 63 after the 1997 season but only 46 after the 1998 season.

DATA

Because there are so few Black and Hispanic pitchers and catchers,⁹ only infielders and outfielders were used in the analysis.¹⁰ Because a player needs a reasonable amount of playing time in AAA to accumulate statistics with which to be evaluated for the next spring, only players who came up to bat at least 300 times in a particular year were considered.¹¹ An AAA season is usually 140 games long, so 300 plate appearances amount to about 2.14 per team game.

A player is promoted if he makes a team's 25-man roster for the start of the regular season. A player is not considered to be promoted if he was called up to the major league team because of an injury to another player or if he began the season in AAA but got called up soon after because he was performing extremely well.¹² A player is thus promoted from AAA one season to the majors at the start of the next because he performed well in AAA in the previous year and/or in preseason (March) spring-training games. The weight given to the previous AAA season is far greater than that given to spring-training games. If spring training is of any importance in this regard, it is in evaluating borderline pitchers.

Players bypassing AAA and going directly to the majors from a lower level are not considered in this analysis, but their omission should not affect the results. These players are much better than average and if they had played in AAA, their home runs, RBIs, and average would reflect that. The variables controlling for offensive performance would pick up everything, leaving nothing to race/ethnicity. In other words, if these players were included, they would not provide much additional information.

As for sample selection issues because only those players of top ability (AAA) are selected for the analysis, a cutoff had to be made at some point. The important consideration is that nothing in the error term due to selecting only AAA players—rather than a larger set—should be correlated with the independent variable race/ethnicity.

Also, there may be concern that a player is not promoted because there happen to be two or three good players at his position on the major league team blocking his progress. There are few instances of this, probably none in the 1990s. If a team has a

glut at any one position, a player at that position is traded to obtain a player to help at a position where the team is weak and whose marginal value is greater. The process became almost frictionless in the 1990s. Players are paid far less than their market value for their first few years in the majors when they can only negotiate with their current team (players can negotiate with any team only after they play five major league seasons). Consequently, they can be quite a bargain and often are traded or force the trade of a teammate at their position.

There are 1,743 valid observations during the 11 years.¹³ The race of each player was inferred from photographs from a number of sources, primarily team Web pages, photos in team yearbooks and programs, and baseball cards. A player is considered to be Hispanic if he was born in Latin America or has a Hispanic surname. The race/ethnicity of 58 players could not be determined, which is about 5 players a year. None of the 58 players was promoted. This will not affect the estimation of the independent variables or interaction terms using race/ethnicity.

A probit equation is run with whether the player was promoted as the dependent variable. Two of the four key independent variables are dummy variables for whether the player is Black and Hispanic. The other two are interaction terms—the Black dummy variable interacted with a dummy variable for whether it is an expansion year (for a Black player in an expansion year), and the Hispanic dummy variable interacted with the identical expansion year dummy (for a Hispanic player in an expansion year).

The data from the 1990s allow for a test of whether any expansion effect, if it exists, continues beyond the 1993 season of expansion. The decline due to expansion, if it exists, may persist in the sense that the expansion year decline will hold for the next year's promotions as well. On the other hand, it may be a temporary decline, and the following year's promotions may exhibit the same discrimination as earlier or something close to it. The interaction terms used for this test are similar to those described above—a race/ethnicity dummy variable interacted with whether it is the year following expansion, 1994.

The analysis controls for age, expansion years, position, and important batting statistics from the previous season including batting average, home runs, RBIs, and stolen bases. A dummy variable for whether the player is an infielder (second baseman, third baseman, or shortstop) controls for position. The variable has a highly significant positive effect on promotion. The infield positions require better defensive skills, so infielders are expected to contribute less in batting. Consequently, infielders are promoted with less productive batting performances than first basemen and outfielders.

RESULTS

There are seven basic probit equations. Two are run using all of the data—one without the Black and Hispanic expansion year interaction terms and the other with them. The last five runs all include the Black and Hispanic expansion year inter-

action terms. Three are broken down by period—one is run using only players from the 1960s and 1970s and two using only players from the 1990s. Two are broken down by position—one is run using only outfielders, the other only infielders.

Table 3 contains the estimated change in the probability of promotion due to race and ethnicity for each of the seven runs, with the significance levels in parentheses. Probit coefficient estimates are converted to percentages. For example, in the first run, the probability of a Black player being promoted is 5.2% less than an identical White player (same age, position, batting performance, etc.). If the White player's probability is 29.0%, then the Black player's is 23.8%.

The first regression was run to show the difference without the Black and Hispanic expansion year interaction terms. The main runs are the second, third, fourth, and fifth ones, which contain the interaction terms. The runs show that Black and Hispanic players face discrimination in promotion. Using all 11 years, a Black player is 8.7% less likely to be promoted than a White player of equal performance, and a Hispanic player is 7.5% less likely. Note the interaction terms—in expansion years the discrimination disappears almost entirely.¹⁴

Broken into two periods, one can see that Blacks faced discrimination in the 1960s and 1970s and still did in the 1990s. The discrimination was offset by expansion. Hispanics faced discrimination in the 1960s and 1970s, which abated in the years of expansion. The estimated coefficients for the 1990s are nonsignificant, so there is no evidence that discrimination still exists today. The results of the fifth run, a test of whether the expansion effect persists, indicate that in the 1990s, given the expansion year effect, there is no effect in the year following expansion.¹⁵

The last two regressions look at outfielders and infielders separately. Blacks face discrimination at both positions—worse for infielders than outfielders—which is offset by expansion (although the interaction term for outfielders is not very significant). The estimates for Hispanics are less conclusive.¹⁶ Outfielders face discrimination, but it does not apparently subside in years of expansion because the interaction term is insignificant (t statistic of only -0.61). For Hispanic infielders, the coefficients on the dummy and the interaction term are significant, but the expansion does much more than offset the discrimination. Consequently, in an expansion year, promotion of a Hispanic infielder is actually more likely than an identical White infielder: The probability of promotion is 6.2% higher.

For robustness, the seven-probit analysis was run with minimum plate appearance cutoffs other than 300. The results using 325 and 275 were similar to those for 300. Above 350, the estimates were similar but lost significance, probably because too few observations remained. Below 200, the estimates were inconclusive—insignificant estimates or significant with as many incorrect signs as correct ones. Players added into the analysis at that point clearly did not play a full minor league season, with enough time to amass representative season totals in home runs, RBIs, and so forth. Per at bat statistics (home runs per at bat, RBIs per at bat) were used to replace totals as independent variables but did not improve estimates using fewer than 200 plate appearances as a cutoff. Although increasing the number of observa-

TABLE 3: Estimated Change in the Probability of Promotion Due to Race/Ethnicity (level of significance in parentheses)

<i>Player Set</i>	<i>Black</i>	<i>Black in Expansion Year</i>	<i>Black Year After Expansion</i>	<i>Hispanic</i>	<i>Hispanic in Expansion Year</i>	<i>Hispanic Year After Expansion</i>	<i>Observations</i>
All	-5.2 (5.7%)			-5.4 (5.5%)			1,743
All	-8.7 (0.5%)	7.7 (1.9%)		-7.5 (3.0%)	5.7 (5.3%)		1,743
1960s to 1970s	-9.3 (9.8%)	8.9 (7.4%)		-15.6 (5.3%)	13.5 (7.9%)		624
1990s	-8.1 (2.5%)	7.2 (9.2%)		-5.0 (insignificant)	1.2 (insignificant)		1,119
1990s	-8.8 (3.0%)	8.2 (9.5%)	3.0 (insignificant)	-4.1 (insignificant)	1.4 (insignificant)	-2.2 (insignificant)	1,119
Outfielders	-8.4 (2.0%)	7.4 (13.0%)		-6.7 (9.1%)	-4.3 (insignificant)		1,003
Infielders	-12.9 (3.0%)	13.7 (2.1%)		-7.6 (9.5%)	13.8 (7.9%)		740

NOTE: Probit equations controlling for age, expansion year, position, and offensive production (batting average, total bases per at bat, stolen bases, home runs, RBIs). All of these variables have *t* statistics greater than 4.5 and are significant to at least the 0.1% level. Age has a negative coefficient; the others have positive ones. Levels of significance greater than 15% are noted as insignificant.

tions, the information obtained from adding players with few plate appearances was of no benefit because it did not provide an accurate representation of their performance.¹⁷

CONCLUSIONS

From these results, the following conclusions can be drawn about discrimination in promotion—though whether the discrimination in question is by ownership, management, or their response to fan preferences does not matter to its existence in promotion from AAA to the majors. Back in the 1960s and 1970s, Blacks and Hispanics faced discrimination when it came to being promoted from the highest minor league level (AAA) to the major league. It was particularly strong for Hispanics, as they were 15.6% less likely to be promoted than a White player of equal performance. Black players were 9.3% less likely. As strong as this discrimination was for Hispanics in the 1960s and 1970s, it did not persist into the 1990s. However, it should still be regarded as a real problem for Blacks, as they were 8.1% less likely to be promoted than Whites from 1991 through 1997.

A possible explanation of the change for Hispanics may be that, in the 1990s, the league expanded into three markets that can be thought of as having large Hispanic American populations (Miami, Tampa, and Phoenix). More important, however, has been the large increase in resources put into scouting talent in Latin America. Major League Baseball has much larger revenues and expenses today than it did in the 1960s and 1970s—salaries, bonuses, ticket prices, cable television contracts, ballpark construction, and scouting (to name a few). With scouting in the United States at its limit, a point was reached where the marginal scouting dollar was better spent elsewhere—in Latin America or, even more recently, in Asia (scouting in Japan and Korea has increased tremendously during the past 10 years).

The expansion year result may be of more general interest to labor economists. As strong as the discrimination was—especially in the 1960s and 1970s—it abated in years when the league expanded. If the 1993 expansion is representative, the decline did not persist beyond the expansion year. The implication of these results is that it becomes more difficult to discriminate in years when the number of jobs needed to be filled is increasing.

The finding can be applied more broadly to professions requiring a high skill level. If an industry is expanding quickly, it will be much more difficult to practice discrimination in promotion. Any number of industries expand rapidly—for example, computer software or Internet services—and highly skilled workers in these areas would not be subject to such discrimination.

SUMMARY

In examining promotion from the highest minor league level to the majors, it was determined that Blacks and Hispanics face discrimination. A Black player is 8.7%

less likely to be promoted than a White of the same age and performance, and a Hispanic player is 7.5% less likely. The discrimination persisted over time for Blacks, although it subsided in years when the league expanded and more jobs were available. There was no difference by position, as Black infielders and outfielders faced discrimination. A Black infielder was 12.9% less likely to be promoted than an identical White infielder, and a Black outfielder was 8.4% less likely than his White counterpart. Hispanics faced discrimination in the 1960s and 1970s that abated in expansion years. However, unlike Blacks, there is no significant evidence that they did in the 1990s.

Discrimination in promotion all but disappeared during expansion. This more general result is evidence that firms in industries that undergo large expansions in a short period of time cannot easily engage in employment discrimination.

NOTES

1. Studies on professional sports have found evidence of wage discrimination. Examples can be found in baseball (Fizel, 1996; Hill & Spellman, 1984), as well as football (Mogull, 1973), basketball (Brown, Spiro, & Keenan, 1991; Kahn & Sherer, 1988), and hockey (Jones & Walsh, 1988; Lavoie, 1989).

2. See Nightengale (1997). The article quotes Jim Lefebvre, former Los Angeles Dodger and current consultant for Major League Baseball International, predicting that in 10 years, 50% of major league players will be Latinos.

3. At the major league level, teams consist of 25 players. In the 1960s, teams generally carried 9 pitchers and 16 batters, so four new teams created about 64 jobs for batters. By the mid-1970s, teams were generally carrying 10 pitchers, and by the 1990s 11, so two new teams created about 30 jobs.

4. The term *outfielder* will be used to refer to an outfielder or a first baseman, and the term *infielder* to refer to a second baseman, third baseman, or shortstop.

5. In pro football, Eitzen and Sanford (1975) and Scully (1973) found Blacks underrepresented at the offensive and defensive positions requiring the most leadership and decision making (quarterback and linebacker).

6. It should be noted that Shepherd and Levin (1973) found no correlation between market power and employment discrimination.

7. The American Football League (AFL), which began with eight teams in 1960, later added one team in 1965 and in 1968. The AFL's Kansas City Chiefs were one of the first teams to create a pipeline to Black colleges.

8. Rival leagues or expansion might also mitigate any differential access to training. If teams are forced to employ their resources more efficiently, training resources would be transferred from over-trained Whites to undertrained Blacks and Hispanics.

9. For example, of the 189 pitchers in AAA in 1968 who pitched at least 50 innings, 3 were Black and 12 Hispanic. In 1969, of the 222 pitchers, 6 were Black (1—Bobby Darwin—then converted to outfielder) and 15 Hispanic. In 1976: 228 pitchers, 5 Black, 14 Hispanic. In 1977: 223 pitchers, 5 Black, 12 Hispanic. There were 19 Black catchers in the entire sample of 11 years (from Table 1, 3% of Blacks in the sample). A complete data appendix is available from the author upon request.

10. Too few Black and Hispanic pitchers was also a concern for Nardinelli and Simon (1990) in studying the baseball card market.

11. The cutoff was at least 300 plate appearances, which differ from at bats. Walks, hit-by-pitches, sacrifice hits, and sacrifice flies are counted as plate appearances but not as at bats.

12. For example, Eddie Williams's call up in late April 1998 by San Diego after hitting more than .400 during the first 3 weeks of the AAA season is not considered a promotion.

13. Tables 1 and 2 have a greater number of observations because the tables use all AAA players for these years, whereas the regression analysis uses only those with 300 or more plate appearances.

14. In probits using only expansion years (not reported in the article but available from the author), dummy variables for Black and Hispanic were insignificant. In runs using only nonexpansion years, they were highly significant.

15. To determine if the effect of expansion year was simply overwhelming the effect of the following year, a 1990s probit was run with race/ethnicity interacted with the year following expansion only (i.e., excluding the expansion year interaction). The interaction terms were positive but insignificant.

16. For Hispanics, regressions broken down by period and position (not reported in the article but available from the author) show discrimination for infielders in the 1960s and 1970s—but none for outfielders in the 1960s and 1970s or infielders and outfielders in the 1990s.

17. Note that the probit runs with low plate appearance cutoffs include players promoted early in a season. For example, consider a player who started the season in AAA, was promoted to the majors in late May after having had x plate appearances, and stayed in the majors for the rest of the season. If he made the major league team the next spring, then he would be accounted for in the regression with x plate appearances as a cutoff.

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Research Note

Economic Return on Schooling for Soccer Players

CARLOS PESTANA BARROS

Technical University of Lisbon (ISEG)

This article tests the relationship between earnings and schooling for male footballers of the Portuguese Football League, using data from a questionnaire carried out in the Lisbon area between January and April 2000. The author verifies that the sports market barely compensates the cost of education in accordance with the theory on the economic return on schooling; rather, it rewards talent in accordance with the theory on stardom. This finding is consistent with all currently available international evidence on the issue. Moreover, the article finds a significant positive association between earnings and professional status, union membership, the division in which the club competes, and the player's performance.

The correlation between schooling and earnings has been the focus of attention in a huge body of work since Mincer's (1974) article. This article aims to estimate returns on schooling for Portuguese soccer players using two complementary sets of approaches, namely ordinary least squares (OLS) and instrumental variables (IVs).

The sports labor market has been, since Rottemberg's (1956) seminal article, an active field of research. The determinants of earnings have been linked to sporting performance, as, for example, by Scully (1974, 1995), who estimated the earnings function for U.S. basketball players, and by Quirk and Fort (1992, appendix to chap. 6), who estimated the earnings function for baseball players in the United States. This sport-earnings function has some minor specificity that deserves to be mentioned. It is based on the individual sportsman's characteristics within his particular sport; it sometimes includes experience (Quirk & Fort, 1992) but does not include education, implicitly assuming that education does not play a role in sport. In a close research to the current article, Shmanske (1992) analyzed the human capital formation in golf, using skills as an explanatory variable of earnings.¹ This article addresses this issue, analyzing the earnings function in the soccer players' market.

The soccer labor market in Europe, as elsewhere, provides manpower for clubs that compete in domestic league championships that run for 8 or 9 months, usually from August to the following May.

Leagues are universally based on the principle of merit, the league being presided over by a national federation and having a divisional structure. This structure reflects the fact that the elite (strongest) clubs play in the First Division, whereas the weaker clubs play in the lower divisions in a descending order (Second Division, Third Division, etc.), depending on the size of the league.

Clubs play against each other twice per season, once in the home stadium and once as a visitor to the opponent's stadium. Three points are awarded for winning a match, and both teams receive one point if the match results in a draw. The object of the competition is to establish an order of merit, the team finishing in first place becoming the champion and earning the honor of representing the country in European competitions. The other primary incentive to compete is the system of promotion and relegation up and down the league for the highest and lowest teams in each division.

In contemporary Portugal, the professional league comprises four divisions. The First and Second Divisions are nationwide, whereas the Third and Fourth are organized in regional zones: three zones for the Third and eight zones for the Fourth. Eighteen clubs participate in each division. At the end of the season, three clubs are promoted from the Second Division to take the places vacated by the last three First Division teams.

The same promotion/relegation system applies throughout the remaining league divisions, with each zonal champion moving up to the next division, while taking into account the appropriate regional zone for all relegations and promotions involving the Third and Fourth Divisions.

As well as this professional federation, there is an amateur league in which clubs compete on a regional basis. As far as the players are concerned, the boundaries between the Third and Fourth Divisions and the amateur league are not clear. Amateurs can be found playing alongside professionals in the same team in these divisions.

With regard to education for soccer players, we should distinguish between education and training. Training is a compulsory, regular activity for all players, from preprofessional juveniles to the most experienced seniors, taking place on a squad basis and organized and led by the club coaching staff. It is concerned solely with the physical and tactical aspects of the sport, in addition to the players' fitness and technical skills. Education refers to academic learning activities that take place in schools and primarily concerns players of school age. However, the question is raised as to whether an educated player might not perform better in his sport, that is, that education might enable a better perception of the rules of the game, a better grasp of strategy on the field of play, and better self-discipline; result in fewer penalizations and expulsions; and so forth. Thus, in a broad context, education may be important. This article will test for this issue.

The second section presents a survey of the literature regarding the return on schooling. In the third section, the article describes the research on this issue as far as Portugal is concerned. In the fourth section, the data are shown. In the fifth section, the variables are set out. In the sixth section, I give the estimates of the return on education for Portuguese soccer players, and in the final section the conclusion is presented, drawing comparisons with other studies on this issue. The article enlarges on previous research in this field, explicitly accounting for the correlation between schooling and earnings in the domain of sport and validating the theory of the economic return on schooling on the basis of a specific sector, whereas most of the previous research relies on samples derived from the general active population.

The overall conclusion is that education plays no role in the sports labor market, signifying that its earnings are driven by talent.

EARNINGS FUNCTIONS

The classic specification of Mincer (1974) for the determination of earnings is

$$\log w_i = \alpha_0 + \alpha_1 S_i + \alpha_2 EXP_i + \alpha_3 EXP_i^2 + \varepsilon_i, \quad (1)$$

where w is the log of earnings of individual i , S_i is a measure of his schooling, EXP represents the years of experience, ε_i is the statistical error term and α are parameters to be estimated, with the parameter α_1 being the return on schooling. Because w is measured in logarithms, the parameter estimates from this regression can be interpreted as reflecting the proportional change in salary when the independent variables change.

Traditionally, Equation 1 was estimated by OLS. The estimated α_i obtained by this approach is not consistent, either because of measurement errors in the schooling variable or because the explanatory variables, such as individual ability, are correlated with the unobserved disturbances in the equation. Innovative approaches have been developed in the applied studies of correlation between schooling and earnings to deal with this problem (Ashenfelter, Harmon, & Oosterbeeck, 1999, p. 452), falling into three categories: (a) controls for variables that may be correlated with schooling and that determine earnings, (b) comparison of twins or siblings with different schooling levels, and (c) the use of IVs that affect schooling levels but do not directly affect earnings.

Among these approaches, the first one deals with the issue of ability bias by including explicit measures that proxy for unobserved ability (IQ test) (Griliches & Mason, 1972). This approach has been criticized because it is extremely difficult to develop ability measures that are not themselves determined by schooling.

The other approach, which deals with IVs, chooses instruments that are not correlated with the earnings residual (Card, 1993). This approach proceeds in two stages. First, by estimating the effect of the IV on schooling; then, by estimating the

IV on earnings. By assumption, the instrument is correlated with earnings because it influences schooling. The instrument chosen in empirical work may not be truly independent of earning residuals.

The instruments used depend on the data available. For example, Angrist and Krueger (1991) used as schooling instruments the season of birth, finding that children born earlier in the year have, on average, less schooling because they reach the compulsory school-leaving age earlier. Levin and Plug (1999), with the same instrument, found the opposite relationship. Harmon and Walker (1995) used quarter of birth and several dummies that relate to raises of the compulsory school-leaving age. Butcher and Case (1994) found that the gender composition of a female's siblings affects her educational attainment, with females with no sisters receiving (on average) more education, and used the gender composition of the siblings as an instrument.

Other researchers rely on more conventional instruments, such as the respondent's social background. Using Finnish data, Uusitalo (1999) considered schooling by employing dummy variables for the father's education and the father's socioeconomic status. Blackburn and Neumark (1995) used as instruments variables related to the respondents' siblings' rank, as well as the fact of living with both parents at the age of 14 years. Brunello and Miniaci (1999) used as instruments a set of variables that measure family background, including the highest educational level and the occupations of the father and the mother.

THE RETURN ON EDUCATION IN PORTUGAL

Previous work on the returns on education in Portugal is summarized in Table 1. From this research, I verify that the return on schooling ranges from 7.4% to 10.4% in the OLS approach and between 1.5% to 3.03% in the IV approach. The average value of these estimates will be a benchmark for this article.

Psacharopoulos (1998) estimated a Mincer model of return on education, discriminating between gender. Kiker and Santos (1991) estimated a Mincer model of return on education, discriminating between men and women, the private and public sectors, and region. The average rates of return are in the 9.4% to 10.4% range. Vieira (1999) estimated the return on education in terms of number of years in education, including in the IV estimates as covariates age, age squared, and a four-region dummy. Barros (2000) estimated the return on education for a sample of managers of Portuguese cooperatives. The instruments used were the following: the position of the individual in the organization's hierarchy, the dimension of the cooperative (measured by the number of workers), and the existence of coworkers with technical status in the cooperative. The results for this specific sample are, as expected, higher than those for the population as a whole and represent a reliable estimation of education in relation to earnings for managers in the Portuguese economy.

TABLE 1: Returns on Education in Portugal

<i>Author</i>	<i>Period</i>	<i>Data Source</i>	<i>Method</i>	<i>Marginal Return</i>
Psacharopoulos (1981)	1977	Quadros de Pessoal do ME	OLS	7.5% = men, 8.4% = women
Kiker and Santos (1991)	1985	Quadros de Pessoal do ME	OLS	10% = total, 9.4% = men, 10.4% = women
Vieira (1999)	1986 and 1992	Quadros de Pessoal do ME	OLS and IV	1986: 7.4% = OLS, 3.03% = IV; 1992: 7.79% = OLS, 1.5% = IV; 1986 and 1992: 7.79% = OLS, 1.5% = IV
Barros (2000)	1999	Questionnaire on cooperative managers	OLS and IV	40% = OLS, 39% = IV

NOTE: ME = Portuguese Ministry of Employment, OLS = ordinary least squares, IV = instrumental variable. Quadros de Pessoal are the official publications of the Portuguese Ministry of Employment statistics on salaries.

The general conclusion drawn from this research is that the average results for Portugal are similar to estimates of returns on schooling for many countries resembling Portugal in terms of economic development, namely Spain (Alba-Ramirez & San Segundo, 1995). Moreover, the OLS estimates are overbiased with regard to the IV estimate (Card, 1994). The overbias estimates can be attributed to measurement error in the schooling variable, to the ability bias, or to the heterogeneity of returns on schooling.

THE DATA

These data are from a questionnaire carried out in Lisbon between January and April 2000 on a sample of players of the First, Third, and Fourth Divisions of the Portuguese Football League on their clubs' premises to generate state-preference data to investigate the economic return on education. There were no Second Division clubs in the Lisbon area at the time the questionnaire was undertaken.

The sampling procedure adopted was the convenience/location sampling method. This method is a nonrandom procedure with very substantial advantages in terms of costs and convenience whenever a sampling frame is not available because it is performed in a central location (in this case, the greater Lisbon area). This method can exaggerate the homogeneity of attitudes and behavior disproportionately, and because of this its projectability is questionable. However, it is extremely useful for hypothesis generation and initial pilot testing of surveys and is very popular in academic research.

The questionnaire was presented to all the soccer players at the clubs' headquarters by the football manager, who had been approached by students, initially by phone and then personally. The questionnaire was pretested on students of sports economics at the Faculdade de Motricidade Humana de Lisboa (the Department of Sports of the Technical University of Lisbon). Only two clubs refused to grant their authorization to present the questionnaire to their players. Among the clubs that agreed to participate (20), the questionnaire was put to a sample of 301 players, which gives a response rate of 20%. There is no suggestion that those players at participating clubs who refused to answer were different, on average, from those who did answer. The players were asked to answer a standard questionnaire, including questions on socioeconomics and other issues. Table 2 summarizes the variables.

ESTIMATES OF THE RETURNS ON EDUCATION

The empirical strategy consists of estimating first the traditional Mincerian earnings Equation 1 and then the structural model 2.

$$\begin{aligned} \ln.w &= X_i \cdot \alpha + \beta_i \cdot S_i + \mu_i \\ S_i &= \lambda \cdot X_i + v_i, \end{aligned} \tag{2}$$

TABLE 2: Characterization of the Replies of Soccer Players

<i>Variable</i>	<i>Variable Description</i>	<i>Range</i>	<i>M</i>	<i>SD</i>
Earnings	Monthly wage in PTE after taxes	50 to 5,000	330	567
Log (earnings)	Logarithm of the monthly wage after taxes	3.91 to 8.51	5.01	1.16
Education	Level of education of the player	2 to 10	6.15	
Experience	Years of career as soccer player	0 to 16	3.32	3.93
Status	Professional (1) or amateur (2)	1 to 2	1.52	
Union	Member of the labor union	0 to 1	0.51	
Division	Division of the club (First = 1, Third = 2, Fourth = 3)	1 to 3	2.4	
Performance	Player's subjective evaluation of his performance on a scale from 1 to 6	1 to 6	3.6	

NOTE: PTE = Portuguese *escudos* (national currency).

where w and S are defined as above, X is a vector of control variables and v is a normal distributed error term with zero mean and finite variance.

In the Mincerian equation, the instruments are all the variables used in the extended model, with a dummy for the father's education (1 if the father has a university degree, 0 if not) and the number of years playing for the club. For the extended model, I used these two last variables as instruments.

Table 3 shows, in the second column, the results for the traditional Mincerian earnings function, in which the logarithm of the net salary serves as a dependent variable that is regressed on the standard controls. I find that this baseline regression produces a negative return on schooling. Controls for field position, union membership, division, and performance, as presented in the fourth column, produce a change from negative to positive values in the schooling return estimates, despite not being statistically significant. Taking into consideration that, according to the traditional literature, schooling is potentially endogenous and/or measured with error, I use a corrective IV procedure. The results are presented in the third column for the Mincerian model and in the fifth column for the extended model.

I considered some test results proposed by Bound, Jaegger, and Baker (1995) to shed light on the quality and validity of the instruments. First, instrumental quality is ensured if there is a strong correlation between the instruments and schooling. It is well documented that an IV procedure using weak instruments may yield more inconsistent point estimates than those produced by OLS.

The models fit the cross-data well with the extended model presenting an adjusted R^2 of 61% that is remarkable for cross-data, showing that the model explains a high proportion of the estimated structure. The F statistic of 51.59 allows us to reject the hypothesis that the explanatory power of the model is not the result of chance. All estimated coefficients have the expected signs, with the exception of squared experience. There was not autocorrelation or heteroskedasticity in either model, and the variables were not collinear.

TABLE 3: Estimates of Returns (dependent variable log w)

Variable	<i>Mincerian Model</i>		<i>Extended Model</i>	
	<i>OLS</i>	<i>IV</i>	<i>OLS</i>	<i>IV</i>
Constant	4.518 (19.35) ^b	4.533 (17.96) ^b	7.022 (20.416) ^b	6.937 (19.965) ^b
Education	-0.0027 (-0.8032)	-0.0312 (-0.841)	0.0079 (0.2896)	0.0030 (0.111)
Experience	0.3205 (8.296) ^b	0.3286 (7.198) ^b	0.070 (1.806)	0.080 (2.037) ^a
Experience squared	-0.015 (-5.460) ^b	-0.0153 (-4.233) ^b	-0.0027 (-0.9507)	-0.0031 (-1.118)
Status	—	—	-0.6556 (5.3765) ^b	-0.6298 (-5.006) ^b
Union membership	—	—	0.1328 (3.8605) ^b	0.1399 (3.370) ^b
Division	—	—	-0.6867 (-9.495) ^b	-0.6592 (-9.053) ^b
Performance	—	—	0.1032 (2.005) ^a	0.098 (1.910)
R^2	0.30	0.31	0.63	0.62
Adjusted R^2	0.29	0.30	0.61	0.61
F	36.2	33.71	54.00	51.59
DW	1.22	1.18	1.34	1.27

NOTE: OLS = ordinary least squares, IV = instrumental variable, DW = Durbin-Watson statistic. T-statistic is in parentheses.

a. Significant at 1% level.

b. Significant at 5% level.

According to the extended model, the earnings are a function of (a) the league division in which the individual plays (an individual playing in the First Division earns more than another playing in the Third Division, etc.), (b) whether the player is unionized (those who are unionized earn more than those who are not), (c) the player's professional status (a professional earns more than an amateur), and (d) the individual's performance (better quality players earn more).

With regard to the return on schooling, the article verifies that it is statistically insignificant in all regressions and negative in the Mincerian equations, denoting that education has an insignificant yet varied effect on the Portuguese football market.

DISCUSSION

These findings point to a significant positive association between earnings and professional status, union membership, the division in which the club competes, and the players' performance. Even after controlling for these variables, I was unable to confirm the earnings-schooling theory for this particular labor market.

What are the implications of these results? First, that the soccer player who is professional,² plays in the First Division, and has the commensurate ability is more highly paid than those who do not fulfil these criteria, which corresponds to expectations. Second is the fact that the unionized player earns more points to the well-known cartelization between the club owners, who exercise a monopoly in the

product market and monopsony in the input market with the union cartel (Adams & Brock, 1997). Third, the statistical insignificance of the school variable denotes that education plays no statistically significant role in this market, which is driven by talent. This result validates the specification adopted by Scully (1974, 1995) and Quirk and Fort (1992). Fourth, the positive significance of experience and the negative insignificance of square experience is in accordance with other studies on this issue. Clearly, the situation is more complex than our conceptualization suggests. If talent drives this market, does this talent need training in the school system to perform better? The answer is yes, but the diversity among the soccer players of the number of school years completed does not have a strong correlation with earnings, thus signifying that the sports market barely compensates the cost of education. Rather, it is talent that drives the earnings in this market. The talent has been measured by two proxy variables: the league division (soccer players with the most talent in this sample play in the First Division) and performance (players with more talent reflect a higher subjective evaluation of their performance).

CONCLUSION

By how much does schooling pay off in the sports domain? OLS estimates do not yield precise results because of endogeneity bias, ability bias, and measurement error in the schooling variable. Tackling these biases with an extended model and with the IV technique allows us to estimate consistent returns on schooling. These findings point to an expected result that education plays no role in this market, which is driven by talent. Further research is needed in this issue.

NOTES

1. The skills used by Shmanske (1992)—driving, approach shot, short game, bunker, shots, and putting—are adequate in individual sports because every athlete develops the same activity in the game. In collective sports, for example, football, the athletes are specialized in the game and are not supposed to do the same activity. In this context we can use a general index that in Portugal is fixed by the sports journalists who attempt to reflect the general performance of the player. Unfortunately, this index is fixed only for the First Division.

2. All players in the First and Second Divisions are professionals, and some players in the Third and Fourth Divisions are amateurs. The F test of joint significance for the respective instrument set is equal to 42.12. Second, instruments are valid, provided they affect earnings through schooling only. I tested whether the instruments have any direct influence on earnings through schooling only with the Sargan test, a test of overidentification restrictions on the instruments, with an asymptotic X^2 distribution and degrees of freedom equal to the number of overidentifying restrictions. With a value of 4.291 ($p = .54$), the validity of overidentifying restrictions cannot be rejected.

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Carlos Pestana Barros is a professor of economics in the Department of Economics of the Technical University of Lisbon (ISEG) and teaches sport economics in the Department of Human Activity.

Book Review

Winners and Losers: The Business Strategy of Football, by Stefan Szymanski and Tim Kuypers. London: Viking, 1999. 408 pp. ISBN 0-670-88486-3

The story of the fall and rise of soccer as Europe's leading spectator sport has been well documented. The 1970s and 1980s saw declining attendances as football was played in run-down, and sometimes unsafe, stadiums with the frequent prospect of hooliganism inside and outside the grounds. However, the late 1980s and 1990s saw a resurgence of football, in England especially, as attendances and broadcasting viewing figures increased and deregulation of the players' labor market permitted an influx of exciting foreign players.

This book takes a long horizon in its examination of trends in British football, from its professional origins in the late 19th century to its fluid position at the end of the millennium. Its perspective is primarily economic, with an infusion of business strategy taken from management. The analysis is clear, objective, dispassionate, and less replete with anecdote than other books in this field. Taking a broadly laissez-faire approach, the authors chart the growing commercialization of soccer, arguing convincingly that this is stimulated by consumer demand. Along the way, a number of myths are demolished. For example, players are not necessarily overpaid as the labor market has become broadly competitive over time with the removal of restrictions to mobility.

The shift in tastes toward soccer in the 1990s has coincided with increased revenues from sales of broadcasting rights as the dominant satellite broadcaster, BSkyB, used broadcasting of soccer games to chase subscription and advertising revenues. As clubs were compelled to become more commercially oriented, several adopted stock market flotation to widen their capital base. These trends are carefully analyzed by the authors with the aid of a database of club-by-club financial statistics drawn from U.K. company accounts and conveniently displayed in an appendix at the end of the book.

Chapter 1 sketches the relationship between club profits and team performance, highlighting the necessary tension between competition and collusion in any sports league. Chapter 2 reviews the changing patterns of club revenues during a 100-year period. For many clubs, gate revenues are now less than 50% of total revenues as broadcasting, advertising, merchandise, and sponsorship revenues have grown sharply in recent years. Chapter 3 turns to the players' labor market. Although direct salary data for players are unavailable, the authors make some useful inferences from aggregate club wage bills. The origins and development of the peculiar European football transfer system, with cash payments for trades of player registrations, is detailed together with threats to its existence following a European Court ruling in 1995 that made transfer fees illegal for out-of-contract players. Chapter 4 proposes an outline of successful business strategy: What makes football clubs successful? The answer is to be found in competitive advantage. Chapter 5 presents the two main economic hypotheses in the book. First, team performance, measured by end-of-season league position, is positively correlated with wage bills. Second, club revenues are positively correlated with team performance. These hypotheses are tested econometrically. Chapter 6 identifies

special features that allow some clubs to overperform relative to the estimated performance–wage bill relationship. These features are aspects of competitive advantage, such as charismatic coaches, club reputation, or architecture. Chapter 7 charts changes in competitive balance in soccer, not just in England, including the impacts of cross-subsidization. Particular attention is given to the replacement of the old-established English Football League cartel arrangement as the new Premier League was formed in 1992. Although previously important, gate revenue sharing in English soccer is now limited to knockout cup matches. Instead, there is revenue sharing through distribution of television broadcasting revenues. Finally, chapter 8 looks into the future of the soccer industry, highlighting tensions between soccer authorities and European Union competition authorities.

This book takes a broad sweep in its approach to the development of the soccer industry. The detailed historical account is strongly enhanced by the use of econometrics. The authors have the novel idea of using goodness of fit in the pay-performance relationship as an indicator of labor market efficiency. As the player labor market became gradually less regulated in the 1980s and 1990s, the fit of the pay-performance relation improves markedly compared to the 1950s and 1960s. I would suggest two caveats here. One is that sources of labor market imperfection, such as adverse selection and moral hazard, may be more apparent than the authors give credit for. For instance, fans sometimes complain that players are hiding in matches and players may learn methods in training to achieve lower effort while still convincing the coach that they should appear in the team. Players who perform well in one team may not do so well after being transferred. The second problem is that the authors express performance as a continuum of league positions through the hierarchy of four divisions that make up the English leagues. For Premiership clubs placed toward the lower end of the top tier, the objective becomes one of survival in the face of the threat of demotion and this entails ever-increasing expenditures on salaries. Different divisions may have different pay-performance relations. Despite these criticisms, the application of pay-performance and performance-revenue relationships is a very useful feature of the book.

One can question the notion of architecture as something driving team success over and above the levels to be predicted from the pay-performance relation. The analysis lacks symmetry here; it would have been useful to learn about teams that have underperformed over time. But if successful teams have good architecture, then surely it is equally valid to claim that good architecture is what successful teams have. Are not successful teams better able to retain great managers and coaches? The authors bravely attempt to open up the black box of coaching production functions in sports, but at the very least the case studies offered here should be complemented by further econometric analysis.

Toward the end of the book, the authors offer a few tantalizing thoughts on the future of European football. The tensions between goals of the clubs and football authorities and external pressures, including those from European Union legislators, are well covered. The authors are critical of centralized sales of broadcasting rights and suggest that pressures to decentralize these will be too great to resist. One of the biggest challenges facing soccer authorities is that of a breakaway European Super League as a rival to the existing European Champions' League currently administered by the UEFA. The authors suggest that a possible viable form for a rival league is an American-style conference structure without promotion and relegation. This idea is presented as what might come to pass rather than the authors' own preferences. Many would consider the institution of promotion and relegation to be an important motivational source of competitive dynamics in football leagues, which ought to be retained in any European club league.

Right at the end of the book, Szymanski and Kuypers suggest that the strongest pressure for change in European football comes from the European Union competition authorities. In one key respect, this is correct: It is clearly the case that European soccer cannot achieve general exemption from competition policy. But current pressures on the sport come more from the European Union commitment to free movement of labor. Nevertheless, the authors of this book are right to claim that however the soccer authorities respond to these pressures, the interests of consumers should be upheld.

This well-presented book combines good analysis with excellent writing. Szymanski and Kuypers have made an extremely relevant contribution to the current debate about the future of European football. Their book deserves serious consideration by academics and practitioners involved in sports generally, not just soccer.

—Robert Simmons
University of Salford

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Credibility and Independence of the World Anti-Doping Agency

A Barro-Gordon-Type Approach to Antidoping Policy

NICOLAS EBER

LARGE, Université Robert Schuman

This article argues that the antidoping policy faces a credibility problem very similar to that identified for the conduct of the monetary policy. Using a theoretical framework à la Barro-Gordon in which athletes form rational expectations about authorities' effort against doping, the author shows that strong antidoping policies are not credible unless conducted by a completely independent World Anti-Doping Agency, provided that its president has either a very strong aversion to doping or a wage contract that incites him or her to implement the announced level of effort.

The purpose of this article is to parallel the credibility problems of the monetary and the antidoping policies. From Kydland and Prescott (1977) and Barro and Gordon (1983), it is well known that public authorities lack credibility in the fight against inflation because of their short-term incentive to reduce unemployment. I use a framework à la Barro-Gordon to show that, in a very similar vein, institutions like sports federations or the International Olympic Committee (IOC) lack credibility in their actions against doping in sport. The reason is that such institutions find optimal to slacken their antidoping policy to preserve stars from disqualification and, hence, to preserve the economic value of the professional sport shows. Athletes forming rational expectations know this low-effort bias of the antidoping authorities, expect a low level of effort, and, finally, choose a high level of doping.

I show that the solution to make the fight against doping credible actually rests on a World Anti-Doping Agency (WADA), such as that established on November 10, 1999, in Lausanne under the initiative of the IOC, but only if this agency is really independent of the federations and of the IOC itself. Indeed, only an independent institution can be credible in the fight against doping, provided that its president has either a very strong aversion to doping or a wage contract that incites him or her to implement the announced level of effort.

The article is organized as follows. The model is laid out in the next section. The third section explains the credibility problem of the antidoping policy. The fourth section identifies the features of the WADA necessary to make it credible in its antidoping mission, followed by the concluding section.

THE MODEL

In the theoretical framework, I consider authorities in charge of the antidoping policy and a continuum of athletes with mass N normalized to unity. Each athlete has exactly the same features. The authorities in charge of the antidoping policy choose a level of effort noticed e : $e \in [\underline{e}, \bar{e}]$, with $0 < \underline{e} < \bar{e} < 1$. This level of effort is a global index that clearly accounts for the number of tests (especially unannounced out-of-competition tests), the degree of severity in the sanctions enforcement, the severity of the tolerance thresholds for banned substances, and so forth. Athletes anticipate the level of effort from the antidoping authorities; let e^a be the expected level of effort. I assume that athletes form rational expectations.

The doping behavior is described by the following rule. I assume that athletes choose their level of doping so that their expected probability of being suspended is exactly equal to a fixed level $\bar{p} \in (0, 1)$; \bar{p} may be interpreted as the admissible suspension risk that athletes have adopted as a kind of social norm.¹ I assume then that the antidoping technologies and procedures are such that, for a given antidoping effort e , the doping level that ensures a suspension risk equal to the normal value \bar{p} is $D(e) = \delta(1 - e)$, with $\delta > 0$. Hence, the more authorities make antidoping effort, the lower is the doping level compatible with the normal suspension risk \bar{p} . It is worth noticing that the antidoping policy is not inefficient in this framework. Indeed, higher antidoping effort from the authorities leads to a lower level of doping for the athletes to preserve an admissible suspension risk (namely \bar{p}). Notice also that, because $e \in [\underline{e}, \bar{e}]$ and $0 < \underline{e} < \bar{e} < 1$, I restrict this analysis to cases where zero-doping is impossible² and where zero-effort against doping is also precluded.³ Thus, even if the antidoping effort is maximum (i.e., if $e = \bar{e}$), a low but positive level of doping subsists so that the suspension risk remains equal to \bar{p} .

Of course, athletes do not know e but form (rational) expectations about it. Thus, the actual doping level is $D(e^a) = \delta(1 - e^a)$ and is chosen such that the expected suspension probability p^a is exactly equal to \bar{p} .⁴ Underlying is thus the key assumption that athletes adjust their doping level to the expected level of antidoping effort to preserve an expected suspension risk equal to \bar{p} .⁵ This assumption deserves further

comments. In some respect, it features the fact that sports regulators are trapped in an endless cat-and-mouse game in which as the antidoping procedures improve, doping methods become more sophisticated. Thus, athletes (with the help of their doctors) may actually be able to adjust their doping level to the regulation.⁶

Accordingly, the real suspension probability may be written as follows:

$$\text{Assumption 1: } p = \bar{p} + \theta[D(e^a) - \bar{D}(e)], \text{ with } \theta > 0.^7$$

Assumption 1 simply means that the real probability of suspension p does not depart from its normal value \bar{p} (because athletes are assumed to adjust their doping level), unless athletes' expectations about antidoping effort are false ($p = \bar{p}$ if $e = e^a$). In the case where athletes overestimate the antidoping effort ($e^a > e$), they choose a too low level of doping ($D(e^a) < \bar{D}(e)$) so that the suspension risk falls under its normal value \bar{p} ($p < \bar{p}$). On the contrary, when athletes underestimate the antidoping policy ($e^a < e$), they choose a too high level of doping ($D(e^a) > \bar{D}(e)$) so that the suspension risk rises above its normal value \bar{p} ($p > \bar{p}$).

Because $\bar{D}(e) = \delta(1 - e)$ and $D(e^a) = \delta(1 - e^a)$, Assumption 1 rewrites:

$$\text{Assumption 1': } p = \bar{p} + \theta\delta(e - e^a).^8$$

Because I have considered a continuum of identical athletes with mass $N = 1$, and because p is the average suspension probability for the whole industry, p also represents the fraction of athletes suspended for doping. Said differently, the expected participation in the industry is equal to $(1 - p)$.

Let us now specify the objective function of the authorities in charge of the antidoping policy. I assume first that the antidoping policy yields a revenue (in terms of image improvement, public health, etc.) $R(e)$ but has a direct (pecuniary) cost noticed $C(e)$. More specifically, I assume:

$$\text{Assumption 2: } R(e) = ae, \text{ with } a > 0.$$

$$\text{Assumption 3: } C(e) = ce^2, \text{ with } c > 0.$$

Clearly, Assumptions 2 and 3 feature decreasing returns to antidoping effort because the marginal revenue is constant while the marginal cost is increasing. To rule out corner solutions to the maximization programs I will study, I restrict the parameters as follows:

$$\text{Assumption 4: } \underline{e} < \frac{a}{2c} < \bar{e}.^9$$

Of course, the authority in charge of the antidoping policy may be a federation or the IOC and may then also be interested in increasing the economic value of the sport as a show.¹⁰ Yet this economic value, noticed V , depends on the quantity and

quality of the participation that, in turn, directly depends on the average disqualification probability p .¹¹ More specifically, I assume:

Assumption 5: $V = b(1 - p)^2$, $b > 0$.¹²

If p would be equal to one (what will never occur in this framework because athletes adjust the doping level precisely so that p remains equal to the normal value \bar{p}), all the athletes would be disqualified and suspended so that the shows would simply disappear and the economic value V would be equal to zero. If p would be equal to zero (what will never occur for the same reason), the participation would be certain and maximum and V would be the highest possible, namely equal to b .¹³

Finally, the authority in charge of the antidoping policy has the following utility function: $U(e) = R(e) + \lambda V - C(e)$, where λ is the weight it gives to the economic stakes of the sport. It will choose $e \in [\underline{e}, \bar{e}]$ so as to maximize this function.

THE CREDIBILITY PROBLEM OF THE ANTIDOPING POLICY

Like Barro and Gordon (1983) in their analysis of the credibility problem of the monetary policy, assume first that the authorities will not renege on any commitment. In that case, knowing that they are credible and that athletes form rational expectations ($e = e^a$), the authorities' problem writes:

$$\max_{e \in [\underline{e}, \bar{e}]} U(e) = ae + \lambda b(1 - \bar{p})^2 - ce^2.$$

The first-order condition (FOC) gives the optimal level of effort:¹⁴

$$e^* = \frac{a}{2c}$$

Assumption 4 ensures that $\underline{e} < e^* < \bar{e}$: The maximum level of effort \bar{e} is too costly and authorities prefer a lower level of effort, namely e^* . Notice that e^* is increasing in a (i.e., in the marginal revenue of the antidoping effort) and decreasing in c (i.e., in the cost parameter).

However, that level of effort is not credible. Indeed, authorities clearly have interest to slacken their effort in the fight against doping once the level of doping is chosen by athletes. In fact, authorities chose the level of effort e after athletes formed expectations. The optimal policy e^* is thus time inconsistent, and athletes expect the authorities to reoptimize as follows:

$$\max_{e \in [\underline{e}, \bar{e}]} U(e) = ae + \lambda b \left[1 - \bar{p} - \theta \delta(e - e^a) \right]^2 - ce^2.$$

The FOC yields:¹⁵

$$a - 2ce - 2\lambda b\theta\delta[1 - \bar{p} - \theta\delta(e - e^a)] = 0.$$

Because athletes form rational expectations, I necessarily have $e = e^a$ in any equilibrium. Plugging $e = e^a$ into the FOC yields the following equilibrium level of effort:

$$\hat{e} = \max\left\{\frac{a}{2c} - \frac{\lambda b\theta\delta(1 - \bar{p})}{c}, \underline{e}\right\}.$$

The key result here is that $\hat{e} < e^*$ when $\lambda > 0$: There is a low-effort bias in the antidoping policy as soon as the authorities are sensitive to the financial stakes of the sport. This bias features the interest of the sports authorities to limit suspensions of athletes to preserve the participation in great events and, hence, the economic value of the sport. Notice that whenever $\hat{e} > \underline{e}$, \hat{e} is decreasing in λ , that is, the more the authorities weight the economic stakes of professional sport, the higher is the low-effort bias. Notice also that whenever $\hat{e} > \underline{e}$, \hat{e} is decreasing in b , that is, the low-effort bias increases with the economic impact of the sport. This point is important because it features the fact that the low-effort bias comes precisely from the economic stakes of professional sport.

The results in terms of doping are clear. Because expectations are rational, equilibrium is featured by $e^a = e$ and the level of doping in equilibrium is $D(e) = \delta(1 - e)$. Because $\hat{e} > \underline{e}^*$ (provided that $\lambda > 0$), I have $D(\hat{e}) > D(\underline{e}^*)$. This result simply means that, making rational expectations, athletes understand the low-effort bias and anticipate \hat{e} as effort from the authorities. Knowing that the authorities will not choose e^* but $\hat{e} > \underline{e}^*$, athletes make expectations accordingly and choose a relatively high level of doping, namely the level of doping that implies a suspension risk p given a level of effort equal to \hat{e} .

SOLUTIONS TO THE CREDIBILITY PROBLEM

There are essentially two solutions in this very simple framework (without uncertainty). Both of them rest on an independent authority, that is, an international antidoping agency.¹⁶

The first solution to restore the credibility of the antidoping policy is simply to make the international antidoping agency headed by a president infinitely doping-averse, that is, completely insensitive to the economic value of the sport.¹⁷ Such a person is featured by a preference parameter λ equal to 0. It is straightforward to check that if $\hat{e} = e$ if $\lambda = 0$. The problem with this first solution is of course to find someone who has really a λ equal to 0, given the very high economic stakes in professional sports.

The second solution is to require the president of the international antidoping agency to announce (before the season, i.e., before athletes' doping choice) an antidoping policy (i.e., a level of effort devoted to the antidoping fight) and to make

his or her wage dependent on the difference between the announced and the realized level of effort. In this respect, the wage of the president would write $w = \bar{w} - \sigma|e - e^l|$, with $\sigma > 0$, where \bar{w} is the fixed part of the wage and e^l is the announced level of effort. From above, it is obvious that e^l would be the first-best, that is, $e^l = e^* = a/2c$. The president then chooses e so as to maximize $w = \bar{w} - \sigma|e - e^*|$, which clearly implies a credible first-best choice: $e = e^*$.

CONCLUSION

The problem is that WADA, established in Lausanne in November 1999,¹⁸ is a product of the IOC and is probably far from being independent of it.¹⁹ Thus, WADA may have some temptations to slacken its antidoping effort when confronted with doping affairs to preserve the economic value of the shows (e.g., the Olympic Games organized by the IOC). Knowing that, athletes may rationally not believe in strong antidoping policies and may then continue to choose high levels of doping.

Small wonder, then, that many people, including White House drug policy adviser Barry McCaffrey, have said that WADA needs to be separated from the IOC if it is to be seen as independent and credible.

NOTES

1. Hereafter, I use indifferently the terms *suspension probability* and *suspension risk*.

2. The underlying assumption is that the level of effort (namely 1) needed to eradicate doping is simply impossible to reach. This assumption allows to overcome the specific problem that zero-doping situations imply necessarily that the suspension risk becomes equal to zero. However, this is an extreme case I can rule out; as soon as the level of effort is lower than 1, doping exists and athletes face a positive suspension risk, namely equal to p according to this structural model of doping behavior. A more general framework in which zero-doping situations are allowed would be more complicated but would not add much insight to this story.

3. This assumption is here simply to overcome the difficulty in interpreting situations where zero-effort in the antidoping policy would yield to a positive suspension risk. Intuitively, zero-effort could mean the total absence of tests and, hence, a suspension risk equal to zero.

4. Of course, athletes know that e must be lower than $e < 1$, so that they always choose a positive level of doping (i.e., the level which entails a suspension risk equal to p).

5. This structural approach to doping behavior does not explicit the incentives to doping. See Bird and Wagner (1997) and Eber and Thépot (1999) for analyses of these incentives.

6. This fact is confirmed by the observation that the probability of being caught for a doped athlete is at the same (very low) level for years and seems to be independent of the level of doping and the level of the antidoping effort. This interpretation is thus that this is precisely because athletes (and their doctors) are able to adjust their level of doping to the antidoping regulation environment to preserve an admissible level of suspension risk that may be actually almost stable.

7. Clearly, θ measures the sensitivity of the suspension probability with respect to the expectation errors.

8. It means that the suspension probability is predetermined (at the level \bar{p}) and evolves according to the equation in Assumption 1'. Of course, the values of the parameter are restricted so that the value of p remains between 0 and 1.

9. It will become clear below that this assumption guarantees that the first-best level of effort is lower than the maximum level e and higher than the minimum level e .

10. This idea is easily justified by the fact that international sports federations organize the most important competitions (e.g., the official championships), whereas the International Olympic Committee (IOC) manages the most cherished event, namely the Olympic Games.

11. Recall that the participation is equal to $(1 - p)$.

12. Thus, I consider increasing returns to participation.

13. In some respect, b is thus a measure of the economic stakes of professional sport: the higher b , the higher the economic value of the sport for a given level of participation.

14. It is straightforward to check that $U(\cdot)$ is concave, so that the first-order condition (FOC) is sufficient.

15. Again, it is straightforward to check that the FOC is sufficient and features a global maximum.

16. Notice the parallel with the monetary policy whose credibility problem leads to an independent central bank.

17. This resembles Rogoff's (1985) solution to restore the credibility of the monetary policy. However, Rogoff gets that an infinitely inflation-averse central banker does not lead to the first-best because, when the economy is affected by shocks, he or she will not be able to stabilize it efficiently. Rogoff then shows that the best solution is to appoint a central banker more inflation-averse than the society but not the person with the highest possible aversion to inflation.

18. For detailed information about the World Anti-Doping Agency (WADA), see its Web site at <http://www.wada-ama.org>.

19. The present president and chairman of the board of the WADA is Richard W. Pound, IOC vice president.

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Nicolas Eber is a professor of economics at the University of Strasbourg, France.

The Game of Life: College Sports and Educational Values, by James L. Shulman and William G. Bowen. Princeton, NJ: Princeton University Press, 2001. 449 pp.

This book is based on what is probably the most comprehensive study to date on college sports and the mission of higher education. Its authors played sports in college and have had distinguished academic careers. Bowen, former economics professor and president at Princeton University, is currently president of the Andrew W. Mellon Foundation. Shulman is the financial and administrative officer for the Mellon Foundation.

The research methodology is first rate. Five categories of selected schools are analyzed: Division IA private universities (e.g., Duke, Rice, Stanford), Division IA public universities (e.g., Michigan, North Carolina, Penn State), Division IAA Ivy League Universities (e.g., Columbia, Princeton, Yale), Division III coed liberal arts colleges (e.g., Denison, Kenyon, Swarthmore), and Division III universities (e.g., Emory, Tufts). Selected data are also presented on certain women's colleges such as Smith and Wellesley. Altogether, 30 schools were surveyed longitudinally by the Mellon Foundation, with detailed information from about 90,000 undergraduates who entered college at three points in time: 1951, 1976, and 1989.

Classification of schools allows comparisons on key aspects of athletic programs. The distinct time frames reveal contrasts on features such as educational achievement, attitudes, family circumstances, and career choices. With response rates of about 75%, there is a high degree of reliability in the sample. Also, there are significant findings on female athletes and comparisons of so-called high profile sports of football and basketball, with low profile sports like crew, fencing, tennis, and wrestling.

After the opening chapter on the historical development of intercollegiate athletics, there are three chapters on the characteristics and experiences of male students, followed by four chapters on women students. Then, in chapter 9, leadership contributions of male and female athletes are reviewed. Chapter 10 examines gift-giving histories of athletes and nonathletes, and chapter 11 addresses the complex finances of sports programs. The final three chapters summarize the findings, take stock of underlying patterns, and prescribe direction for the future.

Readers should find confirmation of certain preconceptions about the collegiate sports scene, but there are numerous surprises too. Several misconceptions have arisen about college sports, and the main entertainment value of the book, making it something of a page turner, is its convincing evidence of demythologization.

Among the key empirical findings that one might expect are that athletes are being recruited far more intensively and offered more scholarships than in the past. The "walk-on" athletes at Division IA schools in 1951 or 1976 had largely disappeared by 1989. Also, whereas few female athletes were recruited in 1976 (their numbers were negligible in 1951), this practice was common in 1989 at Division IA and Ivy League schools. Nor is it surprising to learn that athletes are given preferential treatment in admissions, although that athletes at one typical school were about 50% more likely to get admitted (after taking SAT scores into account) is a shocker. An athlete culture has developed on campus, in contrast to earlier times when jocks more closely resembled other college students. Female athletes are following in the footsteps of their male counterparts in this regard, especially in schools that award athletic scholarships.

Despite lower SAT scores, athletes were found to graduate at high rates. However, for men and women academic rank is significantly lower than their classmates and has deteriorated markedly in recent years. As is generally known, male athletes are highly concentrated in certain fields of study, particularly in the social sciences, and female athletes are following this pattern. Among popular fields are business, communication, psychology, economics (when there is no business program), and political science.

Male athletes are apt to pursue postcollegiate careers in business and finance and less often in medicine, law, science, or engineering. Former athletes in the 1951, 1976, and 1989 cohorts consistently made about 10% more money on average than their classmates.

One might expect that former athletes would be inclined to donate more money to their schools, and they generally do. But high profile athletes at Division IA schools are an exception, giving less. This is partly explained by the anecdotal quote from a former athlete who said, "I gave my knee to Stanford—that's all you're getting from me." The data also contradict a widely accepted myth—that winning teams, especially in football, have a positive impact on giving rates. The authors determined that, except for coed liberal arts schools, winning football teams do not inspire increased alumni donations.

Although one might imagine large profits generated by high profile sports at Division IA schools, this is another myth. The authors quote top sports economist Roger Noll as saying, "No university generates a large enough surplus to justify the capital expenditures necessary to field a football team." Reference is further made to the University of Michigan's sports teams in 1998 to 1999, which had excellent records in football, ice hockey, women's basketball, and men's gymnastics, and overall were ranked sixth among colleges nationally. Yet the athletic department had a deficit of \$2.8 million (or \$3.8 million when capital expenditures and transfers were added in).

In their proposed direction for change, Shulman and Bowen offer sage advice, generally on closing the growing gap between college athletics and educational values. They think it is important to address the blatant abuses of standards of good conduct, especially in the high profile sports of football and basketball, and to consider deemphasizing these sports. The authors note evidence of the rapid growth in the number of coaches and their corresponding emphasis on recruiting, which they perceive as far out of balance with the educational mission.

Shulman and Bowen view Title IX, the law requiring gender equity in athletics for women, as providing an opportunity to rethink the organization of sports on campus. Until now, the approach has been to increase women's sports, which is admirable, but greater equality could be reached by cutting back on men's programs. One idea is to return to single-platoon football. Another is to reduce the number of football scholarships.

Whatever the ideas for retrenchment—and many good ones are offered in the book—it is difficult to overcome the vested interests in favor of increased commercialization of big-time college sports. The media, booster groups, and former athletes are strong advocates of continued growth, so the academy is held hostage to outside forces. The authors urge college presidents and boards of trustees to face up to problems before they worsen. As summed up in the last page of the text material:

The objective, in our view, should be to strengthen the links between athletics and the educational missions of colleges and universities—to reinvigorate an aspect of college life that deserves to be celebrated for its positive contributions, not condemned for its excesses or criticized for its conflicts with educational values.

Shulman and Bowen provide splendid research that refutes myths with solid evidence on the roles of education and sports in preparing students for the game of life. Their book not only deserves to be widely read but acted on as well.

—Paul D. Staudohar
*California State University,
Hayward*