

ELGAR GUIDES TO TEACHING



# Teaching Sports Economics and Using Sports to Teach Economics

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# 1. Integrating sports into economics teaching<sup>1</sup>

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The measurable impact of spectator sports on gross domestic product (GDP) is trivial. In 2018 the average gross revenue of a Major League Baseball (MLB) team was \$330 million, just about the same as the Dippin' Dots company, which makes colorful small pellet-like ice cream dots sold primarily at theme parks and seashore kiosks.<sup>2</sup> The revenues of spectator sports as a whole constitute only a trivial 0.14 percent of GDP (Szymanski 2003). Such comparisons, however, fail to capture the important role of sports in American society.

A typical half-hour local evening television newscast contains about three or four minutes of sports news, roughly 20 percent of the substantive broadcast. The usual daily newspaper devotes one of only three or four sections exclusively to sports. Many more people discuss the challenges facing the local college football team with friends and family than ponder the fortunes of the neighborhood grocery store or ice cream dots. There is undoubtedly a lot of interest in sports by Americans in general, and by students in particular. In our opinion, students are more likely to engage in the deeper thinking that leads to retention if they are interested in the subject being discussed.

The advantages to using sports examples to teach college economics go beyond simply attracting students' interest. Economics is often taught by analogy (McCloskey 1990). Students are more likely to gain an understanding of a point if they can connect personal experience to the analogy, and a lot of young Americans have had substantial experience either playing and/or watching sporting events. Thus, students are more likely to grasp a lesson on marginal vs. average revenues or costs from an analogy about how the scoring average of a high school basketball player changes after a terrific game than from a rendition of the effect of an additional passenger on an airline's marginal and average cost per passenger mile.

Periodic changes in sports leagues' rules, like the shift in property rights over the future services of players from team owners to the players themselves when free agency was introduced in the latter decades of the twentieth century, or the use of a designated hitter or an additional referee, produce natural experiments that illustrate economics in action. The frequent occasions for decisions

by owners, managers, and players offer a virtual experimental laboratory for analysis (and, some might say, even complete with rats).

The plethora of data available about the individual inputs and outputs of sporting teams (as well as the interest of professional economists in sports) has produced a substantial empirical literature that compares actual behavior to that predicted from economic models. Furthermore, many contemporary examples and data are easily accessible for classroom use because of the intense coverage of the “business of sports” by newspapers and magazines.

Both of us have regularly taught principles of economics courses and a specialized undergraduate course on the economics of sports. In this chapter, we relate some of the examples from sports that we use to illustrate important economics principles and some of the lessons we have learned from these experiences. We are certainly not the first to think of using sports as a vehicle to teach economics (Bruggink 1993; Merz 1996); there are now scores of specialized courses on the economics of sports being taught in America’s colleges and universities, and almost all introductory economics textbooks use sports to illustrate some basic principles. The examples that follow vary in applicability and level of analysis from the introductory course to intermediate theory and applied field courses, but all should be within the grasp of motivated undergraduate students.

## PRINCIPLES OF ECONOMICS IN SPORTS

### **Relative Prices**

Press reports regularly claim that baseball ticket prices have soared beyond the reach of average fans, suggesting that it now costs a family of four well over \$200 to attend a typical Major League Baseball (MLB) game.<sup>3</sup> Whether something is considered dear or inexpensive depends on several factors: (1) the rate of its price increase over some time period compared with a yardstick such as the Consumer Price Index (CPI); (2) its price relative to the price of available substitutes; and (3) its price relative to a measure of ability to pay, such as the wage rate or income. On each of these criteria, average baseball ticket prices, for example, are cheap and getting cheaper. An example such as this is an excellent way to introduce students to relative prices, changes in the price level, and changes in purchasing power. Ask them what the role of a price system would be if each individual price in the economy tracked the CPI perfectly.

Measured against inflation, the average admission price to a Major League Baseball game fell or remained constant for most years from 1950 to the early 1990s. Ticket prices have risen relative to the CPI in the last few years, but the inflation-adjusted price has only doubled over the last 70 years. In 2019,

the average ticket price to a Major League Baseball game was still just \$33. In 1950 the average ticket price was 0.047 of average annual income; by 2019 it had risen to 0.052 of average annual income, virtually no change.

Relative to the prices of many other forms of entertainment (i.e., substitutes), baseball ticket prices are lower and have risen less rapidly over time. Professional basketball, football, and ice hockey tickets are each at least three times more expensive<sup>4</sup> (but each of those sports either play many fewer games or play in indoor arenas that seat many fewer fans than baseball). Amusement parks, rock concerts, and theater tickets also cost considerably more than a baseball ticket. Museums, movies, and a walk in the park are exceptions (and a good topic for discussion).

### **Marginal Analysis**

One of the core concepts in economics is decision making at the margin, and the distinction between marginal, average, and total values. Examples from the world of sports can help students understand and appreciate this concept. For example, Los Angeles Angels' slugger Mike Trout had been in Major League Baseball for ten years when he entered the 2021 season with a .304 lifetime batting average. If he hits .347 in 2021 with the same number of at-bats as he averaged over the previous ten years, how does this (marginal) year change his lifetime batting average?<sup>5</sup>

Many athletic contests are decided "at the margin." Just one missed tackle in the National Football League (NFL) or one missed free throw in a Women's National Basketball Association (WNBA) game can cost a team a win. A second baseman signaling to the shortstop whether the next pitch is a fastball seldom makes a difference, but the one time it does during a season can put a team into the playoffs. For example, in 2018, the Houston Astros successfully stole opponents' catchers' signs to the pitcher and occasionally transmitted the information to their teammate in the batter's box by banging on the lid of a garbage can a certain number of times. That helped the batter anticipate the kind of pitch to expect. It apparently worked enough to give the Astros a significant advantage, for which the team and some of the participants eventually were penalized heavily by the Commissioner of MLB. Swimmers, skiers and runners try to save precious seconds by the aerodynamic design of their clothing or equipment because the difference between winning a race and finishing second is often measured in hundredths of a second, as Lindsay Vonn illustrated when finishing third by 0.47 of a second behind the gold medal winner in the 2018 women's Olympic downhill skiing race in South Korea.<sup>6</sup>

The public often questions values in a culture that rewards young athletes with multi-million-dollar contracts yet balks at paying elementary and secondary school teachers – to whom we entrust society's best hope for the

future – a relative pittance. This issue is perfect for the transition from the traditional water–diamond paradox, which most students grasp and appreciate, to a contemporary sports illustration. It is relative scarcity at the margin, not total value that determines price. It is simply easier – and less expensive – to find one more person who can teach fourth grade or high school history well than it is to find someone who consistently can hit .300 (or snowboard like Shaun White). The fact that we spend about \$60 billion a year on sporting events but \$700 billion annually (in 2017) on public elementary and secondary education suggests that our values are reasonably respectable.

Fans and commentators often criticize athletes who exhibit anti-social, and/or even illegal behavior on or off the court or field of play. Quarterback Michael Vick’s staging of illegal dog fights while playing in the NFL in 2007, Pete Rose’s gambling while he was a manager in baseball (that led to a lifetime ban from participating in MLB in any way and has so far kept him out of the Baseball Hall of Fame), Tonya Harding’s role in orchestrating an attempt to kneecap her figure skating rival, Nancy Kerrigan, in 1994, which eventually led to Harding being banned from figure skating for life, and the allegations in 2020 and 2021 against Deshaun Watson, the Houston Oilers’ quarterback, and Trevor Bauer, a Los Angeles Dodgers starting pitcher for sexual abuse of women are but a few examples. Employers would fire most of us for similar stunts. Apart from the fact that some of this behavior may increase the demand for tickets (there is evidence, for example, that fighting in the National Hockey League (NHL) attracts fans (Jones et al. 1993; Rockerbie and Easton 2019)), the point to emphasize is that these individuals receive large economic rents in spite of their anti-social behavior because there are few perceived substitutes for them. In contrast, because there are close substitutes for the typical worker (including school teachers), he or she earns little economic rent. Thus, behavior that the boss perceives as inappropriate can be met with immediate dismissal in schools or universities. In sports, however, termination likely means the destruction of considerable economic rent that is accruing to the franchise owner, which is one reason why the unexpected dismissal of volatile basketball player Latrell Sprewell by the Golden State Warriors for choking his coach in November 1997 was so surprising and attracted so much attention at the time.

## **Demand**

Basic microeconomic models posit that the quantity demanded of a particular good or service is inversely related to its price, *ceteris paribus*. Factors held constant include the price and availability of substitute and complementary goods, income, tastes, expectations, and population. Sports offer a convenient way to get students to think about *ceteris paribus* issues.

For example, the quantity demanded for baseball is a function of the admission price. Other considerations that must be held constant to properly estimate the effect of price on attendance include: the quality of the home team and opponent; how closely the teams are matched; the time the game is played; weather conditions; promotions (such as pre-game souvenirs or post-game fireworks); the location; convenience of travel to and quality of the venue; competing events or entertainment alternatives; whether the game is televised; per capita income and the local unemployment rate; and the population with public transit access or within driving distance of the game.

In addition to the concept of holding other things constant, an instructor can also explore elasticities: how sensitive are fans to ticket prices; does this sensitivity vary with the price level; how income elastic is the demand for baseball, bowling, tennis or cricket? A related demand concept that we find more difficult for students to grasp is the derived demand for a factor of production. Players' salaries are determined by demand derived from the demand to watch particular sports and by the employment alternatives available to players. The profit maximizing price is what the market will bear, based on the anticipated demand for the sport. Players' salaries do not determine ticket prices, no matter how often owners allude to their rising payrolls in order to justify ticket price hikes. The demand for players, and the level of their salaries, is derived from the overall demand to watch the sport in person or on television and to purchase logo merchandise.<sup>7</sup>

## **Efficiency**

Many resource allocation decisions in sports affect efficiency. We focus on just one of them, the allocation of playing talent across teams, in order to illustrate the importance of matching the quantity supplied to the quantity demanded for maximizing social welfare.

Professional team sports leagues take steps allegedly designed to balance the level of playing skills among competitors. They allocate players new to the league on the basis of a "reverse-order draft" that awards the most promising players to those teams that have recently enjoyed the least success on the playing field.<sup>8</sup> Currently the National Football League, the National Hockey League and the National Basketball Association (NBA) limit the total player payroll of teams in an effort ostensibly to prevent "wealthy" teams (those located in more densely populated areas or in areas with more avid fans) from securing a disproportionate share of the most talented freeagent players. Major League Baseball sets a payroll threshold. If a team exceeds the threshold, it must pay a "luxury tax" to the league, apparently for the "luxury" of spending excessive (of the threshold) money on payroll, so reducing the incentive for

teams playing in large markets from accumulating so many talented players as to injure reasonable competitive balance.

Economists have long recognized (Rottenberg 1956) the futility of efforts to balance team playing talent when the teams play in different localities that vary in population and in front of fans that vary in their willingness to pay for a winning local team, and when contracts of players can be transferred among teams. As the Coase theorem reminds us, in the absence of significant transactions costs, resources move to their most valuable use regardless of initial ownership. If a talented baseball player is valued more highly in New York than in Kansas City because there are more New Yorkers willing to pay to see the Yankees win than there are Kansas City residents willing to pay to see the Royals win (or, even with similar populations, if the average New York resident values winning more than does the average resident of Kansas City) the player's contract will be transferred from Kansas City to New York for a price between his value at the two locales. Transfers like this would occur regardless of whether the property rights over the player's services reside with his original team (as in the days when a "reserve clause" granted perpetual ownership rights to the team that first signed a player unless it transferred those rights to another team) or with the player himself, as is the case for those veteran players who qualify for "free agency" today.<sup>9</sup>

Because of player trades and sales, player drafts do not tend to promote a balance of playing skills among teams. Player drafts may subsidize weak teams by granting them initial property rights over players whom they can subsequently sell to other teams. The extent of the subsidy depends on the elapsed time before a player can become a free agent. Free agency for players does not promote a balance of playing skills among teams either. Wealth-maximizing players will sell their services personally to the team willing and able to pay the most for those services, a demand derived from the player's expected contribution to the team's performance and the willingness and ability of local residents to pay for better performance. Occasionally a good veteran player will accept a contract below his estimated market value in order to play on a talented team with a chance to win the league championship or because he and/or his partner prefers its location (e.g. San Diego), further exacerbating competitive imbalance.

For the sake of economic efficiency, this failure to balance competition may be fortunate. The argument that balanced competition is desirable rests on the false belief that fans value only one characteristic of games, namely uncertainty of outcome. Fans are clearly not indifferent to the level of uncertainty of outcome (Knowles, Sherony, and Hauptert 1992), but they also value winning, and the response varies by geographic area (Porter 1992). Although a large imbalance in team playing-skills reduces the uncertainty of games and thereby the demand for those games, the greater willingness to pay for winning

by fans of certain teams than by fans of other teams can mean that the efficient level of competitive balance is far from perfectly even (Fort 2011, Chapter 6). Imbalance leads to more winning by teams situated where people get more satisfaction from winning, and less winning by teams whose fans in the aggregate care less about it. Whenever the difference in the value of winning to the fans in two locations exceeds the loss in value associated with less evenly matched games, efficiency is promoted by moving playing skill from the team located where winning is valued less to the team located where winning is valued more.<sup>10</sup> It is also unlikely that severe imbalance of playing talent would be efficient. As playing-skills become more unequally distributed, the uncertainty of games diminishes, the marginal utility of winning more games to the fans of the more successful teams diminishes, and the marginal utility of winning more games to the fans of the less successful teams grows, both acting to slow the payoff from further unequal allocations of playing skill. Another disadvantage of equally balanced competition is the increased likelihood that the outcome of a contest will be determined by chance – an unusual bounce of a ball or an official's error.

## **Surplus**

Efficiency is achieved when economic resources are devoted to those activities that create the greatest value for consumers. This basic economic concept is often difficult for students to comprehend. Getting the allocation right is relatively more important if the value of resources when they are devoted to their best use substantially exceeds the value that could be created if they were allocated to their second-best use. This difference is surplus.<sup>11</sup> It is large when the demand for the output is high and the opportunity cost of the resources (their value in their next best use) is low, as is common in sports. Although there are a few, the number of potential actors, surgeons, lawyers, and Wall Street bankers among professional athletes is limited. The essence of resource allocation is maximizing consumers' plus producers' surplus.

Many people confuse aggregate revenues with surplus, the net value created by getting the allocation decision correct. The 1994–95 Major League Baseball players' strike provides an opportunity to illustrate this difference. Some television news programs reported the "economic loss" from the strike as the amount of ticket and television revenue that would have been received by teams if the cancelled games had been played, plus an estimate of how much fans would have spent on hotels, restaurants, parking, etc. while attending games. Ask students if this is a good estimate of the social welfare loss of the strike.

There are at least two (potentially offsetting) errors in using foregone revenues as a measure of social welfare. Each emphasizes an important economic



concept. First, revenues fail to include the consumers' surplus lost to the strike. Thus the "economic loss" due to the strike may exceed forgone revenues. To the extent that sports consumers are *fanatics*, and have inelastic demands, unless the teams can perfectly price discriminate, this forgone consumers' surplus could be quite large.

Second, the use of foregone revenue to measure economic loss ignores the possibility that the striking players and/or their families may value their newly created leisure time above zero. This value is the area under the (short run) marginal cost curve. It should be subtracted from total revenue to obtain an accurate estimate of the net economic loss caused by the strike. The value of leisure time created by the strike might have been quite high because it is rare for players to have much time with their families during the summer.<sup>12</sup>

What is really needed to estimate the economic cost of the strike is a measure including all benefits, both those accruing to the consumers as surplus and those captured by the teams and excluding the alternative value of the released resources (of which the players are the largest component, but could include the value of alternative uses of the stadium, for example, as voting locations during the 2020 election). Taking these considerations into account, Chris Douglas (1996) estimated the contemporaneous economic cost of the 1994–95 baseball strike at \$813 million dollars, about \$10 million per day, while forgone revenues were only \$8 million per day. Forgone spending on hotels, food, souvenirs and parking contributed almost nothing to the social welfare loss of the strike because for the most part those services are provided in competitive markets with quite elastic supply and demand. Fans simply drank their beer elsewhere in late summer of 1994. Little surplus was lost by their relocation. However, the inelastic demand for baseball created a substantial loss in consumer surplus. Zipp (1996) provides a good empirical account of these issues.

## Strategy

Game theory now appears as a separate chapter in many introductory economics texts and is being infused throughout other courses in the economics curriculum. Basic concepts of game theory – think ahead, put yourself in your rival's shoes, backward induction, indirect effects, dominant and dominated strategies – are enormously useful in everyday life.

Most sporting events are zero-sum games. As Coco Gauff gains a point, Serena Williams loses one. As the Green Bay Packers gain four yards, the Dallas Cowboys lose four yards. The concepts of game theory are usually introduced with zero-sum games. Their symmetry simplifies the analysis of pure strategy games, allowing more attention to the fundamental ideas. In addition, the concept of preventing your rival from being able to take advantage of

your own strategy by making her indifferent among her alternative strategies is an intuitively appealing basis for teaching mixed strategies that evaporates for variable-sum games.

Although the existence of multiple equilibria is probably the most disconcerting characteristic of games for veteran economists, the appearance of counterintuitive results often creates a mental obstacle for the rookie student. Because of their experience with sports, many students believe they “know how to play the game.” Producing counterintuitive results in this context is persuasive evidence that there is something useful to learn from serious study of economics. A simple exercise with a mixed strategy equilibrium game demonstrates the importance of taking indirect effects into account, which is a key element of “thinking like an economist.”

The payoff matrix in Figure 1.1 reports the success of a baseball batter against a pitcher. For simplicity, the pitcher has only two pitches, a fastball and a curve, and the batter knows that is the pitcher’s complete repertoire. The batter is relatively more successful against fastballs. When he guesses the pitcher will throw a fastball and the pitcher does throw a fastball, he bats .600. When he guesses correctly that the pitcher will throw a curve, however, he hits only .400. When he guesses incorrectly what will be thrown, he always bats just .200. The goal of the pitcher is to minimize the batter’s average and the goal of the batter is to maximize it.

		Batter	
		Guess Fastball	Guess Curveball
Pitcher	Throw Fastball	.600	.200
	Throw Curveball	.200	.400

Figure 1.1 *Baseball game payoff matrix (hitter’s batting average reported in cells)*

The pitcher knows that if he is predictable, the batter has a substantial edge. If the pitcher were to throw only one type of pitch, it would be a curve, but the batter still would be successful 40 percent of the time. There is no *dominant* strategy for either the pitcher or batter because the best pure strategy of each

depends on the pure strategy undertaken by the other. There is no pure strategy Nash equilibrium in this game.

There is a mixed-strategy Nash equilibrium, however. If the pitcher throws fastballs  $p$  percent of the time so as to ensure that the batter cannot take advantage of the pitcher's mix between fastballs and curves, then the batter must be indifferent between guessing fastball, guessing curve, guessing 50 percent fastballs and 50 percent curves, or guessing any other combination available to him. Thus, the batter's expected payoff when guessing any combination of fastballs and curves must be the same. If it is not, he will select the strategy that gives him the higher expected batting average and thus take advantage of the pitcher. The calculations are easiest with the batter's pure strategy alternatives. The expected payoff to him from guessing fastball is  $\{.600p + .200(1 - p)\}$ ; his expected payoff from guessing curve is  $\{.200p + .400(1 - p)\}$ . The value of  $p$ , the percentage of fastballs thrown, that equalizes the two expected payoffs is  $1/3$ .<sup>13</sup> The expected batting average of the batter is .333. Students need to be reminded that while the pitcher's optimal strategy is to throw  $1/3$  fastballs and  $2/3$  curves, the actual delivery of the pitches must be unpredictable.

Now comes the fun. Suggest to the students that you have a tip for the batter: "choke up" on the bat. The effect of this is to raise the batter's success when he is expecting a curve, but the pitcher delivers a fastball. Fewer of these pitches now "blow by" the batter. The batting average in the upper right cell of Figure 1.1 rises to .300. Ask students what the pitcher should do now that the batter is better at hitting fastballs (when he was expecting a curve). The majority will respond that the pitcher should throw more curves. Then solve for the mixed strategy equilibrium.

The new equilibrium mix for the pitcher is 40 percent fastballs, an increase from 33.3 percent prior to the batter "choking up" on the bat, and opposite the usual student prediction. The new expected batting average is .360, a rise of .027, as would be expected when the only change was a batting improvement. Throwing more fastballs after the batter improved his hitting against fastballs will puzzle some students because they will fail to take into account how the batter will change his optimal strategy with his newly discovered skill. The batter's original optimal guessing mix was one-third fastballs. After the tip to "choke up" on the bat, his optimal mix is to guess fastball only one-fifth of the time. He guesses curve more frequently after the tip because the tip has helped his batting when he guesses curve. So, he guesses curve more frequently, 80 percent rather than 67 percent of the time. The pitcher, in turn, adjusts his optimal mix by favoring fastballs because now the batter is guessing curve more frequently, and the pitcher always does worse when actually pitching what the batter is expecting. So, the pitcher throws 40 percent fastballs rather than 33.3 percent fastballs. This exercise helps students appreciate the

importance of thinking about how their rival might react to a change in circumstances as well as how they should adjust their own behavior.<sup>14</sup>

Moving from the theoretical world of game theory and analytics to actual experiences on the field, court or ice, can engage students. For example, in soccer, where should a team position its goalie for a penalty kick, and do they employ a mixed strategy? Should a team “sit on a lead” and choose ball control over the risks associated with trying to score again? In basketball when does it make sense to foul an opponent on purpose near the end of a game? After scoring a touchdown, should a football team attempt a two-point conversion with about a 50–50 probability or settle for the virtually certain 1-point kick?

The structure of sports leagues locks teams into a classic prisoner’s dilemma. Winning is a zero-sum game. Attendance rises with winning, and so revenue depends on a team’s success on the playing field. Thus, each team faces an incentive to sign high-quality free-agent players, even though, when all teams sign comparable free agents, nothing different happens to collective win–loss records. Indeed, the aggregate “output” of the league in terms of games won cannot increase as long as the schedule remains fixed. As a result of competition for free agent players, each team’s expenses rise, revenues remain constant, and profits decline. In order to escape this prisoners’ dilemma, over the years leagues have devised various schemes such as reserve clauses and reverse-order player drafts, the latest of which are aggregate player payroll ceilings (inappropriately called “*salary caps*”).

Levi Leipheimer, one of cyclist Lance Armstrong’s teammates, admitted to doping and using performance-enhancing products because he felt everyone else in cycling was doing it, so he figured it was either go along or be satisfied with not being a contender. He was trapped in a prisoner’s dilemma. After the pervasive cycling scandals became public knowledge, racing officials tried various techniques to alter the game payoffs so as to eliminate performance enhancing drugs as a dominant strategy (Eber, 2008; Cartwright, 2019).

In the 2015 Super Bowl between the Seattle Seahawks and the New England Patriots, it all came down to the last 26 seconds. Seattle, down 28–24, had the ball on the Pats’ one-yard line, and they had their powerful running back, Marshawn Lynch, ready to dive into the end zone. Six points, the extra point, and they own the Lombardi trophy. But Seahawks’ coach Pete Carroll – think mixed strategy here – chose to pass instead, figuring Pats’ coach, Bill Belichick, would stack the line in anticipation of Lynch’s plunge. But maybe Belichick was thinking that Carroll would think this way. The Patriots intercepted the supposedly unexpected pass, and the rest is legend.

## Monopoly

There are numerous examples of monopoly power in sports. Most professional sports teams have market power over local ticket sales because their geographic distance from other teams in the same league creates substantial costs to a consumer who would try to substitute live performances of another team in the face of a price increase.<sup>15</sup> Teams don't have to worry about other suppliers moving into their territory because all of the professional sports leagues have restrictions on team movements, especially those that would place a relocating team near another franchise. In addition, the entry of new teams is strictly limited by the existing teams, who have authority to grant or refuse entry into their league. In a business where new entrants must rely on the cooperation of existing firms to produce their product (who will they play if the incumbents refuse?) there is not likely to be entry from hostile new competitors.<sup>16</sup>

Although expenditures on sports obviously come at the expense of expenditures by consumers on other goods and services, and most likely at the expense of other entertainment options, evidence also suggests that consumers do not even view different sports as particularly good substitutes.<sup>17</sup> Studies of the demand for tickets to professional team sporting events find elasticities of demand at the average price generally less than  $-1.0$  (Fort, 2006) which at first glance suggests that team owners set prices too low to maximize profits. Students can be shown how a profit-maximizing team with very low marginal costs would maximize profits by setting ticket price so that the elasticity of demand is close to (minus) one. If marginal costs are higher, the profit maximizing price is in the elastic region of demand. Marginal costs are certainly minuscule for additional patrons to an individual sporting event that is not sold out, and also quite low for additional games during a season. But if a team owner is more interested in maximizing attendance, or if a team earns profits from the sale of parking and concessions that increase if attendance is larger, then the profit maximizing price easily could be in the inelastic region of demand (Fort, 2006).<sup>18</sup> Newspapers and magazines similarly price in the inelastic region of demand in order to boost circulation and therefore advertising rates.

Perhaps the most interesting application of monopoly to sports involves league decisions to expand. Absent the contrived scarcity of teams that evolves from limitations on expansion, the price of franchises would be modest. Who would be willing to pay almost a billion dollars for an existing franchise when one could get a new one for free? Whereas existing franchises might have some goodwill value, new franchises do not. Yet recent prices for expansion franchises in football, baseball, and ice hockey have been close to prices at which the ownership of average incumbent teams (not the most valuable franchises, which are now in the billions of dollars)<sup>19</sup> has been transferred,

suggesting that the lion's share of the franchise price represents the scarcity value of a franchise rather than established goodwill.

How, then, would leagues determine the optimal rate of expansion to maximize the net present value of the entry fees they collect from expansion franchises? The entry fees are distributed among the incumbent members of the league. No expansion generates no fees. Rapid expansion reduces the willingness of prospective owners to offer high fees for an expansion franchise, because the availability of more expansion franchises is then anticipated to be just over the horizon. Between these extremes is an expansion rate that maximizes the net present value of league entry fees. Leagues must expand slowly enough to keep some franchise-hungry cities and potential owners chomping at the bit, in effect creating the artificial scarcity symptomatic of all monopolies. This scarcity scares bidders into inflating their offers for fear of otherwise being rationed out of the market. But leagues also must expand fast enough to ensure that the number of vacant cities that could support a team does not approach a number that could support an entire new league (perhaps eight). Although an incumbent league can prevent the hostile entry of individual teams by refusing to play them, it cannot similarly block the entry of an entire independent league. Indeed, in 1960 the American Football League (AFL) initiated operations that were so successful that it eventually successfully challenged the incumbent NFL. Of course, once both leagues recognized the effects of competition on owners' profits (via salary competition for new and free agent players), they merged, with the legal blessing of Congress.

Franchise owners often plead their case for monopoly power to Congress. Both the NFL and the NBA secured legislation that allowed them to merge with competing leagues in the 1960s and 1970s without incurring antitrust liability. The NFL also persuaded Congress to pass the Sports Broadcasting Act of 1961, permitting teams in professional sports leagues to sell their broadcast rights collectively. (Universities are not covered by the Sports Broadcasting Act. Thus, in 1984, they were ruled to be in violation of the Sherman Antitrust Act for engaging in similar behavior.)

Congressional pleadings invariably include owners' claims of poverty. Most professional sports teams are privately owned, and not required to disclose financial information publicly. For the most part, the teams have asked the public to take it on faith that owning a professional sports team is not profitable. Economists find these claims disingenuous in light of the rapid rate of increase of franchise values, averaging from 11 to 18 percent annually over the 1990s (Fort 2011, p. 7) and from 11 to 16 percent annually from 2008 to 2016 (DeSantis 2018) for the four major team sports (Scully 1995, p. 132). Why, we might ask, would smart businesspeople, who have earned fortunes in other industries, pay ever-increasing prices for an asset that is expected to generate only losses for their poor owners into the foreseeable future? This conundrum

provides an opportunity to discuss with students the source of asset values and the possibility of nonpecuniary returns, as well as the honesty of professional sports franchise owners.

### **Monopsony**

For many years professional sports franchises were able to buy (players' services) low and sell (tickets and broadcast rights) high. They enjoyed monopsony power in the purchase of their primary input – players – through an agreement among the teams in a league not to hire a player from another team unless the owner of that team voluntarily relinquished rights to him (usually by selling or trading him to the team that most desires the player's services). They sold their tickets in markets insulated from competition with other teams in the same sport by agreement with the other teams in their league and sold national broadcast rights collectively as monopolists, a practice sanctioned by Congress in 1961.

The linchpin of the professional leagues' financial success was their monopsony power over players. Beginning with the emergence of players' unions in the 1960s and exacerbated by strikes, union contract settlements, and periodic legal skirmishes, the monopsony power of professional sports teams over veteran players has been drastically curtailed. Each of the leagues still drafts new players, who may play only for the team that selects them (or the team to which the draft rights are sold or traded). This continues to depress the earnings of relatively new players below competitive market rates. It is perpetuated through the complicity of veteran players who agree to incorporate the draft rules limiting salaries of young players into their union contract with the leagues, thus exempting the draft from the antitrust laws. Veteran players gain by the exploitation of rookies to the extent that funds that would otherwise go toward meeting competitive market salaries for new players are available for negotiations between teams and their veterans (White 1986).

Rookie professional players are also disadvantaged by rules adopted by the NFL and NBA that do not allow teams to draft players until people in their high school graduating class have completed either three years (NFL) or one year (NBA) of college, respectively. These rules allow the professional leagues to keep the players on lower salary "rookie contracts" later through their careers, when they often are approaching the peak of their playing skills. It also helps college and university teams to maintain a high quality of play while paying no salaries to players, and to attract sufficient revenues to pay coaches well (if not exorbitantly) and build superb playing facilities.

The dissipation of market power over veteran players has produced a natural experiment to test the predictions of the monopsony model. Statistical studies of salaries show convincingly that when draft and player-retention schemes

were relaxed in the 1970s, large increases in player compensation resulted (Raimondo 1983; Scully 1989; Quirk and Fort 1992; Kahn 1993). In the 2020s, apprentice baseball players' salaries remain under the control of the teams through an agreement with veteran players to include such restrictions in the collective bargaining agreement. As a result, players in their first three years in the league make about 30 percent of their estimated free market value (Krautman 2019). Compensation has grown most rapidly when either courts or collective bargaining weakened the draft and retention schemes and has grown faster as players have won more relief from these constraints. Over the past two decades professional basketball players' salaries have risen fastest, baseball players' second fastest, football players' third fastest and ice hockey players' slowest. The rapid increase in football player salaries in the 1990s, following the introduction of true free agency for veteran NFL players in 1993, further corroborates the connection between salary levels and competition in the labor market for players.

As monopsony power over their labor inputs has eroded, professional sports teams have turned increased attention to their second most costly input – a facility in which to stage their games. Each of the four major professional team sports leagues operates under a provision similar to the NFL's Rule 4.3, which requires approval of a supermajority (75 percent in the NFL) of the owners for franchise relocation. This voting requirement provides a strategic advantage to both incumbent teams negotiating a stadium contract extension with their existing landlord (often the city or county in which they are located), and teams negotiating with a stadium owner in a location to which they propose to relocate. An incumbent tenant can threaten to relocate and also to form a coalition to block any other franchise from replacing it, thus creating monopsony power for the team in renegotiating its facility lease. A relocating team can credibly threaten to block the relocation of any other team that competes with it for a stadium lease because it needs to form only a sub-majority coalition (of at least 25 percent of teams) to do so, thus deterring competitive bidding for the facility with which it is negotiating.

The result of franchise relocation restrictions in professional sports leagues is a balance of bargaining power tilted toward tenants – that is, team owners. The exploitation of this monopsony power in the stadium and arena market in recent decades is illustrated by the shift in stadium and arena financing. In the 1950s, a majority of professional sports facilities was privately owned and financed. Today, almost all stadiums and arenas are constructed with public funds and leased to teams at trivial rents because the landlords expect to receive external (to the team) rents in the form of marketing and enhanced prestige for their city. As the leagues' monopsony power over players has declined, professional sports teams have taken advantage of the country's obsession with sports by demanding free, or at least heavily subsidized, facil-



ities from communities that believe a professional sports franchise is needed to acquire the image of a “major league” city and see building a stadium as the best way to get one (Noll and Zimbalist 1997; Coates 2019).

### **Collusion and Cartels**

Both professional and intercollegiate sports are replete with collusive agreements that illustrate the fundamental principles of cartels. Here we focus on activities of the National Collegiate Athletic Association (NCAA) (Tollison 2012). Featuring the NCAA to teach about cartels has two advantages. First, many students are enrolled at institutions that are members of the NCAA and take delight in evaluating and criticizing their college or university. Second, the NCAA is not exempt from the antitrust laws prohibiting collusive conduct as are Major League Baseball, national television broadcasting contracts of all professional sports leagues, and the league mergers in basketball and football.

The case for collective behavior in the organization of sporting contests among colleges and universities originated with two private market failures – a public good problem and an externality. The first was the necessity to develop standard rules for football, and the second was the need to control player violence that helped individual teams win games but was destroying public interest in college football in the late nineteenth century. Individual colleges were caught in a prisoner’s dilemma. They all agreed that college football would be better off with less violence, but any team that unilaterally cleaned up its act would suffer on the scoreboard and financially. Collective action was required.

The NCAA was founded in 1905.<sup>20</sup> Once it succeeded in controlling violence, the organization expanded into economic regulation. Its most important market restrictions were developed after World War II, when members agreed to limit player compensation to tuition, room and board (initially called a “Sanity Code,” as if paying players were insane) and to centralize the sales of rights to televise live college football games.

In the 1950s, the NCAA developed a system to detect and punish cheating on the agreements and extended its control of output by limiting the annual number of games in football and men’s basketball. Punishment for cheating (e.g., broadcasting a game in competition with the collectively negotiated exclusive NCAA broadcast, or compensating a player beyond the agreed upon limit of tuition, room and board) could be severe, because the NCAA controlled all college sports and a violation in one sport could spawn sanctions in all.

NCAA sports are ripe for a cartel. There appears to be quite inelastic demand, and entry is difficult.<sup>21</sup> These characteristics ensure substantial rewards to a successful cartel. It is relatively easy to police the behavior affect-

ing some parts of the cartel agreement (e.g., agreement not to televise live football games in competition with the game sold collectively), and institutional arrangements have been devised to limit cheating on other aspects of the cartel agreement (e.g., investigations of and sanctions for exceeding the agreed limit on payments to players).

The restriction of output by limiting the number of games played and televised and limitations on the price of the most important input – the players – enhance net revenues sufficiently that institutions face strong incentives to field successful sports programs. The natural outcome has been a costly expansion of competition in unregulated areas, for example, recruiting, which erodes the net revenues derived from the programs. The NCAA reacted by imposing limitations on some forms of non-price competition, such as limiting the number of coaches, the number of scholarship players, and player recruitment activities. In addition to direct efforts to control costs, the NCAA also enjoys external support for its efforts to protect the revenues produced by cartel restrictions from being squandered via rent-seeking competition (e.g., amateurism is “good” [for players, but apparently not for coaches] on moral grounds). But not all outlets for competitive pressure have been capped. Universities still compete for players by building bigger and better (than the competition) facilities to impress potential recruits.

In contrast to professional sports teams, which historically monopsonized player markets by means of an agreement not to hire players who were allocated to other teams, there is no “draft” of players into college sports. The NCAA controls the player market not by creating market power for individual teams through a draft that limits player mobility, but rather by establishing a maximum wage below the competitive equilibrium wage for the entire market. This provides a pedagogical opportunity to analyze price controls without resorting to the usual examples of New York City rent controls, or usury laws. The gap between a player’s marginal revenue product and the cost of tuition, room and board illustrates the incentive facing coaches, athletic directors and boosters to offer clandestine payments to college athletes and to overindulge in complementary factors of production such as coaches, stadiums, or training facilities as a means of competing for the best athletes.

The NCAA should be recognized as a cartel of colleges and universities, whose behavior is more closely parallel to OPEC (Organization of Petroleum Exporting Countries) than Mr. Chips (Sanderson and Siegfried 2019). The fact that the members are not-for-profit institutions does not dampen their incentive to maximize revenues, for those revenues can be put to uses that enrich the individuals in control. The frequent claims that athletic departments are in poverty are difficult to accept when so few major programs are terminated and so many coaches and athletic directors appear to be paid many times their value in their next best use.<sup>22</sup> Apparently, many of the benefits do not show

up on athletic department financial statements, providing an opportunity to discuss rent seeking and external benefits with your students (and why head football coaches often are paid many multiples of what professors of economics are paid).

### **The Role of Government**

Sports examples can be used to explain the role of government in a market economy. For example, under public interest rationales for government we consider market imperfections – using antitrust laws to create or maintain competition; dealing with natural monopolies; improving efficiency when there are capital market imperfections; internalizing externalities; providing public goods; correcting for information asymmetries; and equity issues. The empirical record of government involvement in sports has been far from favorable to competition – baseball’s antitrust exemption, the Sports Broadcasting Act (permitting the collective sale of television rights to broadcast games), condoning the NCAA cartel, sanctioning mergers between competitive leagues, constraining labor mobility, and so forth; instructors can invite students to come up with examples – positive or negative – that fall under one or more of the usual public interest rationales for government intervention. In addition, one need not look far to find illustrations of the use of government to promote private interests in sports.

The recent controversies surrounding public financing of stadiums and arenas provide an excellent context for discussing the role of government. Why do cities offer teams “free” or highly subsidized places to play more frequently than similar assistance to fellowship clubs, bowling alleys, bookstores, or movie theaters? Do the grounds for public participation fall under public interest or private interest criteria? What are the redistribution consequences, given the average wealth levels of owners, players and fans vs. taxpayers in general (or, depending on how the stadium is financed, the incidence of sales taxes or property taxes or of lottery revenues)? Is a stadium or arena a public good? Would free riding occur? Does a major league sports team create positive (e.g., favorable image, entertainment options) or negative (e.g., congestion, bad role models) externalities? Are sports leagues natural monopolies? Finally, is league control of entry, relocation, labor relations, etc., a good substitute for direct government control if there is, indeed, a public interest reason to forego reliance on competitive markets (Siegfried and Zimbalist, 2000)?

In recent years the NCAA has tussled with federal antitrust law and state laws involving compensation of athletes. These disputes offer good classroom illustrations of the economic role of government, monopsony, monopoly and the law.

The conflict began in 2009 when former UCLA (and NBA) basketball player Ed O'Bannon sued the NCAA for the unauthorized use of his likeness in Electronic Arts video games, for which he received no compensation. On August 8, 2014, District Court Judge Claudia Wilken found in *O'Bannon v. NCAA* that the NCAA's rules and policies prohibiting players from receiving compensation for the use of their images and likenesses was an unreasonable restraint of trade, violating antitrust law. The case challenged the NCAA's member colleges' and universities' collective agreement to refrain from compensating athletes for the use of their names, images and likenesses. The ruling was affirmed on appeal in 2016. Subsequently, many separate but similar related laws were crafted and approved in individual states, starting in California. The "Fair Pay to Play Act," passed in California's legislature in 2019, allowed college athletes to acquire their own endorsements and sponsorships without losing NCAA eligibility. Popularly known as "NIL" laws – Name, Image, Likeness – were then enacted in states across the nation and began to take effect in July 2021.

On June 21, 2021, the United States Supreme Court ruled 9–0 in favor of college athletes in *NCAA v. Alston*. In its decision the Court held that NCAA restrictions about how much education-related compensation players' could receive, based on the collective agreement among colleges, universities and conferences and implemented through the NCAA, violated federal antitrust laws by preventing players from receiving fair-market compensation for their labor. Justice Gorsuch wrote the opinion; Justice Kavanaugh wrote a strongly-worded concurring opinion about agreements among colleges and universities (a cartel) limiting player compensation more generally (to tuition, room and board and some other educationally related benefits) that foresees greater trouble for the NCAA in the inevitable future judicial disputes about college athlete compensation.

## ADDITIONAL ILLUSTRATIONS

Space prevents us from including detailed descriptions of the many various applications of economic principles to sports. In this section we briefly identify a limited grab bag of possibilities.

Sports is a fertile field for examples of *comparative advantage*. Babe Ruth was a superb pitcher for the Boston Red Sox before he was converted to a right fielder in order to keep his bat in the daily lineup. (In his last three years as a pitcher for the Red Sox he was a combined 46–25). Although he had an absolute advantage in pitching over many other players, his comparative advantage was in hitting (Scahill 1990). So, after he was sold to the Yankees for \$125,000 in 1920, he remained a right fielder.

Just two years short of a century after Babe Ruth was converted exclusively to an outfielder (Ruth pitched in only four games after the Yankees acquired him in 1920) MLB welcomed former Japanese baseball star Shohei Ohtani, who has an absolute advantage in both pitching and hitting. Ohtani was leading the American League in home runs when he appeared as the starting pitcher for the American League in the 2021 All-Star Game, and then was the lead off batter as the designated hitter. Because the designated hitter rule allows him to rest his arm between pitching starts, he has become the first star pitcher to also bat regularly in games between his pitching starts.

After some thought, most students accept the notion that *free exchange* can benefit both traders, though when it comes to US trade with China almost everyone seems to believe that only China benefits. Politicians are easily duped into believing that most other countries (China, Mexico, Canada, Japan) benefit from trade at the expense of the United States. The sports counterpart is that some commentators and fans believe that if two teams engage in a player trade, only one benefits. They find it hard to believe that, at least *ex ante*, both teams *expected* to gain from the transaction. Every city and every sport have lists of famous “bad trades,” where the home team’s general manager exposed his incompetence. Thus, we got a summer 2016 newspaper headline: “Atlanta Hawks get Dwight Howard in move that will benefit both parties” – as if this were something that only happens on rare occasions (Golliver, 2016). It was surely not written by someone schooled in economics.

Trade opens up related applications of exchange, including *Pareto optimality* (when we’ve exhausted all opportunities for mutually beneficial gains), the fact that trade value depends upon the marginal values and opportunity costs (such as, what do I have already, in terms of point guards or outfielders, and what do I have to give up?), and diminishing marginal returns or gains. The advantage of agents as negotiators whose broader reputation is at stake and who can insulate the player they represent from creating animosity with a general manager is also relevant. In spite of the loathing they receive from owners and the media, agents’ comparative advantage presumably is to perform functions that lower transaction costs. The agent market is characterized by relatively free entry and price-taking behavior, not unlike real estate agents.

Instructors can employ a simple sports example to illustrate many concepts associated with *production* (Scully, 1974; Jamil, 2019). A discussion might ensue about what constitutes the objective function or output for a team owner – is it victories, the margin of victory (i.e., point spread), championships, attendance, revenues, or television shots of the owner basking in glory in his or her private booth with celebrity friends? Traditional inputs in the production process are players, owners, and managers/coaches, but there are others such as training, grounds keepers, computers and technology, the stadium, promotions and gustatory amenities. As a team employs higher quality inputs – that

is, acquires better players – its expected number of wins and attendance rise, but after some point the rate of increase begins to diminish, and it is conceivable that total attendance and/or revenues could even decrease if a team were so dominant that its contests became predictable and boring.

It is difficult to come up with examples of a *backward-bending labor supply curve* for individuals. Annika Sorenstam provides an option. In 2002, at age 32, Sorenstam won 12 tournaments on the LPGA tour (in that single year) – total dominance for a golfer. That year she announced that she planned to cut back on her 2003 schedule and retire well before she was 40, thereby reducing her supply of labor. The implication was that she planned to start a family and had plenty of money to live on for the rest of her life (her net worth of approximately \$40 million in 2020 will allow Annika, her husband and their two children to live comfortably for the rest of their lives).

Sports offer convincing examples of the principle of *specialization and division of labor*, and it has become more evident over time. The “olden days” often saw more multi-sport players, both in college and in the professional ranks, than exist today. To excel at the highest level of performance, athletes (and musicians and other performing artists) simply must start earlier and practice longer. Time split between two major activities entails a large opportunity cost for each. Even within a sport, say football, one used to see one athlete play more than one position – in the 1950s both on offense and defense, for example, or as a position player and a punter or field goal kicker. Football rosters now contain many more specialty players – pooch punters, nickel backs, long snappers, etc. Baseball relies more and more on specific role positions – a designated hitter (in the American League), long and short relievers, closers, and even base-stealing specialists, which is one reason the versatile Shohei Ohtani is such a sensation for the Los Angeles Angels. Young girls must now choose between gymnastics and figure skating even if they exhibit considerable talent in both sports. Roger Bannister, who broke the four-minute mile barrier in 1954 while he was a full-time medical student, and other earlier track stars, were really amateurs. They trained part-time, whereas now track is a full-time occupation for world class runners.

The economics of ticket resale (“scalping”) provides another refreshing alternative to New York rent control as an example of the effects of a *price ceiling*. In locations where scalping is illegal, the price ceiling is zero, preventing tickets from getting to those who value them the most. Arizona added an interesting twist to scalping a few decades ago, legalizing it within a specially marked area outside the event arena or stadium at a specified time. With all the scalpers together in one place along with all the buyers, the area looked like the floor of the Chicago Board of Trade (before everything went electronic), and the market power of scalpers who preyed on buyers ignorant of lower prices on the other side of the venue was dissipated (Happel and Jennings 1995).

The market for used baseball players illustrates problems caused by *asymmetric information*, *adverse selection*, and the “*winner’s curse*.” Pitchers who are signed as free agents spend more time on the disabled list than those who re-sign with their original team (Lehn, 1982). This can be explained by asymmetric information (Lehn, 1984). Healthy pitchers are re-signed by the incumbent teams, leaving only “lemons” for the “used pitcher” market because of asymmetric information. Further exacerbating the problem of disappointing free-agent signings is the winner’s curse, caused by a player signing with the team bidding for his services that makes the most overly optimistic estimate of his future productivity (Cassing and Douglas, 1980). Teams try to protect themselves against these possibilities by scouting, requiring physical examinations and adding performance incentives to player contracts, but it doesn’t always work. The winner’s curse also affects bidding among cities for hosting the Olympic Games or FIFA World Cup, causing most of them to end up in the red after the event (Andreff, 2014).

For most young students, a wise investment decision is to remain in school through college or even completion of a graduate or professional degree. The forgone income for a four- to eight-year period is rewarded by higher earnings (almost double for a four-year college degree vs. a high school diploma) over a 40- or 50-year horizon. Many textbooks discuss and display these earnings streams and suggest how one would calculate an *internal rate of return*.

For someone contemplating a career as a professional athlete, the age-earnings profile looks much different – earnings could start before high school (for a figure skater or tennis star) or as late as one’s mid-20s (for a baseball player) and may virtually truncate around age 30 (as the average length of a professional career in the four premier team sports leagues in the United States is four to six years). A good question for students to ponder is the rate of return at which it makes sense for a young person with reasonably attractive educational and nonathletic career options to devote herself or himself to athletic training. Given such a short earnings period, one can understand why a talented athlete would choose to forgo some or all of college, especially if there is an opportunity to return later. If Tiger Woods had remained at Stanford after his sophomore year until his class graduated, the Stanford golf team would have been much better, but Tiger would have missed out on the winner’s trophy for seven PGA tournaments (including the 1997 Masters Tournament) and almost \$4 million in tournament earnings.

An example of *opportunity cost* is the case of Jeff Fosnes, the star forward on Vanderbilt’s 1974 Southeastern Conference champion basketball team. Fosnes was drafted in an early round of the NBA draft. He opted for medical school, however, comparing the expected earnings of a 50-year-old physician with those of a 50-year-old NBA player. For him, the opportunity cost of a professional basketball career was too high because, at the time, medical

schools did not admit “older” students. If Fosnes had “gone pro,” he would not be a physician today.<sup>23</sup> In light of the relative growth of NBA salaries, and the willingness of medical schools now to accept older entering students, a graduating star forward with an opportunity to play in the NBA today might make a different decision.

The quality of play and the athletic quality of players in professional sports today is better than ever, and economics has a lot to do with it. Why? Because more opportunities for fame and fortune have lured a higher percentage of a growing (domestic, and international, and, since Jackie Robinson, racially integrated) population into sports. Today’s athletes are bigger, stronger, faster; they are in better physical condition; they start training earlier in life and put in more hours of practice. Thanks to free agency, they also get to keep a higher percentage of the revenues they generate. Salary levels attainable by these top performers produce strong incentives for them to stay in shape and to play better. When one could lose his job as a major league shortstop 60 years ago and return to his local community at a wage roughly comparable to what he earned scooping up ground balls, the financial inducements to stay in shape were not overwhelming; today, however, when even a mediocre professional baseball player’s sports income easily exceeds \$1 million a year, the sacrifice from returning to an ordinary job is enormous.

In a market economy, *economic profits* arise from several factors – hard work, chance, ownership of a specialized resource, entrepreneurship and business acumen, imperfect information, collusion with rivals, barriers to entry, or government protection. Many of these sources reflect a short-run imbalance that eventually is competed away, but some endure. Students can speculate about which factors apply to professional sports. For professional sports leagues and team owners, continued public protection from rivals, allowed collective action in selling broadcast rights and limiting expansion and team relocation, financial entry barriers<sup>24</sup> and infusions of taxpayer dollars for new facilities, may produce an expectation of continued profitability despite owners’ protests that they are losing money. Finally, the direct financial rate of return from owning a sports franchise might be lower than for alternative investments because of the nonpecuniary benefits of ownership – it’s fun and it bestows instant celebrity status on the owner (presumably a positive attribute).

Sports also can be used to illustrate the principle of *discounting* or *present value*. An obvious application is to players’ multi-year contracts. The media invariably reports the undiscounted sum of the annual salaries over the life of the contract. So, a four-year contract that pays a good third line NHL defenseman \$2 million, \$2.5 million, \$3.0 million, and \$3.5 million annually for 2020, 2021, 2022, and 2023 is reported as an \$11 million contract, when its initial net present value at an 8 percent annual investment opportunity cost is only



\$9.7 million (if the salaries are paid at the beginning of each respective year, and before taxes and his agent's cut).

*Moral hazard* can be illustrated by the difference in hit batsmen in the American and National Baseball Leagues. Since the American League uses a "designated hitter" for the pitcher, who never appears at the plate, a pitcher in the American League has less risk of direct retaliation if he were to hit a batter on the opposing team. Early empirical evidence supported this supposition (Goff, Shughart, and Tollison 1997). However, subsequent research argued that retaliation is more efficiently directed at sluggers than at weak hitting pitchers, and showed that American League designated hitters are plunked more frequently than are National League pitchers. Revised estimates showed that the designated hitter effect on hit batsmen is not statistically significant (Trandel, White, and Klein 1998). And one wonders what the wearing of a modern helmet, and foot, shin, and elbow pads by batters has on a pitcher's propensity to throw closer to a batter and/or the batter's inclination to crowd the plate to avoid being struck out with a fastball on the outside edge of the plate?

*Adverse selection* can be illustrated by a *Chicago Tribune* June 18, 2002, report that "The White Sox don't fare well before big crowds." The White Sox were only 7–16 when attendance exceeded 27,000. But larger crowds likely meant the White Sox were playing a better opponent, and so they would be expected to perform worse. Although the *Tribune* article doesn't say, the White Sox poor record could also be because the larger crowds were at away games, since the White Sox were a notoriously poor team and drew few fans to home games that year.

Economists also have useful insights pertaining to *distributional issues*. We can unmask the winners and losers from particular policies, especially when many of the effects are indirect and the distributional impacts are obscured. For example, in a study of the income levels of consumers of different products based on the 1994 Consumer Expenditure Survey (CES), Timothy Peterson (1997) discovered that the weighted mean income of consumers of tickets to sporting events was 78 percent above the average consumer's income. Such information can help people assess the distributional consequences of proposals to subsidize sporting facilities from tax revenues collected via regressive state and local sales taxes. Although it is not clear who benefits most from such subsidies – team owners, players, or fans – none of them is eligible for food stamps.

A further distribution issue that can foster a good (and often heated) discussion is differences in compensation between men and women. Should men's and women's national soccer teams be compensated similarly because they play with the same rules and expend comparable energy? Or should men be paid more because they attract larger crowds that are willing to pay more for

admission to the games? Should prize money be the same on the PGA and LPGA golf tours? Currently it is not.

Finally, we offer a few examples from the most recent sub-field emerging within economics – *behavioral economics*. David Romer’s (2006) analysis of the decision of a football coach to go for a first down rather than punting on fourth down has attracted a lot of attention. Based on the probability of making the first down, and the chance of subsequently scoring vs. getting the ball back after punting and holding the opponent’s offense, or kicking a field goal, he discovered that coaches punt or try field goals (i.e., kick) far too often. Why? Perhaps coaches value the decrease in chances of winning because of failed gambles that are immediately evident and increases from successful gambles that pay off further in the future asymmetrically, called “present bias.” Maybe the instant humiliation if the team does not succeed in making the first down when it does not kick outweighs the eventual scoring benefits of the times when they do make it.

Devin Pope and Maurice Schweitzer (2011) examined putting by professional golfers who seldom leave putts short, because few putts that are left short go into the hole! They discovered that professional golfers leave putts short more frequently when attempting a putt for a birdie than when attempting a similar putt just to save par. Apparently, the thought of turning a possible birdie into a bogey by launching the initial birdie putt far enough beyond the hole that they would subsequently face a difficult par putt coming back induces them to play it safe and leave the putt short more often, insuring the par, but sacrificing a chance at a birdie. The behavior suggests they don’t want to give up an almost guaranteed par when they face a birdie putt and are willing to pay for it by sacrificing some of their chance at a birdie. In behavioral economics it is called “loss aversion.” Baker Mayfield, the Cleveland Browns quarterback, also illustrated it when he stated: “I hate losing more than I love winning” while describing his resolve to lead the Browns to the Super Bowl (Canova 2021).

## DOs AND DON’Ts

This list of guidelines should help instructors who use sports to illustrate basic principles of economics.

- Do remember that not all students are sports fans. Students come with different levels of understanding of league and team names, star players, and knowledge of the histories and strategies of various games. Sometimes background details are required.

- Do bear in mind the instructor–student age gap when selecting examples and illustrations; think Rory McElroy, Naomi Osaka, and Simone Biles rather than Jack Nicklaus, Chris Evert, and Mary Lou Retton, respectively.
- Do use current media accounts and data for both illustrations and measurement purposes.
- Do encourage students to be creative in the application of economic theory to the “wide world of sports.”
- Do let students shine when they know more than you do about a particular game or its rules or history.
- Don’t rely exclusively on North American sports examples and US male sports figures; instead diversify.
- Don’t get caught up in the facts, personalities, or the rules of particular sports.<sup>25</sup>
- Don’t overdo it on sports jargon.
- Don’t forget it’s an economics course, not a sports course.
- Don’t rely too heavily on sports examples; choose your sports carefully, and tie them into economic theory.

## CONCLUSION

In this chapter we have tried both to convey the usefulness of using sports in teaching economic theory to undergraduates and to illustrate some of the ways this can be done. Our coverage is not exhaustive in depth or breadth, but it should give instructors a start. Other economics topics that can be dealt with through sports examples include risk and uncertainty; union behavior; income and substitution effects as they apply to the supply of labor; racial discrimination; the structure of the competition and expected outcomes, such as more likely repeat champions in tennis than golf; and externalities.<sup>26</sup>

One could teach an entire introductory (or intermediate level) price theory course using nothing but sports examples. Although we do not advocate such specialization, it is nevertheless our contention that a dose of sports illustrations can contribute toward making an economics course more enjoyable and productive for both instructors and students.

## ACKNOWLEDGMENT

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## NOTES

1. This chapter is an updated and revised version of Chapter 8, “Using Sports to Teach Economics,” in William E. Becker and Michael Watts, eds., *Teaching Economics to Undergraduates: Alternatives to Chalk and Talk*. Edward Elgar Publishing, 1999. Used with permission of the publisher.
2. <https://entrepreneurshandbook.co/how-dippin-dots-went-from-bankruptcy-to-330m-in-annual-revenue-in-6-years-ae65a18bd59d>.
3. A 2019 study by *Team Marketing Report* in Chicago found that it costs a family of four an average of \$234 to attend an MLB game. The usual tally of a family’s outlay for a game includes tickets, soft drinks and beer, hot dogs and desserts, parking, and souvenirs. Although a family may indeed purchase all of these items on a given evening, (a) they are not required to buy anything beyond the admission tickets, (b) the food substitutes for the cost of what would have been eaten at a restaurant or prepared at home, and (c) the souvenirs are not likely to be purchased on repeat trips to the ballpark. Similar 2019 costs for the NHL, NBA, and NFL were \$424, \$430, and \$540, respectively.
4. 2019 average ticket prices were \$33 for MLB, \$89 for the NBA, \$102 for the NFL, and \$135 for the NHL.
5. In historian Doris Kearns Goodwin’s book, *Wait Till Next Year*, her memoir of a young girl growing up in Brooklyn in the 1950s, she often listened to Dodgers games during the day and then retold the story of the game to her father in the evening. According to Goodwin,
 

When I had finished describing the game, it was time to go to bed, unless I could convince my father to tally each player’s batting average, reconfiguring his statistics to reflect the developments of that day’s game. If Reese went 3 for 5 and had started the day at .303, my father showed me, by adding and multiplying all the numbers in his head, that his average would rise to .305. If Snider went 0 for 4 and had started the day at .301, then his average would dip four points below the .300 mark. (Goodwin 1997, 17)
6. Fans and commentators frequently complain that a particular baseball player “can’t hit,” when in fact the difference between an average hitter – someone with a .260 average – and a player on the verge of stardom and a multimillion dollar contract – someone who can hit .300 – is only one hit a week.
7. In 2019, each NFL team received \$255 million annually from the league’s television contracts, up 150 percent from \$100 million in 2010. Under the 2020 television contracts, which began during the 2014 season, regular season games are broadcast on five networks: CBS, Fox, NBC, ESPN, and the NFL Network. The 150 percent increase in television revenues obtained by the NFL from 2010 to 2019 did not lower ticket prices just because owners and leagues now had more money from non-ticket sources. Ticket prices remained high as a reflection of strong demand to watch live football. NFL player salaries increased, both because of revenue-sharing arrangements and because salaries are derived from the overall demand for football viewing. This is an excellent example of the order of causality.
8. The reverse-order draft provides an opportunity to discuss the frequent conflict between strong *incentives*, arguably one of the most important ideas in all of economics, and equality of either opportunities or outcomes. For example, why reward a team that performs badly with the best player in the subsequent draft? Why not make it draft last, or demote it to minor league status and replace it with the best minor league team for the next season, as is done in European professional

soccer? What are the pros and cons of such a promotion and relegation approach that rewards success and punishes failure (vis-à-vis a reverse-order-draft that rewards failure and punishes success) and why might different leagues in different circumstances choose different incentives? The reverse-order draft also offers an opportunity to discuss unintended consequences. When some teams realized they were out of contention for the annual championship, they would sit star players under contract to reduce the risk of injury to them and also to increase their chances of losing (called “tanking”) and thereby increase the probability of drafting one of the most talented among the new young players entering the league. Once fans realized some teams were tanking, attendance waned. To combat this unintended consequence, the leagues put a group of teams with the worst records together into a group and choose the order of drafting by lottery among them. Thus, finishing last rather than fourth to last in the league standings no longer was valued as highly.

9. In the 1960s, The Kansas City Athletics (now the Oakland Athletics) sold so many good players (including the home run king Roger Maris) to the New York Yankees that commentators sometimes referred to the Athletics as a “Yankees’ farm team.” But the receipts received by the Athletics for the players kept the team out of financial trouble.
10. A slightly different competitive balance issue concerns not whether a team from a home territory that values winning highly wins a larger proportion of its games, but rather whether it tends to win relatively more games played in front of its home crowd. In the NBA, for example, where the home team retains virtually all of the gate receipts, scheduling (e.g., arduous road trips) appears to give more of an edge to home teams. It is not surprising, then, that the NBA has the highest home court winning advantage among the four major professional sports in North America.
11. Be sure to distinguish for students the two different meanings of the word “surplus” in economics. We label an excess of quantity supplied over quantity demanded as “surplus” and also call the area between the demand curve and opportunity cost “surplus.” The latter is the more pervasive use by economists, but students are likely to think the former is the only important use.
12. Players on strike are not unemployed. In US labor statistics they are counted both as in the labor force and employed. However, if the players are locked out by the owners, then they are considered unemployed.
13. Set the two expressions equal to each other and solve for  $p$ .
14. For another application of game theory to baseball see Merz (1996), who discredits Roy Blount Jr.’s (1993, 68) allegation that the great Giants’ centerfielder Willie Mays, who never led the league in doubles, often retreated to first base when he realized he could get to second (but not all the way to third) after a hit into the gap. Blount contends that Mays returned to first because left-handed pull-hitter Willie McCovey followed him in the Giants’ batting order for 13 years. With Mays on first base, the first baseman had to move to the bag to hold Mays close, opening a bigger hole for McCovey on the right side of the infield, while if Mays had gone on to second rather than retreating to first the opposing team would have walked McCovey intentionally. If McCovey got a hit, Mays could then easily make it from first to third with the Giants ending up with men on first and third rather than first and second bases. Merz explains how this alleged strategy of Mays is dominated by going to second no matter what the opposing pitcher does when McCovey comes to bat. Furthermore, why is the first baseman holding Mays on the bag to reduce the probability of a steal of second when Mays just returned from second

to first voluntarily? This is an example of how to infer intentions from observable behavior, the economist's stock-in-trade.

15. In the few instances where there are two professional franchises in the same sport in the same city, it turns out that ticket prices exceed the league average, a surprising result when competition is considered. This result occurs because even just one half of the population in these few cities (Los Angeles, San Francisco, New York, Chicago) vastly exceeds the average population of the cities in which franchises are monopolists.
16. The prospects for entry in professional team sports also differ substantially from other franchise industries because of the monopoly nature of the four major team sports in North America. If, for example, McDonald's, Pizza Hut, Chevron, or Verizon determines not to place a franchise in St. Louis, Burger King, Papa John's, Exxon, or AT&T may enter the St. Louis market. But if the NFL decides not to locate a franchise in St. Louis, there is no comparable professional football league whose entry into the St. Louis market can satisfy that demand.
17. See, for example, Noll (1974) for a series of studies of different sports in which the presence of another sport in the same community does not appear to affect attendance. More recent studies on basketball and MLB in the 1990s find a negative effect of the presence of another sport on attendance, but similar research on Australian Rules Football, Rugby League, and Rugby Union in Australia finds, like Noll, no effect (Borland and MacDonald 2003, p. 490).
18. If the price of attendance is more than just the ticket price that is used in calculating the elasticity of demand, which it is if travel to the game is required, then the true elasticity of demand exceeds that estimated using the ticket price alone.
19. In October 2020, billionaire Steve Cohen paid \$2.4 billion to purchase the New York Mets baseball team.
20. Portions of this section are from Siegfried (1994) and are used with permission of the copyright holder, Federal Legal Publications, Inc. for an extensive analysis of the NCAA as a cartel see Fleisher et al. (1992) and Sanderson and Siegfried (2018, 2019).
21. Entry may be difficult into NCAA sports, but it is easier than entry into professional sports leagues. College teams that wish to upgrade to Division I status (the highest level of competition, and the only level that generates substantial revenues) have numerous teams they can approach as prospective opponents. In contrast to professional sports, collegiate teams attempting to join a major conference also have alternatives, as there are more than a half dozen major college athletic conferences.
22. In October 2020, national champion Louisiana State University head football coach Ed Orgeron voluntarily took a \$300,000 per year (5 percent) reduction in his salary to match the 5 percent pay cut imposed on all non-coaching employees of the LSU athletic department. A \$300,000 pay cut would reduce most people to zero; it left Orgeron with \$5.7 million.
23. The first Heisman Trophy winner, Jay Berwanger of the University of Chicago, faced similar salary offers from the NFL and business entities when he graduated in 1936. He selected business.
24. Because individual teams can't enter the industry, to be a credible threat requires sufficient capital to form an entire new league with a minimum of probably eight teams.
25. Some years ago, a student attempted to enroll in The Economics of Sports course taught by one of us. That course requires intermediate microeconomic theory as

- a prerequisite. The student did not meet the prerequisite, but insisted he would have no difficulty because he “knew more about sports than anyone else.” When he was denied admission to the course (a review of his record in principles confirmed that he surely did not “know more than anyone else about economics”) he muttered that there must be something seriously wrong with a course on The Economics of Sports if a thorough knowledge of sports was not sufficient background to take it. If he had realized the power of the core of economics principles and understood the way in which economists apply those few powerful ideas to myriad issues, he might have recognized that a discipline founded on the idea of “have tools, will travel” relies mostly on the tools, not the travel.
26. One could also tie in Peltzman’s well-known 1975 study of offsetting driver behavior with regard to seatbelt usage with a sport’s proposition that better and more protective equipment for NFL players doesn’t reduce injuries – they just run at each other harder and attempt riskier behavior until their injury rate reaches the prior equilibrium they are willing to tolerate.

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