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# Problems With Data on the Sport Industry

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**Abstract**

Estimating the size of the sport industry is an important exercise. Unlike other industries, the sport industry extends across the usual classifications of economic activity included in national income and product accounts (NIPAs) and includes mass participation in sport and watching, listening, and following sport competitions on various media. Data from each of these areas have problems that make it difficult to accurately estimate the size of the sport industry.

**Keywords**

sport industry, sport definition, data problems, industry size and scope

## Introduction

Sports economics tends to be an empirical field. Applied and theoretical industrial organization (IO) constitutes a significant portion of the research that makes up the field. One application of IO to sports economics is evaluating the structure, conduct, and performance of the sport industry. The first component entails economically defining the sport industry in terms of the relevant product and geographic markets. Once market definitions are determined, it is possible to measure the size and scope of the sport industry; evaluate the extent of competition in the industry; and examine trends in competition. Each of these components requires data on the economic activity in the sport industry. In this article, we discuss some of the problems with data from the sport industry in the context of IO. Sports economics research examining the sport industry from an IO perspective runs into data problems from square

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one: defining the sport industry in economic terms. Such a definition, in general, is elusive. However, the exercise of "defining sport" does bring three important general measurement components to light. Total economic activity, actual participation, and viewing and listening to mediated sources seem important measurement issues regardless of the definition chosen.

In this article, we discuss the task of defining sport to demonstrate the important measurement topics generated in such an exercise. After that, subsequent sections of the article demonstrate the many problems of measuring economic activity, participation, and viewing and listening. Conclusions round out the article.

## The Exercise of Defining Sport

Sport is a complex activity encompassing worldwide spectacles like the World Cup and informal games played on football pitches around the world. A recreational swimmer, a swimmer competing in the World Championship, and spectators watching the World Championship all participate in sport in some way, and all these activities could reasonably be included in the sport industry. What main components for measuring the sport industry are identified in the exercise of defining sport?

Defining sport lies outside the discipline of economics. Several definitions have been proposed. Coakley (2003) characterized sports as activities involving gross motor skills, competition, and an organized set of rules. Fort (2006) qualified Coakley's (2003) competition criteria to include only competition based on objective scoring and further restricted sport to activities using only simple devices, such as bats and balls, or no devices at all, in the case of sports such as running and swimming. The Council of Europe's *European Sport Charter* adopted in 1992 used a broader definition of sport: "sport" means all forms of physical activity which, through casual or organized participation, aim at expressing or improving physical fitness and mental well-being, forming social relationships, or obtaining results in competition at all levels. (Gratton & Taylor, 2000). Informal conversations with other sports economists often turn up other potential criteria, for example that some participants in the activity should receive compensation for success.

These definitions serve to emphasize that many sport-like activities exist that would not be included in subsequent measurement of the sport industry. For example, hot dog eating and ballroom dancing would both appear to fall under the definition of sport under these criteria. A second issue following from these definitions involves identifying criteria that separate sport from games of skill like chess or poker and from recreational activities such as dancing, hiking, fishing, and gardening. The former have no large-motor skill, but the latter do and often are structured competitively. A third issue arises in distinguishing sport from exercise. For example, running has a competitive dimension but jogging does not. Weightlifting is an Olympic sport and bodybuilding is a professional sport, but weight training is a form of exercise practiced by millions of people around the world. The existence of

competitions based on athletic performance on fitness equipment such as stationary rowing machines, elliptical trainers, and stationary bicycles further blurs the unclear distinction between exercise and sport. Defining sport in a way to identify the sport industry is very difficult, except in narrow cases like defining the professional football industry in the United States as the National Football League (NFL).

More difficult cases include National Association for Stock Car Auto Racing (NASCAR) and horse racing. A narrow definition of sport, such as that put forth by Fort (2006), would exclude both activities from sport and therefore would not be included in the sport industry. NASCAR is excluded from Fort's definition under the "simple devices" criterion. Horse racing could also be excluded under the "simple devices" criterion and also from the perspective that it primarily involves horses, not humans. Yet, as shown later in the article, many data sources available for measuring the sport industry group data from NASCAR, other professional car racing circuits such as drag racing, and horse racing with data from professional spectator sports. Furthermore, many sports economists have analyzed economic behavior in NASCAR and horse racing, so these activities would appear to fall under some definitions of sport as they are often the topic of interest in the literature. Groothuis and Groothuis (2008), Coates and Gearhart (2008), Schwartz, Isaacs, & Carili (2007), Connaughton and Madsen (2007), and Depken and Wilson (2004) are recent examples of articles focused on NASCAR racing. Parsons and Smith (2008), DeGennaro (2003), and Gamrat and Sauer (2000) are recent examples of articles focused on horse racing.

Gratton (1988) pointed out that the economic aspects of sport extend well beyond the boundaries of elite sport competition. Mass participation in sport represents one important part of the sport industry outside of elite sport competition. Individuals can participate in the sport industry in three ways: by participating a specific sport, by attending a sporting event, or by watching or listening to a sporting event on television, radio, or the Internet. All three types of participation generate economic activity and could be included in the sport industry. Participating in sport often requires equipment and fees. Attending a sporting event involves purchasing tickets and other related goods such as food, beverages, and souvenirs. Watching or listening to sporting events requires equipment, in the form of televisions, radios, or computers, as well as subscriptions to broadcast services. In addition, participation in the sport market generates consumption benefits that cannot be bought and sold like tickets, but are still an important part of the sport industry. All of this economic activity increases with the number of participants, so estimating the number of participants is an important part of defining the size of the sport industry.

Including participation in the definition of the sport industry means that some activities that could be defined as exercise, such as aerobics or walking, will be included in the industry. Including spectator sports means that auto racing, figure skating, and other such activities fall into this definition of the sport industry. In addition, activities such as shooting, fishing, kayaking, horseback riding, and sailing have professional or Olympic and recreational components. These popular activities

attract many participants and require both considerable time and expensive equipment.

Clearly, a single definition of the sport industry cannot be easily found. In the remaining sections of this article, we focus on an important, closely related economic point: measurement problems in economic data make it difficult to determine the size of the sport industry no matter what definition of the sport industry is used. In the following sections, we document pitfalls in estimating the size of the sport industry from three perspectives suggested by the difficulty of defining sport: using existing NIPAs data; using data on individuals' sport participation; and using data on watching and listening to live spectator sporting events on television, radio, and the Internet. Each component could be considered part of the sport industry, and data from each component have problems that make it difficult to estimate the actual size of economic activity in that area.

## Problems Measuring Total Economic Activity in the Sport Industry

How much direct economic activity, as measured by the dollar value of goods and services produced and consumed, takes place in the sports industry? The answer to this question is surprisingly difficult to determine. The total sales in the accommodations industry (North American Industrial Classification System [NAICS] Code 721, lodging or short-term accommodations for travelers, vacationers, and others) for any recent year can easily be determined ($180,044,424 in 2007). This estimate exists because the accommodations industry has been defined in the existing industrial classification system used by the U. S. Census Bureau to quantify economic activity; total sales in the sport industry cannot be determined so easily because a "sport industry" is not defined by any government agency that collects statistical data on economic performance. Because of the lack of a commonly accepted economic definition of the sport industry, any measure of the size of the sport industry must be estimated from varying sources.

Gratton (1988) discussed a general method for estimating the size of the sport industry based on existing NIPA data. This method accounts for consumer, producer, and federal, state and local government expenditures on sport, although many of the specific categories of spending have to be imputed. The key insight from this article is that "mass participation" activities—what we identify as recreation and exercise—account for the largest share of the sport industry. Elite sport competition accounts for a relatively small portion of the sport industry.

Although a national income and product accounting approach has some appeal, because of the well-developed methodology and the existence of rich set of frequently updated accounts for many developed economies, it also has a number of weaknesses. First, on the national product side, the researcher is at the mercy of the

existing production classification system. The NAICS does not identify the sport industry. The sport industry makes up only a fraction of the activity in any existing industry classification. Thus, if one is not careful to count only activity associated with the sport industry, overestimates of the size of the sports industry from national product accounts will be misleading. Second, on the national income side, the published spending data are not detailed enough to identify the size of consumer spending on sports, no matter how broadly defined. Third, in the United States, all levels of government are involved in the provision of sports facilities and other important activities on the supply side of the sport market, and NIPAs do not contain detailed estimates of government spending. Fourth, much of the activity in the sport market involves nontraded goods and labor inputs not valued at market prices. For example, the labor inputs provided by intercollegiate athletes are not valued at market prices (Brown, 1993). Fifth, sport markets feature both significant consumer surplus and nonmarket consumption benefits that are not reflected in NIPAs (Alexander, Kern & Neil, 2000). Sixth, NIPAs underestimate the size of the sport industry because they underestimate economics activity associated with the voluntary sector, sports events, and sport tourism (Gratton & Taylor, 2000).

The U.S. Census Bureau groups individual firms into industries based on the NAICS. The NAICS defines the Arts, Entertainment, and Recreation industry group (NAICS 71) that contains a number of industry groups that clearly fall in the sport industry. These include Spectator Sports Teams and Clubs (NAICS 711211); Racetracks (NAICS 711212); Other Spectator Sports (NAICS 711219); Golf Courses and Country Clubs (NAICS 71391); Skiing Facilities (NAICS 71392), Fitness and Recreation Centers (NAICS 71394); and Bowling Centers (NAICS 71399). The NAICS also identifies Promoters of Performing Arts, Sports and Similar Events (NAICS 7113) and Agents and Managers for Artists, Athletes, Entertainers and Other Public Figures (NAICS 7114), but these industry groups include some activities outside the sport industry. This group of industry groups in NAICS Industry 71 account for a large fraction of the businesses on the supply side of the sport industry. One important exception is manufacturers of sports equipment. These firms are primarily grouped in Sporting and Athletic Goods Manufacturing (NAICS 33992).

Table 1 contains summary statistics for the NAICS industry groups identified above that comprise part of the sport industry, based on the 2007 Economic Census. Unfortunately, data on revenues from the 2007 Economic Census are not available at this time.

The top row of Table 1, "Spectator Sports Teams," includes professional and semiprofessional football, basketball, baseball, ice hockey, and soccer teams. Note that in terms of number of establishments, employees, and payroll, this is one of the smaller industry groups on the table, accounting for just 1% of the payroll on the table, 3.38% of the employees, and 0.75% of the establishments. The Fitness and Recreation Center industry group is the largest on the table, with over 31,000 firms employing over 500,000 people. Notice the relatively small size of the spectator sport industry group. In addition to fitness and recreation centers, racetracks, other

**Table 1.** Summary Statistics for Firms Related to Sport, 2007

| Industry Group | NAICS Code | Establishments | Employees | Payroll (million) |
|---|---|---|---|---|
| Spectator sports teams | 711211 | 819 | 52,780 | 31,499 |
| Racetracks | 711212 | 733 | 51,221 | 25,480 |
| Other spectator sports | 711219 | 3,079 | 22,091 | 189,214 |
| Golf courses | 71391 | 11,851 | 316,442 | 378,074 |
| Skiing facilities | 71392 | 402 | 75,655 | 4,089 |
| Fitness/recreation centers | 71394 | 31,453 | 514,317 | 510,556 |
| Bowling centers | 71399 | 15,462 | 94,405 | 469,789 |
| Sporting good manufacturing | 33992 | 1,972 | 51,587 | 49,495 |
| Sporting goods retail stores | 45111 | 23,756 | 235,692 | 578,872 |
| Sporting goods wholesalers | 42391 | 5,310 | 53,064 | 226,111 |
| Athletes/entertainers agents | 711410 | 3,722 | 17,420 | 391,494 |
| Sports/recreation instructors | 611620 | 12,259 | 76,571 | 296,418 |

spectator sports—an industry group that includes professional and semiprofessional golf, bowling, boxing, car racing, and other similar sports—are all larger than the spectator sport industry group in terms of number of establishments, number of employees, and payroll. Golf courses employ 6 times the number of workers, and have 10 times the payroll of spectator sports. In total, the industry groups shown in Table 1 include 110,818 establishments employing 1,561,245 people in 2007. The total payroll for these establishments was just over $31 billion.

There are several other sport-related industry groups in the NAICS. These include Sporting Goods Stores (NAICS 45111), Sporting and Recreational Goods and Supplies Merchant Wholesalers (NAICS 42391), Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures (NAICS 711410), and Sports and Recreation Instruction (NAICS 611620). The first 2 industry groups are related to the distribution of sporting goods. These establishments also sell recreation goods such as camping, hunting, and fishing supplies, as well as other goods unrelated to sport. Also, other wholesale and retail establishments, such as department stores, sell sporting goods, so these industry groups do not reflect all of the sporting goods equipment sales in the United States. Much of sport could not take place without firms distributing and selling athletic equipment, so some part of these industry groups belongs in the sport industry.

In terms of number of establishments, employees, and payroll, these industry groups are quite large, especially when compared to spectator sports. However, no reasonable method for determining how much of the economic activity, summarized on Table 1, should be included in the sport industry exists. The last two industry groups on Table 1 are related to the production of inputs of athletes. The Agents industry group also contains economic activity outside the sport industry, as some of these agents represent entertainers and public figures. However, again, the services provided by agents and amateur instruction in sport are necessary for the operation of the sport industry.

Because of the problems discussed above, simply adding up the number of establishments, employees, and dollar value of the payrolls shown on Table 1 would make inaccurate estimates of the size of the sports industry. Many of the industry groups shown on Table 1, including several of the largest in terms of employees and payroll, summarize economic activity that takes place outside the sport industry. Some sporting goods manufacturers export their products, and some other sporting goods are imported into the United States. The industry groups contain substantial activity outside the sport industry and omit substantial activity that should be considered part of the sport industry.

Constructing estimates of narrower categories of economic activity in the sport industry can prove equally difficult. Consider consumer spending on admissions to spectator sporting events. According to the August 2008 *Survey of Current Business*, the NIPA estimate of personal consumption expenditure (PCE) on admission to spectator sports in 2005, line 99 on table 2.5.5., was $16.1 billion. The most recent publication describing the methodology underlying the NIPA PCE estimates, "Personal Consumption Expenditures" Bureau of Economic Analysis (1990), describes the underlying source data for this estimate as the Census of Governments, Consumer Expenditure Survey, and the Census of Service Industries, data from the Service Annual Survey, and "judgmental trends."

The Consumer Expenditure Survey is a nationally representative quarterly survey of household spending. Approximately 7,500 households take part in the interview survey each quarter, and the respondents are asked to consult bills and other financial records when responding to hundreds of detailed questions about their household spending and other characteristics. Because the Consumer Expenditure Survey (CEX) is conducted quarterly, and each household appears in the survey for five consecutive quarters before being replaced, the survey is a rich source of data about consumer spending. Dardis et al. (1994) used CEX data to estimate expenditure on several forms of leisure, a broader category of consumer spending than we consider here.

The CEX asks a number of detailed questions about consumer spending on sport, including a question about spending on single game tickets to spectator sporting events and a question about spending on season tickets to spectator sporting events. These spending variables, along with the sampling weights in the CEX, can be used to generate national estimates of total annual spending on any type of consumer sport spending. If $s_j$ is the spending on CEX item $s$ by household $j$ and $w_j$ is the sampling weight for household $j$, an estimate of total annual consumer spending on item $j$ can be generated by

$$S = \sum_j w_j s_j,$$

where $S$ is the estimated total annual spending on CEX item $s$.

As part of the sampling methodology, the Bureau of Economic Analysis (BEA) publishes sampling weights for each household in the CEX. These sampling weights

link the sampled household with the total number of households in the United States with these characteristics. In other words, each household sampled in the CEX represents a certain number of households in the United States, and the sampling weight reflects this number. If a sampled CEX household spends $100 in a year on tickets to sporting goods, and that household represents 50 households in the U.S. population, then $s_j$ equals $100, $w_j$ equals 50, and their product equals $5,000 in total annual spending. Adding this up for the entire CEX sample produces an estimate of total spending for the entire country.

Based on CEX data from 2005, the estimate of total consumer spending on spectator sporting events was $4.9 billion or just under one third of the NIPA based estimate on PCEs for spectator sporting events. The Service Annual Survey (2005) reports that total revenue for the Sports Teams and Clubs industry group was $14.01 billion in 2005 and that revenues from admissions was $5.02 billion. This estimate of admissions revenue is close enough to the total estimated consumer spending on admissions to spectator sporting events of $4.9 billion to be within the margin of error of the survey.

However, the difference between the $16.1 billion NIPA estimate of PCE on admission to spectator sports in 2005 and the $5 billion estimate from the CEX and the Service Annual Survey remains unexplained. Net exports cannot explain the difference, because attendance at spectator sporting events is not tradable. Another possibility is that business expenditure on tickets to spectator sporting events constitutes a substantial portion of the revenues earned by professional and amateur team sports. In this case, the large literature on consumer demand for spectator sporting events in sports economics that treats attendance at sporting events as a consumer good has missed the point.

Clearly, the measurement of the total economic activity in the sport industry is a difficult task. The sport industry does not fit into the existing NIPA industry group definitions. NIPA data from industry groups related to the sport industry contain many transactions from outside the sport industry. Estimates of specific components of the sport industry, such as consumer spending on single game and season tickets to spectator sporting events, produce consistent estimates across government surveys, but this represents a small portion of the sport industry and underestimates the economic activity associated with sport events. In the next section, we turn to problems measuring mass participation in sport, an activity identified by Gratton (1988) as the largest in the sport industry.

## Problems Measuring Sport Participation

Gratton (1988) describes the sport industry as a pyramid. The top of the pyramid consists of the relatively small elite sport sector, including professional and intercollegiate sports leagues, paying customers, billion dollar broadcast deals, and government subsidies for facilities. The large base of the pyramid contains the sizable mass

**Table 2.** Estimated Participants in Sport, 2005

| Sport or Activity | Number of Participants |
|---|---|
| Walking | 87,500,000 |
| Swimming | 56,500,000 |
| Bowling | 44,800,000 |
| Health club membership | 37,000,000 |
| Bicycling | 35,600,000 |
| Weightlifting | 32,900,000 |
| Running/jogging | 29,200,000 |
| Basketball | 26,700,000 |
| Golf | 24,400,000 |
| Baseball | 14,600,000 |
| Soccer | 14,000,000 |
| Softball | 12,400,000 |
| Volleyball | 11,100,000 |
| Inline skating | 10,500,000 |
| Tennis | 10,400,000 |
| Mountain biking | 9,200,000 |
| Downhill skiing | 6,400,000 |
| Martial arts (2004) | 5,400,000 |
| Snowboarding | 5,200,000 |
| Ice/figure skating (2003) | 5,100,000 |
| Cross-country skiing | 2,600,000 |
| Ice hockey | 2,600,000 |

participation in sport sector. Economic activity in this sector includes the purchase of sport equipment and apparel, travel to events and competitions, government provided facilities, and time spent in the activities. In general, the most important factor in determining the size of the mass participation in sport sector of the sport industry is estimating participation in sport.

There are a number of sources of data on mass participation in sport in the United States. The National Sporting Goods Association [NSGA], 2005a, 2005b periodically produces estimates of the number of participants in sport in the United States, based on estimates from a mail survey sent to about 300,000 households. Table 2 shows NSGA's estimates of the reported number of participants for a number of popular participant sports in 2005.

Aggregating the number of participants reported on Table 2 reveals an important problem. Table 2 indicates that more than 484 million individuals participated in these participant sports in 2005. The U.S. population was about 297 million in 2005, so the survey that generated these estimates counts individuals multiple times. The NSGA survey asks respondents to list every sport participated in more than one time in the past year. Clearly, an individual can easily participate in both tennis and golf, so in one sense this approach is reasonable. However, an estimate of the size of

the economic activity associated with participation in sport should also take into account intensity, or frequency, of participation. For example, the estimated number of participants in golf on Table 2 includes people who borrow an old set of golf clubs from a friend and play a single round and people with country club memberships who play several rounds of golf each week and take vacations to play golf every year. Because of this heterogeneity in the intensity of participation, the participation figures on Table 2 provide imprecise information about the dimensions of sport participation in the United States.

Della Vigna and Malmendier (2006) document another problem with estimates of consumer behavior based on surveys that ask simple questions about the number of times an individual participates in sport. The results in this article indicate that individuals who join health clubs systematically overestimate their attendance at these facilities. If this result extends to other types of sport, then survey-based estimates of participation in sport could substantially overestimate the actual rate and frequency of participation.

A measure of participation in the sport market, which accounts for intensity and frequency of participation, will shed light on how much double counting takes place. The Behavioral Risk Factor Surveillance System (BRFS) Survey, a nationally representative survey of the adult population of the United States conducted by the Centers for Disease Control and Prevention (CDC), accounts for frequency of participation in sport. The BRFS collects uniform state-specific data on health prevention activities, including physical activity. The BRFS uses a telephone survey, meaning that individuals must live in a household with a telephone to be eligible for the survey.

In 2000, the BRFS contained detailed questions about sport participation. The survey included questions asking respondents to list the sport that they spent the most time participating in, given that they reported participating in sport. The question was *What type of physical activity or exercise did you spend the most time doing during the past month*? Individuals who answered this question are not casual or occasional participants in sport.

Table 3 shows the estimated number of participants for all sports with at least 1 million participants in the 2000 BRFS. The totals on Table 3 reflect frequent participants in sport whereas the totals on Table 2 reflect both frequent and infrequent participants. The participation totals on Tables 2 and 3 show some consistencies. Walking has the most participants. About 87 million people, or 25% of the population, reported walking frequently for exercise the BRFS. About 87.5 million people, or 30% of the population, reported walking for exercise either frequently or infrequently. The biggest difference between these two tables is the smaller number of frequent participants in all the sports except walking. For example, while only 2.3 million people reported swimming frequently for exercise, 56.5 million people reported swimming in the NSGA survey on Table 2 that includes infrequent participants. This pattern can be seen in the participation counts for all the other sports.

These participation data suggest that in any year over 50% of the U.S. population participate in some sport regularly and a larger number participate in sport

**Table 3.** Estimated Sport Participants, 2000 Based on BRFS Survey

| Sport | Estimated Number of Participants | | |
|---|---|---|---|
| | Lower bound | Mean | Upper Bound |
| Walking | 68,600,000 | 69,301,784 | 70,000,000 |
| Running/jogging | 12,500,000 | 12,901,119 | 13,300,000 |
| Weightlifting | 7,118,775 | 7,396,304 | 7,673,832 |
| Golf | 4,787,312 | 4,982,688 | 5,178,063 |
| Bicycling | 4,588,754 | 4,791,467 | 4,994,179 |
| Aerobics | 4,189,563 | 4,355,448 | 4,521,333 |
| Basketball | 3,276,901 | 3,461,372 | 3,645,844 |
| Health club workout | 2,375,871 | 2,510,246 | 2,644,621 |
| Swimming | 2,216,229 | 2,356,134 | 2,496,039 |
| Calistenics | 2,054,979 | 2,208,816 | 2,362,652 |
| Bike or rowing machine exercise | 1,493,113 | 1,622,729 | 1,752,346 |
| Tennis | 1,072,147 | 1,171,802 | 1,271,457 |
| Soccer | 878,774 | 1,010,848 | 1,142,922 |

occasionally. By either measure, individual participation in sport in the United States is significant. However, participation in sport exhibits considerable heterogeneity across individual participants, and across sports. Walking appears at the top of every list of popular mass participation sports. However, unlike other sports such as jogging or swimming, walking could include Olympic race walkers engaged in elite competition and a couch potato going to the end of the driveway to pick up the morning paper. A sedentary person could perceive a leisurely stroll around the neighborhood as physically demanding and report this activity as participation in sport. Mass participation constitutes the largest component of the sport industry, and the most difficult to distinguish from activities that lie outside the sport industry.

## Problems Estimating Consumers' Viewing and Listening to Mediated Sport

Sport plays an important function in print and broadcast media. Almost every daily newspaper in the country has a sports section and sport news segments appear on many local and national television and radio stations across the country. Live sporting events appear somewhere on television, radio, and the Internet almost every second of every day. According to the *Vital Statistics of the United States* (2005) the total multimedia audience in the United States in 2005 was 215,800,000. This implies that, of the 295,194,000 people counted as the resident population of the United States in 2005, 73% of them had access to some form of media, including newspapers, television, radio, and Internet. Viewing and listening to sporting events, and reading about sporting events clearly fall into the sport industry.

**Table 4.** Estimated Total Television Viewing Audiences, 2005

| Sport | Television Audience |
|---|---|
| National Football League | 105,874,000 |
| Major League Baseball | 76,744,000 |
| National Basketball Association | 60,877,000 |
| NASCAR Winston Cup Series | 45,588,000 |
| Professional Golfers Association | 37,899,000 |
| NASCAR Busch Series | 27,981,000 |
| Professional tennis | 26,187,000 |
| Horse racing | 21,560,000 |
| IndyCar racing | 19,366,000 |
| Professional Rodeo | 18,862,000 |
| Professional boxing | 18,094,000 |
| Arena Football League | 17,094,000 |
| National Hockey League | 13,870,000 |
| Professional Bowling Association | 13,470,000 |
| Women's National Basketball Association | 12,220,000 |
| NASCAR Truck Series | 12,073,000 |
| Major League Soccer | 10,010,000 |
| Minor League Baseball | 9,668,000 |
| National Hot Rod Association | 7,900,000 |
| Minor League Basketball | 7,126,000 |
| Champ Car racing | 6,678,000 |
| Minor League Hockey | 3,315,000 |
| Professional Lacrosse (MLL, NLL) | 3,103,000 |
| Major Indoor Soccer League | 2,338,000 |

*Notes*. NASCAR = National Association for Stock Car Auto Racing; MLL = Major League Lacrosse; NLL = National Lacrosse League.
Source: National Sporting Goods Association (NSGA).

The first problem with documenting the size of the sport viewing and listening audiences is data availability to the "outside" analyst. In North America, data on the number of individuals and households watching specific television programs are proprietary and extremely expensive. When analyzing the popularity of postseason National Collegiate Athletic Association (NCAA) basketball games a few years ago, AC Nielson Company, a marketing firm that tracks television viewing, graciously offered to sell us the total viewership statistics for a handful of games in the College Basketball Invitational tournament that were televised that year for a mere $10,000. The NSGA reports estimated total television viewing audiences for a number of professional sports leagues. Table 4 shows the estimated television audiences for the professional sports leagues tracked by the NSGA in 2005.

The NFL has the largest television viewing audience of any U.S. professional sports league. The 105 million individuals in the NFL television audience account

for over one third of the total U.S. population in 2005. More than one person in three watched NFL football in 2005. Following the NFL in Television audience are Major League Baseball and the National Basketball Association, two other traditionally popular professional sports leagues.

Interestingly, Table 4 indicates that the Television audience for professional golf (roughly 38 million viewers) and tennis (roughly 26 million viewers), and horseracing (21.5 million viewers), a sport widely perceived to be in decline in the United States, are relatively large. The estimated television audience for these sports may reflect the popularity of a few events, such as the four "Major" championships in golf, the U. S. Open and Wimbledon in tennis, and the three "Triple Crown" races in horseracing. In addition, note that NASCAR has a very large estimated television audience; the total audience for the three NASCAR series is over 85 million, which placed it at a similar level to the "big three" professional sports.

The summary statistics on Table 4 highlight the many problems associated with measuring the size of the sport industry in terms of television viewing. First, simple aggregation across sports leads to double counting. Second, these estimates of total television audience size do not take into account how long an individual spends watching each sport during each episode of viewing, or how many episodes of viewing take place in the average week or month. Raw totals of viewers provide no information about the duration or frequency of viewing. Labor market statistics routinely distinguish between full-time and part-time employment, because working 40 hr a week differs significantly from working half a day a week. Television viewing statistics make no such distinction.

The actual amount of time spent "watching" a sporting event on television is difficult to measure. Television viewing is clearly a "multitasking" environment; a person watching a sporting event on television could be doing any number of things at the same time. Is a person who cooks dinner while a ball game is on the kitchen television watching sport or engaged in household production?

Watching sports on television requires the purchase of equipment (a television) and may also require a subscription to cable or satellite programming packages. Beyond this, the primary economic activity generated by watching sports on television comes from the consumption benefits. Because of the many problems associated with data on television viewing, estimating the size of the sport industry based on aggregate measures of television audience is not informative.

Aggregate estimates of the number of people who listen to sporting events on the radio in the United States are equally difficult. According to the *Statistical Abstract of the United States*, the estimated radio listening audience in the United States in 2005 was about 181 million people, a total that is not much different from the television audience. Anecdotal evidence suggests that quite a bit of sports programming is available on radio, perhaps, as much as on television for major professional sports leagues.

Determining the amount of sport viewing done over the Internet is currently impossible to determine. No systematic surveys of Internet use related to sport

currently exist. The *Statistical Abstract of the United States* reports that about 138 million people had access to the Internet in 2005. In one recent survey, the fraction of surveyed Internet users who reported "checking sports scores or information" was larger than those reporting downloading music, although smaller than those using the Internet for email. In any case, the amount of time spent following sports on the Internet is proportionate to overall Internet use, which is growing rapidly. Furthermore, much of the sport-related Internet use may take place at work, where many people have Internet access, unlike sport viewing on television which takes place primarily at home or in bars and restaurants.

Despite the importance of viewing, listening to, and following sport on television, the radio, and the Internet, available data that quantify these activities are scarce, expensive, and flawed. Ideally, this dimension of the sport industry would be summarized by an estimate of the amount of time each day that the average American spends watching sport on television, listening on the radio, and following sport on the Internet. Such a statistic could be aggregated to place the total time spent on this activity each year in the context of other activities like, for example work or commuting, and also compared to other leisure activities like reading. A potential source of data for this type of estimate is the American Time Use Survey (ATUS). The ATUS is a comprehensive survey of time use. Respondents describe every activity undertaken in a single day, called the reference day, sequentially. Each minute of the reference day is accounted for in the survey. However, the data cannot be used to derive nationally representative summary statistics of time use.

## Conclusions

We document problems defining sport and problems with the data required to describe the size of the sport industry. We first discussed the unique challenges in defining the sport industry, a critical task for estimating the economic activity generated in the sport industry. Our discussion of the problems with using currently available data to measure the sport industry is organized around a three-pronged working definition of the sport industry as being comprised of activities involving: (a) individual participation in sport; (b) attendance at spectator sporting events; and (c) viewing or listening to spectator sporting events on some media. Working from this framework, we examine the difficulties in estimating the size of the sport industry given limitations of data in three areas: existing national income and product accounts data; surveys documenting mass participation; and watching and listening to live spectator sporting events on television, radio, and the Internet.

Although defining the size of the sport industry appears conceptually simple, in practice many barriers exist to researchers who want to answer this question. The sport industry is somewhat unique in this regard, because many other industries are clearly defined in the NAICS. However, sport, unlike making and selling automobiles, is a difficult activity to define, because of the complex nature of sport and the

interrelationship between sport and other parts of the economy. Although estimating the total value of transactions that take place in elite athletic competitions and professional sports leagues may be relatively easy, a complete definition of the sport industry extends well beyond this area. Mass participation in sport is common, but existing statistics on this activity do not precisely capture the frequency or intensity of individual participation. Determining the amount of inactive participation in sport through viewing and listening to sports on television, radio, and Internet is difficult or impossible, given existing data. Even a simple exercise like estimating total personal expenditure on sport produces widely different estimates depending on the assumptions made.

Unlike many other industries, sport also generates significant intangible benefits to a large segment of the society. The estimated size of the sport industry would be much larger if intangible benefits, like those generated by the shared experience of following a sports team or the national pride generated by living in the country that hosted the Olympic Games, were included. For example, Davis and End (in press) found evidence of significant intangible benefits associated with living in the city that is home to the NFL team that wins the Super Bowl. Johnson, Mondello, and Whitehead (2007) estimated that the presence of a professional football team in a city generated $36 million in intangible benefits, and Atkinson, Mourato, Szymanski, and Ozdemiroglu (2008) estimated that hosting the 2012 Summer Olympics will generate £2 billion in intangible economic benefits in the United Kingdom. Although intangible benefits lie outside the scope of this article, the measurement of intangible economic benefits also has a number of potential problems (Walker & Mondello, 2007).

Even if data were available to accurately and reliably measure the economic activity attributable to the sport industry, the underlying challenge of determining whether an activity is really a sport remains. Consider, again, the question: NASCAR, is it a sport? Under Coakley's (2003) definition it is, because it is an activity that involves gross motor skills, competition, and an organized set of rules. Under Fort's (2006) definition it is not, because a race car is a complicated device that is required to participate in the sport. Under the definition adopted by the *European Sport Charter*, it may or may not be included, but likely would be based on the "obtaining results in competition at all levels" criterion. Assuming that a consensus is reached that deems NASCAR a sport, the challenge then becomes measuring its contribution to the sport industry in terms of size and economic activity. The NIPAs are likely the first source of data examined by analysts to determine aggregate revenues and expenditures associated with NASCAR. An accurate estimate will again prove difficult to make because economic activity associated with NASCAR could be embedded in several other industry groups. Another difficult problem is identifying the industry classification for racing car manufacturing. The challenges related to measuring the economic activity generated from viewing and listening to sport apply to NASCAR races as well. The most extensive data on television viewing audiences lie in the private domain and are prohibitively expensive for the outside

analyst, which leaves estimated television audiences from other sources such as the NSGA. Again, the analyst must be careful in using these data to generate estimates of the economic activity associated with indirect participation through watching NASCAR on television. In this sense, our discussion of the data problems associated with defining the sport industry transcends the question of defining sport. Despite the challenges confronting economists in both defining and measuring the size and scope of the sport industry, it is an important question because the answer places sports economics research in context and highlights the importance of the field. We urge others to continue to work on this incompletely answered research question.

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