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David Pan
Northeastern State University

John Baker
Southern Illinois University Edwardsville

Zhen Zhu
University of Central Oklahoma

Elisa Argent
Loughborough University y - England

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AN ECONOMETRIC ANALYSIS OF PANEL DATA FOR TEAM PERFORMANCE, MARKET CHARACTERISTICS, AND ATTENDANCE IN ENGLISH PREMIER LEAGUE

David Pan, Northeastern State University
John Baker, Southern Illinois University Edwardsville
Zhen Zhu, University of Central Oklahoma
Elisa Argent, Loughborough University - England

A panel data analysis was used to assess the effects of selected team and market variables on attendance in the English Premier League (EPL). The results confirmed that (a) winning percentage remained a determinant for increasing attendance; (b) soccer consumers of the EPL were from middle and lower socio-economic classes; (c) newly built or renovated stadiums were significant in increasing attendance, but this only appeared valid for an initial few years; (d) a competitive attitude among spectators between rival teams promoted loyalty, and team identification, consequently increasing attendance; and (e) a promotional strategy of cross-market territories is advisable for sport marketers to increase attendance in EPL games.

Introduction

Team performance variables, especially winning percentage, have been considered to be the most important factors affecting home game attendance (e.g., Baade & Tiehen, 1990; Greenstein & Marcum, 1981; Noll, 1974; Pan, Zhu, Gabert, & Brown, 1999; Porter & Scully, 1982; Quirk & Hodiri, 1974; Scully, 1974; Schofield, 1983; Whitney, 1988). The latter is often used to measure a team's management success, by the amount of revenue derived from such sources as concession sales, parking, corporate sponsorship, and gate receipts. The number of spectators reflects not only the attraction of the match, but also shows the perceived value of the event to spectators through generic sport attributes and marketing schemes.

Traditionally, studies have been conducted from a market or sport perspective, using either cross-sectional or time series analyses to predict multiple sources of variables affecting attendance at a given time, or to estimate a single source over a period of time. Neither of these analyses renders a comprehensive view of attendance. The current study is an attempt to bridge the gap between the aforementioned separate analyses, using a panel data analysis through econometric modeling to estimate multiple sources of variables affecting attendance over a seven-year period. It is hoped that the overall understanding of the attendance function can be best achieved through the construction of a theoretical model that provides a rational base for appropriate business strategies and management decisions.

Theoretical Framework

The achievement of a marketing objective generally begins with the identification of an unmet need in a market segment, so that a suitable product can be designed and marketed to that segment (Porter, 1985). While the classification of meaningful characteristics is a prerequisite to market segmentation, marketing objectives can usually be achieved by deriving product attributes that are congruent with market needs (Kotler, 2003).

The types of variables used to determine their impact on attendance are similar to those used in other industries. For example, learning why a spectator buys a ticket to watch a match is similar to why a customer purchases a product to satisfy a need. However, the usefulness of this information is different from that in other industries. This is because the feedback relative to a spectator's expectations toward the generic nature of a sporting event cannot be fully transformed into a corresponding marketing effort. A sport marketer's primary responsibility, therefore, does not rest upon the sport product core (the game itself) but rather on sport product extensions (those other than of the game itself) (Mullin, Hardy, & Sutton, 2000). An effective sport marketing strategy does not come solely from the production of a winning team, but rather from a conscious effort to produce a successful product, which contains consumer-expected value-driven attributes, for an event that is congruent with unmet needs. To help understand this, we propose a Dual Status Model of sport business by making a distinction between sport consumer and sport customer.

The term sport consumer refers to an individual who is a spectator or participant in a sporting event, while the term sport customer refers to one who is unsure whether or not to become a consumer. An

individual in the sport marketplace always has a dual status. For example, one can be a consumer of a sport product, such as attending a football match, while remaining a customer of others. Or, can become a customer of a sport or product, such as contemplating whether to attend a football match, while remaining a consumer of other products, such as wearing e.g. a Manchester United team shirt. This distinction is made because human beings are creatures of complex physiological, psychological, and socioeconomic experiences. A person possesses a myriad of needs, and only one, or a group of related needs, can be catered for with a particular product in a given place at a given time. We reason that when a person becomes a consumer of a sport by attending a match, the same person also remains a customer of other products with a degree of inclination to become a consumer. This degree can be placed on a continuum ranging, for example, from uncertain to certain.

The Dual Status Model draws a distinction between sport customers and sport consumers using an arbitrary line of product-money transaction. The model does not exclude studies conducted on market segmentation of spectators and fans using numerous methods (e.g., Zhang, et al, 1995 on demographic dimension; Funk & James, 2001 for psychographic dimension; Mahony & Howard, 1998 on behavioral dimension), but rather views that segmentation cannot depict the true nature of the sport market. As viewed by the Dual Status Model, spectators and fans are within the realm of sport consumers, while customers of a sport or any other product only have a degree of propensity to become a consumer.

From the perspective of efficiency, marketing strategies should vary in type and effort according to the different degree of certainty that customers will become consumers. Arguably, a large portion of a marketing effort should be directed towards transforming customers who are uncertain into those who are certain. Similarly, those customers who already are certain require only a small and different type of marketing strategy because of their inclination to become or remain consumers. A sport customer, when compared to a sport consumer with the same market characteristics, would need a much different marketing effort to build a life-long relationship with the sport. A sport marketer's job, therefore, has a two-fold obligation: to retain consumers of their own, but also convert customers who are uncertain into consumers who are certain.

The understanding of this Dual Status Model and its place in the overall business model will enable business leaders to: (1) use sport as a cross-promotional opportunity for other products so as to target sport consumers as their own customers, and (2) prescribe value-based attributes, as is traditionally done in the area of sport product extensions, so that they can be congruent with the expected needs of their own consumers and also counteract the forces of competing alternatives. Through the identification of the marketing and economic variables affecting attendance, the construction of this model will provide a specific rationale for business leaders to formulate appropriate and effective strategies for a given business situation.

Review of Related Literature

A large amount of research has explored the effects of different variables on attendance. This includes age of the franchise (Siegfried & Eisenberg, 1980); age of the stadium (Baade & Tiehen, 1990; Quirk & Fort, 1992; Coffin, 1996), game schedules (Hill et al., 1982; Zhang, Pease, Hui, & Michaud, 1995); other major sports in the same location (Coffin, 1996; Demmert, 1973, Noll, 1974), per capita income or household income (Bird, 1982; Pan, Gabert, McGaugh, & Branvold, 1997); population size in the immediate locale of the event (Baade & Tiehen, 1990; Branvold, Pan, & Gabert, 1997; Bruggink & Eaton, 1996; Coffin, 1996; Knowles, Sherony, & Haupert, 1992; Pan, et al., 1999; Siegfried & Eisenberg, 1980;); stadium capacity (Baade & Tiehen, 1990; Pan, et al., 1999; Wakefield & Sloan, 1995); star players (Baade & Tiehen, 1990; Jones, 1984; Schurr, Wittig, Ruble, & Ellen, 1987; Schwartz, 1973; Scully, 1974); team identification and points of attachment for spectator motivations (Funk & James, 2001; Trail, Anderson, & Fink, 2000), ticket prices (Baade & Tiehen, 1990; Bird, 1982; Pan, et al., 1999; Siegfried & Eisenberg, 1980); and winning percentage (e.g., Baade & Tiehen, 1990; Branvold, et al., 1997; Demmert, 1973; Jones, 1984; Noll, 1974; Pan, et al., 1999; Quirk & Hodiri, 1974; Scully, 1974; Schofield, 1983; Whitney, 1988). Numerous attendance models and classification schemes of variables that influence attendance at sporting events (or other physical activities) have been proposed by Baade & Tiehen, (1990), Chelladurai, Scott, and Haywood-Farmer (1987), Chelladurai (1992), Hansen and Gauthier (1989), and Noll (1974). An attempt to understand fan behavior and subsequently develop an instrument to measure its effect on attendance also was made by Howard, Madrigal, and Kahle (1995). Some of these studies are descriptive in nature, while others are inferential and use conventional cross-sectional or single time-series research designs. Only one study (Pan, et al., 1999) used a panel data

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analysis to identify the effects of selected variables on attendance.

We reason that the variables affecting attendance generally interact with one another in a manner that is either restrained or augmented by their respective categorical functions. For instance, winning percentage is a major variable in the team performance category, and has been identified as the primary determinant of attendance at major sporting events (e.g., Baade & Tiehen, 1990; Greenstein & Marcum, 1981; Medoff, 1976; Noll, 1974; Pan, et al., 1999; Porter & Scully, 1982; Quirk & Hodiri, 1974; Scully, 1974; Schofield, 1983; Whitney, 1988). Winning percentage, however, albeit its importance has little to do with marketing efforts of non-team performance categories illustrated in the aforementioned theoretical framework. From this perspective, team performance variables, such as winning percentage, only serve to *stage* marketing efforts to attract spectators. In theory, a winning team would require little or no marketing effort if it had a perfect attendance record. Conversely, a team with a losing record requires skillful marketing efforts to attract customers and maintain a viable spectator base. This serves the first hypothesis to be tested in the econometric analysis of this study.

Findings have been equivocal as to the functional necessity and suitability of team non-performance and market variables on an ideal model of attendance. We hypothesize that attendance is not solely a function of team performance and market demand in a short-term dynamic process (for example, as an observed attendance surge or drop after a winning or losing season). Rather, it is *cultivated* through the compounded effects resulting from a set of a team's non-performance-related variables. These might include capacity of the stadium and ticket price, in addition to team characteristics such as home-town population or population profiles in the marketplace that would constrain or help attendance as a market base. To better understand the variables in these two different situations, individual effects of a team's non-performance attributes and characteristics in a given marketplace must be isolated in quantifiable terms in addition to that of winning percentage. This serves the second hypothesis to be tested in the econometric analysis of this study.

The inclusion of every possible variable in these two situations is neither economically efficient nor practically feasible in any single study. We believe that the essential concern for research variable selection should be predicated upon a sport business leader's own objectives within the framework of the sport business. Studies are often seen using costly, less practical, or less reliable data collection procedures with enigmatic designs; these studies appear to be less efficient and less preferred by practitioners. The interest in attendance as determined by team attributes and characteristics in the marketplace, and the concern for cost effectiveness and information reliability in data collection, have to be balanced in any variable selection and data analysis. These all can be achieved through a panel data analysis procedure because of its numerous advantages over either cross-sectional or time-series analyses. A panel, or longitudinal data set, is one that follows a given sample of individual subjects over time, and thus provides multiple observations of individuals in the sample (Hsiao, 1986).

The analysis of panel data provides an empirical study of the effects of multiple variables on a dependent variable, through the modeling of related economic behaviors and market characteristics over a period of time. These effects cannot be accurately identified using either a cross-sectional or single time-series data set. The analysis of panel data has numerous advantages over the analysis of conventional data as it improves the degrees of freedom, reduces collinearity among the interpretability of variables, and accurately predicts and interprets the economic behavior of subjects by pinpointing the effect of individual variables (for a review, see Hsiao, 1986, pp 1-10).

In recent years, panel data have become readily available in many industries such as the stock market or retailing industry. There is no exception in sport; as panel data including paid attendance figures, wining percentage, and ticket prices are regularly reported on a seasonal basis. From a technical standpoint, the number of variables used in a panel data analysis is limited by the number of observed subjects, and should not exceed a certain ratio to the number of teams in the model because of the issue of degrees of freedom. Nevertheless, panel data analysis can afford more variables than either cross-sectional or time-series analyses.

Purpose

This study used a panel data analysis to empirically test whether there were any identifiable effects of selected variables that would warrant a business decision in estimating the potential of home game attendance in the EPL. We hoped to pinpoint the areas or variables that would deserve varying types and degrees of marketing efforts and strategies. Team performance variables, such as winning percentage and league position that are traditionally taken for granted, were alternatively tested to see their effect in the panel data

model which contains non-team performance and marketplace variables to estimate their individual effect on attendance. This study was designed to illustrate the advantages of panel data analysis, the locale of the proposed dual status model in the sport business, and an initial effort for a series of similar studies alternatively testing variables in sport product, and market.

METHOD

Variable Selection and Limitations

A list of team performance and marketplace variables considered to be commonly used for predicting attendance was derived from both the literature review and through consultation with practitioners in the English sport industry. These independent variables and reasons for their inclusion in the analysis follow.

The average household income in home city (AVGINC) was used, rather than the conventional per capita income. This was because the former represented a more realistic economic decision unit as a functional variable than the latter, which uses the size of the population as a denominator to signify an average magnitude of local economic development.

The city population (CITYPOP) and county population (CNTYPOP) of the team were used. The latter is the number of people in the county where the team is located minus the city population. Previous studies in the United States (Bruggink & Eaton, 1996; Coffin, 1996; Knowles, Sherony, & Haupert, 1992) have used Metropolitan Statistical Area (MSA) population to estimate attendance with a simple cross-sectional regression analysis. In our study, the MSA is not applicable as each team in the EPL plays at a central location, i.e., a single consumption outlet in sport versus multiple outlets in other businesses.

The league position (LPOS) was selected because the team's rank in the previous season holds a trademark effect on attendance, as people rarely discuss the winning percentage of individual teams in an upcoming season, but only their rank in the previous or current season.

Stadium age (STADAGE) and stadium newness (STADNEW) were selected because research has shown that newly built or renovated stadiums generally increase attendance. Stadium capacity (STADCAP) and average ticket price (AVGTIX) were used as team specific variables selected because of their prima facie value in limiting the number of spectators in the stadium or dictating a spectator's decision to attend games.

Winning percentage (WPCT) is the ratio of wins to total games played by a team during a season. This variable was selected because it has consistently shown to have a major affect on consumers to attend games. Years in the EPL (YR) was selected to determine whether the dynamics of a team that moved in and out of the league had an effect on attendance.

The dependent variable of attendance ratio per game (ATTR) was derived from the number of paid spectators per season, factored by the number of home games played, and the capacity of the stadium. We believe that the absolute attendance number (as widely adopted in previous studies), whether by individual games or by seasons, does not warrant a fair base for an accurate prediction without being weighted by the capacity of the stadium.

When designing the analysis model, certain variables were not included because of concerns over their degrees of freedom; the short-term effect of their apparent values; and the number of non-market variables that should be used in this study. Overall, the decision for adopting the number of variables was restricted by the number of teams used in the analysis. The reliability of the results could otherwise be seriously challenged if the number of variables used in the model was more than the number of observed teams.

Model for the Empirical Test

With few exceptions, attendance at individual games tended to vary over time. Traditionally, cross-sectional studies have used dummy variables to measure the impact of specific team performance and market variables. These effects, however, may not be valid to allow an inference to be derived without introducing a time-series dimension. On the other hand, cross-sectional studies also tend to average the effect of time-series to obtain a variable mean for each team. While this method is valid for measuring variations between specific microeconomic and team-specific attribute variables, it often ignores additional information embedded in the data. This includes team-specific performance and demographic variables that confine individual teams in both short-term dynamics and long-term relationships.

One particular issue that may be considered is the effect of product price strategy on "sport core and extensions" relative to market demand (Mullin, et al, 2000). We would not presume that the ATTR would become smaller if the cost of a ticket increased, because of the inelastic nature of the demand found in some major league sports. (Mullin, et al, 2000, Pan, et al, 1999). Ticket price alone does not truly reflect the economic behavior of all spectators. It is obvious that any single cross-sectional model would not offer a

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complete explanation of this supposition. A single time-series study also would not provide information about the differential impact of team performance and market characteristics on attendance. This is because of its inability to reveal inter-subject variations and offer intact inference for generalization. We attempted to solve this problem with panel data analysis that could simultaneously evaluate the differential impact of team performance and market variables on variations in attendance among teams over time.

Since the data set is both cross-sectional and time series, we started to construct the model by letting $ATTR_{it}$ be a variable representing the average attendance ratio per game for ith team in tth year, and also let $WPCT_{it}$ represent the winning percentage of the ith team in tth year. We further let ε_{it} be a normally distributed, random error term. We conjecture that the ith team's ATTR at time t is determined according to the following equation:

$$ATTR_{it} = \alpha + \beta X_i + \gamma Z_t + \delta WPCT_{it} + \phi Y_{it} + \varepsilon_{it} \quad (1)$$

Where X_i is a vector of team-specific variables that remain unchanged during the sample period. Variables included in this vector are those that should capture some team marketplace variables such as the population of the city or county where the team is located, ticket price, average income, stadium age, stadium newness or stadium capacity. Z_t is a vector of variables that take the same value for all teams during a given year, but can change over time. Examples of these variables in Z_t are the economic conditions such as the level of the Gross Domestic Product (GDP) and unemployment data. We do not specify any specific variables for this vector because its macro-economic effect on all teams should generally remain relatively invariant on the national scale; and its effect nevertheless would be reflected down to the demographic level of a marketplace. In equation (1), Y_{it} are the other team performance variables used to test our alternative hypotheses. These include data of the team's positional change (POSCHNG) in the league over years, years in the league (YR), drawn games (DRAWS), goals for (GF) et cetera.

Unfortunately, estimation of the specification in equation (1) is problematic because it would likely violate the basic assumptions of the classical linear regression model (i.e., no serial correlation, constant variance, endogeneity, and cross-correlation among regressors). If we believe that the error term ε_{it} is comprised of a fixed, team-specific component (λ_i), so that:

$$\varepsilon_{it} = \lambda_i + \nu_{it} \quad (2)$$

Then $Cov.[\varepsilon_{is}, \varepsilon_{it}] \neq 0$ for $s \neq t$. A concern would be particularly warranted if we suspected that vector X_i has omitted some other important team-specific variables in marketplace. In fact, this is likely to be the case no matter how detailed a set of descriptors for team-specific variables in marketplace are included in X_i because we simply don't know all possible variables in any theoretical construct.

To address the problem, we propose a fixed-effects model as follows:

$$ATTR_{it} = \alpha + \sum_{S=1}^{T-1} \psi_s D_s + \sum_{J=1}^{N-1} \phi_j D_j + \delta WPCT_{it} + \phi Y_{it} + \nu_{it} \quad (3)$$

Where T is the total number of time periods and N is the total number of teams in the analysis. The first set of variables are time-specific dummy variables, and are defined as such that $D_s = 1$ if $s = t$ otherwise = 0. The second set of variables are team-specific dummy variables, and are defined as such that $D_j = 1$ if $j = i$ otherwise = 0. Note that ν_{it} is assumed to be nonauto-correlated, homoscedastic, and uncorrelated with the right hand side regressors.

To identify the dynamic relationship of the function of ATTR to a team's winning percentage or league position in association with other team-specific marketplace variables, we alternatively tested the relationship of the winning percentage and league position to the ATTR, because the team's winning percentage would, at first sight, be highly correlated with its league position. The estimated team-specific performance, non-performance, or market effects on the ATTR represented the cross-team variation in the ATTR. This is explained by differences in time-invariant attributes or characteristics, depending upon the nature of a given variable. These team-specific variables serving as the predicted variables on the ATTR were used as the dependent variables in the regression analysis using Equation (3). Specifically, they can be expressed as follows:

$$ATTR_{it} = \alpha + \sum_{S=1}^{T-1} \psi_s D_s + \sum_{J=1}^{N-1} \phi_j D_j + \delta WPCT_{it} + \phi Y_{it} + \nu_{it} \quad (3.1)$$

Or

$$ATTR_{it} = \alpha + \sum_{S=1}^{T-1} \psi_s D_s + \sum_{J=1}^{N-1} \phi_j D_j + \delta LPOS_{it} + \phi Y_{it} + \nu_{it} \quad (3.2)$$

Equation (3.1) or (3.2) can alternatively provide the estimated effects of the selected team variables captured on the ATTR through the alternating winning percentage or league position analysis. The result can approve or dispel the common assumption of whether the winning percentage or league position is a better predictor in

estimating attendance. Certain variables contain minor fluctuation of information over a period of time, but these variables on the team-specific vector were assumed constant during the same period. While one could argue that these variables may have changed over the years, we assumed in our analysis that the effect of changes in these variables during the seven-year period was negligible because they were not qualified to be a trend.

Data and Data Collection

To identify the size of a market, a regional area must be established for the location of each team representing each city and hosted by each county. The data of team marketplace variables such as city population, county population and average income were extracted through local county and national census data. Other data such as a stadium's capacity, the number of paid spectators per season, and the winning percentage for each team during the seven-year period were obtained from each team's web site, and verified by the archives of the EPL posted on the Internet. The EPL currently accommodates 20 teams, where at the end of a season, the bottom four are relegated to a lower division, and the top four teams from the lower division are promoted to the EPL.

Data Analysis

Data were analyzed using the panel data analysis procedure described earlier. Initially, this was performed using the fixed effect method shown in Equation (3.1). Secondly, the LPOS was substituted for the winning percentage to project the $ATTR_{it}$ in Equation (3.2). If this had not been done, it would violate the principle of independency of the two variables, and teams with a higher winning percentage would have to be placed in a higher rank. The established rejection level for all analyses (two-tailed) was $p < .05$.

RESULTS AND PRACTICAL IMPLICATIONS

Winning Percentage Analysis

The results of the winning percentage analysis, as represented by equation (3.1), are presented in table 1. This analysis identified those variables that could be used in predicting changes in the ATTR. Four variables were empirically tested to have significant effects with an additional two having an alpha level below 10.

Table 1: Comparison of Performance Variables Using Equation (3.1) and (3.2)

	ATTR (3.1)			LPOS (3.2)		
Variable	r	SE	t	r	SE	t
AVGINC	-1.0632E-05	5.3144E-06	-2.0007*	-1.2667E-05	5.2887E-06	-2.3952*
AVGTIX	4.0922E-03	3.2365E-03	1.2644	3.8988E-03	3.2244E-03	1.2092
CITYPOP	5.1014E-08	6.0511E-08	0.8431	1.1386E-08	6.0479E-08	1.8826
CNTYPOP	1.9453E-08	1.0664E-08	1.8241#	2.1915E-08	1.0586E-08	2.0702*
POSCHNG	-3.8507E-03	2.3274E-03	-1.6545	-4.7688E-03	2.3714E-03	-2.0095*
STADAGE	-1.4607E-03	8.6950E-04	-1.6800#	-1.3740E-03	8.6614E-04	-1.5863
STADCAP	-4.4366E-06	2.0181E-06	-2.1984*	-3.7029E-06	1.9591E-06	-1.8901#
STADNEW	2.2070E-01	9.1700E-02	2.4069*	2.0630E-01	9.1300E-02	2.2594*
YR	6.2717E-03	9.7267E-03	0.6448	5.2552E-03	9.6778E-03	0.5430
WPCT	5.5940E-01	1.1510E-01	4.8596***	--	--	--
LPOS	--	--	--	-1.3000E-02	2.5870E-03	-5.0080***

* p <.05, ** p <.01, *** p <.001; # p <.10.

Table 2 : Model Estimation for Winning Percentage and League Position Using Equation (3.1) and (3.2)

Variable	ATTR	LPOS
Team Related		
Performance		
POSCHNG (per place)	-0.0039	-0.0048*
YR (per season)	0.0063	0.0053
WPCT (per cent)	0.5594***	--
LPOS (per team)	--	-0.0130***
Non-Performance		
STADAGE (per 10 year)	-0.015#	-0.0137
STADCAP (per 10,000)	-0.4437*	-0.3703#
STADNEW (per project)	0.2207*	0.2063*
AVGTIX (per pound)	0.0041	0.0039
Market Related		
Socio Econo-Demographics		
AVGINC (per 1,000 pound)	-0.1063*	-0.1267*
CITYPOP (per million)	0.0510	0.0114
CNTYPOP (per million)	0.0194#	0.0219*
R^2	0.3994	0.4053
F (16, 123)	5.1115***	5.2394***

* p <.05, ** p <.01, *** p <.001; # p <.10.

The average household income in the home city is the team's market variable that was found to have a negative impact on the ATTR. The average consumers in the EPL appear to come from middle or lower socio-economic classes. People with a higher income appear less likely to watch football games on a regular basis than those with an average income. This result could at least offer the direction for a niche marketing strategy for EPL games to consider segmenting people in a societal stratification from a socio-economic perspective. A recent study conducted by the Sir Norman Chester Center for Football Research (2003) offered additional evidence in support of this finding. A result, derived from approximately 30,000 questionnaires, indicated that the EPL matches seemed to be attracting new fans in high income brackets.

The newness of the stadium was found to have only a temporary effect in improving the ATTR when compared to the relatively longer effect in other studies (e.g. Baade & Tiehen, 1990; Quirk & Fort, 1992, Coffin, 1996). Renovation projects or the construction of new stadiums could lead to an improvement of the ATTR by more than 20%, but the further examination of data indicated that the ATTR improvement occurred only in first few years. From a technical standpoint, it appeared that the inclusion of the stadium newness variable was less practical to accurately predict its effect, because its novelty would soon wear off, particularly when a team performed badly and its effect would hardly last longer than the first few years after its introduction.

It is difficult for sport teams to fill a large stadium. The results indicated that if a stadium added 10,000 more seats, its effect would account for a decrease in the ATTR of 44%, assuming other variables to be constant. The data of stadium capacity were further examined, and it was noted that stadiums with a larger seating capacity, located in an area also having a rival team, often appeared to have a higher ATTR. Considering that these teams, which are often ranked high in the EPL, a further improvement in the ATTR could be achieved by increasing seating capacity of the *often* top-ranked teams. It is not advisable to convert regular seats into luxury suites unless an overriding financial reason is warranted.

Stadium age and county population did not meet the predetermined statistical significance, but their alpha values rendered them worthy of consideration. The older the stadium, the greater the negative effect on the ATTR. This would suggest a decrease in the ATTR of .015%. A county with one million people would lead to an increase of about 2% in the ATTR. This minuscule impact can most likely be attributed to the geographical characteristics in the country, where distance did not appear to be a deterrent for avid consumers to attend away-games, while spectators frequently seemed to go to home-games (Sir Norman Chester Center for Football Research, 2003).

League Position Analysis

The results of the league position analysis in equation (3.2) are also presented in table 1 for comparison. This analysis determined whether a team's position in the league could be used as a visible and viable "trademark" marketing strategy that could have a better function than a winning percentage in the eyes of the public, and whether it could be used to substitute the winning percentage for the estimation of attendance. Five variables were empirically tested to have significant effects on the ATTR (see table 2 in the previous page).

The team's position in the league is related to team performance. Similarly, the team's position in the league reflects the playing quality of the team in a given season. Different from winning percentage, a team's promotion to or demotion from the league is more easily understood by the general public than a winning percentage. In addition to the use of positional change in the league as a variable to estimate attendance, the authors conjectured that the use of the team's position would provide a better-paired estimate in the analysis. As shown in equation (3.2), the league position was used as a substitute for the winning percentage because of its high degree of correlation. The result indicated that a team's position in the league, along with positional change, would have a negative effect on the ATTR. Sport consumers in the EPL were influenced very little by their team's position when they decided to attend games, thus disproving the authors' conjecture. Winning percentage seemed to be a better predictor of attendance than league position.

The average household income in the team's home city is the team's market variable. It was shown to have a negative impact on the ATTR in the league position analysis. This confirmed the finding in the winning percentage analysis, and qualified EPL games as a sport product primarily for people from that socio-economic level.

The county population was shown to have a significant effect on attendance. An increase in a county population by one million people would improve the ATTR by only 2.2%. This is because a largely populated county, when compared to the largely urbanized population in English cities, would have a higher nurturing effect on attendance. However, the expectation of an increase in the county population is neither

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realistic nor practical. Due to the shorter distance between cities, an enlarged range of marketing promotions into nearby territories would be a better marketing strategy and more appropriate for a team's home games.

The newness of a stadium was again shown to be significant for estimating increases in the ATTR. This indicated that a renovated or newer stadium had a direct appeal to those fans and spectators attending the game. Again, the data showed that major increases occurred only during the initial few years after its introduction.

SUMMARY

This study used an econometric model to estimate the potential effect of selected variables on attendance in the EPL from a panel data set over a period of seven years. The empirical results confirmed that team performance, as represented by winning percentage, remained a determinant for increasing attendance. The team's position in the league was assumed to have a better trademark value than winning percentage, as substantiated by its face value. However, it was not qualified to be a better predictor. Other team performance variables such as the number of matches drawn or goals scored were not found to be statistically significant. The variable of newly built or renovated stadiums was found to be a significant factor in estimating attendance. A further examination of the original data revealed that its real practical value was limited within the initial few years after its introduction, thereby rendering a caution that studies on a stadium's age or renovation variable should not be taken at face value. The result contradicted previous studies using this variable in North America (e.g. Baade & Tiehen, 1990; Quirk & Fort, 1992, Coffin, 1996).

The average income of the local market was found to be significant in the estimation analysis. This result affirmed that sport consumers of EPL matches are from middle and lower socio-economic classes. The fact that a market with a higher average income would have a lower ATTR, indicated that EPL matches apparently lack certain product attributes to attract people of socio-economic classes with above-average income. In this vein, further socio-psychological studies on sport consumer behavior should be conducted in this direction.

It was not surprising that the capacity of the stadium was significant in estimating the ATTR. Stadiums with a larger seating capacity, located in the area also having a nearby rival team appeared to have a high ATTR. This result indicates that the competitive mentality of the spectators and fans between the rival teams promotes loyalty, team identification, and consequently increases attendance. The county population could also be a worthy consideration for use in estimating attendance (its alpha was .0706 and .0405 in the winning percentage and league position analyses respectively). Also, the fact that England is geographically limited in area, suggests that a promotional strategy of cross-market territories to attract people from nearby areas to supplement the county population base might be warranted. Pertinent considerations, such as the mode of transportation, available accommodation in the host city, and hospitality of the local people, would influence the effectiveness of this marketing strategy.

This study empirically identified the differential effect of selected variables for estimating attendance ratios in the EPL. The results were discussed relative to marketing implications. A limitation of studies of this type heavily rests upon the number of pertinent variables that could be included in the analysis because the concern over the degrees of freedom that could affect the validity of the results. This study was delimited to a given sport setting. One marketing strategy based upon a given set of variables may work well in one setting, but may not have the same effect in another. Since we believe that a marketing strategy is the function of market and sport specificity in a given marketplace, similar studies of the same sport in another marketplace (or other sports in the similar marketplace) should be replicated. Panel data analysis can afford such a demand, and should be used by alternatively including other pertinent variables. The authors hope that a line of similar studies will be developed to help practitioners in the sport business to better understand the attendance function in quantifiable terms, and consequently provide a rational basis for formulating informed, effective, and efficient marketing strategies.

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David Pan is an assistant professor of marketing at Northeastern State University in Oklahoma. He received his Ph.D. from Southern Illinois University Carbondale and his JD from University of Tulsa in 2000. His research interests are in the areas of sport business, teaching methodology in marketing, online marketing research, Olympic movement, consumer behavior, and international marketing. His numerous research papers have appeared in refereed journals in both the business and sport fields.

John Baker is a professor at Southern Illinois University Edwardsville. He received his Ph.D. from University of Iowa. His research interest is in the area of sport management. He has published seven books and monographs, nine chapters in books, has 46 articles in refereed journals, and has given more than 60 presentations at professional conferences.

Zhen Zhu is an assistant professor of economics at University of Central Oklahoma. He received his Ph.D. from University of Michigan. His research interests are in international economics, econometrics, and energy market behavior. He has published more than 50 articles in refereed journals in these fields.

Elisa Argent is a doctoral candidate at Loughborough University in England where she focuses her work on practical and theoretical study of sport management.

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