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SPORTS ATTENDANCE: A SURVEY OF THE LITERATURE 1973-2007

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SUMMARY: Introduction – 1. Theoretical aspects – 2. Demand definition, data and empirical model – 3. Determinants of attendance (I): Economical aspects – 4. Determinants of attendance (II): Expected quality – 5. Determinants of attendance (III): Uncertainty of outcome – 6. Determinants of attendance (IV): Opportunity cost and other factors – Conclusions

Key words: Attendance, elasticity, quality, uncertainty of outcome

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Introduction

Neale[1] notes that the economics of professional-team-sports is a peculiar economy because the product is the result of the interaction between two teams that produce the match, and eventually of *n* teams that produce a championship. In the professional sport world, clubs do not necessarily behave as traditional profit

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[1] W.C. NEALE, *The Peculiar Economics of Professional Sports, A Contribution to the Theory of the Firm in Sporting Competition and in Market Competition*, in *Quart. J. Econ.*, vol. 78, n. 1, 1964, 1-14.

maximising firms that try to eliminate their competitors to the extent they are allowed by laws that guarantee competition. In professional sports, the most important fact is that spectators decide to attend the matches, and this attendance can be affected not only by the typical economic variables of demand analysis (price and income), but also its characteristics (quality, uncertainty of outcome, etc.). Attendance by fans also requires the participation of the rest of the competitors, to sell the product. Neale expounded this assumption by means of the Louis-Schmelling paradox. In brief, if the heavyweight world champion Joe Louis did not have any rivals, or alternatively, the rivals were not good enough to provide competition, the company "Joe Louis" would not generate profits; the lack of rivals would make it impossible to generate income. On the contrary, rivals of a higher calibre, such as Max Schmelling, would be essential to increase the income of Joe Louis because the high levels of competition would be attractive to spectators. Although Max Schmelling would also obtain profits, for Joe Louis, the quality of the rival would be very important, and would be completely independent of his own skill. This peculiarity of the sports industry was explained by El-Hodiri and Quirk[2] when they pointed out that, on one hand, the teams will try to contract the largest possible amount of talent, to increase the probability of winning all the matches; however, if the team is too successful at maximising winnings, this will compromise the objective of maximising profits, since when the probability of victory is close to one, ticket sales are reduced substantially.

This paper presents a survey of the primarily empirical literature about sporting-events demand (attendance). In section II, the theoretical aspects of demand studies in professional sports is considered, with special reference to the behaviour of clubs as companies and the robustness of the empirical results fitting such theoretical details. Given the mostly empirical approach of the literature, in section III, we place special attention on how demand has been measured and defined, what kind of data have been used and how the equations have been defined. In sections IV through VII, we present in detail the way the different determinants of the demand have been modelled: economic variables (section IV), quality (section V), uncertainty of outcome (section VI) or opportunity cost and other factors (section VII). The article ends with a summary of the main conclusions and future extensions of this literature.

1. Theoretical aspects

Very little literature exists about the theoretical analysis of the demand for sporting events. Most studies focus on two relevant and related questions. The first question involves analysing the behaviour of the clubs as firms. It involves the study of what the objective functions are, namely, which behaviour function should be maximised. With the second question, the researcher seeks to discover if the fixed-

[2] M. El-hodiri, J. Quirk, *An economic model of a professional sports league*, in *J. of Pol. Econ.*, vol. 79, n. 6, 1971, 1302-1319.

price criterion is compatible with profit maximisation, based on the results reported from the available empirical evidence. A debate emerges because of the repeated observation of price elasticities of demand that are less than one in absolute value. This implies that the ticket prices are fixed in the inelastic range of the demand curve. Such behaviour is contrary to the conditions for profit maximisation for the company in a non-competitive context.

One of the earliest authors to pose the question exploring the specific objectives of sports clubs was Sloane,[3] with special reference to football clubs. To Sloane, clubs maximise a utility function that depends not only on profits, but also on factors like sport success, attendance and competition "health". Sloane's argument appears to be quite reasonable, because achieving success in a sport is the most important objective for its supporters. In fact, it will be very difficult for a club to obtain optimal profits if it has a lack of sport success.[4]

In any case, assuming that the clubs do not take into account economic results would be ignoring their role as businesses, which they have a long tradition of being.[5] This is why the most appropriate assumption is to suppose that clubs maximise a utility function which depends, basically, on reaching particular sport successes. It should have at least one restriction, consisting of obtaining a minimum revenue in order to guarantee its viability in the medium and the long run.

Because different profit-maximisation objectives exist, it is possible that some actions taken by the clubs' owners, like fixing ticket prices, do not follow the behaviour patterns of a profit-maximising company, and the prices are not placed in the elastic range of the demand curve. Price fixing in the inelastic range of the demand curve is the behaviour that different authors have tried to justify, starting from several hypotheses on the topic of profit maximisation. For example, it is supposed that if clubs have stadiums that are never or almost never filled,[6] the marginal cost of a new spectator is almost equal to zero. This means that the price at which the club maximises its benefit is fixed when price elasticity is equal to one.

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[3] P. J. Sloane, *The Economics of professional football: The Football Club as a Utility Maximizer*, *Scot. J. of Pol. Econ.*, vol. 18, n. 2, 1971, 121-146. Sloane adapts, among others, the investigations of O.E. Williamson, *Managerial Discretion and Business Behaviour*, in *Am. Ec. Rev.*, vol. 53, December, 1963, 1032-1057 and O.E. Williamson, *A Dynamic Theory of Interfirm Behaviour*, in *Quart. J. of Ec.*, vol. 79, November, 1965, 579-607. F. Carmichael and D. Thomas propose a similar approach based on Sloane's, *Bargaining in the Transfer Market: Theory and Evidence*, in *Appl. Ec.*, vol. 25, December, 1993, 1467-1476.

[4] In the European context, for the teams with the highest budgets that do not participate in any European competition, economic deterioration occurs. In the open league system, this occurs in the same way for the teams that are relegated to inferior divisions.

[5] For example, in the case of British football, the acceptance of professionalism goes back to 1885.

[6] The possibility of fully completed stadiums makes possible the resale, which is legalised in some cases. See for example A.T. Williams, *Do Anti-Ticket Scalping Laws Make a Difference?*, in *Managerial and Decision Economics*, vol. 15, Sep/Oct, 1994, 503-509, or A.C. de Serpa, *To Err is Rational: A Theory of Excess Demand for Tickets*, in *Man. and Dec. Ec.*, vol. 15, Sep/Oct,

Considering the stadium capacity problem, which is necessarily given alongside the existence of a marginal cost equal zero, for El Hodiri and Quirk[7] profit maximisation is reduced to a problem of maximising revenues in each game,[8] subject to the maximum number of tickets that can be sold. They conclude that if the capacity restriction is not active, the price that maximises benefits is the price corresponding to unit elasticity of the demand curve. If, to the contrary the capacity restriction is active, ticket prices are fixed in the inelastic range of the demand curve.

A second scenario where benefit maximisation is compatible with price elasticity lower than one in absolute value involves the local team directly controlling the stadium license rights for items such as food and drinks. Under this assumption, Heilmann and Wendling[9] demonstrate that if clubs are able to fix the prices lower than their corresponding unit elasticity, they fix prices in the inelastic range. An apparently similar approach to the one presented by Heilmann and Wendling is the one taken by Marburger.[10] Marburger sets up a two-equation model. In the first equation, the dependent variable is demand for tickets, and in the second, concessions is the dependent variable. He demonstrates that if the model does not include the licenses, for a given supply, price fixing would correspond to the unit elasticity point; while, if concessions were included as a complement of the benefit maximisation strategy, ticket prices would fall to the inelastic range of the demand curve.[11]

To Kesenne,[12] the fact that the price elasticity of demand is less than one in absolute value does not mean that clubs do not behave like profit-maximising firms.

1994, 511-518.

[7] M. El Hodiri, J. Quirk, *Stadium Capacities and Attendance in Professional Sports*, in S. Ladany (ed.), *Management Science Applications to Leisure-Time Operations*, Amsterdam, North-Holland Publishing Company, 1975, 246-262.

[8] A similar approach is employed by Ferguson, Stewart, Jones and Le Dressay to consider whether the American NHL hockey clubs' behaviour is compatible with benefit maximisation: (D.G. Ferguson, K.G. Stewart, J.C.H. Jones, A. Le Dressay, *The Pricing of Sports Events: Do Teams Maximize Profit*?, in *J. of Ind. Ec*., vol. 39, n. 1, 1991, 297-310).

[9] R.L. Heilmann, W.R. Wendlin, *A Note on Optimum Pricing Strategies for Sports Events*, in R.E. Machol, S.P. Ladany, D.G. Morrison (eds.), *Management Science in Sports*, Amsterdam, North-Holland Publishing Company, 1976, 91-99.

[10] D.R. Marburger, *Optimal Ticket Pricing for Performance Goods*, *Man. and Dec. Econ.*, vol. 18, August, 1997, 375-381. He uses the previous approaches by W. Y. Oi, *A Disneyland Dilemma Two-Part Tariffs for a Mickey Mouse Monopoly*, in *Quart. J. of Ec.*, vol. 85, February, 1971, 77-96, and R.J. Barro, P.M. Romer, *Ski-Lift Pricing, with Applications to Labor and Other Markets*, in *Am. Ec. Rev.*, vol. 77, n. 5, 1987, 875-890. Comment by T. Cowen, A. Glazer, *Am. Ec. Rev.*, vol. 81, n. 1, 1991, 376-377.

[11] A similar result can be found in A. Krautman, D.J. Berri, *Can We Find it at the Concessions? Understanding Price Elasticity*, in *Prof. Sports J. of Sport Ec.*, vol. 8, n. 2, 2007, 183-191. For them, teams discount ticket prices significantly into the inelastic range of demand when concessions are included in the profit-maximisation model.

[12] S. Kesenne, *Ticket Pricing and the Profit Maximizing Hypothesis in Professional Team Sports*, Paper presented in the 4th Conference International Association of Sports Economists, New York, Columbia University, July, 11th-12th, 2002.

One of the arguments supporting this affirmation is that gate revenues are less important to executive managers due to the fact that revenues obtained by tickets sales are lower each time in relation to the total team revenues. Fort[13] points out that inelastic pricing can happen as a result of profit maximisation if there is a particular relationship between an individual team's local TV revenues, the marginal cost of talent and the average of the rest of the teams' local TV revenues.[14] An argument similar to that of Heilmann and Wendling was used by Brook.[15] He notes that teams set ticket prices "low", to capture other revenues sources such as concessions and luxury boxes. In the opinion of Brook, the behaviour of NFL teams is consistent with profit maximisation since estimated marginal non-ticket revenues are greater than the estimated marginal cost of attendance. The same conclusion about setting ticket prices "low" is found by Coates and Humphreys,[16] who report that franchises set prices in the inelastic portion of demand to maximise concessions' revenues. Ahn and Lee[17] show that in a multiple-time-period model, owners set prices in the inelastic range if the intertemporal elasticity of substitution for games is small, and/or if attending games is habit-forming.

In conclusion, as we will see in the next section, the existence of price elasticities of demand lower than one in absolute value is a common feature in the empirical literature. One way to justify this result is to suppose that clubs are not strictly benefit-maximising agents; the other approach tells us that the ticket price is just a part of the total spending of a spectator or family when they go to the stadium to watch a match.

2. Demand definition, data and empirical model

Although other reviews referring to this type of literature[18] exist, they either do not

[13] R.D. Fort, *Inelastic Sport Pricing*, in *Man. and Dec. Econ.*, vol. 25, n. 2, 2004a, 87-94.

[14] The relationship between the pricing behaviour of owners, subsidies and concession and parking revenues can be found in Fort (2004b). Further development of Fort's ideas (2004a, cit., 13) can be seen in P.K. Porter, *The Paradox of Inelastic Sports Pricing*, in *Man. and Dec. Ec.*, vol. 28, n. 2, 2007, 157-158 and R.D. Fort, *Reply to The Paradox of Inelastic Sports Pricing*, in *Man. and Dec. Ec.* vol. 28, n. 2, 2007, 159-160.

[15] S.L. Brook, *Evaluating Inelastic Ticket Pricing Models*, in *Int. J. of Sp. Fin.*, vol. 3, n. 1, 2006, 140-150.

[16] D. Coates, B. Humphreys, *Ticket Prices, Concessions and Attendance at Professional Sporting Events*, in *Int. J. of Sport Fin.*, vol. 2, n. 3, 2007, 161-170.

[17] S.C. Ahn, Y.H. Lee, *Life-cycle Demand for Major League Baseball*, in *Int. J. of Sp. Fin.*, vol. 2, n. 2, 2007, 79-93.

[18] See J.A. Schofield, *Performance and Attendance at Professional Team Sports*, in *J. of Sports Beh.*, vol. 6, n. 4, 1983b, 196-206, J.A. Cairns, *The Demand for Professional Team Sports*, in *Br. Rev. of Ec. Iss.*, vol. 12, n. 28, 1990, 1-12, P. Downward, A. Dawson, *The Economics of Professional Team Sports*, London, Routledge, 2000, S.M. Dobson, J.A. Goddard, *The Economics of Football*, Cambridge, Cambridge University Press, 2001, A. Krautman, L. Hadley, *The Product Market for Professional Sports*, in J. Fizel, *Handbook of Sports Economics Research*, 2006, 175-189 and S.L. Brook, *Evaluating Inelastic Ticket Pricing Models*, cit., 15. Other surveys focus on concrete aspects of attendance like uncertainty of outcome, such as Szymanski S., *The*

make reference to the most recent contributions, they refer to a particular sport or the specific reference to the analysis of demand is considered in a more general analysis scenario, so that the detailed approach taken in this research is lost. The studies that serve as the basis for this review refer to nine professional team sports: baseball (Major League Baseball, MLB; Japanese Professional Baseball League, JPBL; and Korean Professional Baseball League, KPBL), American football (National Football League, NFL), football (soccer), ice hockey (National Hockey League, NHL), basketball (National Basketball Association, NBA), Australian football (Australian Football League, AFL), rugby, cricket and horseracing.[19] In most of the previous review studies, the researchers only make estimations that follow the standard model of economic theory, with specifications imposed by the features of the particular professional sport.

The dependent variable evaluated in the studies mentioned in this review is attendance at sporting events.[20] There is no agreement among the different consulted studies about how to define the attendance precisely. On one hand, this lack of agreement is because of the different types of data used, and, on the other hand, it is due to the different methods of ticket sales depending on the sport and the country. Accordingly, many studies use panel data, time series (seasons) referenced to cross-sectional data (matches or teams), in their estimations, so attendance refers to particular games in the case of matches or the average attendance per season in the case of the teams. Other studies use time series, so the attendance is referenced to the yearly average, with heterogeneous lengths of the periods, limiting the effect analysis to attendance in the short- and long-run of the different explanatory

Economic Design of Sporting Contests, in *The J. of Econ. Lit.*, vol. 41, n. 4, 2003, 1137-1187, and R.D. Fort, Y.H. Lee, *Stationarity and Major League Baseball Attendance Analysis*, in *J. of Sport Ec.*, vol. 7, n. 4, 2006, 408-415. However, the most completed two surveys were published in the same year, the ones by J. Borland, R. Macdonald, *Demand for Sport*, in *Ox. Rev. of Ec. Pol.*, vol. 19, n. 4, 2003, 478-502 and J. Garcia, P. Rodriguez, *Análisis empírico de la demanda en los deportes profesionales: un panorama*, in *Rev. Astur. de Econ.*, n. 26, Jan-Apr, 2003, 23-60. Both studies gather a significant number of works about attendance published up until that date, describing sports, type of data, years included in the sample, etc. The difference is that Borland and MacDonald analyse in more detail the uncertainty of outcome variables that the different authors have used, whereas Garcia and Rodriguez analyse in more detail the economic variables, especially price and income; this paper does something similar.

[19] Analysis referring to individual sports like golf is not reported upon (see L.R. Cottle, *Economics of the Professional Golfers' Association Tour*, in B. Goff, R. Tollison (eds.), *Sportometrics*, Texas, Texas A and M University Press, College Station, 1990, 277-291); neither are pseudo-sport events like rodeo (N. Daneshvary, R. K. Schwer, D.S. Rickman, *Determinants of Demand for Professional Rodeo Attendance*, in *J. of Cul.Ec.*, vol. 17, December, 1993, 77-92). However, some studies about university team sports are included due to their semi-professional character.

[20] Sometimes considering the influence of blackouts in TV broadcastings is useful in evaluating the number of spectators without tickets who do not attend matches. See J.T. Siegfried, C.E. Hinshaw, *The Effect of Lifting Television Blackouts on Professional Football No-Shows*, in *J. of Ec. and Bus.*, vol. 32, n. 1, 1979, 1-13; A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, in *Man. and Dec. Ec.*, vol. 15, Sep/Oct, 1994, 489-495; and W.P. Putsis, S.K. Sen, *Should NFL blackouts be banned?*, in *Appl. Ec.*, vol. 32, n. 12, 2000, 1495-1507, articles.

variables.

Finally, there are studies that use only cross-sectional data referenced to the same season. The type of the data, based on matches or season average, determines the explanatory factors that can be specified and they will be shown subsequently.

Different ticket sales policies make some studies focus their attention, especially due to data availability, on attendance by paying, on attendance by season-ticket holders or on both together. The distinction between standing spectators and seated spectators,[21] between club members and the public,[22] between local spectators and away spectators[23] or between spectators by sex[24] or by age[25] is not regularly possible because such disaggregated data are not often available to build an analysis of demand up to this level of detail.

Table 1 shows the most important empirical studies with explicit mention of what definition of attendance has been used, as well as the object sport of study and the type of data used.[26] These studies have primarily been made in Anglo-Saxon countries, and they are presented in chronological order.

[21] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accommodation in the English Football League*, in *Appl. Ec.*, vol. 24, October, 1992, 1155-1163.

[22] R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, in *Appl. Ec.*, vol. 28, February, 1996, 139-155.

[23] J.W. Hunt, K.A. Lewis, *Dominance, Recontracting, and the Reserve Clause: Major League Baseball*, in *Am. Ec. Rev.*, vol. 66, n. 5, 1976, 936-943.

[24] See R.D. Fort, *Sports Economics*, New Jersey Prentice Hall, 2003. Fort explains this in chapter two devoted to demand and sports revenue, (2nd edition in 2006).

[25] J.A. Cairns, *Evaluating Changes in League Structure: The Reorganization of the Scottish Football League*, in *Appl. Ec.*, vol. 19, n. 2, 1987, 259-275.

[26] In Table 1 are included only the authors that use price as explanatory variable. A more comprehensive table is available at www.rdes.it/RDES_2_09_Villar_Guerrero_table1.pdf

TABLE 1 - ATTENDANCE ON SPORTS (EMPIRICAL PAPERS)

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Demmert (1973)	Baseball **USA**	Seasons (1951-1969). Team.	a) Seasonal home attendance. b) Seasonal home attendance per capita.	OLS	Weighted average price.	a) $\beta > 0$ b) $\eta = -0.93$	Effective buying income per household.	a) $\gamma > 0$ b) $\gamma > 0$
Noll (1974), *Government and the Sport Business*	a) Baseball b) Basketball c) National Football League (NFL) d) Ice Hockey **USA**	a) Seasons (1970 and 1971). b) Seasons (1969/70 and 1970/71). c) Seasons (1968) and (1970). d) Season (1972/73). Team.	Season attendance (baseball, football). Game attendance (basketball and ice hockey).	OLS	a, b, c) Weighted average price x population. d) Not included.	a) $\beta < 0$ b) $\beta < 0$ c) Not included (1968) c) $\beta < 0$ (1970)	a, b, c) Per capita income x population. d) Not included.	a) $\gamma < 0$ b) $\gamma > 0$ c) $\gamma < 0$ (1968) c) $\gamma < 0$ (1970)
Hunt, Lewis (1976), *American Economic Review*	Baseball **USA**	Seasons (1969-1973). Team.	Home attendance. Away attendance.	GLS	Average ticket price (POP).	No results.	Per capita income (POP).	No results.
Gärtner, Pommerehne (1978), *Jahrbuch fur Sozial Wissenschaft*	Football **West Germany**	Seasons (1969-1975). 1 team. Match.	Attendance.	OLS	Average ticket price.	$\beta < 0$	Per capita income of the city.	$\gamma > 0$
Siegfried, Eisenberg (1980), *Atlantic Economic Journal*	Baseball (Minor League) **USA and Canada**	Seasons (1973-1977). Team.	Attendance (log).	OLS	Average ticket price.	$\eta = -0.25$	Per capita income.	$\eta_y = 0.40$
Bird (1982), *Applied Economics*	Football **England**	Seasons (1948/49-1979/80). Season	a) Total attendance in the season (log). b) Division attendance.	1) NLS 2) CORC 3) OLS	Minimum admission price + consumer expenditure on transport.	a1) $\eta = -0.24$ a2) $\eta = -0.22$ b) $\eta < 0$	Total consumer expenditure.	a1) $\eta_y = -0.68$ a2) $\eta_y = -0.62$ c2) $\eta_y = -0.49$ (Div. 1) c3) $-0.96 > \eta_y > -1.15$ (Div. 2, 3 & 4)
Schofield (1983), *Applied Economics*	Cricket **England**	Seasons (1976-1977). Match.	a) Attendance. b) Attendance (log).	OLS	Adult entrance charges. Membership fees.	No results.	Average gross weekly earnings by county.	No results.
Jennett (1984), *Scottish Journal of Political Economy*	Football **Scotland**	Seasons (1975-1981). Match.	Attendance.	OLS	Real minimum adult admission price.	$\beta > 0$	Unemployment Rate (UR).	Home team UR $\gamma < 0$ Away team UR $\gamma < 0$
Wainwright, Pearson (1984)	Football **England**	Seasons (1976-1981). Match.	Attendance.	OLS	Real average price of admission.	$\beta < 0$	Real personal disposable income.	$\gamma < 0$
Geddert, Semple (1985), *Regional Sciences Perspectives*	Ice Hockey **USA and Canada**	Seasons (1981-1983). Team.	Average attendance	OLS	Weighted mean ticket prices for each franchise.	No results.	Not included.	

Author(s)	Sports Country	Data	Dependent Variable	Estimation Methods	Price	Coefficient(β) Elasticity(η) (Not significant in italics)	Income	Coefficient(γ) Elasticity(η_y) (Not significant in italics)
Kaempfer, Pacey (1986), *Social Science Quarterly*	College football (Minor Div. I-A) **USA**	Seasons (1975-1981). Team.	Attendance / season capacity.	OLS	a) Real price of a reserved ticket. b) Price × attendance rate.	a) $\beta > 0$ b) $\beta < 0$	Not included	
Medoff (1986), *Journal of Behavioural Economics*	Baseball **USA**	Season (1980). Team.	Attendance.	OLS	Average ticket price per seat.	*$\beta > 0$*	Per capita income.	$\gamma < 0$
Borland (1987), *Economic Record*	AFL **Australia**	Seasons (1950-1986). Season.	Annual average attendance / population (log).	WLS (H) Panel data with presence of a lagged dependent variable	a) Real minimum price. b) Real average price.	a) η = - 0.14 (short run). η = - 0.58 (long run). b) η = - 0.24 (short run). η = - 0.57 (long run).	Real average weekly earnings in Victoria.	a) η_y = 0.37 (short run). η_y = 1.46 (long run). b) η_y = 0.31 (short run) η_y = 0.74 (long run).
Schollaert, Smith (1987), *Sociological Quarterly*	Basketball **USA**	Seasons (1969-1982). Team.	a) Total attendance. b) Percentage of seats sold. c) Number of unsold seats. d) Per capita attendance.	GLS (C)	1) High ticket price. 2) Moderate ticket price.	1) *$\beta < 0$* *$\beta > 0$* 2) *$\beta < 0$* *$\beta > 0$*	Median household income.	$\gamma > 0$
Cairns (1987), *Applied Economics*	Football **Scotland**	Seasons (1971-1980). 3 teams. Match.	a) Adult attendance. b) Juvenile attendance.	OLS	a) Adult minimum admission price. b) Juvenile minimum admission price.	No results.	Monthly unemployment rate.	No results.
Kahn, Sherer (1988), *Journal of Labour Economics*	Basketball **USA**	Seasons (1980-1986). Team.	a) Attendance. b) Attendance (log).	1) OLS 2) GLS (C)	Minimum price.	a1) *$\beta > 0$* a2) *$\beta < 0$* b1) *$\beta > 0$* b2) *$\beta < 0$*	Real per capita income in the team's SMSA.	a1) $\gamma > 0$ a2) $\gamma > 0$ b1) η_y = 0.31 b2) η_y = 0.33
Whitney (1988), *Economic Inquiry*	Baseball **USA**	Seasons (1970-1984 excluding year 1981). Team.	a) Team home attendance over a full season. b) Team home attendance over a full season (log).	SULS	Weighted average price of 15.000 most expensive seats x population.	a) $\beta < 0$ (National League and American League) b) η = – 0.18 (NL) η = – 0.55 (AL)	Real per capita income in the team's SMSA.	a) $\gamma < 0$ (NL) *$\gamma > 0$* (AL) b) η_y = – 0.21 (NL) η_y = + 0.24 (AL)
Hansen, Gauthier (1989), *Journal of Sport Management*	Several sports **USA and Canada**	Questionnaires sent to the staff of 7 leagues.	Attendance per game. Attendance per season.	Factor analysis ANOVA	a) Price of ticket. b) Price of season ticket.		Average income of population.	
Fizel, Bennett (1989), *Social Science Quarterly*	College football (Minor Div. I) **USA**	Seasons (1980-86). Team.	Annual attendance/stadium capacity x nº home games (AR).	OLS	a) Real average reserved ticket price per game. b) Price x dummy when AR is less than 85%.	a) 0.06 < η < 0.56 b) -0.22 < η < - 0.04	Not included.	

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Scully (1989)	Baseball **USA**	Season (1984). Team.	Season attendance (log).	OLS	a) Total ticket receipt/total paid attendance. b) Price/1984 win percentage.	a) η = - 0.61 b) η = - 0.87	Per capita income.	No results.
Domazlicky, Kerr (1990), *The American Economist*	Baseball **USA**	Seasons (1969-1980). Team.	Attendance per opening (log).	OLS	Weighted average ticket price.	η = - 0.22	Per capita income.	η_y = 1.31
Burdekin, Idson (1991), *Journal of Sports Economics*	Basketball **USA**	Seasons (1980-1986). Team.	Average annual attendance (log).	TOBIT	Median ticket price x 10.	*η = + 0.07*	a) White family annual income. b) Black family annual income.	a) *η_y = 0.05* b) *η_y = - 0.06*
Brown, Spiro, Keenan (1991), *American Journal of Economics and Sociology*	Basketball **USA**	Season (1983/84). Team.	Total attendance.	OLS	Average ticket price.	*β < 0*	Per capita personal income.	*$\gamma > 0$*
Stewart, Ferguson, Jones (1992), *American Economic Journal*	Ice Hockey **USA and Canada**	Seasons (1981-1983). Team.	Average attendance at home games.	Maximum likelihood	Average ticket price.	η = - 0.99	Per capita income of city.	η_y = 0.88
Borland, Lye (1992), *Applied Economics*	AFL **Australia**	Seasons (1981-1986). Match.	Attendance at individual match (log).	Instrumental variables (IV).	a) Real minimum adult price. b) Real average price	a) η = - 0.50 (short run). η = - 0.58 (long run). b) No results.	Real average per capita weekly earnings in Victoria.	a) η_y = - 2.89 (short run). η_y = - 3.39 (long run).
Dobson, Goddard (1992), *Applied Economics*	Football **England**	2 Seasons (1989-1991). Match.	Standing and seated attendance.	GLS (H)	Minimum admission price.	No results.	Not included.	
Branvold, Bowers (1992), *Sport Marketing Quarterly*	Baseball (College) **USA**	1 Season (1989). Match.	Average per game attendace.	Correlation	Average ticket price.	No results.	Not included.	
Whitney (1993), *Economic Inquiry*	Baseball **USA**	Years (1982-1989). Team.	Team home attendance (log).	OLS	Ticket price.	η = - 0.56	Per capita income.	η_y = - 0.93
Bertonazzi, Maloney, McCormick (1993), *Economic Inquiry*	College football (1 university) **USA**	Seasons (1986-1987). Purchaser.	Number of tickets purchased.	OLS	Full unit-price (face value + value of travel+…).	*η = - 0.01*	Per capita income.	*η_y = - 0.04*

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Hynds, Smith (1994), *Applied Economics Letters*	Cricket **Great Britain**	Seasons (1984-1992). Match.	Daily attendance.	OLS	Real price.	η = - 0.38	Real regional income.	$\gamma < 0$
Welki, Zlatoper (1994), *Atlantic Economic Journal*	NFL **USA**	Season (1991). Match.	Game attendance.	TOBIT	Average ticket price.	η = - 0.27	Real per capita income of SMSA	η_y = - 0.35
Wilson, Sim (1995), *Applied Economics*	Football (Semi Pro League) **Malaysia**	Seasons (1989-1991). 2 divisions. Match.	Tickets sold at a home game.	OLS WLS (H), Random effects with panel data	a) Real average price weighted. b) Minimum adult price.	a) $\beta < 0$ *$\beta > 0$* *$\beta < 0$* b) No results.	Not included.	
Dobson, Goddard (1995), *The Statistician*	Football **England and Wales**	Period (1925-1992). 4 divisions. Team.	Average attendance at matches for each season by division.	2SLS (H, C)	Average real divisional admission prices.	η = - 0.07	Not included.	
Alchin, Tranby (1995)	Rugby **Australia**	Seasons (1960-1994). Season.	Average adult attendance (log).	OLS	Real adult admission price.	η = - 0.23	Real disposable income.	η_y = 0.47
Baimbridge, Cameron, Dawson (1995), *Applied Economics Letters*	Rugby **England**	Season (1993/94). Match.	Attendance (log).	OLS	Average price.	η = + 0.09	Unemployment rate.	$\gamma < 0$
Simmons (1996), *Applied Economics*	Football **England**	30 Seasons (1962-1992). Team.	a) Season attendance net of season tickets (log). b) Season attendance including season tickets (log).	OLS	a) Real price inclusive season ticket revenue. b) Real price net season ticket admissions.	$\eta < 0$ for all teams.	Regional real earnings.	$\eta_y > 0$
Fuller, Stewart (1996), *Economic Papers*	AFL **Australia**	Seasons (VFL / AFL 1948-1994. SANFL 1948-1993). Match.	Attendance per game per million people.	WLS	Real minimum price of adult admission.	a) VFL/AFL η = - 0.11 (short run) η = -0.62 (long run) b) SANFL η = -0.23 (short run) η = -0.40 (long run)	Average weekly earnings.	a) No results. b) Not significance.
Baimbridge, Cameron, Dawson (1996), *Scottish Journal of Political Economy*	Football **England**	Season (1993/94). Match.	Attendance (log).	OLS	Weighted average (single and season) prices.	Quadratic function η= -0.38 + 0.05 × log (price) = - 0.27	Average male weekly earnings.	Quadratic function η_y = - 0.06 + 12.6 × 10^{-5} × log (income)

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Dobson, Goddard (1996), *Regional Studies*	Football **England and Wales**	37 Seasons (1955-1992). 4 divisions. Team.	Average home attendance (log).	OLS	Real average admission prices.	- 0.134 > η > – 0.542	Unemployment rates.	Significant in the error correction component but no significant in short run.
Bruggink, Eaton (1996)	Baseball **USA**	Season (1993). Match.	Number of tickets sold (AL), gate attendance (NL) (log).	OLS	a) Average ticket price. b) Adjusted Fan Cost Index.	a) +1.13 > η > + 0.89 (AL) - 1.87 > η > – 2.51 (NL) b) +0.94 > η > *0.22* (AL) *- 0.075* > η > – 1.29 (NL)	Per capita income of MSA.	-0.38 > η_y > - 2.65 (AL) -1.67 > η_y > -2.25 (NL)
Coffin (1996)	Baseball **USA**	Period (1962-1992). Team.	Team annual attendance.	OLS	Average ticket price.	*η = - 0.10* (period 62-75) η = -0.67 (76-92)	Median family income of MSA.	γ > 0 (62-75) *γ < 0* (76-92)
Fort, Quirk (1996)	Baseball **USA**	Period (1976-1988). Team.	Annual attendance.	OLS	Weighted average ticket price.	η = - 0.43 (AL) η = - 0.50 (NL)	Per capita income of MSA.	γ > 0 (AL) γ > 0 (NL)
Szymansky, Smith (1997), *International Review of Applied Economics*	Football **England**	16 seasons (1974-1989). Team.	Average annual gate attendance (log).	RCM	Real gate revenue per person.	- 0.34 > η > - 0.76.	Not included.	
Kahane, Shmanske (1997), *Applied Economics*	Baseball **USA**	3 seasons (1990-1993). Team.	Yearly attendance.	OLS	Average real price.	- 0.82 > η > - 0.85.	Per capita income of MSA.	0.52 > η_y > 0.49
Marburger (1997), *Managerial and Decision Economics*	Baseball **USA**	Seasons (20). Team.	Team attendance (log).	GLS (H)	a) Real average weighted ticket price. b) Price of box seats relative to reserve seats. c) Price of reserve seats relative to general admission seats.	a) η = - 0.56 b) η = - 0.20 c) *η* = + 0.05	Not included.	
Pan, Gabert, McGaugh, Branvold (1997), *Journal of Sport Behaviour*	Basketball (college) **USA**	Questionnaires.	Motives of purchasing a season ticket.	Factor Analysis ANOVA	a) Season ticket prices. b) Ancillary prices.		Household income.	
Boyd, Boyd (1998), *Journal of Economics and Finance*	Baseball **USA**	Season (1984). Team.	Season attendance.	a) OLS b) 2SLS	Average ticket price.	a) η = - 1.04 b) η = - 1.20	Per capita income.	a) *γ < 0* b) *γ < 0*

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Carmichael, Millington, Simmons (1999), *Applied Economics Letters*	Rugby **England**	Season (1994/95). Match.	Attendance (log).	OLS	Minimum adult admission price.	η = - 0.57	Not included.	
Rascher (1999)	Baseball **USA**	Season (1996). Match.	Attendance.	TOBIT	Fan Cost Index.	Not significant	Median income.	Not reported.
Pan, Zhu, Gabert, Brown (1999), *Mid-Atlantic Journal of Business*	Baseball **USA**	Seasons (5). Match.	Average attendance ratio per game.	2SLS	a) Average ticket price. b) Fan Cost Index – Prices.	a) $\beta > 0$ b) $\beta < 0$	Income mean household.	$\gamma < 0$
Welki, Zlatoper (1999), *Atlantic Economic Journal*	NFL **USA**	2 seasons (1996-1997). Match.	Proportion of tickets sold.	a) TOBIT b) OLS	Real average ticket price.	a) η = - 0.17 b) η = - 0.12	Real per capita income of MSA.	a) η_y = 0.53 b) η_y = 0.53
Gustafson, Hadley, Ruggiero (1999)	Baseball **USA**	3 seasons (1990-1992). Team.	Annual attendance.	OLS Canonical regression 3SLS	Average ticket price.	- 0.06 > η > - 0.33	Not included.	
Fort, Rosenman (1999)	Baseball **USA**	2 seasons (1989-1990). Match.	Attendance/ Stadium capacity (log).	GLS (H)	Lowest non-specialty price. a)American League. b)National League.	a) - 1.87 > η > - 2.99 (AL). b) - 0.39 > η > - 1.30 (NL).	Mean per capita income SMSA.	a) -1.38-4 > η_y > *-1.91-4* (AL) b)) 9.66-5 > η_y > *-1.72-5* (NL)
McDonald, Rascher (2000), *Journal of Sport Management*	Baseball **USA**	Season (1996). Game.	Attendance.	TOBIT	Fan Cost Index.	η= - 0.45	Not included	
Depken II (2000), *Journal of Sports Economics*	Baseball **USA**	7 seasons (1990-1996). Team.	Annual attendance for team (log).	OLS MLE	Average price	η = - 0.45	State mediam income.	$\eta_y > 0.95$
Putsis, Sen (2000), *Applied Economics*	NFL **USA**	Season (1996/97). Match.	a) Season ticket sales. b) Individual game ticket sales. c) Number of no-shows.	TOBIT PROBIT (IV) OLS	a) Mean season ticket price. b) Mean individual game ticket price. d) Fan Cost Index.	a) η = - 0.31 b) η = - 0.28 c) No significant. d) $\beta > 0$ (Season and game)	Median income in local market.	a) $\eta_y > 0$ b) $\eta_y < 0$ c) Not significant.
Ferguson, Jones, Stewart (2000), *The Review of Economics and Statistics*	Baseball **USA**	6 seasons (1986-1991). Team.	Attendance (log).	SULS	Average ticket price.	η = - 0.96	Per capita income of the home city.	η_y = 0.55

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Falter, Pérignon (2000), *Applied Economics*	Football **France**	Season (1997/98). Match.	Attendance (log).	OLS	a) Average ticket price. b) Cheapest ticket.	Not introduced.	a) Local wage average. b) Away wage average.	a) $\eta_y < 0$ *b) $\eta_y > 0$*
Wells, Southall, Peng (2000), *Sport Marketing Quarterly*	College football (NCAA II) **USA**	Season (1998). Match.	Attendance	OLS	a) Student ticket price. b) General admission price.	a) $\beta < 0$ b) $\beta > 0$	Not included.	
Schmidt, Berri (2001), *Journal of Sports Economics*	Baseball **USA**	Period (1901-1999). 8 seasons (1991-1998). Team.	Average attendance.	ARIMA SUR	Real weighted average ticket prices.	η = - 0.94 (SUR)	Per capita income.	η_y = 0.40
Depken II (2001), *Journal of Sports Economics*	NFL **USA**	9 seasons (1990-1998). Team.	Home game attendance (log).	a) OLS b) MLE	Average ticket price.	a) η = - 0.61 b) η = - 0.58	City income.	a) η_y = 0.24 b) η_y = 0.23
Alexander (2001), *Journal of Sports Economics*	Baseball **USA**	7 seasons (1991-1997). Team.	Total attendance per year normalized by the population.	2SLS	Real average ticket price.	η = - 5.19	Real per capita income.	Not significant.
Garcia, Rodriguez (2002), *Journal of Sports Economics*	Football **Spain**	4 seasons (1992-1996). Match.	Attendance (log).	a) OLS, panel FE b) 2SLS, panel FE	Minimum adult price.	a) η = - 0.29 b) η = - 0.97	Per capita income.	$\eta_y > 0$
Forrest, Simmons, Feehan (2002), *Scottish Journal of Political Economy*	Football **England**	Season (1995-1996). Team.	Number of tickets sold per unit of population.	OLS	Ticket price + direct cost of travel + time cost of travel.	- 0.28 > η > - 3.67	Not included.	
Poitras, Hadley (2002)	Baseball **USA**	13 seasons (1989-2001). Team.	a) Attendance per game (log).	a) 2SLS b) OLS	Ticket price.	a) η = - 0.21 b) η = - 0.09	Not included.	
Rivers, DeSchriver (2002), *Sport Marketing Quarterly*	Baseball **USA**	4 seasons (1997-2000). Team.	Average game attendance for a single year.	OLS	Average price ticket for a game.	*$\beta > 0$*	Median household income.	$\gamma < 0$
Price, Sen (2003), *Managerial and Decision Economics*	College football (Div 1-A) USA	Season (1997). Match.	Attendance.	TOBIT	% of the area per capita income.	η = - 0.11	Not included.	

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Bhattacharya, Smyth (2003), *Australian Economic Papers*	Cricket **Australia**	Period (1911/12-1983-84). Test Matches.	Average daily attendance at the match.	a) OLS b) GLS	Real adult admission price.	a) $\beta > 0$ (linear) Not significant (log and log-log). b) Not significant.	Real male average weekly earning in the state.	a) Not significant. b) Not significant.
Narayan, Smyth (2003), *Applied Economics*	Horseracing **Australia**	12-year period	Attendance to Melbourne Cup	VECM	Real minimum admission price.		Real male average weekly earnings.	
Depken, Grant (2004)	Baseball **USA**	Period (1991-2001). Match.	a) Real average per-game season ticket price. b) Price of parking. c) Price of beer.	WLS-RE panel.	Real total season attendance.		Real per capita income.	
Schmidt, Berri (2004), *American Economic Review*	Baseball **USA**	14 seasons (1975-1988). Team.	Average attendance.	MCG-FE panel	Real weighted average ticket prices.	$\beta < 0$	Real per capita income.	*$\gamma > 0$*
Winfree, McCluskey, Mittelhammer, Fort (2004), *Applied Economics*	Baseball **USA**	Seasons (1963-1998). Team.	Annual attendance.	NLGLS	Real average ticket prices.	*η = -0,05*	Real per capita personal income at state level.	$\eta_y = 0.17$
Clapp, Hakes (2005), *Journal of Sports Economics*	Basketball **USA**	Period (1950-2002). Team.	Average attendance per game (log).	GLS	Real cost of a ticket.	$\eta = 0.11$	Not included.	
Coates, Harrison (2005), *Journal of Sports Economics*	Baseball **USA**	Period (1969-1996). Team.	Average attendance per game (log).	IV	Real average ticket prices (several measures).	$\eta = -0.23$	Real per capita personal income.	Not significant.
Brook (2006), *International Journal of Sport Finance*	NFL **USA**	Seasons (1995-1999). Team.	Total regular season attendance.	2SLS	Real average ticket prices.	$\eta = -0.5$	Real per capita personal income MSA.	$\eta_y = 0,36$
Lee (2006), *Journal of Sports Economics*	Baseball **Korea**	Period (1982-2003). Match.	Total league annual attendance (log).	a) OLS b) FGLS (C)	Average real ticket prices.	a) *η = -0.06* b) *η = -0.47*	Real per capita GDP.	a) $\eta_y = 0.43$ b) $\eta_y = 0.55$
Krautman, Hadley (2006)	Baseball **USA**	6 season (1991-1996). Team.	a) Regular season attendance. b) Regular season attendance. (log).	OLS	1) Weighted average price. 2) Average-revenue price. 3) Common-seat price	a1) $\beta > 0$ a3) $-0.24 > \eta > -0.27$. b1) $\eta = 0.34$ b3) $\eta = -0.14$	Real metropo-litan income per household.	Not significant.

Author(s)	**Sports Country**	**Data**	**Dependent Variable**	**Estimation Methods**	**Price**	**Coefficient(β) Elasticity(η)** (Not significant in italics)	**Income**	**Coefficient(γ) Elasticity(η_y)** (Not significant in italics)
Donihue, Findlay, Newberry (2007), *Journal of Sports Economics*	Baseball **USA**	Season (2002) Match.	Game attendance (log)	TOBIT	Average real ticket prices.	η = - 1.25	Per capita income home city.	Not significant.
Ahn, Lee (2007), *International Journal of Sport Finance*	Baseball **USA**	Period (1969-2000).	Attendance growth rate (log).	OLS FE Panel Two step - GMM (IV)	Real ticket prices.	Not significant.	Real per capita personal income MSA.	Not significant.
Coates, Humphreys (2007), *International Journal of Sport Finance*	Baseball, Basketball, NFL **USA**	Period (1991-2001). Team.	Average annual attendance (log).	GMM (IV)	a) Ticket price variable. b) Fan Cost Index.	a) η = - 0.26 (MLB) η = - 0.119 (NBA) b) η = - 0.160 (NBA)	Income per capita.	a) η_y = 0.153 (NBA)
Meehan, Nelson, Richardson (2007), *Journal of Sports Economics*	Baseball **USA**	Seasons (2000-2002). Match.	Total number of tickets sold.	TOBIT MLE	Fan Cost Index.	η = 0.594	Per capita income estimated.	a) η_y = 0.369

A detailed analysis of these papers makes it possible to highlight some common patterns regarding the main features of these demand studies. First of all, the normal practice has been to specify a one-equation model of demand using attendance as the dependent variable. However, some studies propose modelling an equation system, either as a simultaneous equation system to take into account the potential endogeneity of some of the explanatory variables such as price (Jones and Ferguson;[27] Cocco and Jones;[28] Paul;[29] Leadley and Zygmont[30]) or the winning percentage,[31] or as a system where the equations are not apparently related to

[27] J.C. JONES, D.G. FERGUSON, *Locational and Survival in the National Hockey League*, in *The J. of Ind. Ec.*, vol. 36, n. 4, 1988, 443-457.

[28] A. COCCO, J.C. JONES, *On Going South: The Economics of Survival and Relocation of Small Market NHL Franchises in Canada*, in *Appl. Ec.*, vol. 29, November, 1997, 1537-1552.

[29] J.R. PAUL, *Variations in NHL Attendance: The Impact of Violence, Scoring and Regional Rivalries*, in *Am. J. of Ec.and Soc.*, vol. 62, n. 2, 2003, 345-364.

[30] J.C. LEADLEY, Z.X. ZYGMONT, *When Is the Honeymoon Over? National Basketball Association Attendance 1971-2000*, in *J. of Sp. Ec.*, vol. 6, n. 2, 2005, 203-221.

[31] E. GUSTAFSON, L. HADLEY, J. RUGGIERO, *Alternative Econometric Models of Production in Major League Baseball*, in J. Fizel, E. Gustafson, L. Hadley (eds.), *Sports Economics. Current Research*, 1999, 95-107.

analyse different types of attendance (Demmert[32]).

The functional form usually used is logarithmic; however, semi-logarithmic or linear specifications are also frequent because the researchers have not paid much attention to the suitableness of the functional form. One exception to this practice is the study of Jones et al.[33] The most typical estimation method used in both cross-sectional studies and time series is Ordinary Least Squares (OLS), with few studies focusing on the problematic question of which is the best estimation method to use given the features of the specified model or the data used. In general, there has been little concern about the econometric aspects linked to these models. Now, these aspects are being taken into account more frequently for the majority of authors that use Generalised Least Squares or other appropriate econometric models.[34]

One important issue is the potentially limited character of the dependent variable, given the capacity restriction. This possibility drives the use of econometric models different from the OLS regression model to correct that problem, the Tobit[35] model.[36] Other authors are worried about the features of the series used and the co-integration relationships between them (Simmons[37]). Garcia and Rodriguez[38] exploit the panel information to control unobservable effects associated with the teams that participate in the game (observation). Ahn and Lee[39] set out a multiple time-period model based on rational expectations and lifecycle consumption. They use panel data and appropriate methods to estimate dynamic models with endogenous variables. They also control for team effects and temporal effects. Another interesting point is the theoretical scenario that joins habit and loyalty.

In column 5 of Table 1, special attention is given to the econometric techniques used in the studies analysed in this review. As was mentioned previously concerning the specification of these demand equations (attendance), the typical scenario is a standard demand function where economic variables (price and income) and specific variables of each observation (game and/or team and/or season) appear as

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[32] H.G. Demmert, *The Economics of Professional Team Sports*, Lexington, Massachussets, Lexington Books, 1973.

[33] J.C. Jones, J.A. Schofield, D.E. Giles, *Our Fans in the North: The Demand for British Rugby League*, in *Appl. Ec.*, vol. 32, November, 2000, 1877-1887.

[34] Worries regarding information quality and suitable methods of estimation are increasingly frequent. For example, see R.D. Fort, Y.H. Lee, *Stationarity and Major League Baseball Attendance Analysis*, in *J. of Sp. Ec.*, vol. 7, n. 4, 2006, 408-415, for time series data.

[35] Probably due to the characteristics of the problem to analyze, no paper has used the model of sample selection proposed by Heckman (1976 and 1979) which, unlike the Tobit model, permits that the factors which explain the fact of full capacity can be different, or having different effects, from the factors that explain the registered attendance.

[36] See among others D.G. Ferguson, K.G. Stewart, J.C.H. Jones, A. Le Dressay, *The Pricing of Sports Events: Do Teams Maximize Profit*?, cit., 8.

[37] R.Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22.

[38] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League*, in *J. of Sp. Ec.*, vol. 3, n. 1, 2002, 18-38.

[39] S.C. Ahn, Y.H. Lee, *Life-cycle Demand for Major League Baseball*, cit., 17.

explanatory factors. The explanatory variables used in the different studies can be classified as follows, depending on whether they approach or represent: economical aspects, expected quality, uncertainty of outcome, opportunity cost and other factors linked to the features of the product.[40]

3. Determinants of attendance (I): Economical aspects

The economic aspects we need to take into account as determinants of attendance are related to factors usually included in every model of demand (ticket price, prices of substitutive and complementary goods, and income), as well as variables referenced to the potential market size, like the population of the geographic area, the stadium capacity or the presence of strikes.

A great diversity of results regarding the effect of ticket price on attendance exists. It is expected that if there were an increase in ticket price, a smaller number of spectators would go to the stadium, so elasticity must have a negative sign and be significant. Nevertheless, although the price coefficient is negative in almost all the studies, it is also not significant in many cases, to the extent that most authors

[40] A list of factors that contribute the attendance at stadiums or arenas, based or not on the answers of the attendants completing a survey, can be observed in J.M. Schwartz, *Causes and Effects of Spectators Sports*, in *Int. Rev. for the Soc. of Sp.*, vol. 8, n. 3, 1973, 25-45; S.M. Thomas, M.A. Jolson, *Components of Demand for Major League Baseball*, in *Un. of Michigan Bus. Rev.*, vol. 31, May, 1979, 1-6; H. Hansen, R. Gauthier, *Spectators' Views of LPGA Golf Events*, in *Sp. Mar. Qu.*, vol. 2, n. 1, 1993, 17-25; H. Hansen, R. Gauthier, *The Professional Golf Product: Spectators' Views*, in *Sp. Mar. Qu.*, vol. 3, n. 5, 1994, 9-16; R. Gauthier, H. Hansen, *Female Spectators: Marketing Implications for Professional Golf Events*, in *Sp. Mar. Qu.*, vol. 2, n. 4, 1993, 21-28**;** S. Hofacre, *The Women's Audience in Professional Indoor Soccer*, in *Sp. Mar. Qu.*, vol. 3, n. 2, 1994, 25-27; P.J. Graham, *Characteristics of Spectators Attending Professional Tennis Tournaments in Two Regions of the U.S*, in *Sp. Mar. Qu.*, vol. 3, n. 3, 1994, 38-44; J.J. Zhang, D.G. Pease, S.C. Hui, T.J. Michaud, *Variables Affecting the Spectators Decision to Attend NBA Games*, in *Sp. Mar. Qu.*, vol. 4, n. 4, 1995, 29-39; R. Madrigal, *Cognitive and Affective Determinants of Fan Satisfaction with Sporting Event Attendance*, in *J. of Leis. Res.*, vol. 27, n. 3, 1995, 205-227; L.R. Kahle, K.M. Kambara, G.M. Rose, *A Functional Model of Fan Attendance Motivations for College Football*, in *Sp. Mark. Rev.*, vol. 5, n. 4, 1996, 51-60; F.B. Krohn, M. Clarke, E. Preston, M. McDonald, B. Preston, *Psychological and Sociological Influences on Attendance at Small College Sporting Events*, in *Col. St. J.*, vol. 32, n. 2, 1998, 277-288; and D. Mahoney, M. Nakazawa, D. Funk, J. James, J. Gladden, *Motivational Factors Influencing the Behaviour of J. League Spectators*, *Sp. Man. Rev.*, vol. 5, n. 1, 2002, 1-24. Differential demographic effects on the purchase of season tickets are controlled for by W.D. Pan, T.E. Gabert, E. McGaugh, S.E. Branvold, *Factors and differential Demographic Effects on Purchases of Season Tickets for Intercollegiate Basketball Games*, in *J. of Sp. Beh.*, vol. 20, n. 4, 1997, 447-463. Predictions of future sports attendance can be seen in K.L. Wakefield, *The Pervasive Effects of Social Influence on Sporting Event Attendance,* in *J. of Sp. and Soc. Is.*, vol. 19, n. 4, 1995, 335-351. The effects of team loyalty and selected stadium factors are controlled for by K.L. Wakefield, H.J. Sloan, *The Effects of Team Loyalty and Selected Stadium Factors on Spectator Attendance*, in *J. of Sp. Man.*, vol. 9, n. 2, 1995, 153-172. M. Bernthal and P. Graham control the influence of sport setting on attendance: M. Bernthal and P. Graham, *The effect of Sport Setting on Fan Attendance Motivation: The Case of Minor League vs. Collegiate Baseball*, in *J. of Sp. Beh.*, vol. 26, n. 3, 2003, 223-239; Braunstein, Zhang, Trail and Gidson consider the

do not include it in their model. Cairns[41] notes several reasons this can happen: the models are not well specified and the true relationship has not been properly identified because the ticket price does not represent the true price of attending a game. It does not include, for example, the price of transportation or other costs associated with game attendance. To Cairns, the lack of or unsuitableness of the data are also problems that arise with the estimations in relation to this variable.

On the other hand, we need to emphasize the empirical difficulty of measuring the relevant price for the attendance equation properly, given the different seats with different prices for the same sporting event. Depending on the situation, the authors use: (i) the average price of the tickets for sale (with or without weighting, depending on the type of ticket for sale), (ii) the average price of the tickets sold, or (iii) the minimum price of all the tickets for sale. The best measure should be the weighted average price of the tickets for sale, since it would include all the information about the variability of prices for each game. It would also not include the implicit endogeneity in usual measures like average price of tickets sold. In this way, the usual lack of information necessary to calculate the weighted price drives the use of minimum price, since it is an option less subject to the endogeneity problems mentioned previously for other measures.[42] Column 6 of Table 1 summarises the variables proposed by different authors and column 7 shows values for the price elasticity of demand or of its coefficient value, depending on the specification.

The results presented in column 7 justify the theoretical concern introduced in the previous section about price elasticities which appear to be less than one in absolute value. If we take into account the corresponding confidence interval, we could consider estimations compatible with benefit-maximising behaviours in the traditional format, which is the case with the sports studied by Demmert,[43] Noll,[44]

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market demand associated with pre-season training: J.R. Braunstein, J.J. Zhang, G.T. Trail, H.J. Gidson, *Dimensions of Market Demand Associated with Pre-season Training: Development of a Scale for Major League Baseball Spring Training*, in *Sp. Man. Rev.*, vol. 8, n. 3, 2005, 271-296.

[41] J.A. Cairns, *The Demand for Professional Team Sports*, cit., 18.

[42] Forrest, Simmons and Feehan quantify the general cost of attending a match as: Ticket price + direct cost of travel + time cost of travel: D. Forrest, R. Simmons, P. Feehan, *A Spatial Cross-Sectional Analysis of Elasticity of Demand for Soccer*, in *Sc. J. of Pol. Ec.*, vol. 49, n. 3, 2002, 336-356. Price and Sen use a percentage of the area per capita income as ticket price: D.I. Price and K.C. Sen, *The Demand for Game Day Attendance in College Football: An Analysis of the 1997 Division 1-A Season*, in *Man. and Dec. Ec.*, vol. 24, n. 1, 2003, 35-46, A student price ticket is used by D.E. Wells, R.M. Southall, H.H. Peng, *An Analysis of Factors Related to Attendance at Division II Football Games*, in *Sp. Mar. Qu.*, vol. 9, n. 4, 2000, 203-210, and real total season attendance is used in C.A. Depken II, D.P. Grant, *The empirical analysis of multiproduct pricing using principal components: An application to major league baseball*, Working Paper n. 04-08, University of Texas-Arlington, Department of Economics, 2004.

[43] H.G. Demmert, *The Economics of Professional Team Sports*, cit., 32.

[44] R.G. Noll, *Attendance and Price Setting*, in R.G. Noll (eds.), *Government and the Sports Business*, 1974, 115-157.

Scully[45] depending on the interpretation of depending on the interpretation of Salant,[46] Stewart et al.,[47] Boyd and Boyd,[48] Ferguson et al.,[49] Schmidt and Berri[50] and García and Rodríguez,[51] among others. In most cases, the price elasticities are negative, in spite of the fact that their absolute values are less than one.[52]

An apparently atypical result is the one that appears to obtain positive price elasticities. Dobson and Goddard[53] note that this result could be sometimes due to the fact that price is just a variable that approaches the team success; the best clubs are in a good position to fix higher prices at the same time that they are able to attract new fans. This justification is indirectly showing evidence about the potential endogeneity of the price variable.

As noted above, one of the reasons mentioned by Cairns[54] when referring to problems concerning the price variable of the good, was that ticket price did not represent the true consumer cost, since the price of complementary goods was not included. In the case of sports, a group of complementary goods like parking, transport, consumption articles and drinks exists, which makes some authors point out that estimated price elasticities should be interpreted carefully, since its true value can be underestimated due to the missing costs of the complementary goods.

There are few authors who have used complementary[55] goods in their

[45] G.W. Scully, *The Business of Major League Baseball*, Chicago, University of Chicago Press, 1989.

[46] D.J. Salant, *Price Setting in Professional Team Sports*, in P.M. Sommers (ed.), *Diamonds are Forever. The Business of Baseball*, Washington. The Brookings Institution, 1992, 77-90.

[47] K.G. Stewart, D.G. Ferguson, J.C. Jones, *On Violence in Professional Team Sport as the Endogenous Result of Profit Maximization*, in *Am. Ec. J.*, vol. 20, n. 4, 1992, 55-64.

[48] D.W. Boyd, L.A. Boyd, *The Home Field Advantage: Implications for the Pricing of Tickets to Professional Team Sporting Events*, in *J. of Ec. and Fin.*, vol. 22, n. 2-3, 1998, 169-179.

[49] D.G. Ferguson, J.C. Jones, K.G. Stewart, *Competition within a Cartel League Conduct and Team Conduct in the Market for Baseball Players Services*, in *The Rev. of Econ. and Stat.*, vol. 82, August, 2000, 422-430.

[50] M.B. Schmidt, D.J. Berri, *Competitive Balance and Attendance. The Case of Major League Baseball*, in *J. of Sp. Ec.*, vol. 2, n. 2, 2001, 145-167.

[51] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League*, cit., 38.

[52] Elasticities higher than one in absolute value can be seen in Table 1. D.L. Alexander, *Major League Baseball: Monopoly Pricing and Maximizing Behavior*, in *J. of Sp. Ec.*, vol. 2, n. 4, 2001, 341-355, reported an unusual elasticity of -5.19, bearing in mind that he uses an inverse demand function.

[53] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, in *Appl. Ec.*, vol. 24, October, 1992, 1155-1163.

[54] J.A. Cairns, *The Demand for Professional Team Sports*, cit., 18.

[55] Gärntner and Pommerehne use the average price of the transport ticket in the city of Hamburg, but they do not include the results. See M. Gärntner, W.W. Pommerehne, *Der Fußballzuschauer-ein Homo Oeconomicus*, in *J. fur Soz. Wis.*, vol. 29, 1978, 188-107. Another point of view is the negative effect of the illegality of consuming alcohol while in attendance (A. Chupp, E. Stephenson, R. Taylor, *Stadium Alcohol Availability and Baseball Attendance. Evidence from a Natural Experiment*, in *Int. J. of Sp. Fin.*, vol. 2, n. 2, 2007, 36-44).

estimations. In the studies of Bird[56] and Bertonazzi et al.,[57] another price is summed up into the ticket price: in the case of Bird, the price of the transport to go to the stadium; in the case of Bertonazzi et al., the fee paid to give them the opportunity to purchase the tickets and then the price of the actual tickets if they decide to attend the match.[58] In relation to these goods, a separate approach to both variables appears more convenient. Some examples include Welki and Zlatoper[59] using the parking price as an explanatory variable, Falter and Perignon[60] with transport cost and Alchin and Tranby (1995)[61] with the program cost. Another approach is to calculate the cost of the complement goods for each fan like Bruggink and Eaton[62] do, or through the Fan Cost Index (FCI) like Rascher,[63] among others. The influence of substitute goods varies among countries and sports. There are sports where other leisure activities, like theatre or cinema, can influence attendance. The presence of other professional sports or other teams in the same sport in the same city can also have an influence. In these cases, the prices of those services should be included in the estimation to estimate the attendance correctly. Nevertheless, in most of the literature, the substitute goods are treated by dummy variables which approach their effect. For example, there are many studies that capture, with fictitious variables, the existence of professional teams of the same sport in the same city, or the teams from other professional leagues. In most cases, the coefficient is negative. Sometimes are statistically significant and other times are insignificant.

Unlike the price, with an impact on attendance that is expected to be negative, *a priori* expectations about the sign of the income variable coefficient are not possible. Some sporting events can be defined as normal goods and others as inferior goods. In the results of the empirical literature also reported on Table 1,[64]

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[56] P.J. Bird, *The Demand for League Football*, in *Appl. Ec.*, vol. 14, n. 6, 1982, 637-649.

[57] E.P. Bertonazzi, M.T. Maloney, R.E. McCormick, *Some Evidence on the Alchian and Allen Theorem: The Third Law of Demand?*, in *Ec. Inq.*, vol. 31, July, 1993, 383-393.

[58] Bertonazzi, Maloney and McCormick (1993, cit., 57) use the time cost of going to the stadium as an explanatory variable. This is similar to the part of the price represented by "time cost travel", as used by Forrest, Simmons and Feehan, (2002, cit., 42).

[59] A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, cit., 20.

[60] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports*, in *Appl. Ec.*, vol. 32, October, 2000, 1757-1765.

[61] T.M. Alchin**,** H.W. Tranby, *Does the Louis-Schmelling Paradox Exist in Rugby League Match Attendance in Australia?*, Working Paper n. 95-09, University of Western Sydney, Faculty of Commerce, 1995.

[62] T.H. Bruggink, J.W. Eaton, *Rebuilding Attendance in Major League Baseball: The Demand for Individual Games*, in J. Fizel, E. Gustafson, L. Hadley (eds.), *Baseball Economic. Current Research*, 9-31, 1996. Bruggink and Eaton calculate cross elasticities, and the values obtained are $\eta_{x,y}$= +0.94 for the American League and $\eta_{x,y}$= -1.29 for the National League. In both cases, the elasticities are significant.

[63] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, in J. Fizel, E. Gustafson, L. Hadley (eds.), *Sports Economics. Current Research*, 1999, 27-45.

[64] Column 8 of Table 1 summarises the variables proposed by different authors, and column 9

Noll[65] suggests that basketball in the USA is a normal good. Australian football shows contradictory results: to Borland,[66] it is a normal good, and yet in his study with Lye,[67] it is an inferior good. The same mixed results occur with baseball and European football. To Noll,[68] baseball is an inferior good, while to Kahane and Shmanske,[69] it has positive income elasticity. To Fort and Rosenman,[70] baseball is an inferior good in the American League (AL) but not in the National League (NL). To Coffin,[71] income had a positive effect on baseball attendance in the 1962-1975 period, and negative but not significant effect in the 1976-1992 period. To Lee,[72] baseball is a normal good in Japan, Korea and the USA. In European football, the coefficients obtained by Bird[73] and Falter and Perignon[74] are negative, while those obtained by Gärtner and Pommerehne[75] are positive. To Simmons,[76] football is a luxury good for Arsenal and Liverpool. To Feehan et al.,[77] attendance at live English football is a normal good. Ice hockey is an inferior good to Jones.[78] Putsis and Sen[79] found in the case of the NFL, the income augments the increase of the sale of tickets for the whole season but reduces tickets demand for individual matches. To Bertonazzi et al.[80] and Welki and Zlatoper,[81] the NFL is also an inferior good, as is cricket to Hynds and Smith[82] and rugby in England to Baimbridge et

shows the values of the elasticity of income or of their coefficient value.

[65] R.G. Noll, *Attendance and Price Setting*, cit., 44.

[66] J. Borland, *The Demand for Australian Rules Football*, in *Ec. Rec.*, vol. 63, September, 1987, 220-230.

[67] J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, in *Appl. Ec.*, vol. 24, September, 1992, 1053-1058.

[68] R.G. Noll, *Attendance and Price Setting*, cit., 44.

[69] L. Kahane, S. Shamamske, *Team Roster Turnover and Attendance in Major League Baseball*, in *Appl. Ec.*, vol. 29, April, 1997, 425-431.

[70] R.D. Fort, R. Rosenman, *Streak Management*, in J. Fizel, E. Gustafson, L. Hadley (eds.), *Sports Economics. Current Research*, 1999, 119-133.

[71] D.A. Coffin (1996), *If You Build It, Will They Come. Attendance and New Stadium Construction*, in J. Fizel, E. Gustafson, L. Hadley (eds.), *Baseball Economics. Current Research*, 1996, 33-46.

[72] Y.H. Lee, *Competitive Balance and Attendance in Japanese, Korean and US Professional Baseball Leagues*, in R. Fort, J. Fizel (eds.), *International Sports Economics Comparisons*, Westport, Connecticut, Praeger Publishers, 2004, 281-292.

[73] P.J. Bird, *The Demand for League Football*, cit., 56.

[74] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports*, cit., 60.

[75] M. Gärntner, W.W. Pommerehne, *Der Fußballzuschauer-ein Homo Oeconomicus*, cit., 55.

[76] R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22.

[77] P. Feehan, D. Forrest, R. Simmons, *Premier League Soccer: Normal or inferior good?*, in *Eur. Sp. Man. Qu.*, vol. 3, n. 1, 2003, 31-45.

[78] J.C. Jones, *Winners, Losers and Hosers: Demand and Survival in the National Hockey League*, in *Atl. Ec. J.*, vol. 12, September, 1984, 54-63.

[79] W.P. Putsis, S.K. Sen, *Should NFL blackouts be banned?*, cit., 20.

[80] E.P. Bertonazzi, M.T. Maloney, R.E. McCormick, *Some Evidence on the Alchian and Allen Theorem: The Third Law of Demand?*, cit., 57.

[81] A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, cit., 20.

[82] M. Hynds I. Smith, *The Demand for Test Match Cricket*, in *Appl. Ec. Let.*, vol. 1, July, 1994,

al.[83]

To Noll,[84] the effect of the income variable can reflect the existence of some differences between different cities on a per capita income basis, for example, the regional, educational, industrial structure and the age pyramid of population. Hence, the interpretation of the income variable coefficient is highly controversial, with estimates that differ substantially among the various studies.

The most typical way to evaluate the income variable has been through per capita income. Nevertheless, some studies use alternative approaches instead of income. Bird[85] uses real consumption spending, a variable which to Cairns[86] is not satisfying due to variations in the saving tendencies and the taxes over the years. Weekly earnings are used by Schofield[87] and weekly earnings only for men by Bhattacharya and Smyth.[88] Wainwright and Pearson[89] use real personal disposable income, while Schollaert and Smith[90] use household income. Burdekin and Idson[91] distinguish between white and black annual income. Hynds and Smith[92] use real regional income as an approach to average gross income. Simmons[93] uses regional real earnings. Falter and Perignon[94] use home and away wage averages, while Baimbridge[95] weights the GDP per capita income by dividing it by the distance. Several measures of median income are used by Rascher,[96] Depken II[97] and Putsis and Sen.[98] City income was used by Depken II[99] and Burdekin et

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103-106.

[83] M. Baimbridge, S. Cameron, P. Dawson, *Satellite Broadcasting and Match Attendance: The Case of Rugby League*, in *Ap .Ec. Let.*, vol. 2, October, 1995, 343-346.

[84] R.G. Noll, *Attendance and Price Setting*, cit., 44.

[85] J. Bird, *The Demand for League Football*, cit., 56.

[86] J.A. Cairns, *The Demand for Professional Team Sports*, cit., 18.

[87] J.A. Schofield, *The Demand for Cricket: The Case of the John Player League*, in *Appl. Ec.*, vol. 15, June, 1983, 283-296.

[88] M. Bhattacharya, R. Smyth, R., *The Game is not the Same: The Demand for Test Match Cricket in Australia*, in *Aus. Ec. Pap.*, vol. 42, n. 1, 2003, 77-90.

[89] A.M. Wainwright, J.M.Pearson, *The Influence of Star Playrs on Football League Attendances*, in *Occasional Papers in Economics and Politics*, Trent Polytechnic Nottingham, 1984.

[90] P.T. Schollaert, D.H. Smith, *Team Racial Composition and Sports Attendance*, in *Soc. Qu.*, vol. 28, n. 1, 1987, 71-87.

[91] R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, in *Appl. Ec.*, vol. 23, n. 1B, January, 1991, 179-186.

[92] M. Hynds I. Smith, *The Demand for Test Match Cricket*, cit., 82.

[93] R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22.

[94] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports*, cit., 60.

[95] M. Baimbridge, *Match Attendance at Euro 96: Was the Crowd Waving or Drowning?*, in *Appl. Ec. Let.*, vol. 4, September, 1997, 555-558.

[96] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63.

[97] C.A. Depken II, *Fan Loyalty and Stadium Funding in Professional Baseball*, in *J. of Sp. Ec.*, vol. 1, n. 2, 2000, 124-138.

[98] W.P. Putsis, S.K. Sen, *Should NFL blackouts be banned?*, cit., 20.

[99] C.A. Depken II, *Fan Loyalty in Professional Sports. An Extension to the National Football*

al.[100]

Independent of the influence that the definition of the income variable used may have on the results, the lack of variability (usually) of that variable for the same team throughout the season can show that this variable is correlated with other observable or unobservable variables that have the same variability structure. In particular, for one given season, this variable would capture the fixed effect of the home team that it was intended to specify.

Some authors have used unemployment explicitly as an approach (of contrary sign) to income. This is the case for Jennett,[101] Dobson and Goddard[102] and Leadley and Zygmont.[103] Although, in other cases unemployment has been used together with the income variable, such as in the studies of Burdekin and Idson,[104] Borland and Lye,[105] Knowles et al.,[106] Dobson and Goddard,[107] Alchin and Tranby,[108] Fuller and Stewart,[109] Rascher,[110] Falter and Pérignon,[111] Jones et al.,[112] Bhattacharya and Smyth[113] and Owen and Weatherston.[114] The most common result posits that

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League, in *J. of Sp. Ec.*, vol. 2, n. 3, 2001, 275-284.

[100] R.C. Burdekin, R.T Hossfeld, J.K. Smith, *Are NBA Fans Becoming Indifferent to Race? Evidence From the 1990s*, in *J. of Sp. Ec.*, vol. 6, n. 2, 2005, 144-159.

[101] N. Jennett, *Attendances, Uncertainty of Outcome and Policy in Scottish League Football*, in *Sc. J. of Pol. Ec.*, vol. 31, n. 2, 1984, 176-198.

[102] S.M. Dobson, J.A. Goddard, *The Demand for Football in the Regions of England and Wales*, in *Reg. St.*, vol. 30, August, 1996, 443-453.

[103] J.C. Leadley, Z.X. Zygmont, *When Is the Honeymoon Over? National Basketball Association Attendance 1971-2000*, cit., 30.

[104] R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit., 91.

[105] J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67.

[106] G. Knowles, K. Sherony, M. Haupert, The *Demand for Major League Baseball: A Test of Uncertainty of Outcome Hypothesis*, in *Am. Ec.*, vol. 36, n. 2, 1992, 72-80. Note of L. Kochman, L., R. Badarinathi, *Baseball Attendance and Outcome Uncertainty*, in *Am. Ec.*, vol. 39, n. 2, 1995, 87. Answer of the authors, G. Knowles, K. Sherony, M. Haupert, *Baseball Attendance and Outcome Uncertainty*, in *Am. Ec.*, vol. 39, n. 2, 1995, 88-89.

[107] S.M. Dobson, J.A. Goddard, *The Demand for Professional League Football in England and Wales, 1925-92*, in *The Stat.*, vol. 44, n. 2, 1995, 259-277.

[108] T.M. Alchin**,** H.W. Tranby, *Does the Louis-Schmelling Paradox Exist in Rugby League Match Attendance in Australia?*, cit., 61.

[109] P. Fuller, M. Stewart, *Attendance Patterns at Victorian and South Australian Football Games*, in *Ec. Pap.*, vol. 15, n. 1, 1996, 83-93.

[110] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63.

[111] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports*, cit. 60.

[112] J.C. Jones, J.A. Schofield, D.E. Giles, *Our Fans in the North: The Demand for British Rugby League*, cit., 33.

[113] M. Bhattacharya, R. Smyth, R., *The Game is not the Same: The Demand for Test Match Cricket in Australia*, cit., 88.

[114] P.D. Owen, C.R. Weatherston, *Uncertainty of Outcome and Super 12 Union Attendance: Application of a General-to-Specific Modelling Strategy*, in *J. of Sp. Ec.*, vol. 5, n. 4, 2004, 347-370.

higher unemployment reduces attendance to stadiums where sport competitions take place, despite the fact that the significance of the coefficients is poor. However, as noted by Borland and Lye[115] and Dobson and Goddard,[116] it is possible that in periods of high unemployment, sports become more popular to help people manage personal frustrations. This could explain, in part, the positive sign found by Falter and Perignon.[117] Burdekin and Idson[118] analyse the influence of unemployment on attendance as a function of race, as well as of other categories such as blue-collar and white-collar.

The majority of the estimations referring to attendance equations consider the market size as an explanatory variable. The definition of "potential" market cannot be made in a precise way for many goods, so approaches to measure the market size are used. In our case, authors approach the potential demand using the total population of the metropolitan area (SMA) or the home team city.[119] Nevertheless, not all the individuals of a town are potential demanders of a particular sport. In general, men typically demand more football services than women. Thus, Dobson and Goddard[120] use male population as an explanatory variable instead of total population. In some cases, particular sports are more followed among some ethnic groups, which leads to considering only the population of a particular ethnic group.[121]

When there is more than one club in the same city, some authors have divided the population by the number of the teams without any kind of weighting. This solution appears to be inappropriate. In fact, even if multiple teams belong to the

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[115] J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67.

[116] S.M. Dobson, J.A. Goddard, *The Demand for Football in the Regions of England and Wales*, cit., 102.

[117] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports*, cit., 60.

[118] R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit., 91.

[119] Population of the home team city is used by N. Jennett, *Attendances, Uncertainty of Outcome and Policy in Scottish League Football*, cit., 101; D.H. Rivers, T.D. DeSchriver, *Star Players, Payroll Distribution, and Major League Baseball Attendance*, in *Sp. Mar. Qu.*, vol. 11, n. 3, 2002, 175-184; and M.R. Donihue, D.W. Findlay, P.W. Newberry, *An Analysis of Attendance at Major League Baseball Spring Training Games*, in *J. of Sp. Ec.*, vol. 8, n. 1, 2007, 39-61. The population of the away team city weighted by the distance is also considered by M. Baimbridge, S. Cameron, P. Dawson, *Satellite Television and the Demand for Football: A Whole New Ball Game?*, in *Sc. J. of Pol. Ec.*, vol. 43, August, 1996, 317-333. The whole population for the case of small stadiums is used in P. Wilson, B. Sim, *The Demand for Semi-Pro League Football in Malaysia 1989-91. A Panel Data Approach*, in *Appl. Ec.*, vol. 27, January, 1995, 131-138.

[120] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, cit., 53.

[121] See R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit., 91; M. Hynds I. Smith, *The Demand for Test Match Cricket*, cit., 82; D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63; and C. Burdekin, R.T Hossfeld, J.K. Smith, *Are NBA Fans Becoming Indifferent to Race? Evidence From the 1990s*, cit., 100.

same city, one of them will have a larger number of fans than the others. Therefore, it seems more convenient to use a population measure which permits weighting in favour of those teams that have a larger number of fans, based on the number of season ticket holders of each team, as Garcia and Rodriguez[122] do.[123]

In the case where a great number of fans from the away team go to support the team, some authors have included the population of the away team in their estimations: Hart et al.,[124] Wainwright and Pearson,[125] Walker[126] and Janssens and Kesenne.[127] The latter divide the away team population by the distance between both teams as an interaction term between the two variables. In general, as is expected, the demand for sports services shows a positive and significant relationship with the population variable.[128]

The stadium capacity could also be thought of as a measure of the potential demand.[129] Including this variable as a determinant of demand is questionable because capacity is a supply variable, as Demmert[130] points out. Jones[131] considers stadium capacity important if the team often reaches full capacity, but less significant if the stadium is usually at half of its capacity. However, in a subsequent paper, Jones and Ferguson[132] omit stadium capacity, and in a subsequent study with Ferguson et al.,[133] they treat the issue of capacity by splitting the sample into two

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[122] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League*, cit., 38.

[123] Population is used in the case of survival for Minor League Baseball teams by D.G. Surdam, *Television and Minor League Baseball: Changing Patterns of Leisure in Postwar America*, in *J. of Sp. Ec.*, vol. 6, n. 1, 2005, 61-77.

[124] R.A. Hart, J. Hutton, T. Sharot, *A Statistical Analysis of Association Football Attendances*, in *Appl. Stat.*, vol. 24, n. 1, 1975, 17-27.

[125] A.M. Wainwright, J.M.Pearson, *The Influence of Star Players on Football League Attendances*, cit., 89.

[126] B. Walker, *The Demand for Professional League Football and the Success of Football League Teams: Some City Size Effects*, in *Urb. St.*, vol. 23, n. 3, 1986, 209-219.

[127] P. Janssens, S. Kesenne, *Belgian Soccer Attendances*, in *Tij. voor Ec. en Man.*, vol. 32, n. 3, 1987, 305-315.

[128] Except in the case of A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, cit., 20.

[129] See M. Poitras, L. Hadley, *Attendance, Revenue, and New Stadiums in Major League Baseball*, working paper presented in the 4th Conference International Association of Sports Economists, New York, Columbia University, July, 11th-12th, 2002; D.J. Berri, M.B. Schmidt, S.L. Brook, *Stars at the Gate: The Impact of Star Power on NBA Gate Revenues*, in *J. of Sp. Ec.*, vol. 5, n. 1, 2004, 33-50; P.D. Owen, C.R. Weatherston, *Uncertainty of Outcome and Super 12 Union Attendance: Application of a General-to-Specific Modelling Strategy*, cit., 114; J.C. Leadley, Z.X. Zygmont, *When IS the Honeymoon Over?*, cit., 30; or D. Coates, T. Harrison, *Baseball Strikes and Demand for Attendance*, in *J. of Sp. Ec.*, vol. 6, n. 3, 2005, 282-302.

[130] Cairns (1990, cit., 18) states that the interpretation of these variables can be problematic and that there exists a problem with the election of estimation methods.

[131] J.C. Jones, *Winners, Losers and Hosers: Demand and Survival in the National Hockey League*, cit., 78.

[132] J.C. Jones, D.G. Ferguson, *Locational and Survival in the National Hockey League*, cit., 27.

[133] D.G. Ferguson, K.G. Stewart, J.C.H. Jones, A. Le Dressay, *The Pricing of Sports Events: Do Teams Maximize Profit*?, cit., 36.

categories: the teams that always or almost always reach full capacity, and the ones that never or almost never reach it.

The effect of stadium capacity on demand may simply be highlighting the need to take into account the fact that this variable marks a limit higher than the observed attendance. Thus, Kahn and Sherer[134] include it to control the upper limit of attendance. This limit of capacity implies, as we showed in the previous section, that the dependent variable in these demand studies has a truncated distribution, as Welki and Zlatoper[135] or Kuypers[136] illustrate. What seems evident is that, as Dobson and Goddard[137] report, when this variable is included, it will be more significant when the stadiums of each club are usually full or at nearly full capacity.

Several authors have studied the influence of strike periods on attendance. For example, Schmidt and Berri[138] and Coates and Harrison[139] found that attendance declines during these periods, but after strikes attendance recovered. To Matheson,[140] recovery to pre-strike levels has been accomplished though the construction of new stadiums and attendance has actually dropped since 1994-95 baseball strike in the U.S. The relevance of the new stadium, in particular, the first year, is positive to Rivers and DeSchriver,[141] Schmidt and Berri[142] and for Winfree et al.[143] for at least a short time. Coates and Humphreys[144] and Feddersen et al.[145] find a positive "novelty effect" of new facilities.[146]

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[134] L.M. Kahn, P.D. Sherer, *Racial Differences in Professional Basketball Players' Compensation*, in *J. of Lab. Ec.*, vol. 6, n. 1, 1988, 40-61.

[135] A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, cit., 20.

[136] T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, working paper, December, Department of Economics University College London, 1995.

[137] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, cit., 53.

[138] M.B. Schmidt, D.J. Berri, *The Impact of the 1981 and 1994-1995 Strikes on Major League Baseball Attendance: A Time-series Analysis*, in *Appl. Ec.*, vol. 34, n. 4, 2002, 471-478; M.B. Schmidt, D.J. Berri, *The Impact of Labour Strikes on Consumer Demand: An Application to Professional Sports*, in *Am. Ec. Rev.*, vol. 94, n. 1, 2004, 344-357.

[139] D. Coates, T. Harrison, *Baseball Strikes and Demand for Attendance*, cit., 129.

[140] V.A. Matheson, *The effects of Labour Strikes on Consumer Demand in Professional Sports: Revisited*, in *Appl. Ec.*, vol. 38, n. 10, 2006, 1173-1179.

[141] D.H. Rivers, T.D. DeSchriver, *Star Players, Payroll Distribution, and Major League Baseball Attendance*, cit., 119.

[142] M.B. Schmidt, D.J. Berri, *What Takes Them Out to the Ball Game?*, in *J. of Sp. Ec.*, vol. 7, n. 2, 2006, 222-233.

[143] J.A. Winfree, J.J. McCluskey, R.C. Mittelhammer, R.D. Fort, *Location and Attendance in Major League Baseball*, in *Appl .Ec.*, vol. 36, n. 19, 2004, 2117-2124.

[144] D. Coates, B. Humphreys, *Novelty Effects of New Facilities on Attendance at Professional Sporting Events*, in working paper n. 03-101, UMBC Economics Department, 2003, 1-19.

[145] A. Feddersen, W. Maenning, M. Borcherding, The *Novelty Effect of the New Football Stadia: The Case of Germany*, in *Int. J. of Sp. Fin.*, vol. 1, n. 3, 2006, 174-188.

[146] A more developed studies about the "honeymoon" effect of a new stadium and increasing attendance can be see in J.C. Leadley, Z.X. Zygmont, *When Is the Honeymoon Over? National Basketball Association Attendance 1971-2000*, cit., 30, and C.M. Clapp, J.K. Hakes, *How Long*

4. Determinants of attendance (II): Expected quality

Quality of product is another aspect that needs to be taken into account in the development of equations for sporting events attendance. This variable in some way captures part of the heterogeneity of the product, since all the matches are different from one another because the teams competing are always different and their situation may change through the competition. Cairns[147] contemplates the effect of this variable through the success probability (home team winning), which has a positive effect on attendance. The higher the expected quality of the home team, all things being equal, the higher the probability of success will be and the larger the demand will be. On the other hand, despite the fact that high away team quality, *ceteris paribus*, will reduce the probability of success, there is evidence that the demand will also increase, as the expected quality of the away team rises, through the greater potential quality of the event as an alternative mechanism. For this reason, most studies have included expected quality measures for both teams when information referring to matches is used. The most-used quality indicator has been the position in the ranking of the clubs before the match.

In this review, we lay out the method of measuring quality through different components that was proposed by Kuypers.[148] The factors include player quality, whether the match is expected to be exciting, the special interest in the match and the current form of the contestant teams. The different attributes which make up the quality of a team are expected to have a positive effect on attendance. Although the roster of a team frequently suffers from changes throughout the season, the quality of a team is a variable that can be considered constant over the season, measuring the quality at the beginning of the season independent of the latest current form. To approach this variable, different alternatives have been used: the budgets of the teams and the number of international players, or the existence of particular superstars on the team. For example, Falter and Pérignon[149] and Garcia and Rodriguez[150] include the budgets of the home team as well as the away team, while the studies which approach the quality through the number of international players or superstars are much more frequent.[151]

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a Honeymoon? The Effect of New Stadiums on Attendance in Major League Baseball, in *J. of Sp. Ec.*, vol. 6, n. 3, 2005, 237-263.

[147] J.A. Cairns, *The Demand for Professional Team Sports,* cit., 18.

[148] T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, cit., 136.

[149] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports,* cit., 60.

[150] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League,* cit., 38.

[151] Therefore, Kuypers (T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, 1995, cit., 136) allows for the players who have been international in the last three seasons, and Ferguson, Stewart, Jones and Dressay (1991, cit., 36) and Rivers and DeSchriver (D.H. Rivers, T.D. DeSchriver, *Star Players, Payroll Distribution, and Major League Baseball Attendance*, 2002, cit., 119) use the number of "superstars" on the team. Burdekin and

The exciting nature of a match is a not very precise concept that has been defined in the literature by different types of variables, all of which are expected to have a positive effect on attendance. For the case of football, for example, the performance is given by goals, thus, this is the most-used measure to gauge how interesting the performance was. Kuypers[152] measures the interest of a match by scored goals in favour or against each of them teams in the last three matches. The larger the number of goals in favour or against, the higher attendance will be. On the other hand, Peel and Thomas[153] incorporate the expected number of scored goals using data from betting, while Dobson and Goddard[154] use the number of total goals of the home and away. For other sports, a measure of the exciting character of the match is the possibility of violence.[155] In the case of ice hockey, Stewart et al.[156] measure violence through some factors like the number of faults, serious and less serious, the number of sanctions in the match, and the number of matches punished by sanctions.

On the other hand, some matches are especially interesting for spectators, apart from the excitement that they can generate. This would be the case for matches between teams from the same city or "rival" cities, or for teams with a large tradition of rivalry independent of the geographical connotation or the beginning or ending matches of the season. This special interest must favour attendance. Usually, this type of information is incorporated to the models through dummy variables.

Finally, a team's performance may condition the attendance (the more positive, the more attendance), referring to both the latest results and the results of each

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Idson (R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit. 91) include the number of players who were selected for the first or the second all-star team in the NBA, while Stewart, Ferguson, Jones (1992, cit., 47) measure the quality of the team using a group of individuals components like the number of all-star players or the number of defenders who score more than 20 points per season. Berri and Schmidt use the All-Star votes received: D.J. Berri, M.B. Schmidt, *On the Road with the National Basketball Association's Superstar Externality*, in *J. of Sp. Ec.*, vol. 7, n. 4, 2006, 347-358. The number of players chosen to play on the all-star team is the factor used in R.T. Jewell, D.J. Molina, *An Evaluation of the Relationship Between Hispanics and Major League Soccer*, in *J. of Sp. Ec.*, vol. 6, n. 2, 2005, 160-177. A different point of view is pointed out by L.M. Kahn, *Sports League Expansion and Consumer Welfare*, *J. of Sp. Ec.*, vol. 8, n. 2, 2007, 115-138; Kahn suggests that if a sport league expands, then spectators see superstars fewer times and the revenues of the teams can be affected.

[152] T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, cit., 136.

[153] D.A. Peel, D.A. Thomas, *The Demand for Football: Some Evidence on Outcome Uncertainty*, in *Emp. Ec.*, vol. 17, n. 2, 1992, 323-331.

[154] S.M. Dobson, J.A. Goddard, *The Demand for Professional League Football in England and Wales, 1925-92*, cit., 107; S.M. Dobson, J.A. Goddard, *The Demand for Football in the Regions of England and Wales*, cit., 102.

[155] This behaviour is similar to that of the attendees of other events who "ask for" more noise. See A.C. de Serpa, R.L. Faith, *Bru-u-u-uce: The Simple Economics of Mob Goods*, in *Publ. Ch.*, vol. 89, October, 1996, 77-91.

[156] K.G. Stewart, D.G. Ferguson, J.C. Jones, *On Violence in Professional Team Sport as the Endogenous Result of Profit Maximization*, cit., 47.

team over several seasons. The usage of these variables is, in a certain sense, a reflection of the "success" of the team. The most recent trajectory is normally approached by the number of points or winnings obtained in the latest matches (Forrest and Simmons[157]).

Concerning the long-run format, depending on the sport considered, several approaches are possible: the number of final series that both teams were in during the last three seasons have been included (Borland and Lye[158]), a dummy variable for the team classified for playoff in the previous year has been defined (Paul,[159] the league position of the teams has been considered (Dobson and Goddard,[160] Simmons,[161] and Czarmintzki and Stadtmann, 2002[162]) or the winning percentage has been included (Boyd and Boyd[163]). The diversity of variables that can be built to measure the long term trajectory are numerous; the ones mentioned here are just a sample.[164]

5. Determinants of attendance (III): Uncertainty of outcome

The appeal of a match or a championship is higher if the outcome is uncertain, than if one of the teams is presented *a priori* as the clear favourite. This is detailed in Section II in relation to the Louis-Schmelling paradox pointed out by Neale.[165] On the other hand, some spectators may go to the stadium only when they were convinced that the home team is going to win. Nevertheless, the most logical argument in sports economics notes that the matches with a higher uncertainty grade attract a larger number of spectators. In the literature, three forms of uncertainty of outcome have been distinguished, depending on the available information: match uncertainty, seasonal uncertainty and the absence of long-run

[157] D. Forrest, R. Simmons, *Outcome Uncertainty and Attendance Demand in Sport: The Case of English Soccer*, in *The Stat*, vol. 51, n. 2, 2002, 229-241.

[158] J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67.

[159] J.R. Paul, *Variations in NHL Attendance: The Impact of Violence, Scoring and Regional Rivalries*, cit., 29.

[160] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, cit., 53.

[161] R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22.

[162] D. Czarnitzki, G. Stadtmann, *Uncertainty of Outcome versus Reputation: Empirical Evidence for the First German Football Division*, in *Emp. Ec.*, vol. 27, n. 1, 2002, 101-112.

[163] D.W. Boyd, L.A. Boyd, *The Home Field Advantage: Implications for the Pricing of Tickets to Professional Team Sporting Events*, cit., 48.

[164] One can consult M. Baimbridge, S. Cameron, P. Dawson (1996, cit., 119), who pay attention to position in the league in the previous seasons, R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22, and S. Szymanski, R. Smith, *The English Football Industry: Profit, Performance and Industrial Structure*, in *Int. Rev. of Appl. Ec.*, vol. 11, n. 1, 1997, 135-153. Szymanski and Smith consider the results of several competitions (Cup + League Cup + European competitions). Also, Kahane and Shmanske (1997, cit., 69) use the winnings percentage of the team over the year.

[165] W.C. Neale, *The Peculiar Economics of Professional Sports, A Contribution to the Theory of the Firm in Sporting Competition and in Market Competition*, cit., 1.

domination of the championship by a particular club.[166]

To measure match uncertainty, the authors have used different approaches. Hart et al.[167] use the logarithm of the difference in league position of both clubs.[168] According to Cairns,[169] the majority of these studies ignore factors like the advantage of playing at home, if a team is or is not performing well, or if a team is gradually improving its league standings. According to Cairns, a possible interaction exists between uncertainty and current form, so that many times in these studies, it is difficult to individually identify the effects of the quality (via current form) and of the outcome uncertainty. Factors that measure match uncertainty have also been taken into account by other authors. Whitney[170] calculates an average expected probability of winning using the percentages of wins from last season, last month and the season-to-date. Peel and Thomas,[171] Knowles et al.,[172]

[166] Borland and MacDonald (2003, cit., 18) use match uncertainty, seasonal uncertainty and uncertainty of long-run outcome. Szymanski (2003, cit., 18) uses match uncertainty, seasonal uncertainty and championship uncertainty. Fort uses measures of game uncertainty, playoff uncertainty, and consecutive-season uncertainty: R.D. Fort, *Competitive Balance in North American Professional Sports*, in J. Fizel (ed.), *Handbook of Sports Economic Research*, 2006, 190-206.

[167] R.A. Hart, J. Hutton, T. Sharot, *A Statistical Analysis of Association Football Attendances*, cit., 124.

[168] Similar measures have been used by J.T. Siegfried, C.E. Hinshaw, *The Effect of Lifting Television Blackouts on Professional Football No-Shows*, cit., 20; P. Drever, J. McDonald, *Attendances at South Australian Football Games*, in *Int. Rev. of Sp. Soc.*, vol. 16, n. 2, 1981, 103-113; J.C. Jones, *Winners, Losers and Hosers: Demand and Survival in the National Hockey League*, cit., 78; J.C. Jones, D.G. Ferguson, *Locational and Survival in the National Hockey League*, cit., 27; D.A. Peel, D.A. Thomas, *Outcome Uncertainty and the Demand for Football: An Analysis of Match Attendances in the English Football League*, in *Sc. J. of Pol. Ec.*, vol. 35, August, 1988, 242-249; D.G. Ferguson, K.G. Stewart, J.C.H. Jones, A. Le Dressay, *The Pricing of Sports Events: Do Teams Maximize Profit*?, cit., 36; R.A. Smart, J.A. Goddard, *The Determinants of Standing and Seated Football Attendance: Evidence from Three Scottish League Clubs*, in *Qu. Ec. Com.*, vol. 16, n. 4, 1991, 61-64; and many others. The difference in points between the home and away teams before the match, and its square, are used by Wilson and Sim (1995, cit., 119). A particular measure for uncertainty is used by Hynds and Smith (1994, cit., 82) due to the peculiarity of sport they study, cricket. In this case, a match lasts several days, but on the second or the third day it can be known which team will be the winner; when this happens, attendance decreases.

[169] J.A. Cairns, *The Demand for Professional Team Sports*, cit., 18.

[170] J.D. Whitney, *Winning Games Versus Winning Championships: The Economics of Fan Interest and Team Performance*, in *Ec. Inq.*, vol. 26, October, 1988, 703-724.

[171] D.A. Peel, D.A. Thomas, *Outcome Uncertainty and the Demand for Football: An Analysis of Match Attendances in the English Football League*, cit., 168; D.A. Peel, D.A. Thomas, *The Demand for Football: Some Evidence on Outcome Uncertainty*, cit., 153; D.A. Peel, D.A. Thomas, *Attendance Demand: An Investigation of Repeat Fixtures*, in *Appl. Ec. Lett.*, vol. 3, June, 1996, 391-394. Other possibilities are proposed with the same data used in the research of Peel and Thomas: J.A. Cairns, *Uncertainty of Outcome and the Demand for Football*, Discussion Paper n. 88-02, Department of Economics, University of Aberdeen, 1988. The uncertainty of the outcome, named p, d and q, is measured as related to the probability of the home team's winning, a draw's occurring or the away team's winning. Four direct measures are used to measure the uncertainty of the match. These direct measures are $(p - q)/d$; $(p - q)$; pq and $p(1 - p)$.

[172] G. Knowles, K. Sherony, M. Haupert, The *Demand for Major League Baseball: A Test of*

Kuypers,[173] Dare and MacDonald,[174] Rascher[175] and Vergin and Sosik[176] use the betting predictions before the match to establish the probability of winning for the home team.[177] In fact, bets reflect all the information about both teams: current form, quality, advantage of playing at home, injuries, etc., so these bets are the first candidates to be used, "ex ante", of the uncertainty of outcome in the match result, as pointed out by Forrest and Simmons[178] and Dawson and Downward.[179]

In relation to the uncertainty of outcome throughout the season, this can be measured through the position that the teams have in the battle to reach the championship or in their "play-offs" classification. This means that this type of uncertainty refers to the performance of each team in relation to the remaining teams in the championship. The measures proposed by authors to calculate the uncertainty of outcome throughout the season take different forms, and all share the idea that the considered team (home or away) is among the candidates for a certain target during the season. The differences in points or positions (Jones[180]), or just purely quantitative information about these two variables, is normally the information used by the authors to measure seasonal uncertainty. For example, Canes[181] uses a change of four or more places in a team's position in league standing.[182]

Uncertainty of Outcome Hypothesis, cit., 106.

[173] T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, cit., 136.

[174] W.H. Dare, S.S. McDonald, *A Generalized Model for Testing the Home and Favorite Team Advantage in Point Spread Markets*, in *J. of Fin. Ec.*, vol. 40, February, 1996, 295-318.

[175] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63.

[176] R.C. Vergin, J.J. Sosik, *No Place like Home: An Examination of the Home Field Advantage in Gambling Strategies in NFL Football*, in *J. of Ec. and Bus.*, vol. 51, n. 1, 1999, 21-31.

[177] Others calculate the probability of winning, like H. Stern, *On the Probability of Winning a Football Game*, in *Am. Stat.*, vol. 45, August, 1991, 179-183, and A. Merez, M.Y. Hu, *Predictors of Outcome of a Soccer-Game: A Normative Analysis Illustrated for the Israeli Soccer League*, in *Mat. Met. of Oper.Res.*, vol. 42, n. 3, 1995, 361-372; they use the estimation of a model to predict this probability.

[178] D. Forrest, R. Simmons, *Outcome Uncertainty and Attendance Demand in Sport: The Case of English Soccer*, cit., 157. Knowles, Sherony and Haupert (1992, cit., 106) conclude that attendance is maximised when the probability "ex ante" of the home team's winning is around 0.6; for Rascher (1999, cit., 63), the figure is 0.66.

[179] In A. Dawson, P. Downward, *Measuring Short-Run Uncertainty of Outcome in Sporting Leagues. A Comment*, in *J. of Sp. Ec.*, vol. 6, n. 3, 2005, 303-313, two measures are presented to test short-run outcome uncertainty, and the use of betting odds is recommended.

[180] J.C. Jones, *Winners, Losers and Hosers: Demand and Survival in the National Hockey League*, cit., 78.

[181] M.E. Canes, *The Social Benefits of Restrictions on Team Quality*, in R. Noll (ed.), *Government and the Sports Business*, 1974, 81-113.

[182] Several measures of the variable "games behind leader" are used by H.G. Demmert, *The Economics of Professional Team Sports*, cit., 32, R.G. Noll, *Attendance and Price Setting*, cit., 44, or M.R. Butler, *Interleague Play and Baseball Attendance*, in *J. of Sp. Ec.*, vol. 3, n. 4, 2002, 320-334.

An alternative approach involves arguing that a team does or doesn't fight for the championship, as Jennett[183] does when calculating the reciprocal number of matches that are needed to win the championship, before the match. The variables "home and away team championship significance" of the matches increase in value as the season progresses, until the team has a possibility of reaching the title. Jennett finds that spectators are attracted by the championship significance and, by extension, the total number of spectators of the league will be increased if the uncertainty about the next champion[184] increases. Cairns[185] uses a dummy variable to control for whether the team contention for the league championship influences the consumer's perception of the attractiveness of a particular contest. This approach assumes that the individuals compare the results of their team against other teams, rather than against an absolute pattern (unobservable).[186] To Kuypers,[187] the uncertainty of outcome over the season is measured by three different measures that capture, in different ways, the number of matches left (GL) and the number of points behind (PB) the leader or above the limit position of relegation. In his study, the uncertainty related to the title and to the relegation to the second division is measured.

Finally, evidence exists in different sports for the probability of a long-run domination by a few teams in the league. This possibility can decrease attendance, not only for the clubs that do not win, but eventually for the team that wins because of the weariness effect. To consider the effect of a long-run domination, Borland,[188] in a study about Australian football, includes the number of different teams in the finals in the past three seasons, divided by the number of finals berths available. He does not find evidence of lower attendance associated with a higher level of domination in the long-run. Comparing attendance for the same team match-ups over several seasons in the Football Association Association Challenge Cup (FA Cup) and in the league, Szymanski[189] designs a "natural experiment" from English football. He finds that uncompetitive balance is increasing between divisions and that has led to a decline in attendance.

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[183] N. Jennett, *Attendances, Uncertainty of Outcome and Policy in Scottish League Football*, cit., 101.

[184] He also allows for the cases of relegated teams.

[185] J.A. Cairns, *Evaluating Changes in League Structure: The Reorganization of the Scottish Football League*, cit., 25.

[186] Borland and Lye (1992, cit., 67) use the sum of matches required to qualify for the finals. Carmichael, Millington and Simmons use the probability of winning the division: F. Carmichael, J. Millington, R. Simmons, *Elasticity of Demand for Rugby League Attendance and the Impact of BSkyB*, in *Appl. Ec. Let.*, vol. 6, December, 1999, 797-800. Garcia and Rodriguez (2002, cit., 38) consider the likelihood of winning the championship.

[187] T. Kuypers, *The Beautiful Game? An Econometric Study of Why People Watch English Football*, cit., 136.

[188] J. Borland, *The Demand for Australian Rules Football*, cit., 66.

[189] S.Szymanski, *Income Inequality, Competitive Balance and the Attractiveness of Team Sports: Some Evidence and a Natural Experiment from English Soccer*, in *The Ec. J.*, vol. 469, n. 111, February, 2001, 69-84.

Very closely related to the uncertainty of outcome is competitive balance. In the demand analysis framework, Schmidt and Berri[190] include Gini[191] coefficients about competitive balance as explanatory factors in their attendance analysis covering several seasons. The authors take two different approaches: with time series, changes in the competitive balance have a significant influence on attendance; with panel data, fans respond negatively to improvement in the competitive balance in the results for one season. On the other hand, that competitive balance improvement, when considered at year three of a five-year period, increases attendance.[192]

Instead of standard deviation, Humphreys[193] uses three measures of competitive balance: the standard deviation of winning percentage,[194] the Herfindahl-Hirschman Index and the Competitive Balance Ratio (CBR), defined as the ratio between the average time variation in win-loss percentage for teams in the league and the average variation in win-loss percentages across seasons. For the author, this last measure explains variation in attendance better than the other two alternative measures.

6. Determinants of attendance (IV): Opportunity cost and other factors

Attendance at live sporting events may involve some costs for the fans that condition their attendance to the stadium. According to prior research, factors that generate these costs are variables like weather, TV broadcastings, the day and time of the match, competition with other sports and the distance between the cities of the two teams.

At first, it seems we could assume that good weather would favour attendance to outdoor performances.[195] However, attendance to stadiums competes with other

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[190] M.B. Schmidt, D.J. Berri, *Competitive Balance and Attendance. The Case of Major League Baseball*, cit., 50.

[191] See J. Utt, R. Fort, *Pitfalls to Measuring Competitive Balance with Gini Coefficients*, in *J. of Sp. Ec.*, vol. 3, n. 4, 2002, 367-373. Utt and Fort use the Gini coefficient of league-wide winning percentages as a measure of game uncertainty.

[192] E.M. Eckard, *Free Agency, Competitive Balance, and Diminishing Returns to Pennant Contention*, in *Ec. Inq.*, vol. 39, n. 3, 2001, 430-443, wants to test to see if attendance declines on average with each additional consecutive year of pennant contention. The independent variable is the number of years since the start of the streak (first or second place in league standings or 3rd or 4th with other conditions). The sign is negative and significant in all cases.

[193] B.R. Humphreys, *Alternative Measures of Competitive Balance in Sports Leagues*, in *J. of Sp. Ec.*, vol. 3, n. 2, 2002, 133-148.

[194] Y.H. Lee, *Competitive Balance and Attendance in Japanese, Korean and US Professional Baseball Leagues*, in R. Fort, J. Fizel (eds.), *International Sports Economics Comparisons*, Westport, Connecticut, Praeger Publishers, 2004, 281-292, analyses the relationship between attendance and competitive balance using a measure of competitive balance (Tail likelihood) as the sum of the densities of the winning percentages of a certain percentage of teams and a measure of playoff uncertainty.

[195] When using these variables, we have to be careful to not give them an explanatory capacity that really corresponds with the existence of regional differences in preferences or alternative leisure activities, more than indicating a direct climatological impact on the demand of tickets.

type of activities. Therefore, the results obtained with this variable are diverse. For example, Noll[196] finds that American football attendance is lower when the proportion of sunny days is larger, and ice hockey attendance, which is played indoors, is higher when the average temperature in December is lower.

The ways of modelling the weather effect have been varied. Quantitative information about the temperature in degrees is used, as well as fictitious variables to capture the effects of whether it rains or not, or if it is a sunny or cold day. In this sense, Gärtner and Pommerehne[197] find less attendance when rain is recorded, but they observe that temperature does not have a significant impact. Likewise, the evidence of a negative impact due to rain is reflected by Cairns,[198] who reports weak evidence for a positive impact due to the sun. Siegfried and Hinsaw[199] measure the current temperature in relation to the average temperature of October and November, and include a dummy variable for rainy or snowing days. In this study, these authors find the number of non-attendees when it rains or is colder significant.[200]

In other studies, the incidence of weather is measured either through defining fictitious variables depending on the seasons (Falter and Perignon;[201] Bhattacharya and Smith;[202] and Owen and Weatherston,[203] or the different competition months, or by incorporating an interaction variable with temperature and raining days (Welki and Zlatoper).[204] In these cases, the specified variables capture not only the weather effect but also the course of the season, so it is difficult to interpret the results.

The TV broadcasting of matches may contribute to less attendance at the stadiums.[205] Baimbridge[206] find a negative and significant effect on attendance if

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See R.L. Geddert, R. K. Semple, *Locating a Major Hockey Franchise: Regional Consideration,* in *Reg. Sc. Persp.*, vol. 15, n. 1, 1985, 13-29.

[196] R.G. Noll, *Attendance and Price Setting,* cit., 44.

[197] M. Gärntner, W.W. Pommerehne, *Der Fuβballzuschauer-ein Homo Oeconomicus,* cit., 55.

[198] J.A. Cairns, *Evaluating Changes in League Structure: The Reorganization of the Scottish Football League*, cit., 25.

[199] J.T. Siegfried, C.E. Hinshaw, *The Effect of Lifting Television Blackouts on Professional Football No-Shows*, cit., 20.

[200] Similar results are obtained in J.M. Zuber, J.M. Gandar, *Lifting the Television Blackout on No-Shows at Football Games*, in *Atl. Ec. J.*, vol. 16, n. 2, 1988, 63-73. Other studies, like those by Peel and Thomas (1992, cit., 153) or Welki and Zlatoper (1994, cit., 20) do not find a significant influence of climatology on attendance.

[201] J. Falter, C. Perignon, *Demand for Football and Intramatch Winning Probability: An Essay on the Glorious Uncertainty of Sports,* cit., 60.

[202] M. Bhattacharya, R. Smyth, R., *The Game is not the Same: The Demand for Test Match Cricket in Australia,* cit., 88.

[203] P.D. Owen, C.R. Weatherston, *Uncertainty of Outcome and Super 12 Union Attendance: Application of a General-to-Specific Modelling Strategy,* cit., 114.

[204] A.M. Welki, T.J. Zlatoper, *US Professional Football Game-Day Attendance,* in *Atl. Ec. J.*, vol. 27, n. 3, 1999, 285-98.

[205] The majority of the European studies take more into account the effect of national television rather than the regional variety.

[206] M. Baimbridge, S. Cameron, P. Dawson, *Satellite Broadcasting and Match Attendance: The Case of Rugby League,* cit., 83.

the match is broadcast live or via satellite. Garcia and Rodriguez[207] make a distinction, for the case of Spanish football, between matches broadcast for free and pay-per-view matches; the loss of spectators is larger when the match is broadcast for free. Both variables are significant, unlike the results obtained by Peel and Thomas.[208]

For Price and Sen,[209] sports broadcastings had a positive effect on attendance due to greater advertising of the sport. A negative effect for all divisions of the English football league was found by Forrest and Simmons.[210] Surdam[211] finds contradictory effects in the case of the MLB. Some authors have analysed the effect that matches played close together can have on attendance to stadiums. Borland and Lye[212] have taken this into account by including a fictitious variable; if the matches of a round are played during several days, they find that its sign is positive and significant. This means that attendance grows when the match concentration is low.

In studies based on information referring to particular matches, whether the match is played on a Sunday or a holiday is also important. Both Sundays and holidays seem to favour attendance to stadiums, according to Peel and Thomas,[213] Hynds and Smith,[214] Rascher,[215] Garcia and

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[207] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League*, cit., 38.

[208] D.A. Peel, D.A. Thomas, *The Demand for Football: Some Evidence on Outcome Uncertainty*, cit., 153. This paper does not include papers whose dependent variable is TV audiences for the matches. Relevant recent studies in this field are D. Forrest, R. Simmons, S. Szymanski, *Broadcasting, Attendance and the Inefficiency of Cartels*, in *Rev. of Ind. Org.*, vol. 24, n. 3, 2004, 243-265; D. Forrest, R. Simmons, B. Buraimo, *Outcome Uncertainty and the Couch Potato Audience*, in *Sc. J. of Pol. Ec.*, vol. 52, n. 4, 2005, 641-661; J. Garcia, P. Rodriguez, *The Determinants of TV Audience for Spanish Football: A First Approach*, in P. Rodriguez, S. Kesenne, J. Garcia (eds.), *Sport Economics after Fifty Years: Essays in Honour of Simon Rottenberg*, Oviedo, Ediciones de la Universidad de Oviedo, 2006, 147-167; K. Alavy, A. Gaskell, S. Leach, S. Szymanski, *On The Edge of Your Seat: Demand for Football on Television and the Uncertainty of Outcome Hypothesis*, Working paper Series IASE n. 06-31, December, 2006; or R. Paul, A. Weinbach, *The Uncertainty of Outcome and Scoring Effects on Nielsen Ratings for Monday Night Football*, in *J. of Ec. and Bus.*, vol. 59, n. 3, 2007, 199–211; and in general terms, M. Cave, R. Crandall, *Sport Rights and the Broadcast Industry*, in *Ec. J.*, vol. 469, n. 111, February, 2001, 4-26; T. Hoehn, D. Lancefield, *Broadcasting and Sport*, in *Oxf. Rev. of Ec. Pol.*, vol. 19, n. 4, 2003, 552-568; or R.G. Noll, *Broadcasting and Team Sports*, in *Sc. J. of Pol. Ec.*, vol. 54, n. 3, 2007, 400-421.

[209] D.I. Price and K.C. Sen, *The Demand for Game Day Attendance in College Football: An Analysis of the 1997 Division 1-A Season*, cit., 42.

[210] D. Forrest, R. Simmons, *New Issues in Attendance Demand: The Case of the English Football League*, in *J. of Sp. Ec.*, vol. 7, n. 3, 2006, 247-266.

[211] D.G. Surdam, *Television and Minor League Baseball: Changing Patterns of Leisure in Postwar America*, cit., 123.

[212] J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67.

[213] D.A. Peel, D.A. Thomas, *The Demand for Football: Some Evidence on Outcome Uncertainty*, cit. 153.

[214] M. Hynds I. Smith, *The Demand for Test Match Cricket*, cit., 82.

[215] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League*

Rodriguez,[216] Paul,[217] Forrest et al.,[218] Paton and Cooke[219] and Donihue et al.[220]

In addition to the day, the time of the match can also be a determinant of attendance. Welki and Zlatoper,[221] Baimbridge et al.[222] and Rascher[223] analyse this question without finding significant effects for the time of the match on attendance. Even so, the inclusion of this variable is usual for cricket (see Paton and Cooke and Morley and Thomas[224]). Also, many fans travel to attend their team matches that are played at stadiums away from home. The quantitative importance of this displacement depends, to a large extent, on the distance covered and on the behaviour of a large number of supporters, who in some cases like English football go with their team when it plays away from home. To analyse this, some authors like Dobson and Goddard,[225] Baimbridge et al.[226] and Forrest et al.[227] have included the first of these factors in their estimations, while the second one is captured by the "loyalty" effect, in this case, referenced to the visitor team.

Winfree et al.[228] used two explanatory variables to capture the influence of

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Baseball, cit., 63.

[216] J. Garcia, P. Rodriguez, *The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League*, cit., 38.

[217] J.R. Paul, *Variations in NHL Attendance: The Impact of Violence, Scoring and Regional Rivalries*, cit., 29.

[218] D. Forrest, R. Simmons, S. Szymanski, *Broadcasting, Attendance and the Inefficiency of Cartels*, cit., 208.

[219] D. Paton, A. Cooke, *Attendance at County Cricket: An Economic Analysis*, in *J. of Sp. Ec.*, vol. 6, n. 1, 2005, 24-45.

[220] M.R. Donihue, D.W. Findlay, P.W. Newberry, *An Analysis of Attendance at Major League Baseball Spring Training Games*, cit., 119. Dummies for different matches played during the week are used by Butler (2002, cit., 182) and J.W. Meehan, R.A. Nelson, T.V. Richardson, *Competitive Balance and Game Attendance in Major League Baseball*, in *J. of Sp. Ec.*, vol. 8, n. 6, 2007, 563-580.

[221] A.M. Welki, T.J. Zlatoper, *US Professional Football: The Demand for Game-Day Attendance in 1991*, cit., 20.

[222] M. Baimbridge, S. Cameron, P. Dawson, *Satellite Broadcasting and Match Attendance: The Case of Rugby League*, cit., 83; M. Baimbridge, S. Cameron, P. Dawson, *Satellite Television and the Demand for Football: A Whole New Ball Game?*, cit., 119; M. Baimbridge, *Match Attendance at Euro 96: Was the Crowd Waving or Drowning?*, cit., 95.

[223] D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63.

[224] D. Paton, A. Cooke, *Attendance at County Cricket: An Economic Analysis*, cit., 219; B. Morley, D. Thomas, *Attendance Demand and Core Support: Evidence from Limited-Over Cricket*, in *Appl. Ec.*, vol. 39, n. 16, 2007, 2085-2097.

[225] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, cit., 53.

[226] M. Baimbridge, S. Cameron, P. Dawson, *Satellite Broadcasting and Match Attendance: The Case of Rugby League*, cit., 83; M. Baimbridge, S. Cameron, P. Dawson, *Satellite Television and the Demand for Football: A Whole New Ball Game?*, cit., 119; M. Baimbridge, *Match Attendance at Euro 96: Was the Crowd Waving or Drowning?*, cit., 95.

[227] D. Forrest, R. Simmons, S. Szymanski, *Broadcasting, Attendance and the Inefficiency of Cartels*, cit., 208.

[228] J.A. Winfree, J.J. McCluskey, R.C. Mittelhammer, R.D. Fort, *Location and Attendance in*

distance between teams on attendance: the inverse in miles to the nearest alternative stadium and a dummy variable if a new team moves within 500 miles of an existing stadium. These two variables reduce attendance and are significant. Loyalty to the team, understood as a habit of going to the stadium, attempts to capture the effect of spectator fidelity over the years. The variables used in the literature to capture this effect are attendance to previous matches and the age of the club.

Borland[229] has pioneered the incorporation of an explanatory factor of attendance (defined in this case as the attendance obtained by both teams, in the same stadium, the previous season).[230] Depending on the available information, the dynamic specification can deal with different definitions of the retarded variables (attendance at the last match played at home, average attendance for the previous season or just as Borland proposes). Dawson and Downward[231] argue that one cannot pick up habit persistence by simply adding lagged attendance to demand equations; more explicit models are necessary for these authors.

The formation date of the teams has been used as a measure of loyalty, as have fictitious variables for teams of a particular age. It is usual to assume that teams that have been established longer will have a larger tradition, which can lead to a larger number of fans. A variable with these characteristics is used by Dobson and Goddard[232] and Baimbridge et al.[233] Coates and Humphreys[234] use a trend variable as explanatory variable that shows attendance increasing within the first years in new facilities and then diminishing at different rates across the MLB, the NBA and the NFL.

Finally, we will mention some variables included among the determinants of attendance in different empirical studies that cannot be classified in any of the groups of variables discussed previously. The first variable is advertising, a variable that has passed unnoticed in most of the literature, perhaps because of the difficulty in obtaining data of this type. The authors who have put a bigger emphasis on a

Major League Baseball, cit., 143.

[229] J. Borland, *The Demand for Australian Rules Football*, cit., 66.

[230] Similar variables are included by J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67; B. Burkitt, S. Cameron, *Impact of League Restructuring on Team Sport Attendances: The Case of Rugby League*, in *Appl. Ec.*, vol. 24, February, 1992, 265-271; D.A. Peel, D.A. Thomas, *The Demand for Football: Some Evidence on Outcome Uncertainty*, cit., 153; R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22, and Ferguson, Jones and Stewart (2000, cit., 49).

[231] A. Dawson, P. Downward, *Measuring Habit Persistence Effects in Attendance at Professional Team Sports Encounters: A Cautionary Note*, in *Ec. Is.*, vol. 5, n. 1, 2000, 37-40.

[232] S.M. Dobson, J.A. Goddard, *The Demand for Professional League Football in England and Wales, 1925-92*, cit., 107.

[233] M. Baimbridge, S. Cameron, P. Dawson, *Satellite Broadcasting and Match Attendance: The Case of Rugby League*, cit., 83; M. Baimbridge, S. Cameron, P. Dawson, *Satellite Television and the Demand for Football: A Whole New Ball Game?*, cit., 119; Leadley and Zygmont (2005, cit., 30) control for the effects of arena age and team age (dummies for the first 15 years of an expansion or relocated team).

[234] D. Coates, B. Humphreys, *Novelty Effects of New Facilities on Attendance at Professional Sporting Events*, cit., 144.

variable such as this are Siegfried and Eisenberg,[235] who consider newspaper or radio advertisements, and also the special promotions that teams make for baseball fans. Also, Alchin and Tranby[236] and Kahane and Shmanske[237] incorporate an estimate of the influence of advertising on attendance through a simple specification with a fictitious variable.[238]

The racial composition of a team can also influence attendance.[239] Specifically, Burdekin and Idson[240] and Hoang and Rascher[241] show that the more similar the racial composition of the team and the geographical area where it is based, the higher the average attendance to the stadium. The importance of the race of the first pitcher for a baseball team has been studied by several authors as a way to determine whether race has an impact on attendance. The conclusions of studies

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[235] J.T Siegfried, J.D. Eisenberg, *The Demand for Minor League Baseball*, in *Atl. Ec. J.*, vol. 8, n. 2, 1980, 59-69.

[236] T.M. Alchin**,** H.W. Tranby, *Does the Louis-Schmelling Paradox Exist in Rugby League Match Attendance in Australia?*, cit., 61.

[237] L. Kahane, S. Shamamske, S., *Team Roster Turnover and Attendance in Major League Baseball*, cit., 69.

[238] Other authors who use promotions to control for their effects on attendance are J.R. Hill, J. Madura, R.A. Zuber, *The Short Run Demand for Major League Baseball*, in *Atl. Ec. J.*, vol. 10, n. 2, 1982, 31-35; D.A. Coffin, *If You Build It, Will They Come. Attendance and New Stadium Construction*, cit., 71; or M. McDonald, D. Rascher, *Does Bat Day Make Cents? The Effect of Promotions on the Demand for Major League Baseball*, in *J. of Sp. Man.*, vol. 14, n. 1, 2000, 8-27. There exists a body of literature that departs from the main objective of this paper in analysing the promotion of attendance. See S.E. Branvold, R. Bowers, *The Use of Promotions in College Baseball*, in *Sp. Mark. Qu.*, vol. 1, n. 1, 1992, 19-24; L.M. Mawson, E.E. Coan, *Marketing Techniques used by NBA Franchises to Promote Home Game Attendance*, in *Sp. Mark. Qu.*, vol. 3, n. 1, 1994, 37-45; K.L. Wakefield, V.D. Bush, *Promoting Leisure Services: Economic and Emotional Aspects of Consumer Response*, in *The J. of Serv. Mark.*, vol. 12, n. 3, 1998, 209-222; or R.A. Browning, L.S. DeBolt, *The Effects of Promotions on Attendance in Professional Baseball*, in *The Sp. J.*, vol. 10, n. 3, Summer, 2007. For a consideration of the effect of promotions separate from other factors of demand, see L.S. Gifis, P.M. Sommers, *Promotions and Attendance in Minor League Baseball*, Discussion Paper n. 05-10, Vermont, Middlebury College, 2005. For an analysis of when promotions are most successful, see T.C. Boyd, T.C. Krehbiel, *The Effect of Promotion Timing on Major League Baseball Attendance*, in *Sp. Mark. Qu.*, vol. 8, n. 4, 1999, 23-34; T.C. Boyd, T.C. Krehbiel, *An Analysis of the Effects of Specific Promotion Types on Attendances at Major League Baseball Games*, in *Mid-Am. J. of Bus.*, vol. 21, n. 2, 2006, 21-32; and T.C. Boyd, T.C. Krehbiel, R.T. Farmer, *Promotion Timing in Major League Baseball and the Stacking Effects of Factors that Increase Game Attractiveness*, in *Sp. Mark. Qu.*, vol. 12, n. 3, 2003, 173-183. T.K. Hixson, *Price and Non-Price Promotions in Minor League Baseball and the Watering Down Effect*, in *The Sp. J.*, vol. 8, n. 4, Autumn, 2005, analyses the watering down effect (when the promotional attendance impact decreases based on an increase in the number of promotions).

[239] An analysis of the importance of racial composition applied to the case of basketball can be seen in D.J. Berri, *Economics and the National Basketball Association: Surveying the Literature at the Tip-off*, in J. Fizel (ed), *The Handbook of Sports Economics Research*, 2006, 21-48.

[240] R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit., 91.

[241] H.A. Hoang, D. Rascher, *The NBA, Exit Discrimination, and Career Earnings*, in *Ind. Rel.*, vol. 31, n. 1, 1999, 69-91.

such as those by Hill et al.[242] and Burdekin and Idson[243] are consistent: if the first pitcher is black, the number of spectators decreases.[244]

Finally, it is important to mention that in relation to the stadium, researchers have focused on more than just capacity, a topic that was discussed previously. Since the earliest studies of demand by Drever and McDonald[245] and Becker and Suls,[246] and the most recent ones by Dobson and Goddard,[247] dummy variables have been generally used to control whether the features of the stadium and the location influence attendance.[248]

Conclusions

In this paper, we have presented a review of demand literature in the field of sports economics, viewing demand as the payment for sporting events of professional teams. Special attention has been paid to the clubs' behaviours as either profit-maximising companies, or as a utility function whose main argument is sport success in a theoretical scenario in which ticket prices are generally fixed in the inelastic range of the demand curve. Also, we have commented on the effect that the consideration of a wider definition of the cost to attend a sport event has on the price elasticity that is finally estimated. In this paper, an exhaustive review of the empirical literature about attendance was presented, with special attention dedicated to the way the dependent variable is defined in the different models, the types of

[242] J.R. Hill, J. Madura, R.A. Zuber, *The Short Run Demand for Major League Baseball*, cit., 238.

[243] R.C. Burdekin, T.L. Idson, *Customer Preferences, Attendance and the Racial Structure of Professional Basketball Teams*, cit., 91.

[244] Burdekin, Hossfeld and Smith are not as severe with their interpretation of this variable: R.C. Burdekin, R.T. Hossfeld, J.K. Smith, *Are NBA Fans Becoming Indifferent to Race? Evidence From the 1990s*, in *J. of Sp. Ec.*, vol. 6, n. 2, May, 2005, 144-159.

[245] P. Drever, J. McDonald, *Attendances at South Australian Football Games*, in *Int. Rev. of Sp. Soc.*, vol. 16, n. 2, 1981, 103-113.

[246] M.A. Becker, J. Suls, *Take Me Out to the Ballgame: The Effects of Objective, Social, and Temporal Performance Information on Attendance at Major League Baseball Games*, in *J. of Sp. and Ex. Psyc.*, vol. 5, n. 3, 1983, 302-313.

[247] S.M. Dobson, J.A. Goddard, *The Demand for Standing and Seated Viewing Accomodation in the English Football League*, cit., 53.

[248] With these variables, whether the stadium is new or old, if is a stadium considered to be classic, if it has been remodeled, and if it is indoor or outdoor can be controlled for. On this issue, see R.D. Zuber, J.M. Gandar, *Lifting the Television Blackout on No-Shows at Football Games*, in *Atl. Ec. J.*, vol. 16, n. 2, 1988, 63-73; B.R. Domazlicky, P.M. Kerr, *Baseball Attendance and the Designated Hitter*, in *The Am. Ec.*, vol. 34, Spring, 1990, 62-68; J. Borland, J. Lye, *Attendance at Australian Rules Football: A Panel Study*, cit., 67; R. Simmons, *The Demand for English League Football: A Club-Level Analysis*, cit., 22; D.A. Coffin, *If You Build It, Will They Come. Attendance and New Stadium Construction*, cit., 71; Kahane, S. Shamamske, S., *Team Roster Turnover and Attendance in Major League Baseball*, cit., 69; D. Rascher, *A Test of the Optimal Positive Production Network Externality in Major League Baseball*, cit., 63; and R. Butler, *Interleague Play and Baseball Attendance*, cit., 182. Also, Bruggink and Eaton (1996, cit., 62) control for this variable, but they measure it through stadium age.

data used and the different groups of determinants that influence attendance. In this context, the following issues should guide the most immediate developments in this literature: greater attention to the aspects related to econometric specification, such as considering the unobservable effects associated with the teams that play each match; the explicit "modelisation" of habits with the contrasting nature of the typical models; the consideration of potential endogeneity of some explanatory factors traditionally considered exogenous; and the incorporation and contrasting of studies concerning competitive balance or the usage of dynamic models.