The determinants of football attendance: new evidence from Italy and future lines of research

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Abstract

This paper investigates the determinants of football attendance on the basis of a unique data set of all fixtures of Italian "Serie A" from season 2004/2005 to season 2010/2011, including a comprehensive list of sport, economic and socio-demographic variables. The paper provides important insights to sport and city managers in order to enhance the demand for football. Results indicate that the degree of competition between teams and the quality of players are important factors of attraction. The introduction of anti-violence measures also affects attendance but differently for committed and uncommitted fans. Moreover, the increase in attendance brought by the World Cup victory in 2006 is more than offset by the decrease induced by the "Calciopoli" scandal.

Key words: football attendance, Italy, Calciopoli

1. Introduction

Football is the most popular sport in the world. Estimates indicate that football has over 4 billion followers and, in 2015/2016, generated 4.580 billion euros from total

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revenues in Europe alone; it pays the most expensive sports TV rights, involves the
highest paid athletes and around 30 football clubs feature in the top 50 list of most
valuable sports teams in the world.

The most watched competition in the world is the Football World Cup. Total
attendance of the 2014 World Cup in Brazil was 3429873 spectators, the 2nd in raking
since 1966 (lower than 1994 USA World Cup only, when spectators were 3568567)
and the average attendance per game was 53592 spectators.

According to the Union of European Football Associations, or UEFA, the European
football's governing body, in season 2016/2017, football attendances in Europe
increased by 2.6 million, realizing a 1.5 per cent year-on-year increase in spectator
numbers at domestic and European games. In 2015/2016, more than 170 million
people attended football games. Around a third of that total was generated by the
combined attendances of English Premier League and second-tier Championship and
of German Bundesliga. Together with English Premier League and German
Bundesliga, Spain's Primera Liga, Italy's Serie A and French Ligue 1 complete the "Top
Five" European leagues' ensemble[2].

A total of 34 European nations saw an increase in attendances in 2015/2016 with
respect to 2014/2015, with 17 decreasing. In season 2016/2017, games of Major
League Soccer in Europe had an average attendance of around 21.66 thousand
spectators per game. The average attendance in the Italian stadia was 21688
spectators, lower than in Germany (where on average 43616 spectators attended the
2016/2017 games), in England (37016 spectators on average) and in Spain (29397
spectators). Compared to season 2014/2015, total attendance to the Italian stadia
increased by approximately 1.7% but mainly in the Serie B league's games. In
addition, in Italy, the number of the Serie A's spectators has showed a decreasing
trend since the mid-eighties and a -1.1% variation since 2010, while it has increased
in the other Top Five's major leagues.

Yet, football can be considered the national sport in Italy. It is organized in three
professional leagues (Serie A, Serie B, Lega Pro) and includes hundreds of amateur
leagues, with total revenue of 1.93 billion euros in the 2015/2016 season, higher than
in France (1.49 billion euros) but lower than in England, Germany and Spain (4.87,
2.71, 2.44 billion euros respectively) (Deloitte, 2017). Among the Top Five, Italy
shows the highest percentage of revenues from broadcasting rights (62% in season
2015/2016) but the lowest from match attendance (11%, like in France) (Deloitte,
2017). Italy also has the lowest percentage of stadium utilization, 52%, while in
England it equals 96%, in Germany 90%, in Spain 76% and in France 70%. In addition,
in 2015/2016, only French Ligue 1 and Italian Serie A, among the Top Five leagues,
recorded aggregate operating losses. According to Deloitte (2017), Italian clubs'
revenues are unlikely to grow significantly over the next two seasons, with Serie A's
entering the third year of the existing media rights advisory relationship covering the
six-year period to 2020/2021. Apart from the funds distributions related to the

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[2]While the first five European football leagues are often referred to as the "Big Five" in the football
environment, we use the denomination "Top Five" since, in the psychological theory, "big five" refers to
the fundamental traits of human personality (McCrae and Costa, 1997).

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Juventus club's run to the 2016/2017 UEFA Champions League, "any further growth is expected to come from improving commercial deals and/or increasing matching attendances" (Deloitte, 2017, page 10).

It is therefore instructive to investigate the determinants of stadium attendance in Italy. Italian clubs' financial difficulties threaten their contractual strength in the market for new talent in an environment where the competition to capture fans' attention is extremely fierce. The increased complexity of the sport business requires an organic strategic planning (Cafferata, 1998), especially in the revenue management area (Mauri, 1999).

This paper investigates the determinants of football match attendance in the Italian major league Serie A. The paper concentrates on match attendance and not on TV audience because fans inside the stadium and television viewers are proven to have different preferences (in particular toward match uncertainty: Buraimo and Simmons, 2009) and the paper aims at providing football managers and national authorities with information on the variables they can control to improve gate revenues.

With respect to previous contributions on the demand for football in Italy (Di Domizio, 2007; Di Domizio and Caruso, 2015), the paper introduces a wider range of determinants related to, in particular, the quality of the match, the structural characteristics of stadium and the sociological aspects that might affect the attendants' behaviours (like match-fixing scandals or intra-city or historical rivalries).

The paper applies a panel data analysis that refers to all Serie A teams, seemingly to Di Domizio and Caruso (2015), but in reference to the period of time 2004/2005-2010/2011 (while Di Domizio and Caruso, 2015, concerns the period 2007/2008-2012/2013). The choice of such time interval is convenient for capturing the effect of exceptional events like the Italian football team's success in the World Cup 2006, the episodes of hooliganism happened in 2007 and the anti-violence measures implemented afterwards. This is particularly interesting given the recent agreement among the Italian football government bodies, including the Ministry of Interior and of Sport, for a freer access to football matches for both occasional and committed spectators[3].

In addition, the paper takes advantage of De Paola and Scoppa (2012) findings about the (absence of) effects of coach changes on team performance and introduces a measure of coach turnover among the attendance's determinants.

2. Literature review

The literature on the demand for football covers almost all major national and international football events taking place in different nations and in sometimes greatly heterogeneous social and economic contexts. The empirical evidence mostly

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[3]Information about the approved protocol is available at:
http://www.figc.it/it/204/2538700/2017/08/News.shtml

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concerns European countries, an exception being Brazil. In such a vast evidence, a few variables recur as the main determinants of football demand: economic factors such as income and ticket price, the expected quality of the match in terms of competitive balance and talents on the pitch, the stadium infrastructure. The articles on demand for football presented in this section are organized by country and pertain match attendance at the stadium. The literature review highlights its main determinants and the various, possibly different, variables used in the literature to describe them.

The majority of empirical analyses on gate attendance relate to Germany. Feddersen et al. (2006) find that football is a normal good. In addition, as purchasing decisions might be influenced by environmental stimuli (Prete et al., 2013), the demand for football is likewise positively affected by the chance of attending a match in a modern and equipped with all amenities stadium. Brandes et al. (2013) find a strong, positive relationship between the economic performance of sport clubs and the demand for tickets in the German league. Benz et al. (2009) claim that uncertainty, history, reputation and club prestige (measured by the national and international titles won) are equally important determinants of attendance. Czarnitzki and Stadtmann (2002) demonstrate that German fans prefer high-level matches and that they value more game quality than uncertainty about the final outcome of the game. The idea that quality is an important determinant of the demand for football is confirmed by Brandes et al. (2008), who control for the players' popularity for verifying the supporters' loyalty to them.

The search for a high quality level is one of the main determinants of attendance to football events in Great Britain as well. The demand for tickets is positively influenced by the degree of game competition and the players' ability both in the English league (Buraimo and Simmons, 2008) and in the international sport events organized on the English soil, like the 1996 European Championships (Baimbridge, 1997). In Buraimo (2008), the talent of the players affects the choice of fans to follow the match. Moreover, people are more likely to attend the game at the stadium on a holiday and when the distance from home is small.

Forrest and Simmons (2006) analyse the fixture congestion in English football league schedules and find that televised midweek Champions League matches involving English Premier League clubs have substantial adverse impacts on lower division football league gate attendance.

Dobson and Goddard (1996) focus on the economic factors determining attendance, a choice suggested by the time interval considered in the analysis (1955-1992) that includes periods of recession for the English economy. In the short term, the choice of attending a match is negatively influenced by ticket price and positively affected by the number of goals scored by clubs during the championship. In the long run, the demand for tickets is negatively influenced by the unemployment rate.

The unemployment rate also plays a significant part in explaining (a decrease in) attendance to the Greek championship matches (Avgerinou and Giakoumatos, 2009). However, the estimate reveals that the enthusiasm generated by the Greek national team's victory in the 2004 UEFA European Football Championship, had a positive impact on the demand for tickets.

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Madalozzo and Berber Villar (2009) show that the ticket price is the main determinant of gate attendance in Brazil. Brazilian fans, while appreciating the high quality of the match, are particularly attracted by the opportunity to pay less or to win a ticket through marketing promotions launched by the championship sponsors.

Falter and Pérignon (2000) evidence that the economic factors matter in the European football panorama as well. More specifically, the analysis on the French Première Division football reveals that football appears to be an inferior product affected by socio-economic variables like unemployment rate and transportation costs.

One study about Finland and another about Switzerland demonstrate that fans also look for comfort when considering attending a football match. Iho and Heikkilä (2010) explain that the introduction of a new and faster method of buying Finnish football match tickets (called ATS) had a positive effect on demand. Baranzini et al. (2008) show that Swiss attendants like matches whose result is a priori uncertain. On the other hand, the presence of obsolete structures, opened in the past and rarely renewed, discourages attendance and depresses the demand for football (though increasing in Switzerland in the last decade).

Studies about the Spanish championship show the most heterogeneous results concerning the determinants of demand for football. García and Rodríguez (2002) confirm that the expected quality and the relative importance of the match are the most significant variables that positively affect attendance. Villa et al. (2010) focus on socio-economic factors and show that population (defined as the number of inhabitants of a province) and income are positively related to the demand for tickets. Unique among the so far considered variables, the club budget is also positively related to the demand for football.

For Italy, Di Domizio (2007) analyzes the aggregate stadium attendance time series from 1963 and 2005 and find that paying spectators are higly sensitive to violence and scandals that might treathen the clubs' credibility while seasonal subscribers do not. Both paying attendants and subscribers do not appear to be sensitive to the competitive balance and subscribers are also attracted by the high odds that the home club will win.

Di Domizio and Caruso (2015) explore the relationship between hooliganism, counterviolence policies and stadium attendence in the Italian "Serie A" matches from 2007 to 2012. Counterviolence measures are captured, in particular, by the so-called "tessera del tifoso" (introduced by Law 41/07), a fidelity card compulsory for seasonal ticket holders and away fans, aimed at keeping out hooligans from stadia and favoring the attendance of either occasional spectators or uncommitted fans. They find that the expected substitution between committed fans and uncommitted ones did not take place.

In this paper, we consider the effect of the "tessera del tifoso" and we stay open to the possibility that additional measures of safety and security (namely, the introduction of turnstiles) may contribute to creating a pleasant environemnt and attracting both occasional and uncommitted spectators. Since successful stadium safety and security result from a right balance between stadium design and stadium management, evidence on the effects of structural and regulatory changes may help

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event organizers and stadium authorities to improve perceived and actual safety and, as a consequence, attendance.

De Paola and Scoppa (2012) use match results of the major Italian soccer league Serie A to study the effects of coach changes on team performance in order to infer the effect of managerial turnover on firm performance. They find that changing the coach does not affect team performance neither when considering as dependent variable the number of points per match nor when looking at the number of goals scored or conceded. Even if the aim of the De Paola and Scoppa (2012)'s article differs from ours', we consider coach changes among the determinants of stadium attendance in Italy.

3. The determinants of attendance: methodology and data

This section describes the manually compiled dataset, introduces the empirical model and explains the estimation strategy. In addition to variables identified as relevant by the dominant literature on stadium attendance, the dataset also includes variables that are original with respect to previous contributions on the subject, at least up to our knowledge. In the first case, the suitable references are included in the variables' description that follows.

The econometric investigation is performed at home match level using a panel dataset containing information on all the fixtures played by the Serie A football clubs between 2004/2005 and 2010/2011 (seven seasons). The lower bound of the time period, season 2004/2005, is suggested by the changes introduced in the Serie A by the Italian FIGC and by the National Professional League of Serie A (LNP, Lega Nazionale Professionisti di Serie A[4]) that made the number of Serie A clubs increase from eighteen to twenty in season 2004/2005 and the number of matches played by each club in each season increase from thirty-four to thirty-eight. Between 2004/2005 and 2010/2011, nine out of twenty-nine clubs played all seven seasons in Serie A while two clubs played one season only in Serie A[5]. On average, the Italian teams played 4.75 out of seven seasons in the major league during 2004/2005 and 2010/2011, with an average attendance of 21369.973 spectators per game, in line with data for 2016. The panel is then composed by 28 cross section units with a variable time length from 19 up to 133 (=19 x 7) weeks. In total, the data set includes more than 2500 records.

We estimate the model:

$$y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \upsilon_i + \tau_t + \varepsilon_{it}$$

(a)

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[4]Up to 2010, there was a unique National Professional League (NPL), often referred to as "Lega Calcio". In 2010, the NPL ceased to exist and two different identities were created: the National Professional League of Serie A and the National Professional League of Serie B.
[5]Cagliari and the fixtures involving it were excluded from the final data set for lack of information about the results of the club.

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where y_{it} represents the number of attendants (in absolute value or natural logarithm) to match played by club i (i=1, …, 28) on its own ground in week t (t=1, …, 133), X_{1it} to X_{4it} are matrixes including the independents variables classified into four different categories ("sport", "stadium", "sociology", "economy and demography", respectively), β_0 to β_4 are the vectors of parameters to be estimated, υ_i is the unobserved individual effect, τ_t is the unobserved time effect, ε_{it} is the error term. The model is estimated through fixed effects, according to the empirical approaches proposed by the extant literature (for instance, Buraimo, 2008)[6].

Table 2 lists the variables included in the data set, the abbreviations used in the estimates, grouped by type (the dependent variable and the independent variables by category: "sport", "stadium", "sociology", "economy and demography") and their description.

The dependent variable y_{it} is *attendance* (or *lattendance* when in logarithm), which is the number of live spectators to any match, including those who paid the ticket and also the seasonal ticket holders, or subscribers (variable *subs*). Alternatively, attendance is also measured by the number of spectators excluding the seasonal ticket holders, with the aim of investigating the behaviour of uncommitted and casual fans and especially because the government strategy against violence focuses on seasonal tickets holders (Di Domizio and Caruso, 2015). In this case, the number of subscribers might be used as an explanatory variable to capture a possible substitution effect between seasonal and gate ticket holders. Information on attendance is obtained from the website www.stadiapostcards.com and crosschecked with the Italian sport newspapers "Gazzetta dello sport" and "Tuttosport".

The "sport" variables (group of variables X_1) include regressors capturing the quality of the match and of the involved team. The odds that the home (variable *quotah*) or away team (*quotaopp*) will win are aimed at measuring the effect that the competitive balance exerts on attendance (Forrest and Simmons, 2002, to cite one). The absolute difference between the odds that the home and the away team will win (variable *quotadiff*) is included in the estimate as an alternative to *quotah* and *quotaopp*. The estimation strategy takes into account the possibility that attendance might depend on the odds in a non-linear way (Buraimo and Simmons, 2008). Odds that the home (away) team will win are obtained from the website www.betexplorer.com.

Variables *pos1h* and *pos1opp* measure the home team's and the opponent's ranking at the end of the previous season. A club newly promoted to Serie A (which had then been playing in Serie B the season before) is assigned the position next to that of the last Serie A's club that was not demoted to Serie B in the previous season. For the

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[6]Gate or seasonal ticket's price is not included among regressors for lack of available information. In previous contributions on football demand in Italy (Di Domizio, 2007; Di Domizio and Caruso, 2015), price ticket is proxied by a national price index that, however, does not take into account the price variability by stadium sector, club and match.

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same, newly promoted to Serie A, hypothetical club, variable *goaldiff1h* (or *goaldiff1opp*), which measures the club's goal difference at the end of the previous season (computed as goals scored minus goals conceded), takes value -30.

Two variables, *chcoachseas* and *chcoachmatch*, are meant to capture the effect that a change of coach, happened at some point of the season, will have on attendance (De Paola and Scoppa, 2012). Variable *chcoachseas* takes value 1 in the season in which a coach is dismissed and replaced and captures the effect of such change on the attendance at any match of the season; variable *chcoachmatch* takes value 1 for the match that immediately follows the coach dismissal[7].

Other "sportive" independent variables concern the clubs' reputation and measure the number of national and international titles won (Benz et al., 2009). National titles (variables *gittith, gittitopp* for the home and the opponent team, respectively, or *gittit*, including both) include Serie A Championship, Italian Cup and Italian Super Cup. International titles (variables *gintltith*, *gintltitopp*, *gintltit*) include European Cup (in 1992 renamed UEFA Champions League), Inter-Cities Fairs Cup (from 1971 to 2008 called UEFA Cup, since 2009 called UEFA Europa League), UEFA Cup Winners' Cup (up to 1998/1999, then absorbed by the UEFA Cup), UEFA Super Cup and Intercontinental Cup (since 2005 FIFA Club World Cup). Single dichotomous variables indicating the UEFA Champions League's and UEFA Europe League's winners are also included as alternative regressors (variables *championh*, *championopp*, *europeh*, *europeopp*). Moreover, variables *goldh* and *goldopp* capture the presence of any FIFA Golden Ball winners among the home and the away team's players. Variable *match* varies from 1 to 19 and indicates the match number in order to infer whether attendance depends on the moment of the season when the match is played. Finally, variable *immassetsh* (*immassetsopp*) measures the value of immaterial assets for the home (away) team. The purchase of a football player is recorded in the club's immaterial assets balance sheet account, where the information was retrieved.

The second category of independent variables (group of variables X_2) includes variables related to the stadium where the match is played. Information about the stadium capacity in terms of seats (variable *seats*: Forrest and Simmons, 2002) was found in the National Observatory on Sports Events website, in the section CNIMS ("Centro Nazionale di Informazione sulle Manifestazioni Sportive", i.e. the national information centre on sports events).

All other variables about the stadium structural characteristics were retrieved from the clubs' websites or from the UEFA website. Those include variable *evstaduefa* (that takes value 1 when the stadium is rated as of category 4 according to the UEFA Stadium Infrastructure Regulations and 0 otherwise), dichotomous variables *noroof* and *totroof* indicating whether the stadium has no roof at all or, on the contrary, a total coverture, respectively, variables indicating the year of inauguration (*inaugstad*)

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[7]Variables *chcoachseas* and *chcoachmatch* refer to home teams (only) to avoid that the coach replacement is accounted twice for each team, one when the team plays on the home ground and one when it plays on the away ground. The same approach is adopted for other independent variables (see the variables' description in Table 2).

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and the year in which the stadium was last restructured (*lastrestr*), on the basis of which the stadium "embellished" age was computed (*stadiumage*).

It is worth noticing that the stadium architecture remained unchanged during the concerned period[8]. The empirical strategy adopted in the paper, that privileges the fixed-effect estimation, does not allow capturing the effect of variables *evstaduefa*, *noroof* and *totroof* since they are dichotomous variables that remain constant for a team over time. Between 2004/2005 and 2010/2011, three out of twenty-four stadia were rated as of category 4 UEFA (stadium Meazza in Milan, stadium Olimpico Grande Torino in Turin, stadium Olimpico in Rome), eight had a complete roof (in addition to the stadia in Turin, Milan and Rome also stadia in Bari, Cesena, Genoa, Naples and Verona) and two no roof at all (stadia in Ascoli Piceno and in Messina).

Variable *torn* equals 1 for all matches disputed from mid-February 2007 on and 0 otherwise. It is meant to capture the effects that regulatory measures introduced to increase the stadium safety have on attendance. These measures include the installation of turnstiles in order to lead supporters enter single-file and restrict the passage to people who insert a regular ticket or the "tessera del tifoso". The "tessera del tifoso" (supporter's ID card) is an identity document identifying fans and supporters of specific football clubs. It was introduced by Law 41/2007 as a further safety measure and with the aim of countering the increasing level of hooligan violence that had led to the death of the Italian police officer Filippo Raciti on February 2, 2007. Both turnstiles and "tessera del tifoso" garnered widespread criticism amongst Italian supporters and club managers upon its introduction and in the years since, as they were thought to do more harm to attendances than good to safety. Actually, stadium turnstiles were made compulsory in 2005 with the emanation of Law 155/2005 and the "tessera del tifoso" during the 2010/2011 season but surely the events on February 2007 radically changed the whole football attendance experience. This is why, in the dataset, variable *torn* takes value 1 from mid-February 2007 on (and not on the single matches classified as "risky" by the State Police, as in Di Domizio and Caruso, 2015).

The third category of independent variables (group of variables X_3) includes sociological variables affecting the preferences of attendants. Variables *derby*, *rivalry* and *twins* take value 1 when the fixture involves, respectively, teams from the same town (Milan and Internazionale, Roma and Lazio, Juventus and Torino, Genoa and Sampdoria), teams whose supporters are linked by traditional rivalry (Internazionale and Juventus, for example) or teams whose supporters have been twinned by the so-called "gemellaggio" (like Brescia and Milan, for example). Information about variables *derby*, *rivalry* and *twins* was searched for by digging into the Internet, in club websites and sports blogs. All three variables are expected to increase the attendance to the game.

Variable *calciop* takes value 1 for all matches played from season 2006/2007 on, when the "Calciopoli" scandal took place. In May 2006, the Italian police uncovered a thick network of relations between professional football leagues' managers and referees' organizations, from both Serie A and Serie B, accused of match-fixing by

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[8]Juventus FC relocated into the new "Juventus" Stadium at the beginning of season 2011/2012.

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selecting favourable referees. The list of major teams involved in the scandal includes Milan, Fiorentina, Lazio, Reggina and Juventus: Juventus was the Serie A champion at the time and, as a final punishment, was relegated to Serie B in the following season 2007/2008 and stripped of the 2005 and 2006 Serie A titles; Milan was punished with eight point deduction that consigned it to the lower reaches of Serie A. The "Calciopoli" scandal had a tremendous impact on the Italian football's image, being covered by all sports media around the world, and seriously damaged the football's attraction power in Italy. In that same year 2006, in July, Italy won the FIFA World cup: a victory that helped healing the wounds caused by the scandal and drew fans closer to football. The variable *calciop* captures the ambivalent consequences that the "Calciopoli" scandal, on the one hand, and the 2006 World Cup victory, on the other hand, had on the subsequent football seasons, from 2006/2007 on.

Last category of independent variables (group of variables X_4) includes economic and demographic characteristics of the clubs' hometown. While the inhabitants of the Province of the home team's hometown (variables *poph*) and the home and away team's Province income (*incomeh* and *incomeopp*) are expected to positively affect the stadium attendance, the distance (variable *distance*) between the home and away team's hometown is expected to negatively influence it (García and Rodríguez, 2002). Information about population was retrieved from the National Institute of Statistics (ISTAT) website, data on income from the Italian Local Municipalities website and data on distance from Google. Being attendance a continuous variable, the estimation of the log-log model (with *lattendance* as dependent variable and *lincomeh* or *lincomeopp* as regressors) provides estimates of the elasticity of football attendance with respect to income.

4. Results

Table 3 and Table 4 show the results of model (a) estimates, using the fixed-effect estimator. First, attendance is regressed on different variables from the "sport" group (X_1) only, with the aim of understanding which degree of competition and which level of game quality the spectators look for when they decide to attend the match at the stadium (Table 3). Then, other variables from the stadium, sociology, economy and demography groups (X_2, X_3, X_4) are added as regressors (Table 4). In particular, models in Table 4 include the stadium variables *torn* and *calciop*, which are pivotal for the analysis of the consequences of the anti-violence measures, on the one hand, and of the Italian World Cup victory, on the other hand[9]. All models include time dummies.

In both Table 3 and Table 4, the dependent variable is total attendance (in logarithm: variable *lattendance*) or, alternatively, the number of attendants excluding the season ticket holders or subscribers (in logarithm: variable *lattminussubs*). Such

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[9]Collinearity between discrete variables (including time dummies) does not allow considering, among regressors, most variables related to the sociological aspects of attendance, like *derby*, *twins*, *rivalry*. Nevertheless, the regression of attendance that includes these variables as unique regressors (not shown) evidences their significant and positive impact on the demand for football.

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distinction allows investigating the possible behavioural differences between committed and uncommitted fans.

Results in Table 3 show that attendance depends on the odds that the home team will win in a non-linear way (Buraimo and Simmons, 2008) as both coefficients of *quotah* (positive) and *quotah_sq* (negative) in models (1) and (3) are significant at 1 per cent level. When the (absolute) difference between the odds that home and away teams will win is included as an alternative measure of competitive balance, estimates show that spectators prefer to attend rather unbalanced matches, since the coefficient of variable *quotadiff_abs* in models (2) ad (4) is positive and significant at 1 per cent level.

Attending a live football match is more attracting as the mid-season break or the end of the season approaches (and variable *match* increases), which is intuitive given the chances that the "winter champion" will turn out to be also the seasonal title's winner, or that competition would tighten toward the end of the championship. Indeed, variable *match*'s coefficient is always positive and highly significant.

These results hold when attendance concerns both committed and uncommitted fans.

Instead, there are some nuances in the influence exerted by other sport variables on regular fans, on the one hand, and occasional fans, on the other hand. For all attendants, the away team's goal differences at the end of the previous season positively impact on the demand (the coefficient of variable *goaldiff1opp* is always positive and significant at 1 percent level) but while uncommitted fans are also attracted by a strong goal difference of the home team (the coefficient of variable *goaldiff1h* is positive significant in model (3)), such difference deters the crowd as a whole from attending the match (the coefficient is negative and significant in model (1)), consistently with the idea that football fans are more willing to support a home team whose historical superiority is dubious.

The second difference between committed and uncommitted fans concerns the reaction to the coach dismissal. Both kinds of spectators appear to be negatively affected by a coach turnover, since the coefficients of variables *chcoachseas* and *chcoachmatch* are always negative (and significant too, in model (1)). Nevertheless, occasional attendants seems to be sensitive to coach changes right after the dismissal but not significantly affected by a turnover happened at some point during the season (as the *chcoachmatch*'s coefficient is negative and significant but *chcoachseas*' one is not in model (3)), which is reasonable, given their characteristics of uncommitted spectators who are probably concerned by sport events in the short but not in the long run.

The third difference concerns the reaction to the teams' assets value. Variable *attendance* is positively influenced by both teams' immaterial assets so that the coefficients of variables *immassetsh* and *immassetsopp* are positive and significant in model (1). When the measure of attendance excludes the seasonal ticket subscribers (model (3)), the value of home team assets (*immassetsh*) results to be not significant while that of the away team (*immassetsopp*) exerts a positive and significant impact on demand, thus capturing the potential attractiveness of opponent's superstars playing on the home team's ground.

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The different impact of the titles won in Italian or International competitions is more difficult to interpret but in general, attendance is higher for most successful teams, as witnessed by the coefficients of *gittith*, *gintltith*, *gittitopp* and *gintltitoopp* that are always positive, when significant.

The inclusion of variables capturing the teams' quality different from the ones included in models (1)-(4) (namely, variables *goldh*, *goldopp*, *championh, championopp*, *europeh, europeopp*), does not alter the estimates and, overall, signals that football spectators value the teams' superiority at national and international level[10].

Table 4 illustrates the estimates of model *a* in which a richer set of variables are included as regressors. The difference between the odds that the home and the away team will win (in absolute value, *quotadiff_abs*) is chosen as a measure of competitive balance.

Distance between the home and the away team's city (variable *distance*) has a negative impact on attendance and a fixture scheduled during the weekend (*we*) attracts more uncommitted fans, as expected. The same uncommitted fans are more willing to attend matches in newer stadia (*stadiumage*). Additionally, a substitution effect emerges between subscribers and occasional fans (*subs*). Football appears to be an inferior good (*incomeh*) and attendance is higher when the home team belongs to a bigger city (*poph*).

Important differences arise in the behaviour of uncommitted fans. The coefficient of variable *torn* (which captures both the installation of turnstiles and the introduction of the "tessera del tifoso") is negative and significant when the dependent variable is *attminussubs* (model (6)), while it is positive and significant when the dependent variable is *attendance* (model (5)). Apparently, football spectators, as a whole, appreciate the additional safety measures but uncommitted fans are discouraged to attend live matches, probably because the "tessera del tifoso" is compulsory just for away fans (and commited ones). This is consistent with the database construction strategy, that takes the point of view of the "home team", so that we might expect that many of the occasional spectators disturbed by the fidelity card are, indeed, the away team supporters.

Similarly, the Calciopoli scandal and the Italian victory in the FIFA World Cup (both captured by variable *calciop*) have a different impact on occasional versus committed fans. In particular, the formers seem to be untouched by the 2006's events (the coefficient is not significant in model (6)) while, when attendance includes subscribers (model (5)), the effect is negative and significant. The Italian supporters' faith has been hit hard by the discovery of match-fixing strategies and even the World Cup successful outcome did not help in reacquainting them with football.

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[10]These additional estimates are not included in Table 3 and Table 4 and are available upon request.

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5. Conclusions

This paper investigates the determinants of stadium attendance to the Italian "Serie A" matches from season 2004/2005 to season 2010/2011. The relationship between attendance and the odds that the home team will win has an inverted-U shape and attendance responds positively to an increase in the difference between the odds that the home and the away teams will win. The quality of players, their value and the titles they won, attract more spectators. Old stadia discourage uncommitted fans from attending the match, and so a coach dismissal, but only in the short run. Similarly to Di Domizio and Caruso (2015), but through a different empirical approach, the paper shows that the introduction of safety measures like the fidelity card "tessera del tifoso" did not bring the substitution of committed with uncommitted fans but, on the contrary, deterred the latters from attending matches played on the away ground. Nevertheless, the installation of turnstiles appears to increase the perceived safety of attendants and the affluence to the stadium. On the other hand, the increase in the overall attendance brought by the World Cup victory in 2006 is more than offset by the decrease induced by the "Calciopoli" scandal.

The paper presents both limitations and challenges that future research might address and take on. First, the analysis of sport demand may be framed within the sport consumer experience and behaviour to deeper investigate how football consumer's perception of quality are formed, which are the key determinants of football consumer satisfaction and how they impact on the loyalty of committed fans (Funk, Alexandris and McDonald, 2016). Second, the analysis omits to include among explanatory variables the clubs' budget that, together with the players' value, constraint the clubs' activity and their performance. Ascari and Gagnepain (2007) simultaneously consider the clubs' demand, performance and budget to document the rent-dissipation in the Spanish football industry. Information on the financial data of Italian football clubs would permit a replication study in the Italian context.

A longer time series of information on the players' value and coaches' turnover might allow verifying the relationship between the players' potential as future leaders (the "expert knowledge": Goodall et al., 2011) and team performance in case he becomes a coach. Likewise, the odds that a team will win may proxy the match's "suspense" and "surprise", that are shown to influence the demand for entertainment (Bizzozero et al., 2016), and can be used to evaluate the success of present or future possible formats of soccer competitions.

A suitable, longer than the actual, period of time should include two more editions of the FIFA World Cup (the 2010's edition, played in the Republic of South Africa, and the 2014's edition, played in Brazil) and the changes recently introduced in the Italian ticketing system. In September 2017, the Italian Football Federation (FIGC), the Italian National Olympic Committee (CONI), the Ministry of Interior and of Sport and the Italian Football Leagues reached an agreement for the free purchase of tickets for non-risky matches and the free purchase of subscriptions. Over the next three years, the "tessera del tifoso" will become a loyalty card and will be seen exclusively as a marketing tool. As per explicit declaration of the National Observatory of Sports Events, the simplification in the ticket purchasing method has been introduced in

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consideration of the overall improvement of data on safety and the adaptation to the European standards of infrastructural criteria in the professional championships (to be realized in three-year time). Therefore, the extension of the time spam included in the empirical analysis would allow a clearer definition of the impact of security measures and of exceptional events like the FIFA World Cup on stadium attendance. At the same time, the evolution of the "tessera del tifoso" into a purely marketing tool invites to address key issues for football club marketers, such as sponsors and right holders' influence, consumption on new platforms, fans' preferences for engaging experiences, keeping in mind that, in the end, empty venues have a hugely negative effect on the entire sports marketing mix.

Table n. 1 – Clubs, number of seasons played by each of them in Serie A and average attendance between 2004/2005 and 2010/2011

Club	Number of seasons played in Serie A	Average number of attendants, per match
Ascoli	2	9760.343
Atalanta	5	12586.95
Bari	2	22566.47
Bologna	4	19822.12
Brescia	2	8075.605
Catania	5	16392
Cesena	1	16469.05
Chievo Verona	6	10930.53
Empoli	3	6717.196
Fiorentina	7	30260.14
Genoa	4	25429.65
Internazionale	7	54197.99
Juventus	6	24204.16
Lazio	7	30269.1
Lecce	4	12877.29
Livorno	5	11397.87
Messina	3	21292.63
Milan	7	54829.23
Napoli	4	42315.77
Palermo	7	26229.6
Parma	6	15003.96
Reggina	5	13143.05
Roma	7	40256.2
Sampdoria	7	22741.2
Siena	6	9798.535
Torino	3	19093.74
Treviso	1	5358.316
Udinese	7	16340.56
Average	*4.75*	21369.973

Source: our elaboration.

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Table n. 2 - List of variables

Type of variable	Model's group of variables	Variable (discrete/dichotomous/continuous, min-max if applicable)	Variable abbreviation
Dependent variable	y_{it}	Attendance (discrete, 0 - 81766)	*attendance*
		Natural logarithm of attendance (continue, 8.006 -11.311)	*lattendance*
Sport	X_{1it}	Season (discrete, 2004 - 2010)	*year*
		Home match number (discrete, 1 -19)	*match*
		Away team	*opp*
		Odds that home team will win (continue, 1.02 - 19.75)	*quotah*
		Square of the odds that home team will win (continue, 1.040 - 390.062)	*quotah_sq*
		Odds that away team will win (continue, 1.1 - 26.09)	*quotaopp*
		Difference between odds that home and away teams will win, in absolute value (continue, 0 - 25.02)	*quotadiff*
		Home team's ranking at the end of the previous season (discrete, 1 - 22)	*pos1h*
		Away team's ranking at the end of the previous season (discrete, 1 - 22)	*pos1opp*
		Home team's goal difference (goals scored minus goals conceded) at the end of the previous season (discrete, -30 - 54)	*goaldiff1h*
		Away team's goal difference (goals scored minus goals conceded) at the end of the previous season (discrete, -30 - 54)	*goaldiff1opp*
		Home team's coach dismissal during the season (dichotomous variable, 0 - 1)	*chcoachseas*
		First match after coach dismissal (dichotomous variable, 0 - 1)	*chcoachmatch*
		Presence of FIFA Golden Ball winners among the home team's players (dichotomous variable, 0 - 1)	*goldh*
		Presence of FIFA Golden Ball winners among the away team's players (dichotomous variable, 0 - 1)	*goldopp*
		Home team participation to the UEFA Champions League during the season (dichotomous variable, 0 - 1)	*championh*
		Away team participation to the UEFA Champions League during the season (dichotomous variable, 0 - 1)	*championopp*
		Home team participation to the UEFA Cup (later, UEFA Europe League) during the season (dichotomous variable, 0 - 1)	*europeh*
		Away team participation to the UEFA Cup (later, UEFA Europe League) during the season (dichotomous variable, 0 - 1)	*europeopp*

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Table n. 2 - List of variables (continues)

Type of variable	Model's group of variables	Variable (discrete/dichotomous/continuous, min-max if applicable)	Variable abbreviation
Sport	X_{1it}	Number of Italian titles won by the home team up the current match (discrete, 0 - 40)	*gittith*
		Number of Italian titles won by the away team up the current match (discrete, 0 - 40)	*gittitopp*
		Sum of the Italian titles won by both home and away teams up to the current match (discrete, 0-69)	*gittit*
		International titles won by the home team up to the current match (discrete, 0 - 18)	*gintltith*
		International titles won by the away team up to the current match (continue, 0 - 18)	*gintltitopp*
		Sum of international titles won by both the home and the away teams up to the current match (discrete, 0 - 29)	*gintltit*
		Total value of immaterial assets for the home team (continue, 1608173 - 171758412)	*immassetsh*
		Number of season ticket holders (for home team only: discrete, 2749 - 52673)	*subs*
		Natural logarithm of season ticket holders (continuous, 7.918 - 10.871)	*lsubs*
		Match for season ticket holders only (dichotomous variable, 0 - 1)	*onlysubs*
Stadium	X_{2it}	Stadium's capacity (discrete, 10000 - 82995)	*seats*
		Stadium opening year (discrete, 1911 - 2006)	*inaugstad*
		Year of the stadium's more recent renovation (discrete, 1959 - 2006)	*lastrestr*
		Number of years since last renovation (discrete, 0 - 78)	*stadiumage*
		Natural logarithm of stadium age (continuous, 2.30 - 4.35)	*lstadiumage*
		Stadium with no roof (dichotomous variable, 0 - 1)	*noroof*
		Stadium with complete roof (dichotomous variable, 0 - 1)	*totroof*
		UEFA stadium category equal to 4 (dichotomous variable, 0 - 1)	*evstaduefa*
		Turnstiles at the stadium and mandatory "tessera del tifoso" for the away team supporters (dichotomous variable, 0 - 1)	*torn*

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Table n. 2 - List of variables (continues)

Type of variable	Model's group of variables	Variable (discrete/dichotomous/continuous, min-max if applicable)	Variable abbreviation
Sociology	X_{3it}	"Gemellaggio" arrangement between home and away teams' supporters (dichotomous variable, 0 - 1)	*twins*
		Fixture is a derby (dichotomous variable, 0 - 1)	*derby*
		Traditional rivalry between home and away team (dichotomous variable, 0 - 1)	*rivalry*
		Match played during the week-end (dichotomous variable, 0 - 1)	*we*
		Match played after the "Calciopoli" scandal (dichotomous variable, 0 - 1)	*calciop*
Economy and demography	X_{4it}	Home team's city	*city*
		Away team's city	*cityopp*
		Population of the Province of the home team's town (discrete, 258821 - 4110035)	*poph*
		Income of the Province of the home team's town (continue, 16385 - 29363)	*incomeh*
		Income of the Province of the away teams' town (continue, 16385 – 29363)	*incomeopp*
		Natural logarithm of income of the Province of the home team's town (continue, 4.214 - 4.467)	*lincomeh*
		Natural logarithm of income of the Province of the away teams' town (continue, 4.214 - 4.467)	*lincomeopp*
		Distance between the home and away teams' towns (continue, 0 – 10000)	*distance*
		Natural logarithm of distance between the home and away teams' towns (continue, 3.039 – 9.210)	*ldistance*

Source: our elaboration.

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Table n. 3 - Fixed effects estimates of stadium attendance: "sport" variables

	Dependent variable			
Model	**(1)**	**(2)**	**(3)**	**(4)**
Independent variables	*lattendance*		*lattminussubs*	
quotah	0.114***		0.289***	
	(0.011)		(0.036)	
quotah_sq	-0.004***		-0.012***	
	(0.001)		(0.003)	
quotadiff_abs		0.010***		0.018***
		(0.002)		(0.006)
goaldiff1h	-0.001***		0.003**	
	(0.000)		(0.001)	
goaldiff1opp	0.001***		0.004***	
	(0.000)		(0.001)	
gittith		0.012***		-0.005
		(0.005)		(0.015)
gittitopp		0.012***		0.041***
		(0.001)		(0.004)
gintltith		-0.010		0.112***
		(0.012)		(0.040)
gintltitopp		0.008***		0.015**
		(0.002)		(0.006)
chcoachseas	-0.034***		-0.032	
	(0.011)		(0.037)	
chcoachmatch	-0.041*		-0.181**	
	(0.024)		(0.083)	
limmassetsh	0.103***		-0.023	
	(0.014)		(0.045)	
limmassetsopp	0.041***		0.206***	
	(0.007)		(0.023)	
match	0.004***	0.004***	0.015***	0.015***
	(0.001)	(0.001)	(0.003)	(0.003)
Constant	7.085***	9.689***	4.818***	7.925***
	(0.269)	(0.043)	(0.898)	(0.162)
Observations	2,503	2,503	2,414	2,414
R-squared	0.356	0.395	0.305	0.357

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Table n. 4 - Fixed effects estimates of stadium attendance

	Dependent variable	
Model	**(5)**	**(6)**
Independent variables	*lattendance*	*lattminussubs*
lsubs		-0.750***
		(0.092)
quotadiff_abs	0.023***	0.052***
	(0.002)	(0.007)
torn	0.138**	-0.150***
	(0.055)	(0.057)
calciop	-0.112***	0.076
	(0.028)	(0.266)
chcoachseas	0.0264*	0.160***
	(0.016)	(0.039)
chcoachmatch	-0.056**	-0.172*
	(0.028)	(0.089)
limmassetsh	0.084***	0.023
	(0.018)	(0.048)
limmassetsopp	0.129***	0.453***
	(0.006)	(0.018)
lincomeh	-4.594***	
	(1.359)	
lpoph	1.561***	
	(0.595)	
ldistance	-0.038***	-0.136***
	(0.007)	(0.023)
we	0.015	0.199***
	(0.016)	(0.048)
match	0.003***	0.014***
	(0.001)	(0.003)
lstadiumage		-26.060***
		(4.742)
Constant	4.574	108.100***
	(11.730)	(18.280)
Observations	1,752	2,139
R-squared	0.310	0.311
Number of *team*	26	24

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