The Determinants of the TV Demand for Soccer:

Empirical Evidence on Italian Serie A for the Period 2008–2015

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Abstract

This paper investigates the determinants of the TV audience for Italian soccer in seven Serie A seasons (2008–09 to 2014–15). Italian viewers have committed behaviour and that outcome uncertainty does not have a impact on the TV audience. When choosing whether to watch a match involving teams other than their favourite team, Italian consumers are attracted by both the aggregate quantity of talent and the matches involving teams at the top of the table. An increase in the TV demand is driven by an enhancement in the performance of the top clubs and in the quality of the entertainment.

Keywords: Broadcasting; Soccer; TV Demand; Uncertainty-of-Outcome Hypothesis; Talent; Serie A.

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Introduction

In team sport TV broadcasting rights constitute the main source of revenue for clubs. In fact, TV networks allocate a substantial amount of money to the most important sport tournaments. In European countries the most popular sport is soccer: consequently, it is not surprising that, in the top five European leagues, the broadcast revenues have increased in the latest years.[1] According to the *Deloitte Annual Review of Football Finance* (2016), the broadcast revenue grew by 8% to €5.8 billion in 2014/15, contributing 48% of the total revenues of the big five leagues. The richest league is the English Premier League: its broadcast revenue reached €2.34 billion in 2014/15, accounting for 53% of the league's total revenue, and the value of the domestic rights for the next broadcast cycle (from the 2016/17 to the 2018/19 season) will total over £5.1 billion. The Italian *Serie A* is not the richest league but receives the highest relative contribution from broadcast revenue among the big five. In 2014/15 the broadcasting rights accounted for €1.1 billion and represented 61% of the cumulative revenue.[2] As reported by the Italian Soccer Federation (FGCI) in its last report (2016), the compound growth rate of broadcasting revenues in *Serie A* has been estimated to be approximately 8.9% per year from 1998 to 2015. The economic relevance, if not dependency, of broadcasting rights for the Italian top teams emerges strongly from the Deloitte Football Money League report (2016), which investigates the economic performances of the top 20 European teams in the season 2014/15. The share of broadcasting rights in the total revenues of the four Italian teams included in the list (Juventus, Roma,

Milan, and Internazionale) is about 55.8%, while the share of the remaining 16 top teams is about 37.2%.

Which factors shape the demand for soccer nowadays? Since Rottenberg (1956) and Neale (1964), outcome uncertainty has been identified as the key variable of attractiveness. North American professional leagues were inspired by this hypothesis.[3] However, the uncertainty-of-outcome hypothesis tends to neglect the impact of the emotional dimension associated with sport fans, who are usually more or less committed to a specific club (Tapp, 2004). In fact, in sport economics there is nowadays a conventional difference between committed and uncommitted fans (Szymanski, 2001). On the one hand, committed fans attend or watch their favourite team's matches regardless of the expected final outcome, as their relationship represents part of their identity and self-image (Robinson & Trail, 2005). On the other hand, uncommitted fans follow a team only if it performs well and/or has higher probabilities of winning, as the association with a successful team makes them feel good and/or repairs damaged self-esteem. Both types of fans, albeit for different reasons, have little interest in the uncertainty of the outcome. Moreover, the amount of talent present in a game and the relevance of the game itself are factors that potentially affect the demand for sport (Kuypers, 1996; Hausman & Leonard, 1997; Hunt, Bristol, & Bashaw, 1999; Funk, Mahoney, & Havitz, 2003; Buraimo, 2008; Tainsky, 2010); sport fans seeking entertainment may be more attracted by matches involving teams with high-level players or teams battling for the title.

This paper contributes to the debate on the determinants of the TV demand for soccer by analysing the Italian *Serie A* from 2008/09 to 2014/15. The results show that the uncertainty-of-outcome hypothesis does not hold for the Italian Serie A. Put differently, the TV demand does not increase when the match outcome is predicted to be very close. Thus, it seems that Italian fans have a strongly committed attitude and, when following games not

directly involving their favourite team, tend to be attracted by matches characterized by high levels of talent across the two teams and matches involving teams that are at the top end of the table.

The Demand for Sports: The Literature Review

The Evolution of the Demand for Professional Sports

The debate about the determinants of the demand for sports has been central to sport economics since Rottenberg (1956) identified the uncertainty of the outcome as the key factor to attract customers to a sporting event; the more balanced a competition, the greater the interest of potential spectators and the higher the actual attendance. Further studies (Neale, 1964; El Hodiri & Quirk, 1971) strengthened the idea that sport professional leagues need a balance in competition between teams to maximize their profitability. Fort and Quirk (1995) theoretically explored how different cross-subsidization schemes, such as a reserve clause, salary cap arrangements, a rookie draft, or revenue distribution issues, may influence the closeness of the competition and consequently the revenues. Other studies (Sloane, 1971; Jennet, 1984; Peel & Thomas, 1988; Hoehn & Szymanski, 1999; Szymanski, 2003) have highlighted that both teams and spectators may not be interested in having a well-balanced competition, as teams, especially in the European context, behave as *utility maximizers*[4] rather than as *profit maximizers*, and spectators seem to enjoy watching a game when the team that they support has many chances of winning. However, the recent literature (Coates & Humphreys, 2010; Fort & Quirk, 2010, 2011; Coates & Humphreys, 2012; Mills & Fort, 2014; Pawlowski, 2014) has suggested that additional efforts on theoretical and empirical grounds must be made when the uncertainty-of-outcome hypothesis is tested with respect to the gate attendance.

That hypothesis can be considered crucial for the actual demand in a single game rather than in a whole season, but if the commitment of fans emerges as an element that is able to affect the demand for sports significantly, it is essential to distinguish between committed and uncommitted fans. Committed fans are loyal and, even though the success of the teams that they support is always desirable, display a much greater propensity to attend games featuring their own teams regardless of their on-field performances or the closeness of the competition. Uncommitted fans have low levels of loyalty and may decide to attend a game due to recent or regular successful on-field performances of the teams that they support or the uncertainty of the outcome. If uncommitted fans who prefer to attend a game when their favourite team is having a great season prevail, teams will prefer winning the championship to the balance of competition; if uncommitted fans who consider attending a close game as appealing prevail, teams will prefer the uncertainty of the outcome actually to attract them to the games.

However, the demand for sport does not correspond simply to gate attendance: the advances in broadcast technology that occurred especially during the 1990s have significantly increased the number of sporting events that are televised and, consequently, the importance of the TV audience within the demand for professional sports; for this reason the sale of TV rights has become the single most important source of revenue to both North American and European professional leagues. TV broadcasting provides sport fans with an alternative option to watch a sporting event, which can affect attendance negatively but does not represent a contraction of the overall demand. Therefore, Borland and Macdonald (2003) made the first attempt to systematize the sources and determinants of the demand for professional sports, meaning not only attendance at sporting events but also broadcasting, sponsorship, and merchandising. Five potential factors were identified from the literature review: *i*) season-level competitive balance, both within a season and across seasons: there is

strong evidence that attendance is related positively to home team performance and little evidence that it is positively related to match-level uncertainty, but intra-seasonal and inter-seasonal uncertainty seem to affect the demand for sport, representing a rationale for sporting league administrators to introduce rules and regulations to protect the long-run competitive balance; *ii*) contest quality: the higher it is, the higher the attendance, so the number of spectators is lower in lower divisions; *iii*) quality of viewing: attendance is higher at newer stadiums, and sport fans are very sensitive to weather conditions and match timing; *iv*) price: attendance's sensitivity to price varies among teams; and *v*) TV: even though the main available evidence suggests that TV broadcasting exerts a negative impact on attendance at a single event, it may also stimulate interest in the sporting competition and increase the overall attendance.

The Relationship between the Gate Attendance and the TV Audience

Several studies followed Borland and Macdonald's avenue of investigation have focused on the relationship between the gate attendance and the TV audience to verify how TV broadcasting affects the number of spectators attending a sporting event. Garcia and Rodriguez (2002) estimated an attendance equation using data on individual games played in the Spanish Liga between 1993 and 1996, including all the explanatory variables traditionally considered by the literature. The results show that games broadcast on television and those not played at the weekend are characterized by significantly lower attendance levels, and this effect is larger when matches are televised on a free-to-air channel rather than on private channels requiring subscription fees.

Forrest, Simmons, and Szymanski (2004) analysed the impact of televised matches on English Premier League match day attendance between 1992 and 2001 by means of a Tobit model. The results show that satellite broadcasting of Premier League matches on Sundays and Mondays do not systematically cause a decline in gate attendance. In general, a mixed

response of attendance to the effects of broadcasting emerged depending on the combination of broadcaster and platform. Buraimo, Forrest, and Simmons (2006) replicated the analysis of the relationship between TV broadcasting and gate attendance for the Football League Championship, the second tier of English soccer, for the period 1998–2004; they introduced two main innovations: 1) the application of GIS technology, which allowed them to control for the market size of home and away teams more precisely by including local population measures; and 2) the adoption of the Hausman–Taylor random-effects estimator to take account of the endogeneity of the television coverage variable. They found that free-to-air TV broadcasting has an estimated negative impact (over 20%) on the gate attendance that turns out to be significantly higher than pay-TV broadcasting (5%), and higher-status games (i.e. international or Premier League top-flight games) televised in competition with a Championship fixture at the stadium tend to detract people from attending the game. Buraimo and Simmons (2008), analysing six seasons of Premier League football from 2001 to 2006, found that matches televised on Sunday and Monday show a slightly negative effect on the number of spectators, whereas matches televised on other days and on public holidays have no statistically significant impact. Allan and Roy (2008) analysed the 2002/03 season of the Scottish Premier League to verify the impact of the public television broadcasting of soccer games on gate attendance. The main novelty was the decomposition of match day attendance into three groups of spectators: *a*) home season ticket holders; *b*) pay-at-the-gate supporters of the home team; and *c*) pay-at-the-gate supporters of the visiting team. The main findings are that season ticket holders are loyal supporters and continue to attend televised matches as well, which, on the other hand, experience lower attendance figures (around 30%) from pay-at-the-gate supporters of the home team. The impact of TV broadcasting on visiting supporters is, instead, insignificant, probably because many supporters who choose to attend away matches are very likely to be season ticket holders for home matches and to show the

same degree of loyalty as the first group of supporters under consideration. Buraimo (2008) showed that the number of stadium spectators positively influences TV audiences, whereas broadcasting, especially if it is implemented by free-to-air television channels, has a negative impact on match day attendance. Buraimo and Simmons (2009) demonstrated that TV broadcasting has a significant impact on match day attendance in the Spanish Liga; this effect is much larger if the TV coverage is implemented by public or free-to-air television channels on weekdays.

The Determinants of the TV Demand for Professional Sports

Fewer empirical studies have investigated the determinants of TV demand. If we consider first the American professional leagues, Hausman and Leonard (1997) demonstrated that the TV ratings for the National Basketball Association (NBA) games are significantly higher when certain players, the so-called superstars, are involved. Kanazawa and Funk (2001) considered the 1996/97 season of NBA basketball to verify the existence of racially based patterns of TV audience demand, finding that viewership increases when a higher number of white players are involved in the game.

Mongeon and Winfree (2012) identified the quality of their favourite team – proxied by the winning percentage – as a factor that increases sport fans' demand regarding both gate attendance and TV audiences of NBA games considering six seasons (2000–2005), whereas the existence of other professional franchises representing potential substitutes in the same geographical area has the opposite effect. Moreover, the income of the area where an NBA franchise is located does not have any impact on gate attendance but is negatively related to television viewership.

Aldrich, Arcidiacono, and Vigdor (2005) replicated a study similar to that by Kanazawa and Funk (2001) for five seasons of the National Football League (NFL) and tried to explain the fact that TV audiences of ABC's Monday Night Football are higher when the

game involves a black quarterback. Paul and Weinbach (2007) also analysed Monday Night Football audiences for eleven NFL seasons (1992–2002) and found that fans prefer games characterized by outcome uncertainty, high quality of the teams playing the game, and high scores.

Tainsky (2010) estimated the demand for 2006 and 2007 NFL games using television broadcast ratings and considering both the home and the visiting team's market: many of the factors influencing attendance remain valid with reference to the television demand as well. More specifically, team quality, tenure in a market, and prime-time broadcasting have a positive effect on TV ratings, while sharing a market with one or more teams affects them negatively. Tainsky and McEvoy (2012) replicated the analysis but considered the TV demand in large markets without local teams: team quality and age, games involving the closest team in proximity to the market, or more prestigious teams, such as the Cowboys and Patriots, and late-season and play-off contests were found to be significant and positively related determinants of TV ratings, whereas concurrent game telecasts and unbalanced matches are negatively related to viewership.

Finally, Salaga and Tainsky (2015) used Nielsen ratings to evaluate TV viewer preferences for Bowl Championship Series telecasts between 2006 and 2010; they found that consumers show preferences for games that are expected to be more certain, but once the game begins, the ratings increase uniformly in contests with increased uncertainty.

Turning our attention to European soccer, Kuypers (1996) estimated both an attendance equation and a TV audience equation for the 1993/94 season of the English Premier League. He verified that variables such as the importance of the game for the Championship or the relegation race, the quality of the game, proxied by the number of international players involved, and the supporters' loyalty to the teams involved can have a positive impact on both the gate attendance and the TV demand.

According to the role of outcome uncertainty, in an empirical analysis of eleven seasons of the Premier League (1993–2003), Forrest, Simmons, and Szymanski (2005) found a significant positive relationship between outcome uncertainty and television audiences' size. Buraimo (2008) showed that outcome uncertainty does not have any significant impact on English soccer TV audiences, whereas the quality of player talent involved and stadium attendance, which is used as a proxy for the game excitement, are positively related to the TV ratings. Moreover, scheduling seems to play an important role: games televised on Sundays and Mondays attract more viewers, and TV audiences are larger in January and February. Buraimo and Simmons (2009) tested the importance of outcome uncertainty over four seasons (2004–2007) of the Spanish Liga. The results concerning match day attendance are very similar to those obtained by Buraimo and Simmons (2008): outcome uncertainty does not have a significant impact on gate attendance, for which the relationship with home win probability shows a U-shape, suggesting that fans are attracted only by games in which their favourite team has a very high probability of winning and by games in which the "David versus Goliath" effect may occur, considering the presence of two traditional big teams, such as Real Madrid and Barcelona. On the other hand, TV audiences were found to have a preference for close matches over games in which the outcome is more predictable, and the increased broadcast revenue deriving from higher outcome uncertainty stimulating TV audiences significantly overcomes the decreased gate revenue. Moreover, the stadium attendance and the appearance of Real Madrid and Barcelona in any televised game have a significant positive impact on the TV ratings. Alavy, Gaskell, Leach, and Szymanski (2010) tested the relationship between the TV demand for English soccer and the outcome uncertainty using minute-by-minute TV viewership figures, showing that the higher the probability of a draw, the more likely viewers are to switch channels. Feddersen and Rott (2011) analysed all the broadcasts of the German national soccer team from 1993 to 2008 and

found that German viewers prefer a national team with established star players and high-quality opponents and that factors such as the kick-off time or weather have some influence on the TV audience, whereas the national team's coaches, implementing more or less attractive playing styles, and student holidays, implying that a large percentage of the population is on holiday and may not watch games, are actually insignificant. Buraimo and Simmons (2015), analysing eight seasons (2001–2008) of the English Premier League, showed that the competitive balance has a significant impact on the TV audience only in the first two seasons under consideration, and it is very likely that over time people have developed, in correspondence with an increase in the quality of talent that joined the Premier League, a preference for games involving a significant amount of high-level players or superstars, regardless of the distribution of such talent across the clubs. Cox (2015) also considered eight seasons (2005–2012) of the English Premier League and found that spectators at the stadium prefer more certain matches whereas TV viewers prefer more balanced matches, suggesting that a revenue-sharing policy aiming to increase the outcome uncertainty would affect the attendance and TV audience in opposing directions.

Finally, Schreyer, Schmidt, and Torgler (2016) investigated four seasons of German soccer and showed that the uncertainty-of-outcome hypothesis holds for the television viewing of the Bundesliga but not for that of the German Cup.

The Italian Football Broadcasting Setting

The TV live coverage of *Serie A* is all-inclusive but rather complex/multi-structured. In the period under investigation, three broadcasters were involved: the satellite pay-TV platform Sky and two pay-per-view digital terrestrial (DTV) platforms, Dahlia and Premium. Sky differentiated its proposal into two packages; the first (more expensive), SkyCalcio, gave subscribers the opportunity to watch live all the matches played in *Serie A*; the second,

SkySport, only broadcast matches played in advance/postponed and two or three self-selected matches played on the traditional Sunday evening date. DahliaCalcio broadcast, for a limited period, team-selected matches on the DTV pay-per-view platform. The Dahlia channels lost its TV rights in February 2011 because of insolvency. Premium provided the PremiumCalcio package's subscribers with team-selected matches.

Although satellite television started to broadcast matches in 1993, the data about TV audiences are limited. The National Professional League (LNP) provides official data from the season 2008/09, but only for matches broadcast on Sky. Data on DTV audiences are provided from 2010, but only for the Premium platform. In the following table 1 we summarize the number of available observations, by season, associated with each broadcaster.

Table 1 about here

The empirical specification

The empirical investigation focuses on matches and covers eight seasons, from 2008/09 to 2014/15. There are 2659 observations for the following teams: Atalanta, Bari, Bologna, Brescia, Cagliari, Catania, Cesena, Chievo-Verona, Empoli, Fiorentina, Genoa, Hellas-Verona, Inter, Juventus, Lazio, Lecce, Livorno, Milan, Napoli, Novara, Palermo, Parma, Pescara, Reggina, Roma, Sampdoria, Sassuolo, Siena, Torino, and Udinese. The data used for the empirical investigation are drawn from the data set AUDIBALL (Caruso & Di Domizio, 2015b),[5] and related sources are listed in table 2.

Different OLS estimations are used to model the Sky audience for a match involving teams *i* and *j* in season *t* ($sky\_audience_{ijt}$) according to the equation:

$$\ln(sky\_audience_{ijt}) = \alpha X_{ijt} + \beta S + \gamma Z + e_{ijt}, \qquad (1)$$

where X_{ijt} is a vector of independent variables, S is a vector of season fixed effects, Z is a vector of dummy variables, α, β, and γ are the associated coefficients, and e_{ijt} is the disturbance term.

As the dependent variable we use *sky_audience*, namely the total number of people watching the match on Sky channels, with the exclusion of viewers at pubs and/or clubs where matches might be shown. The data on audiences are officially provided by LNP on its website; they are based on the AGB-Auditel survey, which provides on a daily basis the most important rating for Italian television programmes, taken as a measure of the commercial value of advertising associated with the event.[6] *sky_audience* is obtained by summing the audiences of the SkyCalcio channels, accessible only to the SkyCalcio package subscribers, and SkySport channels, accessible also to the SkySport package subscribers, as a minimum of three games per fixture are broadcast to the subscribers of both packages. The exclusion of the pay-per-view audience from our empirical investigation is driven by three reasons. First, as indicated in the section above, data on Premium are available only from 2010, while data on Dahlia are not available. Second, the two DTVs only broadcast (Dahlia until February 2011) a selection of matches live, while Sky broadcasts all matches. The third reason is based on price; while the marginal cost of watching football matches on satellite television is null, since the subscribers pay an annual fixed amount depending on their preferred package, the same does not apply to pay-per-view spectators. Dahlia and Premium viewers actually have (had) the double opportunity of subscribing to an annual fixed-amount package or, alternatively, paying for a single match using a prepaid card.

Specification (1) is based on Buraimo and Simmons (2015) and includes among the explanatory variables: *a*) variables capturing the competitive balance: *probs_difference*,

wages_difference, and *points_difference*; *b*) variables capturing the relevance of the game: *combined_wages*, *points_sum*, *derby*, and *fixture*; *c*) *pd_cw*, representing the interaction variable between *points_difference* and *combined_wages*; *d*) *substitutes*; *e*) the dummy variables *sky_plus* and *working_day*; and *f*) a set of dummy variables capturing seasonal fixed effects.

Therefore, the first set of explanatory variables includes three variables modelling the competitive balance: *probs_difference*, *wages_difference*, and *points_difference*. *probs_difference* is the uncertainty-of-outcome-related variable obtained from the betting market. The odds as a proxy for outcome uncertainty have been used, among others, by Pope and Peel (1989), Peel and Thomas (1992), Czarnitzki and Stadtmann (2002), Dobson and Goddard (2008), Buraimo, Forrest, and Simmons (2008), Forrest and Simmons (2008), Buraimo and Simmons (2009), Rodney, Weinbach, Borghesi, and Wilson (2009), Alavy, Gaskell, Leach, and Szymanski (2010), and Štrumbelj (2016). Our measure of uncertainty is calculated as the differences (in absolute value) between the home and the away team win probabilities in the match under investigation. Odds are available online in the archive section dedicated by Football-Data to Italian professional soccer. Given the (almost) perfect linear correlation between odds among the different bookmakers, we selected those provided by *BET365*, because this is the most comprehensive set. For Bologna–Catania matches in the season 2008/09 and Chievo-Bologna and Genoa-Brescia in the season 2010/11, we used odds from *Blue Square* and *Bet&Win*, respectively, because *BET365* did not accept bets on these matches.

The variable *wages_difference* is the absolute difference between the home and the away team's standardized wages,[7] where standardized wages are intended as the ratio between the team's payroll and the seasonal average payroll.

The variable *points_difference* measures the performance gap of the two opponents until the match under investigation and incorporates information on the past season performances to take into account the fact that a team's form is still unsettled and its real strength mostly unknown at the early stages of a season, so the league standings may not reflect the actual values (Dang, Booth, Brooks, & Schnytzer, 2015). Therefore, $w=(n-1)/N$ is the weight applied to the absolute difference in the per-game seasonal average points of the two opponents before the match, where $n=1,2,\ldots,N$ represents the upcoming fixture and N=38; $1-w$ is the weight applied to the absolute difference in the per-game seasonal average points of the two opponents at the end of the previous season.[8]

The second group of independent variables contains variables associated with match expected relevance: *combined_wages*, *points_sum*, *derby*, and *fixture*. The *combined_wages* variable captures the aggregate amount of talent involved in the match. It was used by Hall, Szymanski, and Zimbalist (2002), Forrest, Simmons, and Szymanski (2005), and Buraimo and Simmons (2008) and is computed by means of the seasonal payroll of teams involved in the match under investigation as follows:

$$combined\_wages = \frac{home\ team\ payroll}{seasonal\ average\ payroll} \times \frac{away\ team\ payroll}{seasonal\ average\ payroll}. \qquad (2)$$

The variable *points_sum* is computed using the same weighting system as for *points_difference* to take into account the sum of the home and the away team's average seasonal points not only in the current season up to the match under investigation but also in the previous season.[9]

derby is a dummy variable, considered also by Buraimo (2008) and Buraimo & Simmons (2009), identifying the matches played between teams located in the same city or in

the same region, as this kind of geographical rivalry is traditionally considered to be more appealing and exciting.

Finally, *fixture*, used also by Di Domizio (2013), is the count (spanning from 1 to 38) of matches in each season and, as suggested in Pawlowski & Anders (2012) and Pawlowski & Nalbantis (2015), is also included in quadratic form to verify whether there is a non-linear relationship with the TV demand and whether early-season and late-season matches attract more or fewer viewers than the others.

In addition, *pd_cw* represents the interaction variable between *points_difference* and *combined_wages* and aims to verify whether games involving teams with a significant point gap but a combined amount of talent above the median tend to record a higher number of viewers.

substitutes indicates the number of matches played at the same time as the match under investigation and takes an integer value ranging between 0 and 9. The inclusion of this variable in the empirical investigation aims to measure the potential crowding-out effect of competitive matches on our observed event, as in Mongeon and Winfree (2012).

sky_plus represents a dummy variable equal to 1 if a game was televised by both SkySport and SkyCalcio and 0 if a game was televised only by SkyCalcio and aims to capture the fact that some games potentially reach a larger number of fans.

working_day is a dummy variable, suggested in Buraimo and Simmons (2015), defining the time collocation of matches and indicates whether a match is scheduled on a weekday or not.

In addition, a set of dummies – *season_08/09*, *season_09/10*, *season_10/11*, *season_11/12*, *season_12/13*, *season_13/14*, and *season_14/15* – is introduced to isolate potential seasonal fixed effects.

In specification (2) we also include two variables arranging matches in space and time. The first is *distance*, used previously by Buraimo, Forrest, and Simmons (2006) and Tainsky and McEvoy (2012). It is an integer variable measuring the distance, in km, between the town centres of the two cities of teams involved in the match and is intended to act as a proxy for the travel cost for the supporters. The data are retrieved from the Michelin Guide on the website www.viamichelin.it, which suggests the shortest way to reach cities by car.

Then, *combined_market* is introduced to take into account the market size effects, as used by Cairns (1987), Buraimo and Simmons (2006), Tainsky (2010), and Caruso and Di Domizio (2015a): we expect a larger audience for games involving teams with larger local fan bases. It is computed as follows:

$$combined\_markets = \frac{home\ team\ population}{seasonal\ average\ population} \times \frac{away\ team\ population}{seasonal\ average\ population}. \quad (3)$$

The population data relate to the (team-associated) municipality's total residents on 1 January across the associated seasons; the data are provided by the Italian Statistics Institute (ISTAT) online. The use of the local population as a proxy for the market size is due to the unavailability of reliable data concerning the total number of supporters for each club included in our sample, which represents a limitation of our analysis, as clearly some big clubs (in particular Juventus, Inter Milan and AC Milan) attract a significant number of fans in all the Italian regions.

In specification (3) we include *capacity_utilization*, representing the game's attendance, measured by the number of tickets sold plus seasonal ticket holders per match, as a percentage of the stadium capacity and capturing the level of expectations and atmosphere surrounding the game. This variable is obtained by cross-checking the data provided by the LNP and information on the Web[10] and is closely related to the variables associated with

match expected relevance. We expect that a more passionate environment, induced by a bigger crowd, may influence the TV audience positively.

Similar to Feddersen and Rott (2011), we also estimated a specification including variables related to the weather conditions (i.e. temperature, rain, snow, etc.). Since these models add complexity without adding results of interest, we do not report them in this paper. However, the findings are available upon request.

The description of the whole set of variables is summarized in the above-mentioned table 2, whereas their descriptive statistics are listed in table 3.

Tables 2 and 3 about here

Empirical Results

The results of the OLS estimates are shown in Table 4. All the explanatory variables are expressed in natural logs, so the estimated coefficients can be interpreted as elasticities. The coefficients of the dummy variables are transformed into percentage points of 100 (exp(β)-1) (Vittinghoff, Glidden, Shiboski, & McCulloch, 2012; Nalbantis, Pawlowski, & Coates, 2015). Seasonal fixed effects are omitted for simplicity.

Table 4 about here

Among the variables modelling the competitive balance, *wages_difference* shows a positive and substantial influence on the audience in all the specifications: a 1% increase in the gap between the potential amount of talent of the two teams determines an increase in the number of viewers between 0.70% and 0.76%. This finding contradicts the uncertainty-of-outcome hypothesis (UOH), which had been confirmed in previous studies. Forrest, Simmons, and

Buraimo (2005), for example, reported that the coefficient associated with the difference in relative wages has a negative and statistically significant sign. In Buraimo (2008) and Buraimo and Simmons (2015), the coefficients associated with the absolute difference in relative wages are not statistically significant, even though this variable is relevant in determining the selection of matches to be broadcasted. Cox (2015) modelled the outcome uncertainty using the difference in win probabilities; when statistically significant, the associated coefficient is negative, supporting the UOH. Moreover, the UOH rejection for Italian viewers is in contradiction to the result obtained by Buraimo and Simmons (2009) for the Spanish Liga; they modelled the outcome uncertainty using win probabilities and found a negative and statistically significant association between the audience rating and their absolute differences, supporting the idea that Spanish viewers prefer close contests to predictable ones.

This is a relevant result, since Italian fans appear to be strongly "committed". They tend mainly to watch games involving their favourite team, regardless of the strength of the opponents. Consequently, a game involving a top club, with a very large fan base, and a lower-tier club has systematically more viewers than a potentially more balanced game involving small or medium clubs with significantly smaller fan bases. As the Italian top clubs are mainly located in the biggest Italian cities, the variable *combined_markets* may represent a good proxy to verify this hypothesis: in all the specifications, *combined_markets* has significant and positive coefficients, which confirm that games involving teams with larger fan bases record higher TV audiences.

Another issue concerns the so-called "David vs Goliath" hypothesis; according to this assumption, Italian viewers tend to be more attracted by matches played between differently talented teams, because they hope for an upset of the top talented/ranked team. Again, *probs_difference* does not show any impact on the TV audience, whereas *points_difference*

has a significant negative impact but its coefficient is not very large (between -0.32 and -0.38). The positive and significant coefficients of both *combined_wages* and *points_sum* highlight that the TV audience is sensitive to the quality and the importance of the game: Italian fans are significantly attracted by games characterized by high levels of talent and extremely attracted by games involving teams that are at the top end of the table. In particular, a 1% increase in the weighted sum of the average seasonal points translates into a more than proportional increase (between 1.51% and 1.79)% in the number of TV viewers, whereas a 1% increase in the combined relative seasonal payrolls of the teams involved in the match under investigation determines an increase between 0.38% and 0.62% in the total audience.

Therefore, following on from the previous analysis, it is more likely that an Italian fan, choosing whether to watch a game not involving the team that he or she support, will choose a match with a large number of top players and/or with teams battling at the top of the table rather than a general balanced game, as close games are not necessarily high quality or instrumental to the title race. This result is confirmed by the significance of the interaction variable *pd_cw*: summing the coefficients of *points_difference* and *pd_cw*, we can see that a 1% rise in the point gap between the teams involved in the game under investigation determines an increment between 0.45% and 0.53% in the TV audience if the sum of the seasonal payrolls is above the median value.

The positive significance of *derby* confirms that the relevance of a game, given in this case by the rivalry between the two teams, is more appealing to Italian viewers than outcome uncertainty: derbies record on average a total audience that is larger by 12–18%. The variable *fixture* shows a non-linear relationship with the TV demand: the number of viewers tends to increase as the season advances but drops slightly in the final matches. There are two possible explanations: 1) except for 2009/10 and 2011/12, the final matches have not been decisive for

the title, and the title race itself has been limited to no more than two teams; and 2) most of the late-season games lack attractiveness, as they involve teams that have already achieved (or failed) their seasonal objectives and do not compete with the required intensity.

As expected, *substitutes* has negative coefficients, ranging between 0.56 and 0.57: if soccer viewers have a larger set of potential choices, the audience will not be focused on a single event but spread across different games and consequently will be lower on average for each match. Another expected result is given by the large positive coefficients for *sky_plus*, as games also televised by SkySport, which are usually the most important of the single fixture and involve at least one top team, reach a larger number of fans. More precisely, a game also televised by SkySport records on average a total audience that is larger by 112–120% than a match broadcast only by SkyCalcio.

Finally, *working_day*, *distance*, and *capacity_utilization* exhibit no significant impact.

Then, we replicate our estimates using *sky_share*, the percentage of people watching the associated match with respect to the people watching TV at the same time, as the dependent variable. As we can see in Table 4, our main findings concerning the "committed" behaviour of Italian fans and their preference for high-quality and high-significance games rather than generally balanced games are fully consistent. They are still strengthened by the greater significance of *capacity_utilization*, which is closely related to the variables capturing the relevance of the game as it captures, through the game's attendance as a percentage of the stadium capacity, the level of expectations and atmosphere surrounding the game; in particular, a 1% increase in the relative attendance seems to be associated with a rise of between 0.12% and 0.13% in the TV share. This suggests that a game with higher levels of expectations and atmosphere is not able to persuade more people to watch TV and follow the game itself but to attract more people who have already been watching TV. Relevant differences emerge only in relation to the size of the coefficients, which are significantly

smaller, and the dummy *working_day*, which shows significant negative coefficients: games televised during the week record on average a total share that is smaller by 14%. A possible explanation is that audience ratings are inherently influenced by the number of people watching TV at a certain moment and by competitor networks' scheduling: thus, *a*) all the variables considered have a stronger impact on the absolute number of viewers than on their percentage, as the number of people actually watching TV may vary according to factors such as the match day, match time, season, competitors' programmes, and so on, and *b*) particularly on weekdays, as we have already outlined, more people prefer to stay at home and watch TV than to go out socially and, at the same time, TV scheduling is richer and provides them with more options, so it is possible that, even though games that are televised during the week do not have a lower absolute number of viewers, their ratings are lower as the number of people watching alternative telecasts is higher.

To test the collinearity, we calculated the variance inflation factor (VIF) of our independent variables, shown in Appendix A. The VIF values are significantly lower than 10 and do not indicate strong collinearity. Appendix B focuses only on the variables modelling the competitive balance and shows that there is not a strong correlation among *probs_difference*, *wages_difference*, and *points_difference*.

Moreover, to check further the robustness of our estimates and to verify the potential bias deriving from the inclusion of the games accessible to both SkyCalcio and SkySport packages subscribers, we replicated our estimates by taking into account the games broadcast only to SkyCalcio subscribers. Table 5 shows that our main findings are confirmed: the higher coefficients of *wages_difference*, *combined_wages*, and *points_sum* strengthen the idea that Italian football fans show "committed" behaviour and, when deciding whether to watch a game not involving the team that they support, choose matches with a large number of top players and/or with teams battling at the top of the table. The only significant

differences emerge in relation to the significance of *distance*, which has an expected positive but not large impact on the TV demand, and the positive significance of *working_day* in the estimates taking *skycalcio_audience* as a dependent variable. A possible explanation is that midweek fixtures are designed not to schedule matches involving two big clubs. Therefore, each big club would face a small or medium club and be followed by their own committed fans, whereas a big match tends to concentrate an outstanding number of TV viewers by subtracting audience to the other games. Considering that only three games are broadcast also to SkySport subscribers in the midweek fixtures, at least four big clubs out of seven (Juventus, AC Milan, Inter Milan, Napoli, Roma, Lazio, Fiorentina) are broadcast only to SkyCalcio subscribers. The higher number of committed fans following those clubs determines consequently an increase in the average audience of the midweek games broadcast only to SkyCalcio subscribers.

Table 5 about here

Conclusion

In this paper we have investigated the factors affecting the TV demand for soccer for the Italian *Serie A.* By means of different OLS specifications, we have shown that Italian fans are not particularly interested in the competitive balance of a game, probably because of their strongly "committed" attitude, as they tend mainly to watch games involving their own team regardless of the strength of the opponents. Moreover, when choosing whether to watch a match not directly involving their favourite team, Italian sport consumers appear to be attracted particularly by the aggregate quantity of talent and by matches involving teams

battling at the top of the table. In fact, a 1% increase in the combined payrolls of teams determines an increase between 0.56% and 0.96%, whereas a 1% increase in the sum of the average seasonal points translates into an increase between 0.64% and 0.74% in the number of TV viewers.

This poses intriguing questions with regard to a novel mechanism to favour the competitive balance. In fact, the results seem to suggest that both committed and uncommitted fans are not likely to demand more soccer in the presence of a greater competitive balance in the league. In fact, a larger audience can be expected in the presence of a large number of committed supporters and if teams enrol talented players.

Therefore, the attempt to make the league more appealing through the introduction of mechanisms aimed to enhance or preserve the balance of each single game, like in the North American professional leagues, may be unsuccessful. On the contrary, the league management should try to increase the alternative sources of commercial revenue (sponsorships, merchandising, and commercial use of the stadium) to allow Italian clubs to invest more in the purchase of more talented players, which would enhance the quality of the entertainment. Moreover, they should attempt to ensure the competitiveness of the big clubs, as matches involving teams battling at the top of the table are on average viewed more and could attract an even larger audience if they regularly involve big clubs, which can benefit from a larger fan base as well as usually from a larger quantity of talent due to their significantly larger budgets.

Footnotes

1. English *Premier League*, German *Bundesliga*, Spanish *Liga*, Italian *Serie A*, and French *Ligue 1*.

2. Baroncelli and Caruso (2011) reported accurate figures for the Italian Serie A for the period 1998–2008. In those years the TV rights increased by 310%.
3. Consider for instance (i) revenue-sharing systems, (ii) maximum wages, (iii) transfer restrictions, (iv) salary caps, (v) luxury taxes, (vi) roster limits, and (vii) reverse order of finish drafts. These policies are actually justified by the will to preserve the competitive balance and, consequently, to maximize the profits.
4. Recently Dietl et al. (2011) developed a contest model of a professional sport league in which clubs maximize the weighted sum of profits and wins.
5. The Cagliari–Roma match in the 2012/13 season was not played because of irregularities in the home team's stadium.
6. Regarding Auditel, see www.auditel.it. Note that *audience* is the average data of the match; therefore it is not possible to scrutinize our analysis in a dynamic context, even if the role of UOH is relevant for the TV viewership in the progression of the game as suggested in Chung et al. (2016).
7. The data on payrolls are those provided by La Gazzetta della Sport in its annual report at the start of each football season. The payroll includes the wages paid by teams to the players net of the bonus associated with the team and single-player performances.
8. As regards the first match of each season, we indicate the average points of the previous season.
9. As for the point differences, the data on fixture 1 of each season refer to the last fixture of the previous season.
10. See www.stadiapostcards.com. Note that the data on attendance are 2539 of a potential 2659; this is because of a lack of data or their inconsistency, since Cagliari and Chievo-Verona do not provide official ticketing reports of their home games.

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Tables

Table 1. Available observations of audiences on satellite and DTV platforms: 2008/09–2014/15

Season	SkyCalcio	SkySport	Premium
2008/09	380	188	0

2009/10	380	127	138
2010/11	380	144	320
2011/12	380	134	322
2012/13	379	180	323
2013/14	380	180	324
2014/15	380	192	325
Total	2659	1145	1752

Table 2. Description of the variables

Variable	**Description**	**Source**
sky_audience	Total number of people watching a match on Sky channels	Lega Calcio
sky_share	Percentage of people watching a match on Sky channels with respect to the people watching TV at the same time	
skycalcio_audience	Total number of people watching a match broadcast only to SkyCalcio subscribers	
skycalcio_share	Percentage of people watching a match broadcast only to SkyCalcio subscribers with respect to the people watching TV at the same time	
probs_difference	Absolute difference between the home and the away team's win probabilities	http://www.football-data.co.uk/italym.php.
wages_difference	Absolute difference between the home and the away team's relative wages, where a team relative wage is given by the team payroll divided by the seasonal average payroll	La Gazzetta dello Sport
points_difference	Weighted sum of the absolute difference between the home and the away team's average seasonal points up to the match under investigation and the absolute difference between the home and the away team's average seasonal points in the previous season	Almanacco del Calcio – Panini
combined_wages	Product between the home and the away team's relative wages	La Gazzetta dello Sport
points_sum	Weighted sum of the sum of the home and the away team's average seasonal points up to the match under investigation and the sum of the home and the away team's average seasonal points in the previous season	Almanacco del Calcio – Panini

derby	Dummy variable that takes the value of 1 if a match is played by teams from the same city or the same administrative region and 0 otherwise	
fixture	Progressive number of matches in each season	
substitutes	Number of matches played at the same time as the match under investigation	Lega Calcio
sky_plus	Dummy variable that takes the value of 1 if a match is broadcast both by SkyCalcio and by SkySport and 0 otherwise	Lega Calcio
working_day	Dummy variable that takes the value of 1 if a match is played on a weekday and 0 otherwise	Almanacco del Calcio – Panini
distance	Distance, in km, between the town centres of the two cities of teams involved in the match	www.viamichelin.it
combined_markets	Product between the home and the away team's relative market sizes, where a team's relative market size is measured by the ratio between team-associated municipality total residents and seasonal average residents	ISTAT
capacity_utilization	Ratio between the attendance, measured by the number of tickets sold plus the seasonal ticket holders per match and the stadium capacity	Lega Calcio and www.stadiapostcards.com

Table 3. Descriptive statistics of the main variables

	Obs.	**Mean**	**Median**	**Std Dev.**	**Min.**	**Max.**
sky_audience	2659	449884.9	250373	528233.7	781	2916186
sky_share	2658	2.083	1.32	2.168	4.5e-05	13.88
skycalcio_audience	1514	148812.6	71581.5	184943.6	781	1275559
skycalcio_share	1514	0.817	0.41	0.979	4.5e-05	6.88
probs_difference	2659	0.282	0.247	0.190	0	0.824
wages_difference	2660	0.876	0.466	0.888	0	3.431
points_difference	2660	0.575	0.460	0.502	0	3
combined_wages	2660	0.961	0.484	1.297	0.068	12.107
points_sum	2660	2.738	2.723	0.770	0	6
derby	2659	0.052	0	0.222	0	1
fixture	2660	19.5	19.5	10.968	1	38
substitutes	2659	3.298	4	2.797	0	9
sky_plus	2659	0.431	0	0.495	0	1
working_day	2659	0.139	0	0.346	0	1
distance	2660	496.51	456	317.395	0	1228
combined_markets	2660	0.938	0.313	1.704	0.004	16.344
capacity_utilization	2660	0.565	0.569	0.219	0	1.040

Table 4. OLS model for TV audience and share, Sky channels

Dependent variable:	*ln(sky_audience)*			*ln(sky_share)*		
	(1)	(2)	(3)	(1)	(2)	(3)
ln(probs_difference)	0.152	0.129	0.123	0.028	0.026	0.017
	(0.107)	(0.102)	(0.102)	(0.037)	(0.037)	(0.0367)
ln(wages_difference)	0.706***	0.760***	0.761***	0.255***	0.270***	0.271***
	(0.043)	(0.043)	(0.043)	(0.018)	(0.018)	(0.018)
ln(points_difference)	-0.384***	-0.316***	-0.324***	-0.048	-0.032	-0.044
	(0.112)	(0.106)	(0.106)	(0.035)	(0.033)	(0.034)
ln(combined_wages)	0.615***	0.391***	0.384***	0.437***	0.374***	0.361***
	(0.040)	(0.046)	(0.046)	(0.017)	(0.019)	(0.019)
ln(pd_cw)	0.527***	0.454***	0.455***	0.154***	0.134***	0.135***
	(0.106)	(0.100)	(0.100)	(0.037)	(0.036)	(0.035)
ln(points_sum)	1.788***	1.518***	1.507***	0.501***	0.439***	0.421***
	(0.152)	(0.149)	(0.149)	(0.049)	(0.048)	(0.048)
derby	0.111**	0.164**	0.160**	0.067***	0.046*	0.040
	(0.056)	(0.080)	(0.080)	(0.021)	(0.025)	(0.025)
fixture	0.374***	0.370***	0.374***	-0.052	-0.052	-0.045
	(0.101)	(0.098)	(0.097)	(0.036)	(0.036)	(0.036)
$fixture^2$	-.0882***	-0.087***	-0.088***	0.001	0.002	0.000
	(0.021)	(0.020)	(0.020)	(0.007)	(0.007)	(0.007)
ln(substitutes)	-0.562***	-0.573***	-0.573***	-0.279***	-0.281***	-0.281***
	(0.021)	(0.020)	(0.020)	(0.009)	(0.009)	(0.009)
sky_plus	0.788***	0.751***	0.750***	0.307***	0.297***	0.296***
	(0.036)	(0.035)	(0.035)	(0.015)	(0.015)	(0.015)
working_day	0.043	0.048	0.048	-0.144***	-0.143***	-0.143***
	(0.035)	(0.034)	(0.034)	(0.012)	(0.012)	(0.012)
ln(distance)		0.022	0.023		-0.005	-0.004
		(0.017)	(0.017)		(0.006)	(0.006)
ln(combined_markets)		0.549***	0.551***		0.140***	0.143***
		(0.040)	(0.040)		(0.016)	(0.016)
ln(capacity_utilization)			0.084			0.136***
			(0.101)			(0.036)
Constant	9.038***	9.051***	9.025***	0.191**	0.254***	0.211**
	(0.228)	(0.241)	(0.242)	(0.077)	(0.083)	(0.083)
Adjusted R-squared	0.805	0.818	0.818	0.883	0.887	0.887
Observations	2659	2659	2659	2658	2658	2658

Robust standard errors in parentheses obtained using the robust or sandwich estimator of variance; p*<0.10, p**<0.05, p***<0.01.

Table 5. OLS model for TV audience and share, SkyCalcio

Dependent variable	*ln(skycalcio_audience)*			*ln(skycalcio_share)*		
	(1)	(2)	(3)	(1)	(2)	(3)
ln(probs_difference)	0.293*	0.169	0.169	0.069	0.045	0.031

	(0.165)	(0.155)	(0.155)	(0.052)	(0.051)	(0.050)
ln(wages_difference)	1.008***	1.110***	1.110***	0.393***	0.417***	0.420***
	(0.091)	(0.087)	(0.087)	(0.036)	(0.035)	(0.035)
ln(points_difference)	-0.281*	-0.234	-0.234	-0.046	-0.039	-0.049
	(0.157)	(0.147)	(0.148)	(0.043)	(0.040)	(0.041)
ln(combined_wages)	0.994***	0.667***	0.667***	0.435***	0.348***	0.337***
	(0.119)	(0.134)	(0.135)	(0.048)	(0.052)	(0.052)
ln(pd_cw)	0.455***	0.347**	0.347**	0.167***	0.145***	0.148***
	(0.161)	(0.151)	(0.151)	(0.055)	(0.053)	(0.053)
ln(points_sum)	2.092***	1.717***	1.717***	0.387***	0.312***	0.305***
	(0.217)	(0.209)	(0.210)	(0.063)	(0.061)	(0.060)
derby	-0.035	0.160	0.160	0.013	0.028	0.023
	(0.090)	(0.101)	(0.101)	(0.031)	(0.030)	(0.030)
fixture	0.302**	0.274**	0.274**	0.083*	0.076*	0.079*
	(0.145)	(0.139)	(0.138)	(0.044)	(0.044)	(0.044)
$fixture^2$	-0.075**	-0.068**	-0.068**	-.022**	-0.021**	-0.021**
	(0.030)	(0.029)	(0.029)	(0.009)	(0.009)	(0.009)
ln(substitutes)	-0.689***	-0.701***	-0.701***	-0.268***	-0.270***	-0.271***
	(0.048)	(0.047)	(0.047)	(0.018)	(0.018)	(0.018)
working_day	0.179***	0.177***	0.177***	-0.073***	-0.073***	-0.073***
	(0.055)	(0.053)	(0.053)	(0.017)	(0.017)	(0.017)
ln(distance)		0.127***	0.127***		0.015	0.016*
		(0.030)	(0.031)		(0.009)	(0.009)
ln(combined_markets)		0.757***	0.757***		0.175***	0.176***
		(0.067)	(0.067)		(0.027)	(0.027)
ln(capacity_utilization)			0.000401			0.0923**
			(0.133)			(0.044)
Constant	8.805***	8.232***	8.232***	0.126	0.0728	0.0411
	(0.337)	(0.361)	(0.363)	(0.104)	(0.114)	(0.116)
Adjusted R-squared	0.643	0.679	0.679	0.727	0.741	0.741
Observations	1514	1514	1514	1514	1514	1514

Robust standard errors in parentheses obtained using the robust or sandwich estimator of variance; p*<0.10, p**<0.05, p***<0.01.

Appendix

Appendix A. VIF statistics

Variable	**VIF**
probs_difference	1.43
wages_difference	3.02
points_difference	2.62
combined_wages	3.65
pd_cw	4.92
points_sum	2.72
derby	1.35
substitutes	2.46
fixture	1.16
working_day	1.09
distance	2.04
combined_markets	1.50
sky_plus	2.45

capacity_utilization	1.18
Mean	1.98

Appendix B. Correlation matrix of the CB variables

	probs_difference	*wages_difference*	*points_difference*
probs_difference	1.00		
wages_difference	0.44	1.00	
points_difference	0.52	0.57	1.00