Perceived game uncertainty and suspense: A test of the uncertainty of outcome hypothesis using a stated preference approach

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Contents

Abbreviations

ACB	Analysis of Competitive Balance
BvB	Borussia Dortmund
CB	Competitive Balance
CHZ	Theoretical model by Coates, Humphreys and Zhou (2014)
FC	Football Club
FIFA	Fédération Internationale de Football Association
HHI	Herfindahl Hirschman Index
ITC	Intention-to-Consume
MLB	Major League Baseball
MLS	Major League Soccer
NBA	National Basketball Association
NFL	National Football League
NHL	National Hockey League
OCB	Objective (secondary data-based) Competitive Balance
PCB	Perceived Competitive Balance
SC	Sport Club
UEFA	Union des Associations Européennes de Football
UOH	Uncertainty of Outcome Hypothesis
US	United States
WTP	Willingness-to-Pay

1 Introduction

This introductory chapter describes the problem statement and the outline of this dissertation (section 1.1), as well as giving an overview of the structure (section 1.2).

1.1 Problem statement and outline

In the 2016–17 season, FC Bayern Munich celebrated its fifth consecutive Bundesliga title. At the same time, the league reported (Bundesliga, 2017) its lowest annual aggregated attendance (12.7 million attendees) since the 2007–08 season (11.8 million attendees) and a drop of more than one million attendees since the last time a team other than FC Bayern Munich have won the title (BvB Dortmund, season 2011–12: 13.8 million attendees). These numbers may suggest that the domination of FC Bayern Munich has affected the interest of German fans in the Bundesliga. Such a conclusion, however, is somewhat contradicted by the fact that the media revenues of the league are steadily increasing and will be almost twice as much from season 2017–18 onwards (more than one billion euros; see Financial Times, 2016). Based on these developments, the following questions arise: Do fans care about balanced competitions and tight games? Or do they just prefer watching high-quality teams competing?

The underlying issue in this debate has been a core topic in sport economics for more than six decades now and is based on the so-called uncertainty of outcome hypothesis (UOH). The UOH posits that fans utility (and consequently demand) increases from observing games/contests with a certain degree of equilibrium. However, such equilibrium is often scarcely attainable, as inevitably large-market teams (e.g., FC Bayern Munich) will always prevail due to greater financial means and increased drawing power on talent. Therefore, for several decades now, the UOH has formed the basis of the competitive balance (CB) argument to justify restrictive market practices (e.g., salary cups, revenue sharing devices) otherwise prohibited by law.

Nevertheless, despite the theoretical relevance of the UOH and its prominence as justification for regulations in sports leagues, empirical research has so far struggled to provide strong evidence that stadium or TV audiences increase under certain conditions: when evenly matched teams compete in a game (short-term CB); the more uncertain the outcome of sub-competitions is (mid-term CB); the more balanced leagues become over time (long-term CB). In contrast, several studies have even reported the opposite, that is: demand for tickets and televised sports rises as the certainty of a home (or away) team win rises (u-shaped relation); sub-competitions, such as the race to secure a spot for continental club competitions or the fight to avoid relegation do not evoke fans' interest; attendances and media revenues increase despite the long-term dominance of single teams. Alongside this, the empirical evidence becomes even more ambiguous when different fan types, sports, countries and consumption modes are taken into consideration.

The lack of clear evidence on the empirical relevance of the UOH has currently motivated two (separately developed) lines of research which incorporate for the first time psychological insights into the behaviour and economic decision-making of fans in order to unravel the enigmatic relation between outcome uncertainty and sports demand. The first line – referred to as the Perceived Competitive Balance (PCB) literature – builds upon the idea that fans possibly perceive CB in a different fashion than the way in which economists have tended to measure it. Employing a stated preference approach (i.e., *individual-level* data), empirical evidence from this line of research suggests a divergence between fans perceptions of league suspense and "objective" (i.e., secondary data-based) indices of CB (OCB). As possible reasons for this divergence, the PCB literature discusses behavioural anomalies such as framing effects, attention-level effects and threshold effects. The second line draws on the prospect theory and the concept of reference-dependent preferences in order to provide for the first time a consistent theoretical model that can explain fan preferences not only for close contests, but also for games involving a favourite. Based on this reference-dependent preference model the u-shaped relation between home win probabilities and sports demand frequently reported by studies using *game-level* data can be explained by consumers exhibiting loss aversion and deriving more utility from the chance of seeing an upset.

While both lines constitute a major contribution to our understanding of the underlying mechanisms underlying sports consumers' behaviour and decision making under uncertainty, they have several shortcomings, in part because of their pioneering nature.

For instance the PCB literature, besides using rather abstract consumption scenarios, has only focused so far on fans perception of the *whole league* and not *single games*. Moreover, it has used subjective measures that are hardly comparable with objective (i.e., secondary data-based) measures of uncertainty. On the other hand, while the empirical examination of the presence (or not) of reference-dependent preferences focuses on single games, studies in this context using game-level data have only been able to infer "average" consumptions patterns without being able to control for individual *heterogeneity* and the *idiosyncratic* expectations of fans.

This dissertation endeavours to shed further light on the relation between uncertainty of outcome and consumer choices, drawing on the PCB literature and extending the empirical examination of the concept of reference-dependent preferences in the demand for televised sports events. To do so, the studies presented herein rely on a *stated preference approach*, develop (to a certain degree) realistic consumption scenarios and test the UOH using *individually weighted evaluations* of uncertainty. The aims are: first, to extend the concept of perceived suspense in single-game settings, thus providing some evidence for its monetary relevance and attesting the presence (or not) of behavioural anomalies such as those reported in the PCB literature; second, to examine how perceived game suspense is related to various game characteristics and provide some initial insights into how notions of game suspense unfold; third, to develop measures of perceived game uncertainty that are comparable to objective measures in order to test the manifestation of reference-dependent preferences not only in within-country settings , but also in between-country settings; fourth, to test whether perceptions of game suspense and game uncertainty are interrelated or distinct from each other; fifth, to provide for the first time some comprehensive empirical evidence of their impact on sports demand, taking into account the different fan-team relationships, types of games and consumption modes.

1.2 Structure of the dissertation

The dissertation is structured as follows. Following the introductory remarks just presented (Chapter 1), the next chapter (Chapter 2) addresses the definitions and concepts in the study, as well as the empirical relevance of CB and UOH. After discussing the empirical findings of the related literature, an introduction to the behavioural economics of CB and UOH is provided (Chapter 3). In this chapter, the PCB literature and the Coates, Humphreys and Zhou (CHZ) (2014) framework of reference-dependent preferences are presented. Chapter 4 demonstrates the current shortcomings of the literature, as well as presents the research objectives followed by the three empirical studies which are provided in Chapter 5. The final chapter (Chapter 6) discusses the central findings of the empirical studies and their theoretical and managerial implications as well as discussing the limitations and future research avenues.

2 Economics of competitive balance and uncertainty of outcome

Following the seminal works by Rottenberg (1956) and Neale (1964) it has commonly been argued that the fans' interest in (and consequently demand for) a sports contest is higher the more uncertain its outcome is expected to be. The idea behind this hypothesis is that teams not only need each other to be able to produce an indivisible joint-product (a league) (Neale, 1964), but also need that "the differences in quality of play among teams are not too great" (Rottenberg, 1956, p. 256) to maximize fan welfare. This economic interdependence (or peculiarity as it is called by Neale [1964]) of teams suggests that unlike any other typical industry, a pure monopoly in sports is highly unlikely to maximize profitability and that unlike other business entities which strive for stability and predictability (Oliver, 1991), sports teams can only thrive when the outcome of their endeavours is unpredictable/uncertain.

While for many decades researchers had tried to demystify the relation between CB, the UOH and fan interest, it was only at the beginning of the new millennium that a more systematic approach to assessing the relevance of CB und uncertainty of outcome arose. In this regard – and based on prior developments in the literature concerned – Fort and Maxcy (2003) identified two distinct lines, that is, the Analysis of Competitive Balance (ACB) literature and the test of the Uncertainty of Outcome Hypothesis (UOH) literature. This chapter provides an overview of the definitions and concepts of CB and the UOH (section 2.1) and delivers some major findings from the aforementioned lines of literature during recent years (section 2.2 and section 2.3) with the focus on the links between CB, the UOH and sports demand.

2.1 Definitions and concepts

Rottenberg (1956) spoke of "the dispersion of percentages of games won by the teams in the league" (p. 246). Neale's (1964) notion of uncertainty of outcome was based on the "excitement in the daily changes in the standings or the daily changes in possibilities of changes in standings" (p. 3). While these first definitions[1] of CB were somewhat unidimensional, it was rather quickly recognized that uncertainty can unfold in many dimensions. This multidimensionality was first described in the seminal paper of Sloane (1971), followed by several other scholars (e.g., Jones, 1984; Cairns, Jennett & Sloane, 1986; Buzzacchi, Szymanski, & Valletti, 2001; Szymanski, 2003). Given the diversity of terminology concerning CB dimensions, this dissertation draws on a synthesis of the previous literature and adopts the subsequent definitions/wording: the degree of CB between players and/or teams entails three dimensions, which refer to: (i) uncertainty with regard to the outcomes of games (short-term CB); (ii) uncertainty with regard to the outcomes of in-season sub-competitions (mid-term CB); (iii) performance differences between players/teams over time and the degree of dominance (or not) by a few players/teams in a league over time (long-term CB). What follows is a brief discussion of these three dimensions and how scholars tend to measure them.

Short-term CB: The short-term dimension of CB focuses on so-called *game uncertainty*. To measure game uncertainty scholars often rely on win probabilities derived from betting odds (Peel & Thomas, 1988). The advantage of betting odds is that they take into account numerous (hardly measurable) factors (form of players/teams, injuries, head-to-head statistics, injuries, suspensions, home team advantage, etc.) and are therefore considered quite accurate in depicting the probabilities of a game's outcome. Based on this information scholars tend to use first- and second-order terms of home win probabilities to attest to whether there is an inverted u-shape relation with demand. In other words, they test whether attendance and/or viewing figures are maximized when both the home and away team have equal chances of winning. Another popular index for measuring game uncertainty is the Theil (1967) measure (also known as Shannon

1. Over the years, CB has also been described, inter alia, as "competitive equality" (Jones, 1969), "equalization of competitive strengths" (El-Hodiri & Quirk, 1971), "sporting equality" (Dabscheck, 1975), "parity" (Chatterjee & Yilmaz, 1991) and "symmetry among teams" (Palomino & Rigotti, 2000).

entropy), which makes use of information on home win, away win and draw probabilities. The Theil measure reaches its maximum value when all three outcomes are equally likely and its minimum value when the probability mass is concentrated in one of the outcomes. For the UOH to hold, the measure presumes a positive linear relation with demand. A further measure frequently used is the absolute difference between home and away team probabilities (Buraimo & Simmons, 2015); however, the shortcoming of this measure is that – unlike the Theil measure – it does not explicitly take into account the draw probability. For the UOH to hold, this measure hypothesizes a negative linear relation with demand, that is, attendance or viewing figures should increase the lower the degree of variation between home and away team probabilities is.

Mid-term CB: The mid-term dimension of CB focuses on the so-called *seasonal uncertainty*. By making use of information with regard to the collected points and/or league standings, mid-term CB attempts to depict the degree of closeness in sub-competitions. These sub-competitions, which take place within a league and during a regular season, concern the race for the championship title, the race to secure a place in postseason competitions (i.e., play-offs) and/or continental club competitions (e.g., UEFA Champions League, UEFA Europa League), as well as the fight to avoid relegation. In this regard, a single game might not only be characterized by game uncertainty, that is the chances of either of the two contestants winning, but also by how relevant or decisive this game's outcome is for the final outcome in the aforementioned sub-competitions. There are several measures for capturing mid-term CB. Jennett (1984) focused on m*atch relevance*, which measures the ex ante championship significance of each game for both contestants using ex post information about the number of games they still have to win in order to be champions in the given season. Closely related to this measure is c*hampionship uncertainty*, first introduced by Janssens and Késenne (1987) and modified by Pawlowski and Anders (2012) and Pawlowski and Nalbantis (2015). This ex ante measure takes into account the points required to be champion in a given season, the points already collected in the season so far, the maximum points that can be achieved during the season and the maximum points that can be collected until a certain matchday. Other similar measures developed to capture mid-term CB focus on p*layoff uncertainty* (Krautmann, Lee, & Quinn, 2011), c*ompetition Intensity* (Scelles et al., 2013a; 2013b), the *decisiveness of a game* (Geenens, 2014) and the *league standing effect* (Humphreys & Zhou, 2015), first elaborated by Neale (1964).

Long-term CB: The long-term dimension of CB focuses on *inter-seasonal uncertainty*. Following Buzzacchi et al. (2001), long-term CB entails a *static* component which focuses on performance differences (e.g., differences in team rankings, points and winning percentages) over time and a *dynamic* component which focuses on the domination (or not) of specific teams in a given league over time. The most widely used measure in this context draws on the Herfindahl-Hirschman index (HHI) (Hirschman, 1964) first applied in a sports-setting as measure of uncertainty by Depken (1999). Scholarship has employed various versions of this index. For instance, Depken (1999) applied the HHI to observe the distribution of wins (static), while Leeds and von Allmen (2005) modified the index to depict how championship titles are spread amongst the clubs of a given league over time (dynamic). Other popular long-term CB measures are the standard deviation of win percentages or points, also known as the Scully–Noll ratio (Noll, 1988; Scully, 1989) as well as measures that apply Lorenz curves (Quirk & Fort, 1992), concentration ratios (Koning, 2000), Gini coefficients (Schmidt & Berri, 2001) and Markov metrics (Krautmann & Handley, 2006).

2.2 Analysis of Competitive Balance (ACB) literature

The ACB literature "focuses on what has happened to competitive balance over time or as a result of changes in the business practices of pro sports" (Fort & Maxcy, 2003, p. 155). The majority of studies which fall within this line of research, have focused on the long-term dimension of CB (e.g., Fort & Quirk, 1995), with only a few studies using short-term (e.g., Nalbantis & Pawlowski, 2016) and mid-term (e.g., Pawlowski & Nalbantis, 2015) measures. The empirical findings can be categorized into studies which (i) aim to depict the evolution (trend) of CB over time and studies which (ii) aim to observe structural changes in CB and the impact of institutional changes on it. While the first set of studies reveals different trends in CB across leagues, providing some historical (and rather descriptive) insights of what caused positive or negative CB trends, it is the latter set of studies which constitutes perhaps the most important contribution to the ACB literature. These studies provide empirical evidence on whether league regulations (some of which would otherwise be prohibited by law due to their restrictive character) do indeed fulfil their purpose/justification in promoting CB.[2] For instance, Fort and Quirk (1995) found that devices such as salary capping and free agency do not have the anticipated positive impact on CB in the North American Major Leagues. In the context of European soccer, scholarship has focused on issues such as the Bosman ruling (positive impact; see Flores et al. 2010), the collective selling of television (TV) rights (no impact; see Peeters, 2011) and the break-even rule of the UEFA's Financial Fair Play (positive impact; see Peeters & Szymanski, 2014). A set of studies has focused on changes in prize money distribution, such as the increase in UEFA Champion League bonus payments in 1999–2000 (negative impact; see Pawlowski et al., 2010), as well as on the impact of competition formats, such as unbalanced league schedules (negative impact; see Lenten, 2008), point score systems, such as 3-1-0 (negative impact; see Haugen, 2008) and quadruple round-robin tournaments (no impact; see Pawlowski & Nalbantis, 2015).

2.3 Uncertainty of Outcome Hypothesis (UOH) literature

While the ACB literature provides some fruitful insights into the suitability (or not) of cross-subsidization mechanisms and the impact of league regulations on CB, it is the UOH literature which establishes the crucial links between CB and sports demand. To this end, researchers rely predominately on econometric models, treating CB measures (mostly short-term and mid-term) as determinants in demand equations. Other determinants that are used in this context as control variables include standard economic aspects (e.g., regional income and population sizes), quality aspects (e.g., team performances and presence of star players) and opportunity costs (e.g., scheduling issues and weather conditions). [3]

2. The impact of regulations on CB is very important from a legal point of view. The European Court of Justice acknowledged CB as an appropriate justification for restrictions of the European Union treaties freedoms, such as the free movement of workers and the freedom to provide services (e.g., Bosman Case C-415/93). However, the European Court of Justice mandates that these restrictions are only justifiable, if they can (inter alia) *ensure* the achievement of their aims, namely promoting CB. For a detailed discussion of the CB as a justification for legal exemptions see Mehra and Zuercher (2006), Budzinski (2012) and Budzinski and Szymanski (2015).

3. For a detailed on discussion on the determinants of in-stadium attendance and the demand for televised sports, see Borland and MacDonald (2003), García and Rodríguez (2009) and Nalbantis and Pawlowski (2016).

Short-term CB: In contrast to the assertion that a game needs to be tight in order to be attractive, the majority of studies analysing the impact of game uncertainty on *stadium attendance* report the opposite effect, that is, stadium attendance is maximized when either the home or the away team has a significantly higher chance of winning (for recent reviews, see Coates et al., 2014; Pawlowski, 2013; Schreyer, Schmidt, & Torgler, 2016a). This finding remains largely consistent regardless of the setting, i.e. it is similar in different sports and different countries. Compared to this evidence, however, studies analysing the impact of game uncertainty on *TV viewing figures* are ambiguous (for a recent review see Nalbantis & Pawlowski, 2016). Against this background, two interesting issues should be mentioned. *First*, there seems to be a divergence in findings between European and North American studies, with the latter studies finding predominantly a positive relation between game uncertainty and TV demand, while the majority of European studies fail to provide evidence on the relevance of the UOH for soccer audiences. *Second*, several papers point to the existence of moderating aspects. For instance, Forrest et al. (2005) and García and Rodríguez (2006) noted that the impact of game uncertainty depends, on the half of the season under consideration (first half, no support for the UOH; second half, support for the UOH) and upon the broadcasting platform (pay-tv channels, no support for the UOH; free-to-air channels, support for the UOH) respectively. Another interesting aspect that arises in the empirical examination of the impact of game uncertainty on sports demand is the role of supporter status. Some first discussions on this issue go back to Szymanski (2001) who elaborated on the differences in the utility of committed local fans and "neutral" TV viewers, arguing that the latter make up the majority of viewers of televised sports events. [4] Empirical evidence on the moderating role of supporter status is sparse, which can mainly be ascribed to the lack of individual-level information in the data. In this regard, some initial empirical evidence is provided by Tainsky, Xu and Zhou (2014) who were able to discriminate between local and non-local TV markets. The authors found that in markets without an NFL team the audience prefers watching games with evenly matched teams. However, when a local NFL team is present, the TV audience in these markets does not care about game uncertainty. Last but not least, it has to be noted that a very limited number of

4. A first very rough test on the dominant role of "neutral" fans in televised sports was provided by Forrest et al. (2005) who found that for the television audience, the *combined* quality of the two contestants matters, rather than the *individual* team performance.

studies have gone beyond the frequently examined in-stadium attendance and TV viewing figures of full-length games to test the relevance of the UOH. Against this background, Dietl, Frank and Roy (2009) focused on Bundesliga highlights and found that fans do not value game uncertainty when it comes on this particular consumption mode.

Mid-term CB: Concerning mid-term CB there are to-date surprisingly few papers that have examined empirically its effect on in-stadium attendance (e.g., Pawlowski & Anders, 2012; Pawlowski & Nalbantis, 2015) and on the demand for televised sports (e.g., Scelles, 2017). Overall, the findings seem to be consistent across leagues and countries (Austria and Switzerland: Pawlowski & Nalbantis, 2015; England: Scelles, 2017; France: Scelles et al., 2013a; Germany: Pawlowski & Anders, 2012; Scotland: Jennett, 1984), but only with regard to the championship race. For other sub-competitions, the empirical evidence is mixed. For instance, games involving teams which have the chances of securing a place in continental competitions (Pawlowski & Anders, 2012; Scelles, 2017), or which are fighting against relegation (Jennett, 1984; Scelles, 2017) are seldom found to be associated with greater demand. North American studies focus on play-off uncertainty. In this regard, the findings point to a positive impact on ticket demand, which begins to unfold primarily towards the end of the season (Krautmann, Lee, & Quinn, 2011). Similar schedule-related issues on the impact of seasonal uncertainty are also reported in the context of soccer (e.g., Scelles, 2017).

Long-term CB: Empirical evidence on the links between long-term CB and sports demand is sparse and – similar to the short-term CB – ambiguous, pointing to the existence of cross-continental differences. A number of studies focusing mainly on the MLB attest to a positive relation between long-term CB and annual league-level attendance (Schmidt & Berri, 2001; Humphreys, 2002). Concerning European soccer, anecdotal evidence suggests that long-term CB is not particularly relevant, as both attendance and TV viewing figures have been increasing steadily over the years, although leagues have become increasingly dominated by a small number of teams (see Flores et al., 2010; Pawlowski et al., 2010). In line with this, Brandes and Franck (2007) based on data from several top European soccer leagues failed to attest to a positive relation between long-term CB and in-stadium attendance, the only exception being the French league.[5]

To sum up, the empirical findings on the relevance of the aforementioned dimensions of CB for sports demand are ambiguous, pointing in many instances to a divergence between the CB, the UOH and consumer choices. One of the first attempts to synthesize possible reasons for this lack of clear evidence was provided by Szymanski (2006), who argued that the lack of support for the UOH could be attributed to fans preferences for David vs. Goliath games and fans' interest in upsets or simply to fact that fans want their team to win. While plausible, these explanations lacked a theoretical framework that could explain the underlying mechanisms and their relation with the UOH. Moreover, while they convey the impression that the UOH's "importance is not as great as is often suggested" (Szymanski, 2006, p. 598), it could simply be that the effects of CB and uncertainty of outcome on sports consumers' utility and behaviour are more complex than initially thought. What follows is a discussion of recently introduced concepts, which – with the use of behavioural economic theories – attempt to shed light on the aforementioned issues.

5. The authors included in their estimations the German Bundesliga, the French Ligue 1, the Italian Serie A and Serie B, as well as the English Premier League and Championship.

3 Behavioural economics of competitive balance and uncertainty of outcome

Thus far, scholarship dealing with CB and the UOH have relied on economic models of rational behaviour; that is, they have largely assumed that individuals possess the following traits: perfect self-interest, perfect rationality and perfect information. This traditional model of human behaviour, based on the so called "homo economicus", however, fails to apply psychological insights into the behaviour and economic decision-making of agents. Although it has largely been accepted that human behaviour is often complex, inconsistent, imperfect and unpredictable since the 1970s,[1] it was just a couple of years ago that researchers (e.g., Pawlowski & Budzinski, 2014; Coates et al., 2014; Humphreys & Zhou, 2015) realized that transferring behavioural economic concepts to the context of the CB and UOH literature[2] is vital to explain various phenomena which existing decision theories have struggled to explain. In this context, the related literature has so far focused on two separately developed lines of research. The first line (i.e., the PCB literature) deals with whether fans' evaluations/ perceptions of CB (PCB) are in line with objective (secondary data-based) CB (OCB) indices and tries to scrutinize possible heuristics/cognitive biases that induce a divergence between the two (section 3.1). The second line of research (the CHZ model) focuses on the existence of reference-dependent preferences, attempting to provide a theoretical basis for sports consumers' preferences for favourite teams and uncertain outcomes (section 3.2). What follows is a discussion of both lines.

1. For an in-depth discussion of the history and evolution of behavioural economics see Barberis (2013).
2. Note that the first incorporations of behavioural anomalies / cognitive biases into sports settings took place as early as the mid-80s (hot hand fallacy; see Gilovich, Vallone, & Tversky, 1985). Recently there has been a growing body of papers developed to provide field evidence of the presence of behavioural biases taking advantage of sports (or sports-related) data. For instance List (2003) examined the presence of an endowment effect in the market of sports memorabilia. Edmans, García and Norli (2007) focused on sports sentiment and stock returns. Pope and Schweizer (2011) and Allen, Dechow, Pope, and Wu (2017) tested the manifestation of loss aversion among professional golfers and marathon runners respectively.

3.1 Perceived Competitive Balance (PCB) literature

Motivated by Zimbalist (2002, p. 112) who stated that "the best measure of competitive balance is the one to which fans show the greatest sensitivity", Pawlowski (2013a; 2013b) and Pawlowski and Budzinski (2013) introduced a novel measure, the so-called PCB.[3] This approach builds upon the idea that fans might perceive CB differently from the ways in which economists tend to measure it. Based on a stated preference approach, the authors identified the fans' perceptions of the level of CB *within a league* by asking them to evaluate the level of its suspense on a scale of 0-10 (0≡not at all suspenseful...10≡very suspenseful). Their findings indicated a divergence between OCB and PCB and posit the following three theoretical reasons based on behavioural economics. [4]

The first, concerns the existence of *threshold effects*. Individuals' choices may be better described by "satisficing", that is, they make a choice that is "good enough" rather than seeking an optimal level of satisfaction with regard to the consumption of any good (Simon, 1955; Pawlowski & Budzinski, 2014; Budzinski & Pawlowski, 2017). In the context of CB, this means that once a certain level of a "satisficing" CB is reached, no further cognitive resources are spent on additional optimization of the consumption in question. This entails that (small) variations above the "satisficing" level of CB do not matter: they are not relevant to consumption behaviour and thus do not lead to greater demand. However, variations of CB beneath this "satisficing" level/threshold may set off strong (demand) reactions or in other words discontinuity effects. Some first empirical evidence on the existence of threshold effects is provided by Pawlowski (2013a, 2013b),

3. It should be noted that there is a strand of literature which using survey data touched upon the concept of the UOH prior to the PCB literature. These studies mainly fall within the discipline of media and marketing research and were developed in isolation from previous developments in theory and empirical research in sports economics. For instance, Sapolsky (1980) asked respondents to rate their "enjoyment" while watching the final stages of close or lopsided basketball games. Gantz et al. (2006) asked respondents to evaluate the "unpredictability" of sports events. Several papers focused on "drama" (e.g., Kim et al. 2008; Andrew et al. 2009), the "closeness of the fight", or combined "suspense" and "drama" (Bennett et al. 2007). An exception to the aforementioned studies is the work of Koenigstorfer, Groeppel-Klein and Kunkel (2010), who asked respondents to evaluate various aspects that lay within the scope of the CB literature. However, their measures were rather vague in that the fans were just asked to state whether they agreed or disagreed with a series of statements (e.g., "To me, the league is a very balanced league"). The majority of these studies have limited external validity due to the survey methods and sampling procedures used. For a discussion of these studies, see Pawlowski (2013b) and Nalbantis and Pawlowski (2016).

4. For more detailed descriptions of the survey and the methods of analysis see Pawlowski (2013a, 2013b) and Pawlowski and Budzinski (2013, 2014).This section provides a brief overview over the possible behavioural anomalies behind the divergence between OCB and PCB; for an in-depth discussion, see Pawlowski and Budzinski (2014) and Budzinski and Pawlowski (2017).

who found an inelastic response by sports fans for both very high and very low values of PCB, and Pawlowski and Budzinski (2013), who – based on willingness-to-pay (WTP) scenarios for improvements in CB – identified a tipping point/threshold value of PCB the crossing of which can lead to substantial demand reactions.

Second, the divergence between PCB and OCB could be possibly ascribed to *framing effects* (Tversky & Kahneman, 1981; Pawlowski & Budzinski, 2014). This type of cognitive bias describes the phenomenon that individuals base their preferences on past experiences as well as on the context in which information is delivered. With regard to CB this means that the fans assess the parity in a league not solely based on its current degree of CB; instead the current degree of CB is (also) evaluated in relation to the degree of CB in previous seasons, which act as anchors (reference points) in their subjective valuations. Empirical evidence on the existence of framing effects is provided by Pawlowski and Budzinski (2013), who showed that in leagues in which fans have been accustomed to high levels of CB in past seasons, a small decline in CB in the present season has a stronger influence on their perceptions.

A third reason that might explain why fans' perceptions of CB differ from OCB concerns the presence of *attention-level effects*. These relate to how individuals' attention drawn to a specific phenomenon shape their valuation of a given good (Tversky & Kahneman, 1979; Pawlowski & Budzinski, 2014). In the sports context, leagues consist of several sub-competitions (championship race, race against relegation etc.), which differ in terms of relevance and (thus) enjoy different levels of media exposure. Consequently, it may be that PCB is more likely to be driven by the closeness of these sub-competitions and their subjective relevance to the individuals than by the degree of inter-seasonal uncertainty (i.e. long-term CB). In this regard, empirical evidence suggests that mid-term PCB measures correspond largely to mid-term OCB measures (Pawlowski & Budzinski, 2014).

3.2 Reference-dependent preferences and loss aversion

Kahneman and Tversky's (1979) prospect theory showed that the evaluation of outcomes is strongly dependant on a reference point. Drawing on this theory, Köszegi and Rabin (2006) proposed a model of reference-dependent preferences that conceptualised *expectations* as reference points. This constituted a major contribution to the theory concerning the formation of reference points (see Barberis, 2013), as it enabled for the first time a more straightforward approach to examine how individuals contemplate gains and losses. Their model assumes that an individual forecasts both the outcomes she faces and her own reaction to these outcomes in order to rationally develop a consistent plan of action. Positive and negative deviations from these endogenously determined reference points equate to subjective gains and losses respectively, with reactions to losses being stronger than those to gains (expectation-based loss aversion).

Concerning sports, there is an abundance of psychological evidence showing that game outcomes have an effect on individuals' well-being (Schwarz et al., 1987), mood (Wann et al., 1994) and self-esteem (Bizman & Yinon, 2002). Emotional shocks generated by losses have frequently been related to negative effects on fans' health condition (Carroll et al., 2002) and phenomena such as negative stock market reactions (Edmans et al., 2007). Recently, Card and Dahl (2011) introduced a model to explain the occurrence of domestic violence based on game outcomes. A key component of their model is that wins and losses generate emotional cues reflecting gain–loss utility around an expectation-based reference point (Köszegi & Rabin, 2006). The authors found that unexpected losses in NFL games increase the likelihood of domestic violence, while unexpected wins or games expected to be close do not affect domestic violence rates.

Building upon the basic framework provided by Köszegi and Rabin (2006) and its sports-specific application by Card and Dahl (2011), Coates et al. (2014) developed for the first time a theoretical basis for the UOH. Their theoretical (CHZ) model takes into account fans' preferences for close games and for games involving favourites by distinguishing between two types of utility. There is an intrinsic consumption utility that corresponds to utility as in traditional analysis and a gain–loss utility that is generated by deviations between the actual game outcome and the fans' reference points, which reflect their expectations of the game outcome. Reference-dependent preferences arise when there is a marginal impact of either positive (i.e., win) or negative (i.e., loss) deviations from these reference points. The CHZ model generates assumptions consistent with the UOH when the marginal utility of experiencing an unexpected win (i.e., ex ante expectation of a loss) exceeds the marginal utility of an unexpected loss (i.e., ex ante expectation of a win). However, when the marginal utility of an unexpected loss outweighs the marginal utility of an unexpected win, fans exhibit loss aversion and derive more utility from seeing upsets (i.e., seeing an ex ante favourite team suffering a loss). With regard to the CHZ model three important issues must be noticed.

First, the CHZ model was developed to explain consumers' decision to *attend* games and applies to a setting in which the vast majority of attendees are fans of the home team. In settings, in which a significant number of attendees are also fans of the away team (e.g., European soccer), [5] the application of this model is also possible, but it requires information about the fans' affiliation with the competing teams to distinguish between the different reference points and preferences. Still, there are also sports consumers who are committed neither to the home nor to the away team. While these are expected to make up for a rather negligible portion of the potential attendees at a given game (Coates et al., 2014), the vast majority of the TV audience (as elaborated before) is expected to consist of such "neutral fans". The CHZ model posits that the consumption utility these fans derive from a home win and a home loss are equal and there is no gain–loss utility. In instances in which this "pure neutrality" arises, it is expected that game uncertainty and the win probability of either of the contestants will play no role in determining their consumption behaviour. Nevertheless, the so far sparse and rather preliminary empirical evidence based on game-level data (e.g., Tainsky et al., 2014) seems to challenge the presence of such "pure neutrality" in the context of TV demand.

5. In the German Bundesliga 10% of the total stadium capacity or at least 1,000 tickets are designated for visiting fans. In the UEFA Champions League and Europa League competitions the designated space for visiting fans comprises (at minimum) 5% of the total stadium capacity.

Second, the empirical examination of the CHZ model relies (solely) on the first- and second-order terms of home win probabilities. A *direct* and *separate* parametrization of the preferences for game uncertainty and loss aversion is not possible. What is possible, however, is to infer the *relative size* of these parameters based on the estimated signs of the first- and second-order terms of home win probabilities (see Humphreys & Zhou, 2015). In this regard, a positive sign of the second-order term implies that the relative size of the loss aversion parameter exceeds that of the parameter denoting the preference of game uncertainty. This does not exclude *per se* the existence of preferences for game uncertainty; it indicates, however, that these preferences are *dominated* by loss aversion (Humphreys & Zhou, 2015).

Third, while the CHZ model provides a theoretical framework for explaining a preference for upsets, considering the empirical evidence on the impact of superstars on sports demand (e.g., Hausman & Leonard, 1997), it might well be that fans are attracted by a favourite visiting team due to the presence of players with remarkable talent, impressive performance and high popularity. [6] Moreover, it is well established in the empirical examination of sports demand that the status of the contestants (e.g., brand strength[7]) is related to increased audiences (e.g., Pawlowski & Anders, 2012). Therefore, increasing attendance with a decreasing home win probability could *likewise* be explained by fans having a preference for strong brands and superstars and *not just* by loss aversion (Budzinski & Pawlowski, 2017). In this regard, however, it should be noted that recent studies also report a u-shaped relation between home win probabilities and stadium attendance when fixed effects capturing unobservable heterogeneity in the visiting teams are included (Coates et al., 2014; Humphreys & Zhou, 2015) and when adjusted home winning probabilities that account for the unobservable heterogeneity in the quality of the competing teams are implemented (Humphreys & Zhou, 2015).

6. For a discussion of the economic theory of superstars (Adler, 1985; Rosen, 1981) and empirical findings of this phenomenon in the context of TV demand see Nalbantis and Pawlowski (2016).
7. For a discussion of team brands in the context of European soccer, as well as internal and external factors that may affect their development, see Richelieu, Pawlowski, and Breuer (2011).

4 Interim conclusion and research objectives

The widespread belief of economists, media and policy-makers that more tickets are sold and more viewers flock to their TVs the more uncertain the result of a game cannot be confirmed given that decades of empirical research have offered (at best) ambiguous evidence. Recent studies based on behavioural economic concepts provide some valuable first insights into the possible reasons behind this lack of clear evidence by examining the divergence of PCB and OCB, as well the presence of consumers with reference-dependent preferences. However, as this strand examining behavioural sports economics is relatively new, there are several issues to be addressed. This chapter outlines the current research gaps and desiderata (section 4.1). After doing so, it describes the research objectives of the empirical studies presented in this dissertation (section 4.2).

4.1 Research gaps and desiderata

Overall, based on the review of research previously conducted, five research gaps and desiderata can be identified.

First, apart from the major limitation of the stated preference approach, namely that it "is based on what people say rather than what people do" (Bertrand & Mullainathan, 2001), the measures employed by Pawlowski (2013a, 2013b) and Pawlowski and Budzinski (2013) focus on rather abstract WTP scenarios. In addition, while the measure of perceived suspense as employed in these studies could reveal some interesting demand patterns, it was related to fans' perceptions about the whole league. As such, little is known about how this measure relates to the demand for single games and whether issues such as threshold effects and attention-level effects also arise in this context. Since tangible and sufficiently realistic scenarios are thought to be less prone to various types of bias (Mitchell & Carson, 2005), introducing sufficiently binding scenarios that are concrete, accurate and easier for fans to evaluate would considerably extend our knowledge with regard to the impact of individually weighted evaluations of uncertainty on consumer choices. Moreover, focusing on single games would provide some further insights into the relation between perceived suspense with game uncertainty, as well as into what the game characteristics may play an important role in the formation of game suspense perceptions.

Second, the empirical examination of the CHZ model relies on the assumption that fans' subjective evaluations of the outcomes of games are *equal* to the probabilities derived from the betting odds. However, given the findings on the divergence between PCB and OCB and the existence of behavioural anomalies in this regard, it is highly likely that perceptions of the closeness of the games *vary* not only from secondary data-based indices of game uncertainty, but also from person to person. The empirical tests of the CHZ model, as they rely on game-level data, are not able to take into account this idiosyncratic variance in fans' expectations. In contrast, the existing evidence on reference-dependent preferences has been *inferred* from "average" consumptions patterns. This constitutes a serious drawback considering that the literature from more general settings indicates that the presence of loss aversion might vanish once heterogeneity is taken into account (e.g., Bell & Lattin, 2000). Moreover, it is frequently argued that issues such as a high degree of experience with a product may mitigate the presence of behavioural anomalies (e.g., List 2003). [1] Therefore, developing a measure of perceived game uncertainty that is comparable to objective measures and incorporating individual specific heterogeneity would allow a more straightforward examination of the presence of reference-dependent preferences and loss aversion in the context of sports demand.

Third – and closely related to the aforementioned issue – the CHZ model posits that "pure"/"neutral" fans constitute a negligible proportion of potential attendees at sporting events. However, as discussed previously, "neutral" fans constitute the vast majority of TV viewers. Thus far, previous research on the demand for televised sports has only been able to infer sports consumers' impartiality based on whether there is a team competing in their region (e.g., Tainsky et al., 2014), without being able to distinguish directly – due to the lack of individual-level information in the data – between the different fan types

1. List (2003) found that the sports memorabilia traders with high market experience are rather likely to behave according to the neoclassical predictions than to be prone to cognitive biases such as the endowment effect. Note, however, that some recent empirical findings show that loss aversion emerges even in the behaviour of highly experienced individuals. For instance Pope and Schweitzer (2011) found evidence for loss averse behaviour in experienced and well-incentivized professional golfers. Allen, Dechow, Pope and Wu (2017) found marathon runners to have reference-dependent preferences regardless of their level of experience.

(i.e., home, away team and “neutral” fans). Bearing in mind the notion of “pure neutrality”, as well as the suggestion that consumption and enjoyment of televised sports depend upon the dispositional affiliation of viewers with teams and/or players (Zillmann, Bryant, & Sapolsky, 1989; Raney, 2006), it appears highly relevant to examine empirically whether and in what manner supporter status may moderate the impact of game uncertainty/suspense on the demand for televised sports and to ascertain whether (or not) the manifestation of reference-dependent preferences occurs independently of supporter status.

Fourth, although international media rights constitute a continuously growing income stream there is quite limited evidence on the impact of game uncertainty on the demand for foreign league telecasts (Schreyer et al., 2016c). Given cultural differences, it may be that overseas consumers experience and consume sports products differently from local consumers. Concerning this point, it is well established in more general settings that risk and uncertainty attitudes vary between countries (Vieider et al., 2015; Wang, Rieger, & Hens, 2016). As loss aversion is frequently found to dominate soccer fans’ game uncertainty preferences, it seems highly relevant to test empirically the CHZ model in between-country settings, in which the degree of loss aversion seems to differ. This may provide some fruitful insights into whether the manifestation of reference-dependent preferences combined with loss aversion remains when examining the same type of sports (i.e., soccer), or whether the generic cultural differences and ensuing variations in risk and uncertainty attitudes contribute to cross-country/continental differences with regard to game uncertainty preferences such as those argued to exist between European and North American studies on the UOH.

Fifth, bearing in mind that nowadays consumption modes such as tape-delayed/time-shifted viewing are becoming particular popular (Nalbantis & Pawlowski, 2016) and given that the mode of observation might generally affect predictions concerning the relationship between outcome uncertainty and sports demand (Coates et al., 2014), it is also crucial to extend our understanding on this issue. Moreover, it is of great interest to ascertain whether the preference for strong brands (Pawlowski & Anders, 2012) and for high-quality contestants (Humphreys & Zhou, 2015) are likely to affect the dominant role of loss aversion in fans' preferences or whether reference-dependent preferences with loss aversion unfold regardless of the opponent constellation and type of game.

4.2 Research objectives

The studies presented herein try to address the aforementioned shortcomings in the literature by employing novel empirical designs and settings to further unravel the relation between the UOH and the demand for sports. To this end, all three studies draw on a stated preference approach. Based on respondents' statements regarding upcoming games, the focus is on individually weighted evaluations of uncertainty and their impact on fans' consumption behaviour. What follows is a brief discussion of the objectives pursued by each study.

Study 1: Nalbantis, G., Pawlowski, T., & Coates, D. (2017). The fans' perception of competitive balance and its impact on willingness-to-pay for a single game. *Journal of Sports Economics*, *18*(5), 479–505.

Study 1, presented in section 5.1, focuses on a single game of the German Bundesliga and introduces the measure of perceived game suspense. The study's main objective is to provide an alternate view of the relationship between CB and stadium attendance by relating for the first time the concept of PCB[2] with the willingness to pay (WTP) for a single game. Focusing on implied WTP for suspense without forcing fans to try to "value" suspense directly, the aim is to provide further insights into its monetary evaluation, as well as to investigate the presence (or not) of behavioural anomalies such as those elaborated in the PCB literature. Last but not least, this study attempts to deliver some first evidence on the moderating role of certain fan types (e.g., being club member, season ticket holder) in the influence of perceived game suspense on WTP. Study 1 lays important groundwork and the path for the survey designs implemented in Study 2 and Study 3.

2 As discussed previously the term PCB was established to describe CB and suspense within a league. While Study 1 uses the same term (PCB), given the fact that the focus is on a single game the measure used is probably better described as perceived game suspense. Therefore in the discussions in this dissertation, as well as in Study 2, the latter term is used.

Study 2: Pawlowski, T., Nalbantis, G., & Coates, D. (2017). Perceived game uncertainty, suspense and the demand for sport. *Economic Inquiry*, doi 10.1111/ecin.12462.

Study 2, presented in section 5.2, builds upon Study 1, but focusing on the consumers' intentions to watch soccer games live on TV. Study 2 contains respondents' evaluations concerning two full matchdays (18 games in total) of the German Bundesliga, which makes it possible to provide some first insights into how the measure of perceived game suspense as developed in Study 1 relates to diverse game characteristics. The main objective of this study is to bridge plausible behavioural economic explanations (see Chapter 3) for the lack of support of the UOH in sports demand. To do so, it aims to develop a measure of perceived game uncertainty that is comparable to objective measures. The goal is to test the presence of reference-dependent preferences, while controlling for individual heterogeneity. Moreover, the study strives to provide some empirical evidence on whether fanship status (home, away and "neutral" fans) acts as moderator in the relationship between game uncertainty/suspense and the demand for soccer telecasts and whether reference-dependent preferences with loss aversion arise (or not) independently of fanship status.

Study 3: Nalbantis, G., & Pawlowski, T. (2017). Reference-dependent preferences and international demand for sports. *Working paper*.

Study 3 presented in section 5.3, utilizes a similar design as Study 2 focusing, however, this time on transnational demand. The study contains data about US respondents' perceptions /evaluations with regard to five European soccer finals, six games of top European leagues and two MLS regular season games. Based on the measure of perceived game uncertainty as introduced in Study 2, the main objective of this study is to test for the first time the presence of reference-dependent preferences in a between-country setting and to examine whether the apparent cross-continental differences on the impact of game uncertainty between North America and Europe can be attributed to cross-cultural variations with regard to loss aversion or can simply be ascribed to the type of sports under examination. The study further aims to investigate whether the mode of consumption and the type of games (cup finals vs. league games) affects fans' preferences for game uncertainty.

5 Empirical studies

This chapter presents the three empirical studies of the dissertation. Each study includes an introduction to the topic, a brief overview of the literature, details of the data and the method used, as well as information on the econometric approach followed. In addition, every study contains a results section, followed by a discussion of the findings and a conclusion. At the end of each study a list of references is provided, as well as appendices in which robustness checks and further information on the data are presented.[1]

1. The style of the manuscripts (e.g., citation style, etc.) corresponds to the guidelines of the journals.

5.1 The fans' perception of competitive balance and its impact on willingness-to-pay for a single game (Study 1) *

Article

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The Fans' Perception of Competitive Balance and Its Impact on Willingness-to-Pay for a Single Game

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Abstract

The economics literature related to the uncertainty of outcome hypothesis reopens the discussion of whether the fans' perceptions of competitive balance (CB) are in line with Rottenberg's and Neale's theory. This article contributes to the literature by analyzing the effect of fans' perceptions of suspensefulness on their willingness-to-pay for a single-game ticket and evaluating monetarily the (un)importance of CB. Results suggest that fans' notions of competitiveness influence their spending behavior, rising as perceived balance rises, at least up to high levels of competitiveness.

Keywords

uncertainty of outcome hypothesis, willingness-to-pay, perceived competitive balance, football, soccer

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The fans' perception of competitive balance and its impact on willingness-to-pay for a single game

Introduction

Since Rottenberg (1956) and Neale (1964), it is argued that fan interest would be higher in a game between evenly matched teams than between a very good and a very poor team, leading to higher demand for tickets and consequently to higher league revenues from the former than from the latter. Similarly, Zimbalist (2002) argues that the importance of competitive balance (CB) is derived from the assumption that fans have a strong preference for outcome uncertainty. Yet recent studies show that stadium attendance rises the more certain a home win becomes (e.g., Coates & Humphreys, 2012) or even the more probable an away win becomes (e.g., Coates, Humphreys, & Zhou, 2014; Pawlowski & Anders, 2012). Such findings reopen the discussion of whether the fans' perception of CB is in line with Rottenberg's and Neale's theory. In view of that, Pawlowski (2013a, 2013b) and Pawlowski and Budzinski (2013) introduced a stated preference (SP) approach on the league level to track down the so-called "perceived" competitive balance (PCB) and found that PCB differs from "objectively" (statistically) measureable competitive balance (OCB), unveiling a new approach to understanding the relationship between fans and CB. In addition to their intention-to-consume approach, Pawlowski and Budzinski (2013) associated PCB with the fans' willingness-to-pay (WTP), including data on three major leagues from Germany, Denmark, and the Netherlands. Their results indicated that a tipping point/threshold value of CB exists and that crossing this threshold can lead to massive demand reactions.

Building upon these PCB studies developed so far and taking into account that PCB reflects an individually weighted evaluation of OCB, in this article, we aim to gain insights into the role of the CB as an integral constituent of the fans' WTP for a ticket to a specific game. This analysis is a further step toward the monetary evaluation of CB at the league level (Pawlowski & Budzinski, 2013) and the relationship between CB and stadium attendance.

The fans of a German 1st Bundesliga club were surveyed prior to a league game and were asked about their WTP for a ticket to the upcoming game as well as about their perception of suspensefulness of the game under consideration. The results strongly indicate that the latter has a significant positive impact on the respondents' WTP and that this WTP differs according to the fan's involvement with the club. Moreover and by sorting WTP to ticket prices, it is shown that a higher degree of perceived suspensefulness significantly affects the preference for higher quality seating, at least as indicated by the increase in the probability of reporting a WTP at the level of the highest ticket prices.

The remainder of the article is organized as follows: In the subsequent section, a theoretical model is presented, followed by the third section with a discussion of the empirical methodology and the chosen design as well as details of the data collection and a description of the data. The fourth section presents and interprets the results. The last section discusses the findings and concludes the article.

Modelling the Fans' Willingness-to-Pay

We assume that a survey respondent possesses the utility function $u = u$ (x, PCB, z, d) with x, PCB, d and z greater than or equal to zero. Utility u is increasing in z, x and PCB but decreasing in d; x takes the value of 1 if the individual attends the football match and 0 if otherwise, PCB measures the fan's perception of suspensefulness for a game, z is a composite of all market goods, and d is distance from the football stadium. Since PCB is a *non-market* good, the fan's budget constraint is m = $px + z$, where m is the fan's money income, $p = t + c$ (d) is the sum of the ticket price t and the travel costs c (d), and the price of the composite commodity is normalized at 1. Solving the fan's expenditure minimization problem: min ($px + z$) subject to a prescribed level of utility u^* and a given level of perceived suspensefulness PCB_1 results in the expenditure function m (p, PCB_1, u^*) which equals the fan's observed money income m.

Now suppose that PCB increases, say to PCB_2. Since greater perceived suspensefulness is assumed to enhance utility, utility u' will be greater for this new level of perceived suspense while the fan continues to spend his money income m. The minimum expenditure necessary to obtain the utility level u' at the original perceived suspense is m (p, PCB_1, u') > m. Therefore, WTP for the increase in PCB is WTP = m (p, PCB_1, u') – m. This is the equivalent variation measure of the welfare change induced by an increase in PCB. The theoretical model informs specification of the empirical WTP model:

$$WTP_i = \alpha' X_i + \beta PCB_i + \varepsilon_i \quad (1)$$

where α is a $k\times1$ coefficient vector, X_i is a $k\times1$ vector of explanatory variables which includes distance, a constant, consumer income, as well as personal and demographic characteristics. The preference parameter for PCB is denoted by β. Summing up, the main hypothesis to be tested in the empirical analysis is whether $\beta > 0$ holds.

Research Design and Data

This section describes the survey and provides some insights about the game under consideration. Next it discusses the elicitation methods followed, giving emphasis to the biases resulting out of Contingent Valuation Method studies and explains how we deal with them. Furthermore, it displays the chosen econometric approach as well as the empirical model derived from our theoretical approach. Finally, it describes the variables used in the empirical model.

Survey

To examine the impact of the PCB of a single game on the fans' WTP, an online survey (with the use of QuestionBack AG software) was conducted among "fans" of the Facebook page of VfB Stuttgart, a professional football club competing in the German 1st Bundesliga. Day by day, many researchers converge on the use of social media platforms for research reasons, as they are able to reach wide audiences rather cheaply and have various possibilities to directly analyze the users' view of companies and organizations (Edelman, 2012). Samuels and Zucco (2013, 2014) attest that social networks are a promising medium to conduct research and detect no internal validity threats. Their results indicate almost identical findings by applying the same research in a nationally representative sample and another on a convenience sample recruited via Facebook. A first study in the sport economics context was conducted by Feddersen, Humphreys, and Soebbing (2013) who utilize Facebook to analyze “likes” aiming to investigate whether sentiment biases exist in sports betting markets.

The survey was conducted between the April 11, 2013, and April 14, 2013, and was accessible until 15 min before the kickoff of the game VfB Stuttgart against Borussia Mönchengladbach. The game was about average and did not involve a traditional (or any other kind of important) rivalry. It took place five matchdays before the end of the season, with VfB Stuttgart being 10 points away from securing an UEFA Europa League place and 9 points away from the relegation zone. The difference between the contestants was five points, with the bookmakers giving a 41.97% probability for a home (VfB Stuttgart) win. Noteworthy is that the average home win probability of VfB Stuttgart during the season (2012-2013) was 42.31%, establishing this game as somewhat representative of all home games of the club in that season.[1] All in all, we were able to gather 875 completed and quality-corrected questionnaires.[2]

Some additional details about the survey are important. First, our survey did not provide any monetary incentive for fans to respond. However, to increase participation in the survey, respondents could take part in a lottery afterward to win a jersey of the club. Furthermore, requirements of the club precluded us from posting the survey multiple times, and the vast majority of survey responses came in the first few hours after the survey was launched. Consequently, while it might be interesting to do so, we are unable to track changes in WTP responses as game time approached. Finally, it might also be of interest to assess WTP by *stated* seating section, yet we lack such kind of information.

1. Figure A1 (appendix) provides an overview of the home win probabilities in relation to attendance figures for VfB Stuttgart regarding the season under consideration, indicating that the game chosen for the survey belongs to a group of games with similar win probabilities and attendance figures.

2. To determine the “quality”, each individual’s processing time is correlated with the average processing time of the entire sample. This relationship can be expressed by an index which indicates quality. The recommendation of QuestBack AG was followed and every participant with an index .03 was removed from the data. Furthermore implausible observations were deleted, that is, observations where school pupils appeared to be more than 80 years old and so on (n = 30). Such observations were (partly) caused due the fact that respondents only born before 2000, were able to state their year of birth.

However, if stated WTP is in line with the prices charged by club, it may be possible to sort the WTP to ticket categories.

Elicitation Method

An important aspect of every SP study is the thoughtful design and operationalization of the elicitation questions. Although there is a general opinion among many CV practitioners (see Hanemann, 1984) that the closed-ended elicitation format should be preferred, our study uses an open-ended elicitation format, that is, the respondent is directly asked to state his maximum WTP for a ticket to attend the upcoming football game. The open-ended elicitation method has several advantages such as the absence of an "anchoring" or "starting point" bias that occurs when respondents are influenced by the starting values or succeeding bids used in closed-ended designs (see Green, Jacowitz, Kahneman, & McFadden, 1998). Yet at the same time an open-ended format may lead to a large number of nonresponses, if the respondents find it difficult to answer, and it may be vulnerable to hypothetical and strategic bias (Louviere, Hensher, & Swait, 2000).

Loomis (2011) states that hypothetical bias arises in SP valuation studies when the respondents' reported WTP exceeds what they actually pay using their own money in laboratory or field experiments. Loomis (2011) argues that there exists no widely accepted general theory of respondent behavior that explains this particular type of bias, yet he suggests that an entirely new theory of respondent behavior shedding light on this issue may be possibly found in behavioral economics and psychology. Following this suggestion and utilizing psychological studies of preference construction, Schläpfer and Fischhoff (2012) show that a high familiarity with a good exerts a diminishing effect on hypothetical bias. In our study, it is reasonable to assume that the respondents are familiar with the good for which the WTP value is elicited. Being a Facebook fan of a football club allows "likers" to have access to information regarding ticket offers and prices which is often posted directly by the club on its page. Additionally, almost 100% of the respondents state they are highly interested in the German Bundesliga, which conveys a certain degree of familiarity with the product of football in Germany, and thus it is anticipated that fans' responses are in line with the range of ticket prices. Consequently, even if WTP values in our sample are likely to be somewhat inflated, we are confident that our survey design and sample choice is able to reduce the disparity between true and hypothetical WTP values.

In addition, it must be noted that we intentionally avoided asking fans about their WTP for an increase in suspense, as in that case we would have had the same issues that exist whenever the respondent is unfamiliar with the good. We presume that fans would have never been able to actually look at prices for suspense, so they would have no basis on which to form a WTP. However, with our chosen approach, we expect to get an implied WTP for suspense without anyone having to actually try to "value" suspense. Concluding, as this study's objective is to compare the reported WTP values to each other rather than to apply some true valuation, a hypothetical bias (even if arguably existent) is not a real concern.

Yet another important issue is the strategic bias which is the case when respondents act strategically and do not state their true WTP when they know it. Nessim and Dodge (1995, p. 72) expect that "buyers may attempt to quote artificially lower prices, since many of them perceive their role as conscientious buyers as that of helping to keep prices down." To minimize the risk of strategic bias, it was made clear to the respondents that the survey is part of a research project for academic purposes. The survey avoided the use of VfB Stuttgart's logo but displayed the logo of the German researchers' academic institution. In this way, it is anticipated that respondents were aware that any statement made in the questionnaire could not have had any possible impact on the decision making of the club. However, not all respondents have the incentive to understate their WTP. Moreover, respondents whose expected cost of the scenario is larger than their WTP, have incentives to state a zero WTP. Even so, in our survey, there was only a single case where the stated WTP was zero.

Regarding the elicitation of the fan's perception of game uncertainty, the fans were asked to state on a scale of 0 to 10 (0 = *not at all suspenseful* . . . 10 = *very suspenseful*), how suspenseful they thought the upcoming game of VfB Stuttgart against Borussia Mönchengladbach would be. In this manner, the survey response is able to measure the PCB or, in other words, the degree of perceived suspensefulness of a particular game.

This approach of capturing uncertainty was outlined by Pawlowski (2013a, 2013b) and is found to be consistent with the theoretical literature on CB.[3]

Econometric Specification

First of all and in order to get some insights as to whether there exist systematic differences between perceived suspense and WTP, we assess the mean WTP values for different suspense levels by implementing a nonparametric approach and by estimating the survivor function of WTP responses as in Pawlowski and Budzinski (2013). The Kaplan–Meier survival functions are simply derived by arranging the sample's WTP values in ascending order and calculating the proportion of the sample that has a WTP greater than each value (Bateman et al., 2002) and hence for different levels of suspense.

Apart from that we test the anticipated relationship between WTP and PCB by controlling for other covariates. Due to the absence of zero WTP values (only one respondent stated zero), there was no need to analyze the WTP data with the Tobit model. Therefore, a multivariate regression model is preferred, which enables the modeling, examination, and exploration of multiple relationships and can be useful for the prediction of the WTP values corresponding to a set of different suspense values. As the distribution of WTP is skewed, normality of the error terms was more closely approximated when WTP was logarithmically transformed. For that reason, the natural logarithm of WTP was used as the dependent variable. The empirical model (Equation 2) expresses WTP to depend on perceived game suspense, perceived league suspense, sociodemographic factors, and opportunity costs. Overall, two different specifications of the regression model have been estimated, differing with regard to the definition of the PCB_{game} variable.

$$\widehat{\text{WTP}}_\text{i} = b_0 + b_1\text{PCBgame}_i + b_2\text{PCBleague}_i + b_3\text{Single}_i + b_4\text{Female}_i + b_5\text{Age}_i + b_6\text{Unemployment}_i + b_7\text{Income}_i + b_8\text{Distance}_i + b_9\text{Distance2}_i \qquad (2)$$

3. Pawlowski (2013a, 2013b) runs various principal component regressions that confirm that the perception of the fans regarding suspense indeed reflect (among others) the short-, mid-, and long-term dimension uncertainty of outcome.

Moreover and as we show in the upcoming Descriptive Statistics section, the reported WTP values seem to be in line with the range of ticket prices set by VfB Stuttgart for the season (2012-2013), therefore, we treat the reported WTP as a signal of the ticket category the individual would have purchased. [4] The reason is that it may be that the reported WTP reflects the desire to purchase a high quality ticket for the match versus a low-quality ticket. To assess this possibility, we relate the WTP to ticket prices within the stadium at the time by introducing three distinct ticket categories (“standing,” “curva” and “main stand”). With these categories as the outcome variable, we employ an ordered probit model using the same covariates as in Equation 2. Following Cameron and Trivedi (2010) for individual *i*, we specify $y_i^* = x_i' \beta + \varepsilon_i$, where a normalization is that the vector of explanatory variables x does not include an intercept. For very low y_i^*, ticket category is standing; for $y_i^* > a_1$ ticket category is curva; for $y_i^* > a_2$ ticket category is main stand. The order of the ticket categories denotes also the order of their quality/cost and therefore the threshold parameters (or cutoff points) are defined with the following order $a_1 < a_2$. Defining the probabilities of observing $y_i = j$, where alternative $j = 1, 2, 3$, leads to:

$$\Pr(yi = j) = \Phi[\alpha_j - x_i' \beta] - \Phi[\alpha_{j-1} - x_i' \beta] \quad (3)$$

with Φ(.) being the cumulative distribution function of the univariate standard normal distribution. In addition, we calculate the average marginal effects (AMEs) that provide a better representation of how changes in the explanatory variables affect the probability of a specific choice and are therefore more realistic than the marginal effects at the means.

Descriptive Statistics

After the deletion of observations with missing values for the relevant variables and the omission of respondents who stated that they possess season tickets as well as of those

4. This approach was kindly suggested by an anonymous referee.

who indicated that they will attend the game at stadium (i.e., might have already purchased tickets), the final net sample used in the data analysis consists of 510 observations..[5] The following tables provide an explanation of the variables (Table 1) and their descriptive statistics (Table 2).

Table 1. Variables Description.

	Question	Type	Description
Dependent Variable			
WTP	How much would you be willing to pay at most for a ticket to attend the game VfB Stuttgart - Borussia Mönchengladbach?	Metric	Open question format WTP
Ticket category		Ordinal	Standing = 1 if WTP <=18 € Curva = 2 if WTP >18 € & <=38 € Main stand = 3 if WTP >38
Perceived suspense			
Suspense	How suspenseful do you think will be the upcoming game?	Ordinal	The perceived suspense (0 = *not at all suspenseful*...10 = *very suspenseful*)
Bundesliga suspense	Considering the actual season, how suspenseful do you think is the German 1st Bundesliga?	Ordinal	The perceived suspense (0=*not at all suspenseful*...10 = *very suspenseful*)
Demographics			
Single	Marital status	Dummy	Marital status (single = 1)
Female	Gender	Dummy	Gender (female = 1)
Age	Year of birth	Metric	Age (in years)
Unemployment	Are you currently employed?	Dummy	Employment status (unemployed = 1)
Income ≥3500 €	If you add up your income, how high is your net household income per month (after taxes and other deductions)?	Dummy	Net household income per month. Original format: 8-categories; Recoded as dummy (≥ 3500 € = 1)
Opportunity costs			
Distance in km	ZIP Code	Metric	Travel distance to the venue by car (in km)

Note. WTP = willingness-to-pay

The mean WTP of the sample is 25.10 €, with its distribution (as already discussed) indicating a skewness to the left (Figure 1). The responses, as anticipated, seem to be in line with the range of ticket prices set by VfB Stuttgart for the season (2012-2013), which

5. The models initially included season ticket holders and attendees. The results were largely the same; however, the impact of suspense was generally smaller than without them (Table A3). A result expected since, for example, season ticket holders purchase tickets well in advance of any individual game and attendees have the possibility to purchase tickets for the upcoming game couple of weeks ahead.

was (excluding VIP and business seat tickets) between 8.00 € and 85.00 € (VfB Stuttgart, 2012).

Table 2. Descriptive Statistics.

	Mean	SD	Min	Max
Dependent Variable				
WTP	25.10	10.60	5	70
Natural log of WTP	3.139	.413	1.610	4.248
Ticket classification	1.875	.604	1	3
Perceived suspense				
Game suspense	6.071	2.185	0	10
Game suspense squared	41.616	25.222	0	100
Medium suspense level (4-6)	.382	.486	0	1
High suspense level (7-10)	.480	.500	0	1
Bundesliga suspense	5.508	2.209	0	10
Demographics				
Single	.816	.388	0	1
Female	.259	.438	0	1
Age	27.714	9.168	14	69
Unemployment	.024	.152	0	1
Income ≥3500 €	.120	.325	0	1
Opportunity costs				
Distance in km	135.44	176.982	2	819.004
Distance squared (×1,000)	49.606	115.041	.004	670.768

Note. WTP = willingness-to-pay

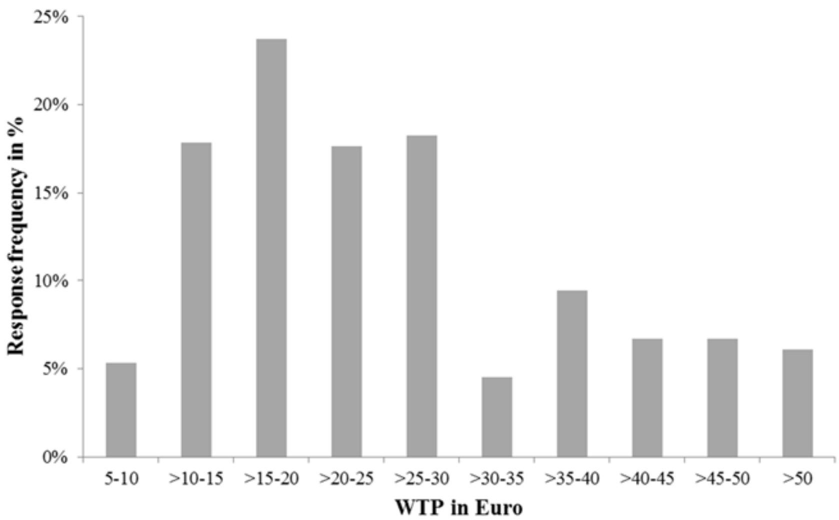

Figure 1. The distribution of the willingness-to-pay (WTP) measure in the sample.

Concerning the ticket categories (Figure 2), 62% of the fans indicate a WTP that corresponds to the value of a ticket for the stands located behind the goals (curva), 25% of them would be willing to pay for a ticket for the nonseater (standing) section, whereas 13% for a ticket in the central stand (main stand) of the stadium.

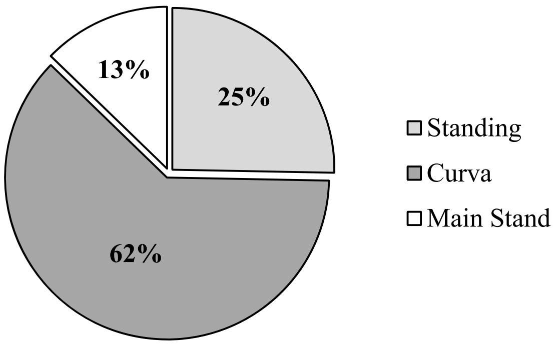

Figure 2. The distribution of ticket price categories.

Regarding the perception of suspensefulness of the game against Borussia Mönchengladbach, Figure 3 provides an overview of its distribution, highlighting a skew to the right, with the majority of respondents (57%) rating the game 6, 7, or 8. The mean PCB of the sample is about 6 of 10.

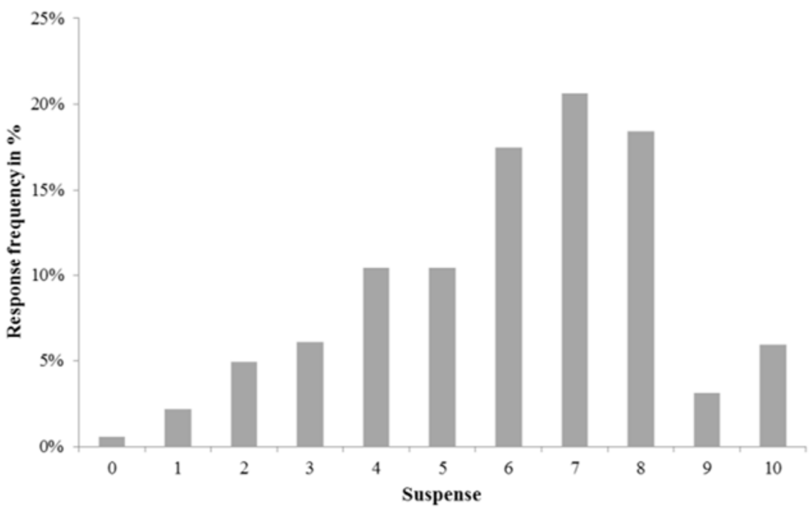

Figure 3. The distribution of the PCB measure in the sample.

Likewise, considering the then current season (2012-2013), VfB Stuttgart fans rate on average the suspensefulness of the German 1st Bundesliga as 5.5 out of 10. Furthermore, the analysis controls for covariates such as perceived league suspense, sociodemographics (single, gender, age, unemployment, and income), and opportunity costs (travel distance). [6] Twenty-six percent of the respondents are female. On average, a survey participant is around 28 years old, and 2.4% of the respondents are unemployed. Twelve percent declare a net household income per month (after taxes and other deductions) of more than 3,500 €. Finally, on average, respondents live 135 km from the Mercedes-Benz Arena (the stadium of VfB Stuttgart). Figure 4 provides a map of all survey respondents' locations which are all to be found within the geographical boundaries of Germany. As expected, the majority of them live in the southern part of country and in specific within the limits of the state of Baden Württemberg the capital of which is the city of Stuttgart. [7]

It is important to consider whether this self-selected sample of VfB Stuttgart fans is (to some extent) representative of German football fans to assess the generalizability of our results. A useful study in this context was conducted by SPORTFIVE (2009) which examined a representative sample of the total German population. We compare our survey sample with the subsample of the SPORTFIVE survey that reported being highly interested in football, estimated to be around 33% of the total German population. We focus on this particular SPORTFIVE subsample because our self-selected sample consists of individuals likewise highly interested in football as evidenced by their having liked the Facebook page of their favorite football club. Table 3 provides a comparison between the two surveys with full-sample characteristics of the SPORTFIVE study being included to ensure completeness.

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6. Initially, the analysis included "involvement" covariates (importance of VfB, Pay TV subscribers and if the respondents visited the stadium for a game in the season under consideration, Tables A1 and A2). The results with and without these covariates are largely the same (Table A3). It was decided to omit those variables from the main models presented in the article for potential endogeneity issues.
7. In the state of Baden-Württemberg (season 2012-2013) there are other two 1st Bundesliga clubs, that is, SC Freiburg and TSG 1899 Hoffenheim. However, VfB Stuttgart is the most populated club of the state. Hereto a Sport+Markt (2012) study found out that 40% of the (football-interested) Baden-Württemberg residents are fans of VfB Stuttgart. For more information, visit http://www.spiegel.de/sport/fussball/bild-854316-398035.html.

Figure 4. The sample's geographical distribution (Germany).

Table 3. Samples' Comparison with SPORTFIVE (2009).

	VfB sample	SPORTFIVE (2009) Subsample (Highly interested in football)	SPORTFIVE (2009) Full Sample (German population)
<29 years	70%	25%	22%
30–49 years	26%	35%	34%
>50 years	4%	41%	44%
Income ≥2,500€	24%	27%	24%
Female	26%	23%	47%
Bundesliga interest	100%	99%	77%
No game attended (current season)	41%	44%	64%

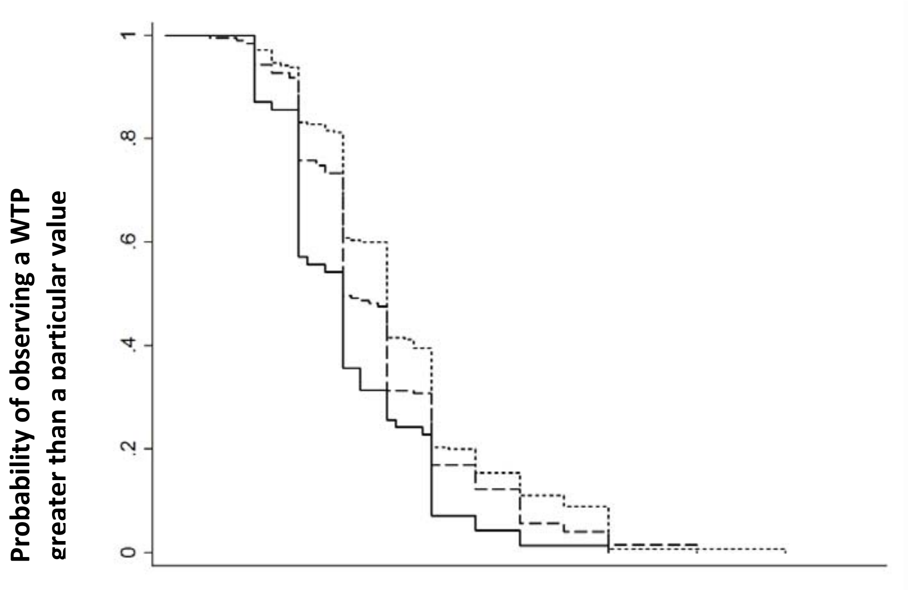
Regarding the socio-demographic characteristics of the two samples, the respondents in our sample are on average much younger than respondents in the SPORTFIVE subsample. Our relatively young sample is likely to be attributed to the fact that our survey was conducted online via Facebook. As a matter of fact, Facebook reports that 70% of the around 25 Million German Facebook users are younger than 34 years (SocialBakers, 2013). Yet this sample characteristic is comparable with the sample in Pawlowski (2013a, 2013b; <29 years = 51%; 30–49 years = 34%; >50 = 10%) who used a very different sampling method by conducting face-to-face interviews at stadiums and in bars. Thus, it seems that a self-selection of younger fans may also be a sign of higher probability to consume by this particular segment of fans, resulting in a generic overrepresentation of them in surveys even when the settings are completely different. As far as gender is concerned, the portion of females in our study (26%) is comparable to the proportion found in the SPORTFIVE subsample (23%) and in line with the average portion of female attendees (25%) in the German Bundesliga in recent years (Bundesliga, 2009). Furthermore, several other sample characteristics such as the net household income, Bundesliga interest, and game attendance in the current season [8] are more or less similar. Summing up, while opportunities to test the representativeness of our sample are somewhat limited, rough comparisons suggest that our sample may be representative, with regard to the SPORTFIVE subsample of highly interested football fans in Germany.

Results

Figure 5 displays the estimated Kaplan–Meier survival functions as well as the standard errors of the mean WTP values, derived with the bootstrapping method (999 replications). We distinguish between three different levels of suspense, low suspense where the survey response equals 0 through 3; mid suspense where the survey response is 4, 5, or 6; and high suspense where the response is 7 or larger. A log-rank test allows us to reject the hypothesis that the survivor functions corresponding to the levels of suspense are equal, and the p value is <.001.[9]

8. To address issues concerning validity our models initially included also a variable denoting "current season consumption." The variable was not significant and findings remained robust. This variable turns to be significant only (and as expected) in the models which include season-ticket holders (see Table A3, Model 4). Therefore, there are no concerns about an influence of it on the willingness-to-pay (WTP) and thus no concerns about validity.

9. This test is applied with sts test STATA syntax, which obtains (according to STATA manual) at each distinct failure time in the data, the contribution to the test statistic as a weighted standardized sum of the difference between the observed and expected events in each of the *k* groups. The expected number of events is obtained under the null hypothesis of no differences between the survival experiences of the *k* groups.



				95% Confidence Interval	
Suspense level	**N**	**Mean**	**Standard error**	**Lower Bound**	**Upper Bound**
Low (——)	70	20.67 €	1.014	18.68	22.66
Medium (– –)	195	24.45 €	.722	23.03	25.86
High (····)	245	26.89 €	.717	25.48	28.29
All sample	510	25.10 €	.466	24.19	26.01

Note: Standard errors were derived by bootstrapping (r=999)

Figure 5. Survivor functions of willingness-to-pay (WTP) responses.

The estimated survival functions demonstrate different patterns regarding the three levels of perceived suspense. The mean WTP values for each discrete suspense level show that respondents who report high perceived suspense are willing to pay more for a ticket than are those who report mid and low perceived suspense. The stated WTP of the high-suspense group is 15.4% more than that of the mid-suspense group and 28.5% more than the low-suspense respondents. The mean WTP of the high, mid, and low suspense groups are, respectively, 28.89 €, 24.45 €, and 20.67 €.

Table 4. Estimation Results of the Models.

	Model 1	Model 2	Model 3
Perceived suspense			
Suspense (0-10)	.100 (.032***)		.299 (.103***)
Suspense squared	-.006 (.003**)		-.019 (.009**)
Medium suspense (4-6)		.138 (.052***)	
High suspense (7-10)		.207 (.053***)	
Bundesliga suspense	.033 (.008***)	.035 (.008***)	.080 (.025***)
Demographics			
Single	-.087 (.066)	-.088 (.067)	-.288 (.199)
Female	.074 (.041*)	.072 (.041*)	.140 (.121)
Age	.0002 (.003)	.0003 (.003)	-.0002 (.008)
Unemployment	-.041 (.104)	-.041 (.100)	.029 (.257)
Income ≥3500 €	.178 (.051***)	.173 (.051***)	.345 (.155**)
Opportunity costs			
Distance	.001 (.0003***)	.001 (.0003***)	.003 (.001***)
Distance Square (×1,000)	-.002 (.001***)	-.002 (.001***)	-.004 (.002**)
κ_1			.749 (.464)
κ_2			2.680 (.475)
Constant	2.566 (.153***)	2.752 (.135***)	
N	510	510	510
R^2	14.3%	14.8%	
Adjusted R^2	12.6%	11.7%	
Cragg-Uhler R^2			12.2%

Note. Robust standard errors are in parenthesis.Significance levels are indicated as ***p ≤ .01. **p ≤ .05. *p ≤ .1.

In Table 4, we report the estimation results of the ordinary least squares (OLS) regression models (Models 1 and 2) as well as the results of the ordered probit regression (Model 3). In Models 1 and 3, game suspense is ordinal, as taken directly from the survey, and accompanied by its squared term. In Model 2, a high-suspense level dummy variable takes a value of one when the survey respondent indicated the four highest levels of suspensefulness, and zero otherwise and medium suspense level is a dummy variable that takes a value of one when the survey respondent indicated the three median levels of suspensefulness (the four lowest levels were set as the reference category).[10] Robust standard errors are reported for all models. Apart from that, multicollinearity is tested using the mean estimated variance inflation factors. In all cases, the variance inflation

10. Initially estimated was also a model with the full set of individual suspense dummies (Table A6). After running hypothesis tests we could not reject the null hypothesis that the individual suspense dummies are equal in the groups that form our Model 2 (Table A7). This let us conclude that fans cannot, on average really distinguish 11 degrees of suspense, but they can distinguish low, medium, and high suspense. Therefore, Model 2 (Table 4) and Figure 5 are based on the broader categories of low, medium, and high suspense.

factors are less than six, rejecting the possibility that predictors are highly linearly related. We further evaluate the effect of covariates (Model 3) by examining their marginal effect on the probability of observing each ticket category. Table 5 reports the AMEs computed over the estimation sample.

Table 5. Average Marginal Effects (Model 3).

	Standing section	Curva	Main stand
Perceived suspense			
Suspense (0-10)	-.089 (.030***)	.030 (.011***)	.059 (.021***)
Suspense squared	.006 (.003**)	-.002 (.001**)	-.004 (.002**)
Bundesliga suspense	-.024 (.007***)	.008 (.003***)	.016 (.005***)
Demographics			
Single	.085 (.059)	-.029 (.020)	-.056 (.050)
Female	-.041 (.036)	.014 (.012)	.027 (.024)
Age	.0001 (.002)	-.00002 (.001)	-.00004 (.001)
Unemployment	-.009 (.076)	.003 (.026)	.006 (.050)
Income ≥3500 €	-.102 (.046**)	.035 (.018*)	.067 (.030**)
Opportunity costs			
Distance	-.001 (.0003***)	.0003 (.0001**)	.001 (.0002**)
Distance square (×1,000)	.001 (.0005**)	-.0004 (.0002**)	-.001 (.0003**)
N	510	510	510

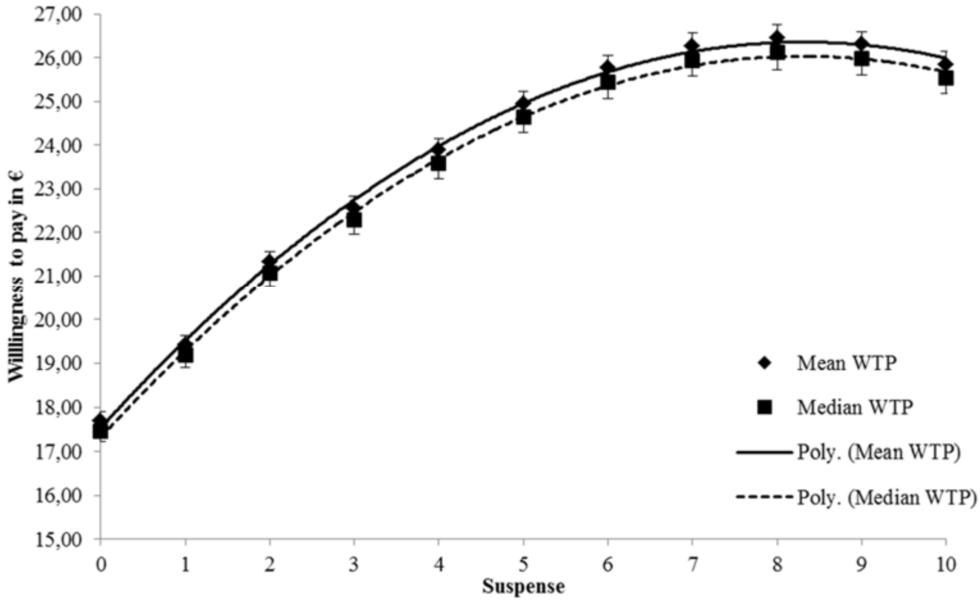
Note. Robust standard errors are in parenthesis.Significance levels are indicated as ***p ≤ .01. **p ≤ .05. *p ≤ .1.

Setting the focus on the relationship between WTP and PCB, the first thing to notice is that in both OLS Models 1 and 2 suspense is positive and significant at the 1% level. All in all, the results indicate a positive and significant effect of PCB on WTP, meaning that an increase in perceived suspensefulness can lead to an increase in a fan's WTP to attend the game.[11] Noteworthy is that in Model 2, the increment to WTP from low to mid-level suspense is larger than the increment from mid-level suspense to high suspense, indicating the existence of diminishing marginal WTP for suspense. [12]

11. As noted in Note 6, we calculated models regarding different involvement groups. Our findings suggest that involvement affects the influence of suspense on WTP. In most cases, involved individuals have higher WTP than noninvolved individuals at specific (high) suspense levels (Tables A3 and A4). However, for members, who neither attend nor have season tickets, suspense has the same effect as for nonmembers.
12. Regarding involvement groups, we find that members like nonattendees have a diminishing marginal WTP with respect to increases in suspense, whereas for season ticket holders and ticket purchasers the marginal WTP is rising as suspense rises (Tables A3 and A4).

Diminishing marginal WTP is also evident in Model 1, which, additionally, points toward a threshold value of PCB, beyond which WTP no longer rises. Figure 6 illustrates the mean and median WTP values implied by the coefficients from Model 1. All variables except suspense and suspense squared are set equal to the sample mean in the computations. Moreover, we adjust the predicted values for the estimate of the conditional variance (see Greene, 2008) and apply bootstrap standard errors (999 replications) to derive 95% confidence intervals on the mean and median WTP. Figure 6 shows graphically the diminishing marginal WTP. The maximum WTP for increased suspense occurs at about suspense level eight.

Figure 7 shows the predictive margins of the nonlinear PCB variable for the three different ticket categories. Fans' probability to report a WTP in the (low-cost) standing ticket price range declines as suspensefulness rises, dropping from about 0.6 for the least suspenseful match to about 0.25 for the most suspenseful. By contrast, the probability of a WTP in the curva or the main stand zone increases with increasing PCB. Consistent with our OLS findings, all three ticket categories point toward a tipping point, with the maximum likelihood of a respondent reporting either of the mid and high ticket price ranges is maximized at suspense level eight. Of course, this means that at the same suspense level is the least likelihood of reporting a WTP consistent with a standing section ticket. In view of that these findings reveal a higher demand for quality seating as suspense increases until a threshold value of PCB, beyond which demand no longer rises.



Suspense level		WTP in €	Standard error	95% Confidence Interval Lower Bound	Upper Bound
0	**Median**	17.46	.129	17.21	17.71
	Mean	17.68	.105	17.47	17.89
1	**Median**	19.18	.138	18.91	19.45
	Mean	19.42	.110	19.20	19.63
2	**Median**	21.06	.154	20.76	21.36
	Mean	21.32	.125	21.08	21.57
3	**Median**	22.29	.161	21.97	22.60
	Mean	22.56	.130	22.31	22.82
4	**Median**	23.58	.180	23.23	23.94
	Mean	23.88	.137	23.61	24.14
5	**Median**	24.65	.181	24.29	25.00
	Mean	24.95	.141	24.68	25.23
6	**Median**	25.44	.190	25.07	25.82
	Mean	25.76	.146	25.47	26.04
7	**Median**	25.94	.191	25.57	26.32
	Mean	26.26	.148	25.97	26.56
8	**Median**	26.13	.201	25.73	26.52
	Mean	26.45	.151	26.15	26.75
9	**Median**	25.99	.197	25.60	26.37
	Mean	26.31	.148	26.02	26.60
10	**Median**	25.53	.182	25.18	25.89
	Mean	25.85	.147	25.56	26.14

Note: Standard errors were derived by bootstrapping (r=999)

Figure 6. Polynomial trend lines of predicted mean and median willingness-to-pay (WTP) values.

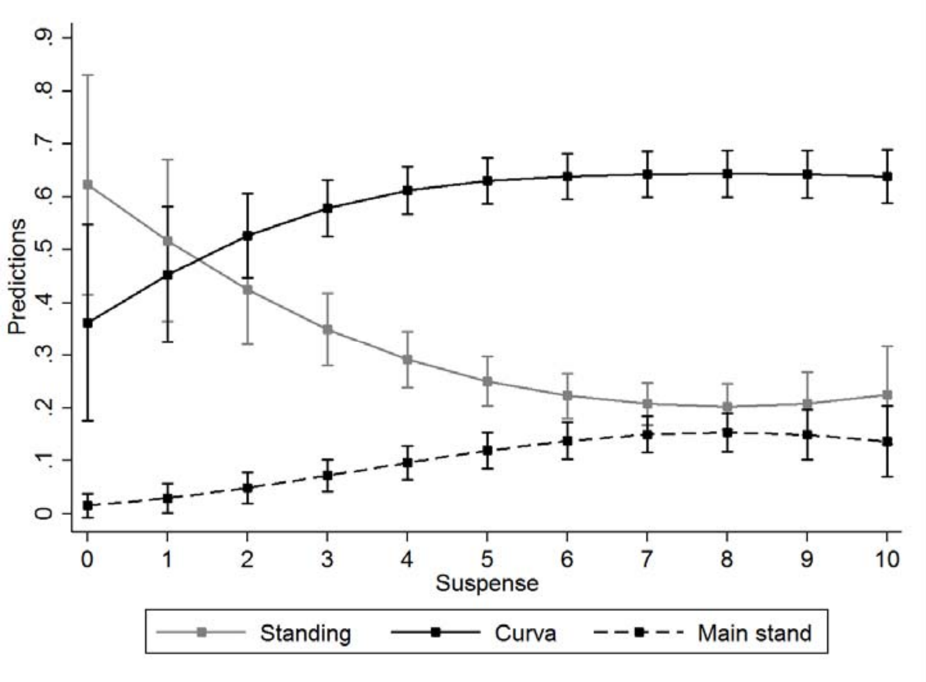


Figure 7. Predictive margins (95% confidence intervals [Cis]) for perceived competitive balance (PCB) and ticket categories.

Our results also indicate that the effect of the current league season's PCB is a positive and statistically significant determinant of WTP in both OLS Models 1 and 2. In other words, WTP for VfB Stuttgart versus Borussia Mönchengladbach is greater because the fans perceive the league to be more balanced. Moreover, this WTP rises by 3.4–3.6 percentage points for each unit increase in perceived suspense in the league. [13] At the average of the perceived league suspense, WTP for the Stuttgart-Mönchengladbach match is 20–21% greater than it would be if the league were perceived as completely lacking in suspense.[14] Regarding the likelihood of stating a WTP which corresponds to a higher quality seating (Table 5), the current league season's PCB is found to be positive and statistically significant for the categories curva and main stand, but negative for the

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13. Percentage points were calculated with $100(e^{\hat{\beta}} - 1)$ (see Vittinghoff, Glidden, Shiboski & McCulloch, 2012).
14. These values are calculated in the same manner as the WTP predictions in Figure 6, namely, by setting perceived league suspense equal to zero and all other covariates equal to the sample mean. Moreover, the predicted values were adjusted for the estimate of the conditional variance and then we compare the mean predicted value of zero league suspense with the mean predicted value of the sample mean. This difference is reported here in percentage points.

low-cost standing section category. An increase in perceived league suspense increases the likelihood of reporting a WTP at the level of a high- and mid-range cost ticket by 1.6 and 0.8 percentage points, respectively.

These findings are accompanied by the expected income effect in all three model specifications, that is, WTP rises with the income level of the consumer. Controlling for game characteristics, sociodemographic factors, and opportunity costs, the OLS regression results indicate that fans who have a net household income per month (after taxes and other deductions) of more than 3,500 € are WTP 18.9–19.5 percentage points more than others for a ticket. Similarly, fans with high income are 10.2 percentage points less likely to express a WTP at the level of the price of a standing section ticket, whereas they are 3.5 (though only at the 10% level of significance) and 6.7 percentage points more likely to report WTP at the price levels of a curva and a main stand section ticket, respectively.

Furthermore, being single or unemployed has no statistically significant effect. However, the results do indicate that female respondents have greater WTP than male respondents, though only at the 10% level of significance (Models 1 and 2).

Finally, the distance the respondents live from the Mercedes-Benz Arena has a positive and significant effect on WTP across both OLS models; however, its squared term indicates a diminishing effect. The positive effect could be due to the fact that the more distant the fans are, the less likely they are to have attended or to plan to attend other games, which results in more available budget and, consequently, higher WTP. Likewise and vice versa, it could be that the nearer fans are, the lower their maximum WTP, as they are, all else constant, likely to have attended or to plan to attend other games, so they experience a diminishing marginal WTP. Further, they may be better informed of ticket prices so that their WTP better represents actual prices than does that of fans who are farther away. The same effect of distance is evident also on the probability of ticket choice. The distance the respondents live from the Mercedes-Benz Arena has a positive and significant effect on the probability to report a WTP at the level of a curva or main stand section ticket; however, the squared term indicates a diminishing effect. At the same time, the probability of a WTP at the price levels of the standing section is declining with increasing distance.

Discussion and Conclusion

This study builds upon the idea of PCB or perceived suspensefulness utilized by Pawlowski (2013a, 2013b) and Pawlowski and Budzinski (2013, 2014) to study the relationship between fan perceptions of balance and their WTP for a single-game ticket. Our results show that fans who view the game as more suspenseful also tend to state a higher WTP to attend the match and are more (less) likely to express WTP big enough to purchase a higher (lower) quality seat. The evidence here suggests that fans' perceptions influence their purchasing behavior but in a very interesting way. The more the game is perceived as suspenseful, the higher the WTP and the probability the WTP is to cover purchasing a high-quality ticket but only until a certain level after which increases in the degree of suspensefulness have no additional impact. Our results provide support for discontinuity effects, as elaborated by Pawlowski and Budzinski (2013, 2014), by which we mean that the relation between CB and fans' consumption reveals a discontinuity, a "saturation point" or threshold, above which fluctuations in CB are less relevant for fans, while fans' consumption behavior changes significantly by a drop in CB below that crucial threshold.

Furthermore, our results contribute to the optimal CB discussion by providing a measure of the potential revenues from enhancements to perceived balance. Among others, Szymanski (2003) argued that club and franchise owners are unlikely to be interested in a perfectly balanced competition. Our results may be consistent with that argument as we show that after a certain level of competitiveness or perceived suspensefulness in an individual match, the potential revenues to the owners will remain more or less the same. Further increases in the perceived balance of the individual match will generate no additional revenue but surely would come at some cost. However, if the impact of league balance on the game studied here is representative of the league balance effect on all games, then revenues could grow another 20% from improvements in the perception of league-wide balance from its mean level to the maximum perceived balance. We cannot determine if this is sufficient to warrant attempts to enhance perceived league balance, as nothing here addresses the possible costs to the individual clubs or the league of doing so.

Still a weakness of this research is that we do not know what each fan understands by high or low suspense; that is, for the latter, it could be the anticipation of a home team win, the fact that the opponent is a strong brand (Pawlowski & Anders, 2012) or because he or she wants to witness an upset (Coates et al., 2014). What we do know is that PCB matters for fans, and we demonstrate that this approach is also suitable to test the importance of short term CB as a possible driver of purchasing behavior.

Nevertheless, this is the first research approaching the enigmatic relationship between fans and CB in this way. There is a need for additional data gathering to test our findings in other sports and in other countries. Finally, as our sample consists of VfB Stuttgart fans, it would be perilous to attempt to generalize their behavior in regard to other fans. However, Pawlowski (2013b) shows that even if every club bears its own history with successes or failures, which shapes the physiognomies of each fan group, there is no indication that club past successes affect the PCB. Moreover, our sample is not markedly different in its characteristics compared to the SPORTFIVE subsample. Therefore, our results may be representative at least as far as highly interested football fans in Germany are concerned.

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APPENDIX A

Table A1. Description of Additional Variables (Involvement Checks).

	Question	Type	Description
Involvement group			
Season ticket live	Do you have a season ticket at VfB Stuttgart?	Dummy	Recoded both as dummy, if live=1 and season ticket holder=1 then season ticket live=1
	Will you be watching the game VfB Stuttgart - Borussia Mönchengladbach live?	Dummy	
Season ticket	Do you have a season ticket at VfB Stuttgart?	Dummy	Season ticket holder (season ticket=1)
Member	Are you a member of VfB Stuttgart?	Dummy	Membership status (Member=1)
Involvement			
VfB Importance	Being fan of VfB is a very important part of my life	Ordinal	The importance of VfB Stuttgart. 7-point scale (totally disagree/ totally agree)
Pay TV	Do you have a Pay TV-Subscription that allows you to watch the Bundesliga?	Dummy	Pay TV subscription (Pay TV=1)
Stadium visit	Considering the actual season, how many home games of VfB Stuttgart have you attended live at stadium so far?	Dummy	Original format metric. Recoded as dummy, if home games≥1 then stadium visit=1

Table A2. Descriptive Statistics (Involvement Checks).

	Mean	SD	Min	Max
Dependent Variable				
WTP	25.23	10.716	5	73
Natural log of WTP	3.144	.411	1.609	4.290
Perceived suspense				
Game suspense	5.960	2.259	0	10
Game suspense squared	40.617	25.569	0	100
Bundesliga suspense	5.475	2.293	0	10
Interaction terms				
Season ticket live # suspense	1.212	2.570	0	10
Season ticket live # suspense2	8.064	19.664	0	100
Season ticket # suspense	.902	2.278	0	10
Season ticket #suspense2	5.993	17.314	0	100
Member # suspense	1.707 (1.345)	2.857 (2.638)	0	10
Member # suspense2	11.063 (8.753)	21.469 (19.516)	0	100
Involvement group				
Season ticket live	.218	.413	0	1
Season ticket	.164	.371	0	1
Member	.311 (.237)	.463(.426)	0	1
Involvement				
VfB Importance	4.880	1.743	1	7
Pay TV subscription	.356	.479	0	1
Stadium visit	.676	.468	0	1
Demographics				
Single	.825	.380	0	1
Female	.258	.438	0	1
Age	28.133	9.255	14	69
Unemployment	.023	.150	0	1
Income ≥3500 €	.112	.316	0	1
Opportunity costs				
Distance in km	117.264	164.276	2	819.004
Distance squared (×1,000)	40.696	104.060	.004	670.768

Note: Sample=652. Descriptive statistics for reduced sample (=510) in parenthesis, rest reported in Table 2.

Table A3. OLS Regression Results (Involvement Checks).

	Model 4	Model 5	Model 6	Model 7	Model 8
Perceived suspense					
Suspense (0-10)	.086 (.027***)	.099 (.032***)	.079 (.034**)	.106 (.037***)	.125 (.035***)
Suspense squared	-.005 (.002**)	-.006 (.003**)	-.004 (.003)	-.006 (.003**)	-.008 (.003***)
Bundesliga suspense	.028 (.007***)	.031 (.007***)	.030 (.007***)	.030 (.007***)	.032 (.008***)
Interaction terms					
Sticketlive#suspense		-.088 (.060)			
Sticketlive#suspense2		.009 (.006)			
Sticket #suspense			-.037 (.063)		
Sticket #suspense2			.003 (.006)		
Member #suspense				-.095 (.056*)	-.113 (.080)
Member #suspense2				.009 (.005*)	.010 (.007)
Involvement group					
Season ticket live		.254 (.144*)			
Season ticket			.093 (.137)		
Member				.246 (.139*)	.356 (.206*)
Involvement					
VfB Importance	.016 (.010)				
Pay TV subscription	.080 (.032**)				
Stadium visit	.075 (.035**)				
Demographics					
Single	-.028 (.055)	-.055 (.057)	-.036 (.056)	-.037 (.055)	-.084 (.066)
Female	.072 (.037*)	.060 (.037)	.060 (.037)	.060 (.037)	.072 (.041*)
Age	.002 (.002)	.0006 (.002)	.002 (.002)	.001 (.002)	.0002 (.003)
Unemployment	-.046 (.105)	-.025 (.104)	-.025 (.104)	-.028 (.102)	-.052 (.103)
Income ≥3500 €	.169 (.045***)	.168 (.046***)	.165 (.046***)	.161 (.045***)	165 (.051***)
Opportunity costs					
Distance	.001 (.0003***)	.001 (.0003***)	.001 (.0003***)	.001 (.0003***)	.001 (.0003***)
Distance square (×1,000)	-.002 (.0005***)	-.002 (.001***)	-.002 (.001***)	-.002 (.001***)	-.002 (.001***)
Constant	2.368 (.136***)	2.525 (.138***)	2.554 (.138***)	2.486 (.143***)	2.483 (.155***)
N	652	652	652	652	510
R^2	16.0%	14.7%	13.6%	14.1%	15.1%
Adjusted R^2	14.3%	12.9%	11.8%	12.4%	12.8%
AIC	0.927	0.943	0.955	0.949	0.958

Note. AIC = Akaike information criterion; OLS = ordinary least squares. Robust standard errors are in parentheses. Significance levels are indicated as ***p ≤ .01. **p ≤ .05. *p ≤ .1.

Table A4. Interactions Hypothesis Testing (Involvement Checks).

	F-statistic	Probability > F	H_0
Model 5			
Suspense+Sticketlive#suspense = 0	.04	.837	Cannot be rejected
Suspense2+Sticketlive#suspense2 = 0	.31	.579	Cannot be rejected
Joint test	4.73	.009	Reject
Model 6			
Suspense+Sticket#suspense = 0	.61	.435	Cannot be rejected
Suspense2+Sticket#suspense2 = 0	.02	.884	Cannot be rejected
Joint test	4.14	.016	Reject
Model 7			
Suspense+Member#suspense = 0	.06	.806	Cannot be rejected
Suspense2+Member#suspense2 = 0	.35	.554	Cannot be rejected
Joint test	5.28	.005	Reject
Model 8			
Suspense+Member#suspense = 0	.03	.871	Cannot be rejected
Suspense2+Member#suspense2 = 0	.05	.823	Cannot be rejected
Joint test	1.41	.244	Cannot be rejected

Table A5. Descriptive Statistics Dummy Model.

	Mean	SD	Min	Max
Perceived suspense				
Suspense = 3	.061	.239	0	1
Suspense = 4	.104	.305	0	1
Suspense = 5	.104	.305	0	1
Suspense = 6	.175	.380	0	1
Suspense = 7	.206	.405	0	1
Suspense = 8	.184	.388	0	1
Suspense = 9	.031	.175	0	1
Suspense = 10	.059	.236	0	1

Note. Sample = 510, rest of the descriptive statistics are reported in Table 2. OLS = ordinary least squares

Table A6. OLS Regression Dummy Model Results.

	Model 9
Perceived suspense	
Suspense = 3	.129 (.089)
Suspense = 4	.128 (.077*)
Suspense = 5	.250 (.083***)
Suspense = 6	.202 (.078***)
Suspense = 7	.276 (.075***)
Suspense = 8	.266 (.078***)
Suspense = 9	.233 (.102**)
Suspense = 10	.236 (.097**)
Bundesliga Suspense	.034 (.008***)
Demographics	
Single	-.081 (.068)
Female	.073 (.042*)
Age	.0005 (.003)
Unemployment	-.030 (.103)
Income ≥3500 €	.173 (.052***)
Opportunity costs	
Distance	.001 (.0003***)
Distance Square(×1,000)	-.002 (.001***)
Constant	2.687 (.143***)
N	510
R2	14.6%
Adj. R2	11.8%
AIC	0.975

Note: Robust standard errors are in parentheses. Suspense Values 0, 1, and 2 are set as reference categories. AIC = Akaike information criterion; OLS = ordinary least squares. Significance levels are indicated as ***p ≤ .01. **p ≤ .05. *p ≤ .1.

Table A7. Hypothesis Testing Dummy Model

	F-statistic	Probability > F	H_0
Model 9			
Suspense4=Suspense5=Suspense6	1.57	.208	Cannot be rejected
Suspense7=Suspense8=Suspense9=Suspense10	.14	.936	Cannot be rejected

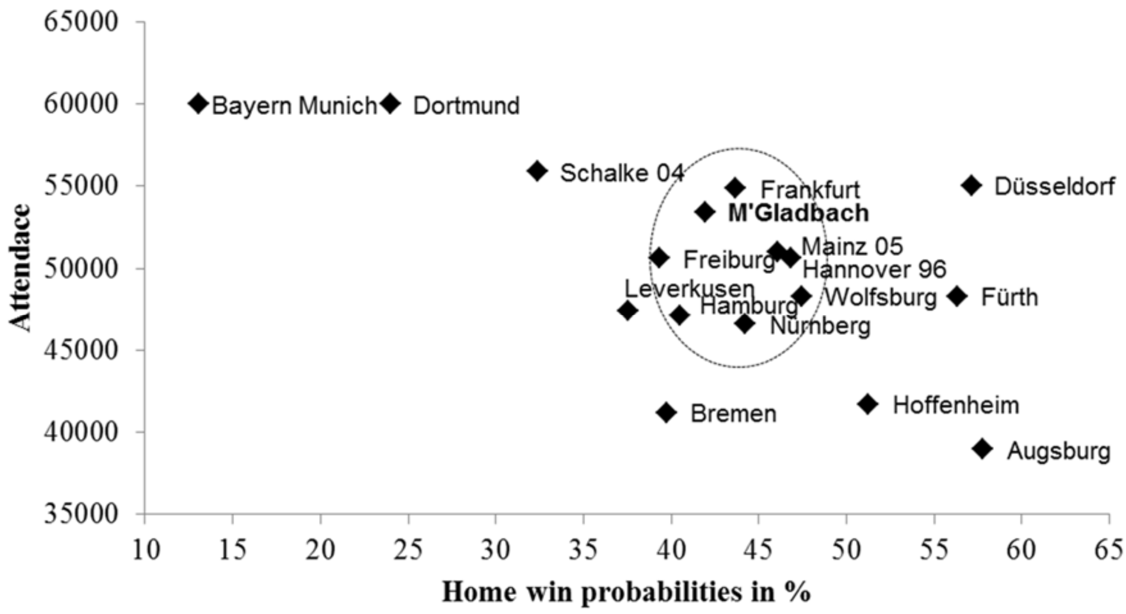

Figure A1. Home win probabilities and attendance of VfB Stuttgart (Season 2012-2013). *Note.* Betbrain average odds are used from football-data.co.uk, and attendance numbers are collected from weltfussball.de.

5.2 Perceived game uncertainty, suspense and the demand for sport (Study 2) *

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PERCEIVED GAME UNCERTAINTY, SUSPENSE AND THE DEMAND FOR SPORT

TIM PAWLOWSKI, GEORGIOS NALBANTIS and DENNIS COATES*

This study tries bridging between different behavioral economic explanations for the lack of support of the uncertainty of outcome hypothesis in spectator sports. We test a measure of perceived *game uncertainty that is comparable to* objective *measures frequently tested in the literature. Econometric results suggest that fans do not perceive closeness of a game differently than how economists have tended to measure it. However, fans' perceptions of suspensefulness are distinct from their perceptions of game uncertainty. Moreover, the finding that fans' preferences for game uncertainty are dominated by loss aversion also emerges—independently of fanship status—in our stated-preference setting.* (*JEL* L83, D12, Z2)

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Perceived game uncertainty, suspense and the demand for sport

Introduction

Professional sport leagues around the globe have instituted many extra-market rules, especially with regard to the sport labor market. Common measures in this regard are salary caps, entry drafts or revenue sharing devices.[1] Such devices are commonly justified as necessary to maintain or improve the level of competitive balance (CB) within a league. In fact, the CB argument is the main "justification that sports leagues offer to defend agreements otherwise prohibited by antitrust laws" (Mehra and Zuercher 2006, 1505). This argument is based on the assumption that sport competitions need to be tight to be attractive for spectators – a relation first mentioned by Rottenberg (1956) and Neale (1964) in their seminal works six decades ago, which is now established in the literature as the Uncertainty of Outcome Hypothesis (UOH) in sports.

Following Szymanski (2003), uncertainty in this regard refers to outcomes of games (*match / game uncertainty*) or in-season sub-competitions such as the championship race or the fight against relegation (*seasonal uncertainty*) as well as the degree to what a league is dominated (or not) by a few teams over time (*championship uncertainty*). Importantly, single games might not only be characterized by *game uncertainty*. Rather, *seasonal uncertainty* might also unfold at the level of a single game which is referred to as *Match Relevance* (e.g., Jennett 1984), *Decisiveness of a Game* (e.g., Geenens 2014), the *League Standing Effect* (e.g., Humphreys and Zhou 2016) or *Competition Intensity* (e.g., Scelles et al. 2013a; 2013b) in the literature.[2]

Over several decades, numerous papers have tested the impact of uncertainty – in particular *game uncertainty* – on the demand for sport. In contrast to the widespread belief in the UOH by policy makers, however, this empirical literature offers ambiguous findings. While there is some supportive evidence for the relevance of *seasonal*

1. See Fort and Quirk (1995) for a detailed introduction into this topic.
2. In Section II, we will come back to the different conceptualizations of *seasonal uncertainty* (at the level of a single game) when discussing the uncertainty of outcome (UO) measures used in this study.

uncertainty, match-level attendance studies seldom find that more tickets are sold the more uncertain the result of the game is anticipated to be. In contrast, most studies show that stadium attendance rises as the certainty of a home team or away team win rises.[3] Moreover, although there is more supportive evidence for the impact of *game uncertainty* on TV viewing in several sports, a very limited number of studies on soccer finds either clear (Buraimo and Simmons 2009; Meier and Leinwather 2012; Schreyer, Schmidt, and Torgler 2016a) or partial support (Schreyer, Schmidt, and Torgler 2016b; 2017) for the relevance of close soccer games for TV viewers.[4]

Currently, three different behavioral economic explanations for the remaining “lack of certainty about outcome uncertainty” (Leach 2006, 117) are discussed in the literature.[5] *First*, fans might exhibit loss aversion and derive more utility from the chance to see an upset. This idea is based on prospect theory and the concept of reference-dependent preferences (Kahneman and Tversky 1979) and was recently transferred into the context of sports demand by Coates, Humphreys, and Zhou (2014). The authors distinguish between two types of utility that a consumer receives from attending a sporting event, that is, “consumption” utility that corresponds to utility from standard consumer theory and “gain-loss” utility that is derived from differences between expected and actual game outcome. According to their theoretical model, the UOH only emerges when the marginal utility of an unexpected win exceeds the marginal utility of an unexpected loss. When, however, the marginal utility of an unexpected loss is larger than the marginal utility of an unexpected win, a consumer exhibits loss aversion and derives more utility from the chance to see an upset, which by definition requires a favorite team ex-ante.[6]

3. A detailed overview on the in-stadium attendance literature dealing with the relevance of the UOH in European professional football, that is, soccer, is provided by Pawlowski (2013).
4. A detailed overview on the literature about the demand for televised sports events and the relevance of the UOH is provided by Nalbantis and Pawlowski (2016).
5. A comprehensive review of this literature is provided by Budzinski and Pawlowski (2017).
6. Considering the economic theory of superstars (Adler 1985; MacDonald 1988; Rosen 1981), it might well be that a favorite away team attracts fans due to its strong brand and the opportunity to see star players. In this regard, increasing attendance with decreasing home win probability might be explained by fans either exhibiting loss aversion (Coates, Humphreys, and Zhou 2014) or having a preference for strong brands and superstars (Pawlowski and Anders 2012). However, in more recent studies, a u-shaped relation between home win probabilities and stadium attendance was found even when quality adjusted home win probabilities are used (Humphreys and Zhou 2016) and/or visiting team fixed effects are included (Coates, Humphreys, and Zhou 2014, Humphreys and Zhou 2016).

Second, fans might perceive closeness of a game in a different way than how economists have tended to measure it due to the existence of behavioral anomalies such as *framing effects* (Tversky and Kahneman 1981), *attention level effects* (Bernheim and Rangel 2009) or *threshold effects* (Simon 1955). Though a consistent theoretical model incorporating these anomalies does not exist, some recent evidence based on data gathered in fan surveys suggests that such differences between "perceived" uncertainty by the fans and "objectively" (statistically) measureable uncertainty with regard to the effect on demand might exist indeed (Pawlowski 2013; Pawlowski and Budzinski 2013; Nalbantis, Pawlowski, and Coates 2015). While these studies offer a new and interesting line of research, it remains unclear, however, what previously developed subjective measures mean. In this regard, perceived "suspensefulness of a game" – which is the wording used in previous fan surveys – might proxy *game uncertainty*, *seasonal uncertainty* (at the level of a single game), both dimensions or even further issues such as the quality of the contestants.

Third, given the fact that consumption depends upon the affective dispositions of viewers towards the competing teams (Raney 2006), it may be that the impact of *game uncertainty* is moderated by being a fan of the home team, the visiting team or neither the home nor the visiting team (neutral spectator). Schreyer, Schmidt, and Torgler (2016c) – addressing the attendance behavior of season ticket holders (i.e., a specific type of home team fans) in the German Bundesliga – provide partial support for this assumption. While their results point towards a u-shaped relationship between home win probabilities and the season ticket holders' decision to attend a game, other *game uncertainty* measures suggest that season ticket holders do care about game outcome uncertainty. Though the authors only have access to a specific type of home team fans, their study provides some initial empirical evidence on the importance of accounting for fan-team relationships in further investigations.

Until now, considerable differences in the measurement of *game uncertainty* as well as a lack of appropriate data made any attempt to synthesize these plausible though different explanations for the lack of support for the UOH—in particular with regard to game uncertainty—impossible. While previous studies relying on secondary data were unable to detect possible differences between subjective and objective measures of *game* *uncertainty*, the major limitation of earlier studies employing subjective measures is that it remains unclear what these measures mean and how they relate to common objective measures. Moreover, though it appears relevant to control for fan status in this regard, no study previously looked at all different types of fans, that is, home team fans, visiting team fans, or neutral spectators.

Our study tries bridging between these plausible though different explanations by using data, representative for all soccer-interested individuals in Germany and gathered in repeated surveys, to develop a measure of perceived *game uncertainty*, which is closely related to a common measure based on betting odds, and subsequently test its impact on the consumers' intentions to watch soccer games live. The design of both data collection and analysis enables us to test several assumptions commonly thought to be problematic when employing a stated-preference approach. Moreover, the data allows a distinction with regard to fan status and therefore testing its (eventually) moderating role of the relation between (perceived) *game uncertainty* and the demand for sports.

Data and Methodology

Data Collection and Cleaning

Soccer-*interested* individuals (fans from now on) were randomly recruited from a German wide representative online panel provided by a market research company. The first question served as screen to identify those with a minimum interest in soccer. Individuals uninterested in soccer did not answer the questionnaire. The survey took place in the days prior to two German Bundesliga matchdays (i.e., the 10th and 27th of the 2014–15 season). Fans were asked about all nine games on the upcoming matchday, for a total of 18 games in the survey. Matches in the first and second matchday pair the same teams (though with home and away teams flipped) with the top game between Football Club (FC) Bayern München (FCB) and Borussia Dortmund (BVB; see Table 1). This unique set-up allows gathering viewing intentions from *all* fans about *all* games regardless of whether they are a fan of one of the participating teams. Respondents who are neither a fan of the home nor the visiting team in a given game are assumed to be "neutral fans."

The link to the questionnaire of the second survey was initially distributed only among those who had already participated in the first survey to create a panel. Those respondents from the first survey who did not respond in the second survey were replaced by randomly selected new respondents. The overall objective was to have two samples with at least 3,000 participants in each round and a certain overlap of participants who filled in the questionnaire in both rounds. The total number of completed surveys is 6,332 between both rounds (3,029 in the first survey; 3,303 in the second survey). There are eight observations where the ID of a respondent appears twice in the survey. These observations concern respondents who encountered problems in their first attempt to complete the questionnaire. Therefore, it was decided to delete the (chronologically) first response of each respective observation. Moreover, two observations do not have an identification number and were consequently also deleted from the sample.

Further quality and consistency checks were employed as described in detail in Appendix A. Finally, since several matches are played simultaneously and the decision to watch any individual match live in the stadium can make watching other matches impossible, we excluded the few stadium attendees from our sample, that is, 220 from the first survey and 170 from the second.[7] The final net sample used in our data analysis consists of 2,415 (2,686) observations in the first (second) survey.

To assess the generalizability of our results a useful study in this context was conducted by SPORTFIVE (2009) examining a representative sample of the total German population and providing information about the distribution of gender and age as sorted by the level of "general interest in soccer" and the "frequency of attendance to a live professional soccer match in the current season."

7. On a regular matchday with games on Friday, Saturday, and Sunday only four matches do not have competing matches occurring at the same time: Friday there is only one game starting at 8.30 p.m., Saturday there is a single game broadcast at 6.30 p.m., and Sunday there are two match broadcasts, one starting at 3.30 p.m. and one starting at 5.30 p.m. The other five matches are regularly played on Saturday afternoon at 3.30 p.m.

Table 1. Game Characteristics.

#	Home team (#rank)[a]	Away team (#rank)[a]	Kick-off (time / day)	Obj. [b]	Subj. [c]	Suspense [c]	Ø Brand index [d]	Result	Tickets [e]	% Capacity [f]
First survey (10th matchday)										
1	FC Bayern München (1)	Borussia Dortmund (15)	18:30 Sat	64.1%	6.7	8.3	62.3	2-1	71,000	99.8%
2	FC Schalke 04 (12)	FC Augsburg (9)	20:30 Fri	49%	6.6	5.4	53.4	1-0	60,954	98.4%
3	Borussia M'gladbach (2)	TSG 1899 Hoffenheim (4)	15:30 Sun	47.8%	6.7	6.1	46.8	3-1	52,409	97%
4	1. FSV Mainz 05 (6)	SV Werder Bremen (18)	15:30 Sat	53.1%	6.5	5.1	51.6	1-2	31,017	91.2%
5	Hannover 96 (7)	Eintracht Frankfurt (11)	15:30 Sat	41.3%	5.7	5.1	47.6	1-0	42,200	86.1%
6	VfB Stuttgart (14)	VfL Wolfsburg (3)	15:30 Sat	29.8%	4.9	5.4	46.2	0-4	50,000	82.7%
7	Hamburger SV (16)	Bayer 04 Leverkusen (5)	15:30 Sat	26.3%	3.7	5.7	49.7	1-0	52,990	92.3%
8	1. FC Köln (10)	SC Freiburg (17)	17:30 Sun	50%	6.3	4.8	49.9	0-1	49,500	99%
9	SC Paderborn 07 (8)	Hertha Berlin (13)	17:30 Sun	36.4%	5.6	5.1	38.7	3-1	14,630	97.5%
Second Survey (27th matchday)										
10	Borussia Dortmund (10)	FC Bayern München (1)	18:30 Sat	28%	4.4	8.3	62.3	0-1	80,667	100%
11	FC Augsburg (6)	FC Schalke 04 (5)	15:30 Sun	39%	4.6	5.7	53.4	0-0	30,660	100%
12	TSG 1899 Hoffenheim (7)	Borussia M'gladbach (3)	15:30 Sat	35.8%	4.2	5.6	46.8	1-4	30,150	100%
13	SV Werder Bremen (9)	1. FSV Mainz 05 (11)	15:30 Sat	39.3%	6.1	5.2	51.6	0-0	41,000	97.4%
14	Eintracht Frankfurt (8)	Hannover 96 (14)	15:30 Sat	47.7%	5.9	4.9	47.6	2-2	49,600	96.3%
15	VfL Wolfsburg (2)	VfB Stuttgart (18)	15:30 Sat	65.4%	7.3	5.4	46.2	3-1	30,000	100%
16	Bayer 04 Leverkusen (4)	Hamburger SV (16)	15:30 Sat	70.3%	7.2	5.5	49.7	4-0	30,210	100%
17	SC Freiburg (15)	1. FC Köln (12)	15:30 Sat	36.2%	5.2	5.0	49.9	1-0	23,800	99.2%
18	Hertha Berlin (13)	SC Paderborn 07 (17)	17:30 Sun	48.6%	6.1	4.6	38.7	2-0	44,031	59.3%

Notes: [a] Rank in the league table prior to the matchday under consideration. [b] Objective home win probabilities derived from average margin-corrected betting odds (source: football-data.co.uk). [c]Subjective home win probabilities calculated as sample mean values of responses to the question "How likely do you think will there be a home win in the upcoming GAME?" (0≡away club will definitely win…10≡home club will definitely win) with the sample applying the .25 quality threshold and strict sample correction for "fan" and "age" (see Appendix A for more information on this). [d]Average brand index of the opponents in the game (source: Woisetschläger et al. 2014). [e] Sold tickets for the game under consideration (source: weltfussball.de). [f] Percentage of stadium capacity utilization (source: bundesliga.com).

The portion of females responding to the survey in our study (first survey: 47%; second survey: 43%) is very much like the SPORTFIVE (2009) sample (47%). Regarding age, again the respondents in our sample seem to be on average comparable to the respondents in the SPORTFIVE (2009) sample. In our study about 19% are less than 29 years old (SPORTFIVE: 22%), 29% are between 30 and 40 years old (SPORTFIVE: 34%), and the remaining 51% are more than 50 years old (SPORTFIVE: 44%). Unfortunately, no further variables are available for a comparison. However, these figures suggest that our sample is representative with regard to gender and age of the German population with a general interest in soccer.

Measures

The fans' stated intention to watch a game "live on TV" or "not live at all" serves as dependent variable in our demand models. As mentioned before, we needed to exclude the few stadium attendees from our sample and focus in the following on the intention to watch any of the games live on TV (or not). A common criticism of using such a stated-preference measure as proxy for demand is that it is based on what people say rather than what people do. In this regard, however, it is important to note the concreteness of (a) the *products* under consideration, that is, specific soccer games, (b) the *choice scenario* developed, that is, a few days prior to two matchdays, and (c) the *question* asked, that is, "Will you be watching game x live?" (with three possible answers being "no," "yes, in the stadium," or "yes, on TV"). This forces respondents to make a forecast about their decision to consume a clearly defined product in the very near future. While this does not rule out false statements in general, it limits the number of possible reasons for false statements. More precisely, a statement might be false because the respondent did not want to answer correctly (*liar*) or because her plans have changed in the short time period between when the survey was conducted and kick-off (*switcher*). Since we are not interested in forecasting the total number of TV viewers for any specific game but rather in discriminating between viewers and non-viewers such false statements are not a problem as long as they are randomly distributed among respondents. We do not see any reason to believe that this assumption is violated.

The first uncertainty measure developed in our study follows earlier studies on perceived competitive balance (PCB). The term PCB was established by Pawlowski (2013) and

Pawlowski and Budzinski (2013) and their studies on perceived CB and suspense within a *league*. Nalbantis, Pawlowski, and Coates (2015) used the same term for their study. However, given the specific setting in Nalbantis, Pawlowski, and Coates (2015), that is, a single game, as well as the temporal order of their survey, that is, before the kick-off of a specific game, their ex-ante measure is probably better described as *perceived game suspense*. We made use of the latter term and accounted for the perceived "suspensefulness" of the single games by asking the fans to state on a scale of 0–10 (0≡not at all suspenseful … 10≡very suspenseful) "How suspenseful do you think the upcoming GAME will be?" Many scholars define suspense as an experience of uncertainty.[8] In this regard, Mullet et al. (1994) note that in a gambling context suspense reaches its peak when the uncertainty as to the outcome of the gamble is at its highest (50% win probability). In terms of a soccer game's outcome, it may be that a fan perceives suspense at its maximum when the (perceived) likelihood of a loss is more or less even with that of a win. However, uncertainty over the outcome may not always be sufficient to generate feelings of suspense regarding the match (Madrigal and Dalakas 2008; Ortony, Clore, and Collins 1988). For instance, the ex ante uncertainty about the outcome of a soccer game may not be intrinsically suspenseful, unless the consequences of a win or loss are compelling. As such the hope of winning the championship, securing a place in the Union of European Football Associations (UEFA) club competitions, avoiding relegation or the fear of failing to achieve these milestones—because of the game's (uncertain) outcome—do also generate suspense. Therefore, the perceived suspensefulness of a game might be related not only to *game uncertainty*, but also to *seasonal uncertainty* (at the level of a single game) or both. Moreover, a game could also be suspenseful because a coach or a player is on the verge of surpassing a milestone (anticipation of record-breaking performance, becoming the league's top goal scorer, etc.) or because the quality of the contestants is perceived as being high. In general, what is suspenseful may be highly idiosyncratic (Mullet et al. 1994).

8. For an elaborated discussion about the definition of suspense see Zillmann (1996). More recently, Ely, Frankel, and Kamenica (2015) developed models distinguishing between suspense and surprise. Their context is one in which information is revealed over time, and individuals use that information to adjust their beliefs about the future. The authors define suspense as "induced by variance in the next period's beliefs" and surprise as "change from the previous belief to the current one."

In contrast to Nalbantis, Pawlowski, and Coates (2015) who used data from just a single game, we have data for 18 games. Therefore, we are able to compare this subjective measure with available objective data about the games in order to apprehend (at group level) the link between suspensefulness and game characteristics. As indicated by Figure 1, there is a strong negative correlation (for all games: r=−0.580; without FCB vs. BVB: r=−0.857) between perceived game suspense and the sum of the opponents' league ranks (prior to the matchday). This negative correlation is consistent with the idea that the most suspenseful games are between teams involved in the race for the championship or the qualification places for the UEFA Champions League and UEFA Europa League. Moreover, this measure seems to consist of a notion of clubs' brand strengths given the fact that the top game between FCB and BVB (with the highest average brand index, see Table 1) is perceived to be the most suspenseful despite the rather poor performance of Borussia Dortmund in the first half of the 2014–2015 season. In this regard it is indicative that the strong positive correlation (all games: r =0.769) between perceived suspense and the average brand index of the contestants seems to be determined by this particular game (without FCB vs. BVB: r =0.288).

This assumption is further supported by comparisons between our measure of perceived game suspense and different competition intensity (CI) measures as proposed by Scelles et al. (2013a), Andreff and Scelles (2015), and Scelles (2017). The correlations, provided in Appendix B, indicate that games involving clubs which are in championship contention are perceived as being more suspenseful than games involving clubs which are in contention for other sub-competitions. Moreover, it appears that perceived suspense may also reflect the quality of the contestants, since games involving clubs which are closer to the relegation zone are perceived as comparably less suspenseful.

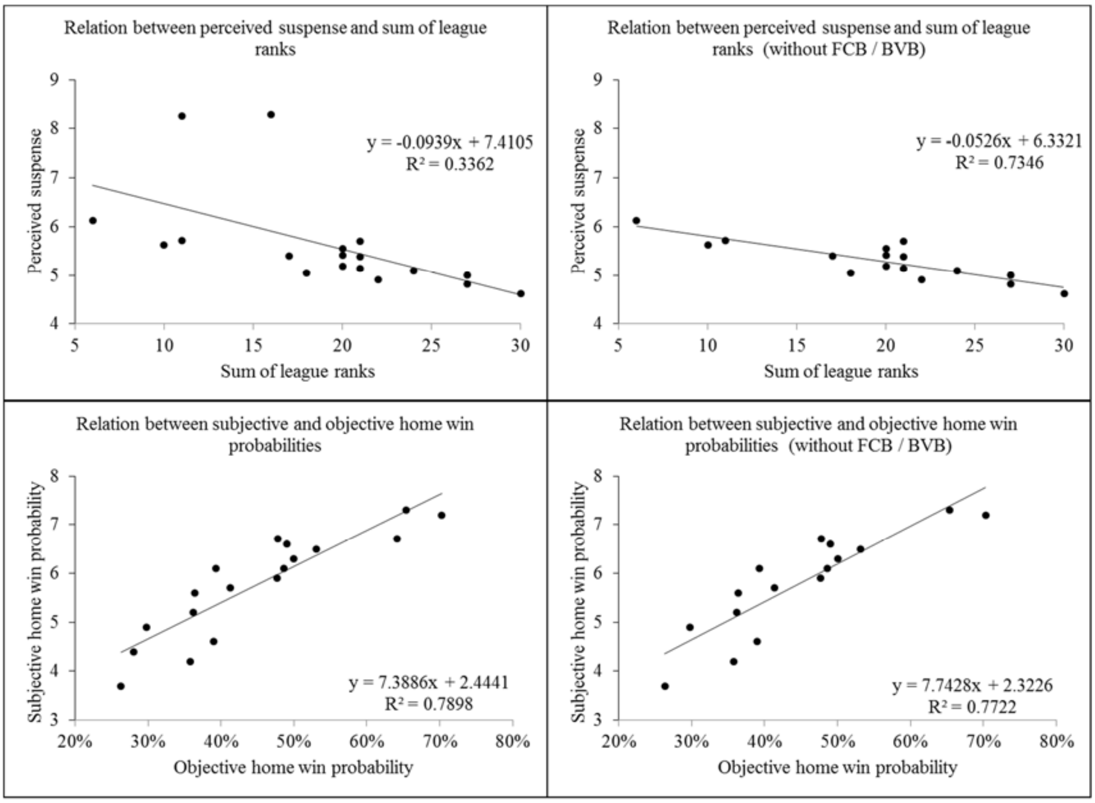
Summing up, while we are unable to disentangle this further due to the limited number of games under consideration, these simple correlations suggest that (perceived) game suspense measures something different than (perceived) game uncertainty and might be related rather to *seasonal uncertainty* (at the level of a single game) as well as quality and/or brand strength of contestants. Therefore, to fully address game uncertainty in our setting and in order to compare our findings with those studies using objective measures, we developed a second measure, called perceived game uncertainty, with a novel approach in our study.

Respondents were asked to state on a scale of 0–10 (0☰away club will definitely win . . . 10☰home club will definitely win) "How likely do you think will be a home win in the upcoming GAME?" The answers are interpreted as subjective home win probabilities, which, with their squared terms, we include in the regression models. Note that respondents' probability judgements are based on beliefs about the properties of the games such as the teams'/players' performance, etc. As such, a respondent's prediction for game A does not affect her prediction for game B. Therefore, the elicitation of home win predictions in our surveys is not affected by a "conjunction fallacy" (Tversky and Kahneman 1983). Moreover, the behavioral economics and psychology literatures find that subjective probabilities can be quite different than objective probabilities, particularly for low probability events with which people have little experience (Ungemach, Chater, and Stewart 2009). However, the subjective home win probabilities in our survey are strongly correlated (for all games: r =0.889; without FCB vs. BVB: r =0.879) with objective home win probabilities derived from betting odds (see Figure 1). Because our survey respondents are soccer fans it is likely that they are well acquainted with the game and with the teams and, therefore, are reasonably accurate, on average, in their perceptions of the likelihood of the home team winning specific matches. Consequently, we contend that this measure allows for a direct comparison with previous findings in the literature using home win probabilities derived from betting odds.

Since empirical evidence (e.g., Zillmann and Cantor 1977) shows that a positive (negative) outcome is enjoyed (disliked) based on the individual's disposition towards the protagonists and antagonists, it is likely that there is a dispositional mediation of (perceived) game uncertainty and suspense (Zillmann 1996; Schreyer, Schmidt, and Torgler 2016a, 2016b, 2016c). To take the potential moderating role of fanship status into account, our models include interactions between the variables of interest (i.e., perceived suspense and perceived home win probability) and fanship status (home fan and away fan). Furthermore, we control for socio-demographics (marital status, gender, age, and travel distance from the venue hosting the game) and game dummies in the models. Table 2 reports the statistics, rounded to two decimals, of the sample used separately for the first (second) matchday surveys. Overall, 2.6% (second survey: 1.7%) of the respondents are fans of the home team, whereas 2.0% (2.5%) are fans of the visiting team. Moreover, 47% (43%) are female. On average, a survey participant is 47 (48) years old and lives about 372 (387) kilometers away from the venues hosting the games. Furthermore, 25% (23%) of the respondents are single. For both matchdays, the proportion of games that respondents state they intend to watch live on TV is between 23% and 25%. Regarding games' suspensefulness, on average, respondents rate the games as 5.6 (5.6) out of 10. At the same time, the average rating of the likelihood of a home win is about 5.9 (5.7) out of 10. As can be seen, there are hardly any differences between the two survey rounds with regard to the descriptive statistics. Finally, there are no substantial deviations with regard to the descriptive statistics between the sample with and without consistency-checked corrections (see Table A2 in Appendix A).

Empirical strategy

The data gathering process as described before provides a panel data set with nine observations per respondent and information about each decision to watch (or not) any of the games live on TV. Pooled logit models with individual clustered error terms and fixed effects (FE) models were estimated for both matchdays. The major difference between these approaches is that the FE models only use those individuals who stated an intention to watch some (but not all or none) of the matches live on TV while the pooled models use all individuals. Though it is generally desirable to use all observations available, including individuals for whom there is no variation in the decision to view or not view despite variation in their perception of the home win probability will downward bias the effect of home win probability. Furthermore, while the pooled models allow controlling for available individual characteristics in the data (i.e., marital status, age and gender), the FE models wash out the influence of all of these individual traits that are constant across matches. In this regard, the FE models also purge any potential common method bias which might occur when independent and dependent variables are gathered with the same instrument as it was done here (for a discussion on this issue see Antonakis et al. 2010).



Notes: Suspense values were calculated as sample mean values of responses to the question "How suspenseful do you think will be the upcoming GAME?" (0≡not particularly suspenseful…10≡extremely suspenseful). The sum of league ranks is based on the clubs' league rank prior to match kick off. Objective home win probabilities were derived from average margin corrected betting odds (source: football-data.co.uk). Subjective home win probabilities were calculated as sample mean values of responses to the question "How likely do you think will be a home win in the upcoming GAME?" (0≡away club will definitely win…10≡home club will definitely win). FCB, FC Bayern München; BVB, Borussia Dortmund.

Figure 1. Correlation between subjective and objective measures of "suspense" and "game uncertainty".

Table 2. Sample Characteristics.

	First Survey (10th matchday)							
	Sample Used in the Pooled Models				Sample Used in the Fixed Effects (FE) Models			
	M	**SD**	**Min**	**Max**	**M**	**SD**	**Min**	**Max**
Intention to watch a game live on TV	0.25	0.43	0	1	0.24	0.43	0	1
Perceived suspense	5.64	2.67	0	10	5.63	2.70	0	10
Home team fan	0.03	0.16	0	1	0.03	0.17	0	1
Away team fan	0.02	0.14	0	1	0.02	0.14	0	1
Subj. home win probability	5.88	2.56	0	10	5.80	2.56	0	10
Single	0.25	0.43	0	1				
Female	0.47	0.50	0	1				
Age in years	47	15.38	18	78				
Distance to the venue of the home team by car (in km)	373	195	0.5	938	375	196	1.4	923
	Second Survey (27th matchday)							
	Sample Used in the Pooled Models				Sample Used in the Fixed Effects (FE) Models			
	M	**SD**	**Min**	**Max**	**M**	**SD**	**Min**	**Max**
Intention to watch a game live on TV	0.24	0.43	0	1	0.23	0.42	0	1
Perceived suspense	5.58	2.67	0	10	5.65	2.62	0	10
Home team fan	0.02	0.13	0	1	0.02	0.14	0	1
Away team fan	0.03	0.16	0	1	0.03	0.17	0	1
Subj. home win probability	5.67	2.58	0	10	5.58	2.62	0	10
Single	0.23	0.42	0	1				
Female	0.43	0.50	0	1				
Age in years	48	14.65	17	71				
Distance to the venue of the home team by car (in km)	387	198	2.4	1,036	389	197	2.42	1,023

Results

As indicated by the results in Table 3, the influence of the explanatory variables does not vary much—neither between the two matchdays under consideration nor between the different econometric specifications. In all models, perceived suspense is positively related to the intention to watch a game live on TV while home win probability is negatively and its square is positively related to the intention to watch a game live on TV. As expected the pooled model coefficients are closer to zero than the FE coefficients. In each case, the results imply that the probability of watching the game live on TV is higher when the game is perceived to be suspenseful. “Perceived game suspense,” however, is different from “perceived game uncertainty” since the home win probability is also a significant predictor of TV viewing intentions. Interestingly, the probability of watching the game live on TV is higher when respondents strongly expect either a home or an away team win (Figure 2). This contradicts the UOH with regard to game uncertainty and is in line with previous studies employing objective measures of game uncertainty.

This finding comes along with control variables showing plausible signs. As expected, the home and away fans are actually more likely to watch the game of their favorite team than are neutral fans. The probability of viewing decreases with increasing age up to a certain point after which the likelihood to watch the game live on TV increases again. The same nonlinear pattern is also evident for the variable measuring distance to the game venue. Interestingly, being single is negatively associated with the likelihood of watching the game live on TV, whereas being female has no statistically significant effect. Finally, as expected there are game specific differences in viewing behavior with the top game between FCB and BVB attracting the most fans.[9]

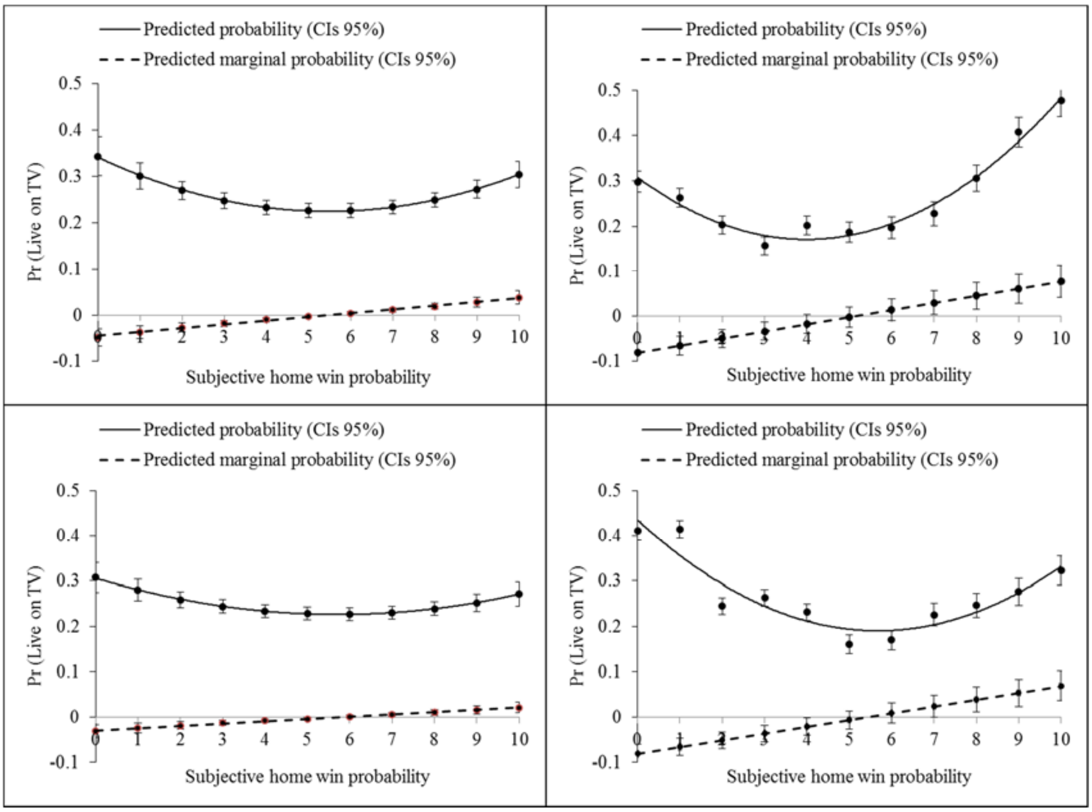
To check the robustness of our results we re-estimated all models described in this paper (1) without quality threshold, (2) with no strict sample correction for 'fan' and 'age' as well as (3) with subjective home win probabilities interacted with 'interest in the league' instead of fan status. All results remain similar to the results in the paper. Importantly, the u-shaped relation between subjective home win probabilities and the intention to watch a game live on TV still exists.[10]

9. Results on game dummies are available in the Appendix A Table A3.
10. Results are available in the Appendix D Tables D1 and D2 as well as Figures D1 and D2.

Table 3. Logit Model Estimates.

Dependent Variable: 1 If the Respondent Intends to Watch That Game Live on TV, 0 Otherwise	First Survey (10th matchday)		Second Survey (27th matchday)	
	Pooled	**FE**	**Pooled**	**FE**
Perceived suspense	0.195***	0.518***	0.233***	0.586***
	(0.015)	(0.026)	(0.013)	(0.027)
Home team fan × perceived suspense	-0.132***	-0.374	-0.087	0.515
	(0.046)	(0.244)	(0.068)	(0.352)
Away team fan × perceived suspense	-0.077	-0.354	-0.079*	-0.144
	(0.051)	(0.466)	(0.044)	(0.139)
Home team fan	1.574***	6.260**	1.295	35.464**
	(0.598)	(2753)	(0.894)	(17.728)
Away team fan	1.316**	5.645	1.423***	3.945***
	(0.513)	(4.294)	(0.432)	(1.247)
Subj. home win probability	-0.239***	-0.438***	-0.167***	-0.453***
	(0.039)	(0.072)	(0.035)	(0.067)
Subj. home win probability squared	0.022***	0.043***	0.015***	0.042***
	(0.004)	(0.006)	(0.003)	(0.006)
Home team fan × subj. home win probability	0.139	0.421	0.084	-9.760*
	(0.149)	(0.572)	(0.194)	(5.070)
Home team fan × subj. home win probability squared	-0.012	-0.040	-0.008	0.654**
	(0.012)	(0.047)	(0.015)	(0.330)
Away team fan × subj. home win probability	0.010	14.917	0.120	0.580*
	(0.111)	(733.158)	(0.092)	(0.321)
Away team fan × subj. home win probability squared	-0.003	-1.356	-0.014	-0.034
	(0.011)	(75.888)	(0.010)	(0.038)
Single	-0.342***		-0.475***	
	(0.115)		(0.111)	
Female	-0.079		0.007	
	(0.084)		(0.081)	
Age in years	-0.032		-0.062***	
	(0.020)		(0.020)	
Age squared	0.000		0.001***	
	(0.000)		(0.000)	
Distance to the venue of the home team by car (in km)	-0.001***	-0.006***	-0.000	-0.002***
	(0.000)	(0.001)	(0.000)	(0.001)
Distance squared	0.000**	0.000***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Game dummies	*Included*	*Included*	*Included*	*Included*
Panel member			-0.217**	
			(0.085)	
Constant	-0.748		-0.585	
	(0.463)		(0.457)	
Observations	21,560	8,462	24,035	9,300
Number of clusters / ID	2,415	947	2,686	1,038
Log-likelihood	-11,188.768	-1,318.799	-12,115.727	-1,451.468

Notes: Models are calculated with .25 quality threshold and strict sample correction for "fan" and "age" (see Appendix A for more information on this). Pooled models have been estimated with clustered errors by individuals. FE, fixed effects. Standard errors are given in parentheses. Significance levels are: * ≡ p≤10%, ** ≡ p≤ 5%, *** ≡ p≤ 1%.



Notes: These figures are derived from the logit model estimates (see Table 1); Figures above: 1st Survey (10th matchday), left: derived from the pooled model, right: derived from the FE model; Figures below: 2nd Survey (27th matchday), left: derived from the pooled model, right: derived from the FE model. Marginal effects for the pooled models were computed with the help of the STATA command *margins* with the range of home win probability values being specified by using the 'at()'-option. By using factor variable notations, the *margins* command is able to identify the different components of interaction terms. Marginal effects for the FE models cannot be *estimated* since the individual fixed effects are not consistently estimated in logit models. However, by substituting $Pr(y_{it} = 1|x_{it}, \alpha_i)$ and $Pr(y_{it} = 0|x_{it}, \alpha_i)$ with the relative frequencies of intentions to watch (or not) any of the games live on TV, we are able to *approximate* the discrete change in the probability of TV viewership at each level of $hwin$, i.e. the *predictive marginal probability*. The *predicted probability* is then calculated by subtracting the *predictive marginal probability* from each *hwin*-specific portion of TV viewership. Details on these calculations are provided in Appendix C.

Figure 2. Predicted (marginal) probability of watching live for subjective home win probabilities.

Conclusion and Discussion

This study tries bridging between plausible though different behavioral economic explanations for the lack of support of the well-known UOH in sports. We develop and test a measure of *perceived* game uncertainty that is comparable to *objective* measures frequently tested in the literature. Overall, the findings suggest that the probability of watching a soccer game live on TV is higher when respondents expect a certain home or away team win. This is in line with most previous studies employing *objective* measures of game uncertainty. We conclude that the common finding that fans do not value game uncertainty can be explained by fans exhibiting loss aversion with regard to game uncertainty rather than differences between perceptions and measurements of game uncertainty. In this regard, though home and away fans are actually more likely to watch the game of their favorite team than are neutral fans, we do not find any evidence of fanship status being a moderator of the relation between game uncertainty/suspense and the demand for sport.

Moreover, the paper finds that peoples' perception of the suspensefulness of a game is distinct from their perception of the relative strengths of the teams as the suspense variable and both the home win probability and its square are all individually statistically significant. The structure of our data allows comparing the developed game uncertainty and suspense measures with objective data on different characteristics of games and opponents. Results derived from simple correlations and the fact that the coefficients on the suspense variable are somewhat larger at the 27th matchday than at the 10th matchday are both consistent with the idea that perceived suspense measures *seasonal uncertainty* (unfold at the level of a single game) which is referred to as *Match Relevance*, *Decisiveness of a Game*, the *League Standing Effect*, or *Competition Intensity* in the literature. Moreover, perceived suspense seems to capture also the quality of the contestants, since games involving clubs which are closer to the relegation zone, are perceived as less suspenseful. Exploring this more in depth, however, is the subject of future research. In this regard, it also appears to be worth exploring whether and how the notion of suspense as developed by Ely, Frankel, and Kamenica (2015) is related to survey responses here and in other studies focusing on the relation between game uncertainty and the demand for sports. Moreover, it would be interesting and relevant to test the relations between perceived game uncertainty, suspense, and the demand for sport in other settings including different sports and countries.

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Appendix A: Data and Models

Quality Corrections

The quality correction program of Questback[11] is able to identify participants who simply "clicked through" based on the time to fill in the answers. Since the number of questions a participant has to answer might vary between participants, the time required by a participant to complete the survey as a whole is not a reasonable measure of "quality." Therefore, an individual quality variable is calculated based on the time taken by the participant to complete a particular page of the survey in relation to the average processing time of the entire sample for this page. This quality variable has a value of 0.5 if the corresponding user required exactly the average time for processing the questionnaire pages. A value of 0.25 signifies that the respondent needed only half as long as the average processing time (per page) and so on.

Table A1 provides the distribution of the quality variable separately for each survey as well as for the total number of participants. In general, it is recommended by Questback to carefully check respondents with a quality threshold below 0.25. Since the inclusion or exclusion of participants with a quality threshold below 0.25 would be arbitrary, we decided to estimate all models only with data from respondents that passed the .25 quality threshold. The quality corrected database contains 5,370 observations with 2,548 (2,822) respondents participating in the first (second) survey.

Consistency Checked Corrections

Taking advantage of the fact that a large portion of our sample took part in both surveys (i.e., 2,248 participants are panelists) we are able to perform some consistency checks in order to improve the quality of the data. Any inconsistency among panelists can be attributed either (a) to misstatements due to "slip-over" or "in-hurry" responses, (b) to the fact that eventually a different person from the same household responded, or (c) to the

11. Questback. *Enterprise Feedback Suite. EFS Survey, version 9.1/1.2*. Köln-Hürth: Questback GmbH, 2013.

fact that the respondent's status indeed changed between both survey waves. The latter reason, however, seems plausible only for some characteristics such as residence.

To check the consistency of responses in our sample we focus on gender, age, nationality, residence, and the favorite club. The results from these checks as well as our treatment of observed inconsistencies are summarized in the following.

Gender: 51 out of 2,248 panelists reported a different gender in the two survey waves. Six out of these 51 respondents differ only by gender while age, nationality, residence, and the favorite club are the same in both waves. Therefore, "gender" was recoded to "missing" for these six observations. The remaining 45 panelists received a new ID for the second survey on the assumption that a different person from the same household responded. This might occur in rare cases according to Questback.

Age: 165 out of the 2,248 panelists reported a different age in the two waves. Further analysis revealed that 30 panelists are trouble free as they state different gender and already received a new ID for the second survey. A further 21 out of these 165 respondents differ only by age. In contrast to the gender question, the age question was designed as "dropdown" and therefore inconsistent age responses might be attributed to "slip-overs." Therefore, those 21 panelists who only differ by age while gender, nationality, residence, and the favorite club are the same in both waves received the mean value of both stated age values (average difference: 4.9 years) in the two survey rounds. For the remaining 114 panelists, "age" was recoded to "missing" in those models estimated with strict sample correction for "fan" and "age" (as indicated in the notes below the tables that display the logit model estimates).

Nationality: 30 out of the 2,248 panelists reported a different nationality in the different waves. Twenty of them switched between "German" and "German plus a second nationality." These 20 cases were recoded as "Germans" (i.e., 0≡not German; 1≡German). The others switched between "German" and "other nationality." Therefore, "nationality" was recoded to "missing" for these observations.

Residence: 54 out of the 2,201 panelists with valid zip codes (some zip codes were falsely specified) stated a residence which is more than 20 km away than the previous stated residence, whereas 2,037 stated exactly the same zip code as before. We do not see any reason for further corrections here as it may be that these 54 panelists were moving houses or have intentionally stated a slightly modified zip instead of the truthful one to protect privacy. Whatever the reason behind this inconsistency is, the difference is either plausible (since approximately 14% of the German population are moving houses, which doubles the number of potential "movers" in our sample) or negligibly small.

Favorite club: 436 out of the 2,248 panelists "changed their club preference" between survey round one and two. At a first glance, this sounds dramatic and worrisome. However, the following explanation as well as the treatment for "switchers" as chosen here might probably relax this issue. In general, 17 panelists are trouble free as they state different gender and already received a new ID for the second survey. One hundred and fifteen out of the remaining 419 panelists had no favorite Bundesliga club in survey round one and switched to a favorite club in survey round two. Another 153 had a favorite club in survey round one and switched to "no favorite club" in survey round two. Both changes (from "no favorite club" to "fan of a club" and from "fan of a club" to "no favorite club") are generally plausible. Therefore, these 268 out of the 2,248 panelists remain in the sample with the differently stated club preference in each wave. For the remaining 151 panelists, "favorite team" was recoded to "missing" in those models estimated with strict sample correction for "fan" and "age" (as indicated in the notes below the tables that display the logit model estimates).

Table A1. Descriptive Statistics: Quality Variable.

First Survey (10th matchday)				Second Survey (27th matchday)				Total			
Quality	**Freq.**	**Percent**	**Cum.**	**Quality**	**Freq.**	**Percent**	**Cum.**	**Quality**	**Freq.**	**Percent**	**Cum.**
0.03	4	0.13	0.13	0.03	0	0	0	0.03	4	0.06	0.06
0.04	5	0.17	0.3	0.04	3	0.09	0.09	0.04	8	0.13	0.19
0.05	2	0.07	0.36	0.05	6	0.18	0.27	0.05	8	0.13	0.32
0.06	12	0.4	0.76	0.06	7	0.21	0.49	0.06	19	0.3	0.62
0.07	6	0.2	0.96	0.07	8	0.24	0.73	0.07	14	0.22	0.84
0.08	13	0.43	1.39	0.08	10	0.3	1.03	0.08	23	0.36	1.2
0.09	13	0.43	1.82	0.09	17	0.52	1.55	0.09	30	0.47	1.68
0.1	18	0.6	2.41	0.1	8	0.24	1.79	0.1	26	0.41	2.09
0.11	19	0.63	3.04	0.11	21	0.64	2.43	0.11	40	0.63	2.72
0.12	21	0.69	3.74	0.12	16	0.49	2.91	0.12	37	0.59	3.31
0.13	23	0.76	4.5	0.13	18	0.55	3.46	0.13	41	0.65	3.95
0.14	12	0.4	4.89	0.14	24	0.73	4.19	0.14	36	0.57	4.52
0.15	26	0.86	5.75	0.15	21	0.64	4.82	0.15	47	0.74	5.27
0.16	15	0.5	6.25	0.16	23	0.7	5.52	0.16	38	0.6	5.87
0.17	31	1.02	7.27	0.17	34	1.03	6.55	0.17	65	1.03	6.9
0.18	36	1.19	8.46	0.18	28	0.85	7.4	0.18	64	1.01	7.91
0.19	40	1.32	9.79	0.19	38	1.15	8.55	0.19	78	1.23	9.14
0.2	39	1.29	11.07	0.2	38	1.15	9.71	0.2	77	1.22	10.36
0.21	38	1.26	12.33	0.21	30	0.91	10.62	0.21	68	1.08	11.44
0.22	30	0.99	13.32	0.22	37	1.12	11.74	0.22	67	1.06	12.5
0.23	39	1.29	14.61	0.23	44	1.33	13.07	0.23	83	1.31	13.81
0.24	35	1.16	15.77	0.24	44	1.33	14.41	0.24	79	1.25	15.06
≥0.25	**2,548**	**84.24**	**100**	**≥0.25**	**2,822**	**85.62**	**100**	**≥0.25**	**5,370**	**84.95**	**100**
Total	**3,025**	**100**		**Total**	**3,297**	**100**		**Total**	**6,322**	**100**	

Table A2. Sample Characteristics without Consistency Checks and Quality Control.

	First Survey (10th matchday)							
	Sample Used in the Pooled Models				*Sample Used in the FE Models*			
	M	***SD***	**Min**	**Max**	***M***	***SD***	**Min**	**Max**
Intention to watch a game live on TV	0.26	0.44	0	1	0.25	0.43	0	1
Perceived suspense	5.57	2.71	0	10	5.60	2.67	0	10
Home team fan	0.04	0.21	0	1	0.05	0.22	0	1
Away team fan	0.03	0.18	0	1	0.04	0.19	0	1
Subj. home win probability	5.81	2.57	0	10	5.74	2.55	0	10
Single	0.26	0.44	0	1				
Female	0.45	0.50	0	1				
Age in years	45	15.29	17	78				
Distance to the venue of the home team by car (in km)	373	195	0.5	944	376	196	1.4	930
	Second Survey (27th matchday)							
	Sample Used in the Pooled Models				*Sample Used in the FE Models*			
	M	***SD***	**Min**	**Max**	***M***	***SD***	**Min**	**Max**
Intention to watch a game live on TV	0.25	0.43	0	1	0.23	0.42	0	1
Perceived suspense	5.52	2.69	0	10	5.61	2.62	0	10
Home team fan	0.02	0.15	0	1	0.03	0.16	0	1
Away team fan	0.03	0.18	0	1	0.04	0.19	0	1
Subj. home win probability	5.59	2.57	0	10	5.52	2.60	0	10
Single	0.25	0.43	0	1				
Female	0.43	0.50	0	1				
Age in years	46	14.84	17	91				
Distance to the venue of the home team by car (in km)	388	198	2.4	1,036	388	198	2.42	1,023

Table A3. Logit Model Estimates Including Game Dummies.

Dependent Variable: 1 If the Respondent Intends to Watch That Game Live on TV, 0 Otherwise	First Survey (10th matchday)		Second Survey (27th matchday)	
	Pooled	FE	Pooled	FE
Perceived suspense	0.195***	0.518***	0.233***	0.586***
	(0.015)	(0.026)	(0.013)	(0.027)
Home team fan × perceived suspense	-0.132***	-0.374	-0.087	0.515
	(0.046)	(0.244)	(0.068)	(0.352)
Away team fan × perceived suspense	-0.077	-0.354	-0.079*	-0.144
	(0.051)	(0.466)	(0.044)	(0.139)
Home team fan	1.574***	6.260**	1.295	35.464**
	(0.598)	(2753)	(0.894)	(17.728)
Away team fan	1.316**	5.645	1.423***	3.945***
	(0.513)	(4.294)	(0.432)	(1.247)
Subj. home win probability	-0.239***	-0.438***	-0.167***	-0.453***
	(0.039)	(0.072)	(0.035)	(0.067)
Subj. home win probability squared	0.022***	0.043***	0.015***	0.042***
	(0.004)	(0.006)	(0.003)	(0.006)
Home team fan × subj. home win probability	0.139	0.421	0.084	-9.760*
	(0.149)	(0.572)	(0.194)	(5.070)
Home team fan × subj. home win probability squared	-0.012	-0.040	-0.008	0.654**
	(0.012)	(0.047)	(0.015)	(0.330)
Away team fan × subj. home win probability	0.010	14.917	0.120	0.580*
	(0.111)	(733.158)	(0.092)	(0.321)
Away team fan × subj. home win probability squared	-0.003	-1.356	-0.014	-0.034
	(0.011)	(75.888)	(0.010)	(0.038)
Single	-0.342***		-0.475***	
	(0.115)		(0.111)	
Female	-0.079		0.007	
	(0.084)		(0.081)	
Age in years	-0.032		-0.062***	
	(0.020)		(0.020)	
Age squared	0.000		0.001***	
	(0.000)		(0.000)	
Distance to the venue of the home team by car (in km)	-0.001***	-0.006***	-0.000	-0.002***
	(0.000)	(0.001)	(0.000)	(0.001)
Distance squared	0.000**	0.000***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
FC Bayern München vs. Borussia Dortmund	0.531***	2.623***	0.314***	2.093***
	(0.067)	(0.196)	(0.061)	(0.173)
FC Schalke 04 vs. FC Augsburg	0.131***	0.647***	-0.050	0.373**
	(0.040)	(0.165)	(0.041)	(0.168)
Borussia M'gladbach vs. TSG 1899 Hoffenheim	-0.002	0.570***	-0.100**	0.171
	(0.043)	(0.164)	(0.041)	(0.172)
1. FSV Mainz 05 vs. SV Werder Bremen	-0.036	-0.156	0.000	0.178
	(0.039)	(0.179)	(0.036)	(0.174)
Hannover 96 vs. Eintracht Frankfurt	0.079**	0.080	0.017	0.015
	(0.036)	(0.175)	(0.036)	(0.178)
VfB Stuttgart vs. VfL Wolfsburg	0.048	0.137	0.009	0.457***
	(0.040)	(0.173)	(0.045)	(0.169)
Hamburger SV vs. Bayer 04 Leverkusen	0.043	0.606***	-0.010	0.464***
	(0.049)	(0.171)	(0.044)	(0.167)
1. FC Köln vs. SC Freiburg	0.074*	0.121	-0.047	-0.012
	(0.038)	(0.178)	(0.036)	(0.179)
Panel member			-0.217**	
			(0.085)	
Constant	-0.748		-0.585	
	(0.463)		(0.457)	
Observations	21,560	8,462	24,035	9,300
Number of clusters / ID	2,415	947	2,686	1,038
Log-likelihood	-11,188.768	-1,318.799	-12,115.727	-1,451.468

Notes: Matches in the second survey pair the same teams with home and away teams flipped (reference category: SC Paderborn 07 vs. Hertha Berlin). Models are calculated with .25 quality threshold and strict sample correction for "fan" and "age" (see Appendix A for more information on this). Pooled models have been estimated with clustered errors by individuals. FE, fixed effects. Standard errors are given in parentheses. Significance levels are: *p≤10%, **p≤5%, ***p≤1%.

Appendix B: Competition Intensity and Perceived Suspense

Following Scelles et al. (2013a), Andreff and Scelles (2015) and Scelles (2017) we calculated competition intensity (CI) measures for all relevant sub-competitions of the German Bundesliga, i.e. the championship race (1^{st} place), securing a place for UEFA Champions League (2^{nd}-4^{th} place) and UEFA Europa League (5^{th}-7^{th} place), reaching a place for the relegation play-offs (16^{th} place) and being on the relegation zone (17^{th}-18^{th} place). The aforementioned CI studies have so far only focused on the points needed to reach different sporting prizes for the club which is the *closest* to a specific sporting prize. Since we deal with TV audience, we modified this index by including the sum of points needed to secure a sporting prize for *both* clubs.

Since sporting prizes differ with regard to their attractiveness and significance for the audience (Scelles et al. 2016), we implemented weights as introduced by Kringstad and Gerrard (2005) measuring 1 for the championship, $1/1.5^2$ ($1/2^2$) for qualifying for the UEFA Champions League (UEFA Europa League) and $1/3^2$ for relegation play-offs and direct relegation. Following Scelles et al. (2013b) we constrained the temporal horizon for these calculations and just looked at whether (or not) a club is able to achieve a particular sporting prize within the next three matchdays.

In Table B1, correlations with our perceived suspense measure are reported for both unweighted and weighted CI measures as well as two different versions: Version 1 considers the points' difference of a club already achieving a sporting prize with the club closest to it. Version 2 awards 0 point to all clubs which are already in a position that secures them a sporting prize (i.e., they are awarded the highest CI value). Importantly, a higher *unweighted* CI score denotes a lower level of CI, whereas a higher *weighted* CI score denotes a higher level of CI for a single game.

Table B1. Correlation Between Perceived Suspense and Competition Intensity (CI) Measures.

	Unweighted CIs					Weighted CIs					
Matchday	**CHAMP**	**UCL**	**UEL**	**RPL**	**REL**	**CHAMP**	**UCL**	**UEL**	**RPL**	**REL**	**SUM**
Version 1											
Both	-0.28	0.01	0.37	0.61	0.62	0.28	0.01	-0.17	-0.42	-0.41	0.05
10th	-0.32	-0.01	0.64	0.55	0.55	0.48	-0.10	-0.64	-0.21	-0.17	0.17
27th	-0.75	0.10	0.52	0.84	0.85	—	0.03	0.16	-0.57	-0.58	-0.44
Version 2											
Both	-0.37	-0.05	0.35	0.61	0.63	0.75	0.12	-0.15	-0.41	-0.42	0.49
10th	-0.55	-0.34	0.70	0.54	0.55	0.73	0.30	-0.70	-0.21	-0.20	0.59
27th	-0.86	0.12	0.43	0.84	0.86	0.94	-0.03	0.12	-0.57	-0.58	0.90

Notes: Reported are correlation coefficients. A higher *unweighted* CI score denotes a lower level of CI, whereas a higher *weighted* CI score denotes a higher level of CI for a single game. CHAMP, champion; RPL, relegation play-offs; SUM, sum of the weighted CI measures of all sub-competitions; UCL, UEFA Champions League; UEL, UEFA Europa League; —, not calculated due to the small number of clubs in contention

A first thing to notice is that the correlations between the CI measures and perceived suspense are in general higher for the 27th matchday than for the 10th matchday, which implies that suspense is higher when more is at stake. All in all, the findings show that perceived suspense is positively (negatively) correlated with the weighted (unweighted) CI measures for the championship race. However, there is a negative (positive) correlation with the weighted (unweighted) CI measures for relegation (both play-off and direct relegation) and only a weak correlation with the CI measures for the European club competitions. These findings indicate that games involving clubs which are in championship contention are perceived to be more suspenseful, than games involving clubs which are in contention for all other sub-competitions. Moreover, it seems that perceived suspense may also reflect the quality of the contestants, since games involving clubs which are closer to the relegation zone are perceived as being less suspenseful.

Appendix C: Approximating Marginal Effects in the Fixed Effects Logit Model

Let y_{it} be a binary variable measuring the intention for $i = 1,\dots, N$ individuals to watch any of the $t = 1,\dots, T$ games live on TV (or not). x_{it} is a vector of explanatory variables (including subjective home win probability $hwin_{\text{it}}$ and its squared term $hwin_{it}^2$) and α_i is a term measuring individual heterogeneity, that is, a fixed effect, such that

(A1) $$\text{E}(y_{\text{it}}|x_{\text{it}}, \alpha_{\text{i}})=\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})=\frac{\text{e}^{\alpha_{\text{i}}+\beta x_{\text{it}}}}{1+\text{e}^{\alpha_{\text{i}}+\beta x_{\text{it}}}}$$

Then the marginal effect of interest can be calculated by computing the derivative of the index function with respect to $hwin_{it}$ and $hwin_{it}^2$ for each observation, that is,

(A2) $$\frac{\partial\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})}{\partial hwin_{\text{it}}}=\frac{[\beta_1+2*\beta_2\text{hwin}_{\text{it}}]*\text{e}^{(\beta_1 hwin_{\text{it}}+\beta_2 hwin_{\text{it}}^2+\beta x_{\text{it}}+\alpha_i)}}{\left[1+\text{e}^{(\beta_1 hwin_{\text{it}}+\beta_2 hwin_{\text{it}}^2+\beta x_{\text{it}}+\alpha_{\text{i}})}\right]^2}$$

This can be re-written as

(A3) $$\frac{\partial\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})}{\partial hwin_{\text{it}}}=[\beta_1+2*\beta_2 hwin_{\text{it}}]*\frac{\text{e}^{(\beta_1 hwin_{\text{it}}+\beta_2 hwin_{\text{it}}^2+\beta x_{\text{it}}+\alpha_{\text{i}})}}{1+\text{e}^{(\beta_1 hwin_{\text{it}}+\beta_2 hwin_{\text{it}}^2+\beta x_{\text{it}}+\alpha_{\text{i}})}}*\frac{1}{1+\text{e}^{(\beta_1 hwin_{\text{it}}+\beta_2 hwin_{\text{it}}^2+\beta x_{\text{it}}+\alpha_{\text{i}})}}$$

(A4) $$\frac{\partial\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})}{\partial \text{h}win_{\text{it}}}=[\beta_1+2*\beta_2 hwin_{\text{it}}]*\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})*\text{Pr}(y_{\text{it}}=0|x_{\text{it}}, \alpha_{\text{i}})$$

Equation (A4) cannot be *estimated* since the individual fixed effects α_{i} are not consistently estimated in logit models. However, by substituting for $\text{Pr}(y_{\text{it}}=1|x_{\text{it}}, \alpha_{\text{i}})$ and $\text{Pr}(y_{\text{it}}=0|x_{\text{it}}, \alpha_{\text{i}})$ using the relative frequencies of intentions to watch (or not) any of the games live on TV, we are able to *approximate* the discrete change in the probability of TV viewership at each level of *hwin*, i.e. the *predictive marginal probability*. The *predicted probability* is then calculated by subtracting the *predictive marginal probability* from each *hwin*-specific portion of TV viewership.

Appendix D: Robustness Checks

Table D1. Logit Model Estimates without Quality and Consistency Checked Corrections.

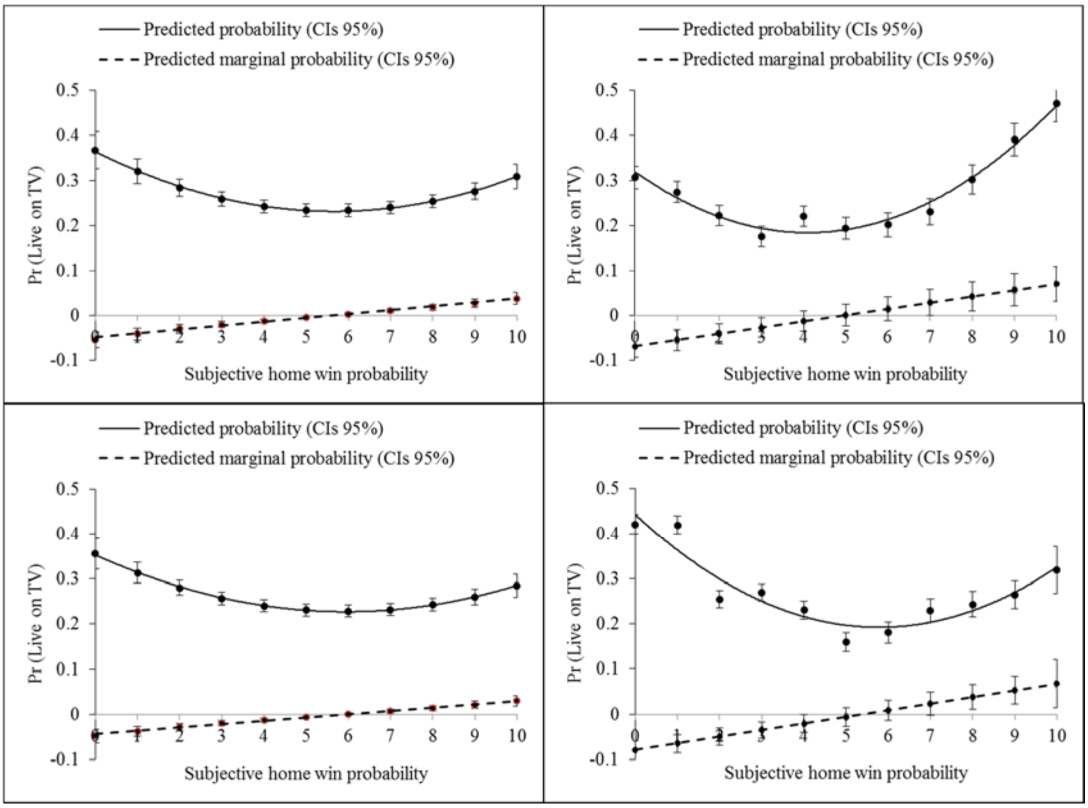
Dependent Variable: 1 If the Respondent Intends to Watch That Game Live on TV, 0 Otherwise	First Survey (10th matchday)		Second Survey (27th matchday)	
	Pooled	FE	Pooled	FE
Perceived suspense	0.202***	0.458***	0.238***	0.553***
	(0.014)	(0.025)	(0.013)	(0.024)
Home team fan × perceived suspense	-0.130***	-0.219*	-0.090**	-0.066
	(0.028)	(0.120)	(0.045)	(0.122)
Away team fan × perceived suspense	-0.091***	0.018	-0.037	0.061
	(0.033)	(0.140)	(0.033)	(0.087)
Home team fan	1.531***	4.669***	1.457**	2.689
	(0.361)	(1.432)	(0.582)	(1.705)
Away team fan	1.639***	4.212***	0.774**	1.778**
	(0.345)	(1.493)	(0.323)	(0.774)
Subj. home win probability	-0.264***	-0.370***	-0.241***	-0.444***
	(0.038)	(0.069)	(0.033)	(0.061)
Subj. home win probability squared	0.023***	0.037***	0.020***	0.041***
	(0.003)	(0.006)	(0.003)	(0.006)
Home team fan × subj. home win probability	0.183*	0.291	0.008	-0.450
	(0.098)	(0.359)	(0.139)	(0.514)
Home team fan × subj. home win probability squared	-0.015*	-0.024	-0.001	0.066
	(0.008)	(0.030)	(0.011)	(0.042)
Away team fan × subj. home win probability	0.032	-0.100	0.164**	0.302
	(0.081)	(0.429)	(0.075)	(0.223)
Away team fan × subj. home win probability squared	-0.004	0.023	-0.017**	-0.021
	(0.008)	(0.048)	(0.008)	(0.026)
Single	-0.315***		-0.466***	
	(0.100)		(0.097)	
Female	-0.080		-0.032	
	(0.075)		(0.073)	
Age in years	-0.027		-0.058***	
	(0.018)		(0.017)	
Age squared	0.000		0.001***	
	(0.000)		(0.000)	
Distance to the venue of the home team by car (in km)	-0.001***	-0.005***	-0.000	-0.002***
	(0.000)	(0.001)	(0.000)	(0.001)
Distance squared	0.000**	0.000***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
FC Bayern München vs. Borussia Dortmund	0.271***	2.403***	0.220***	1.922***
	(0.058)	(0.190)	(0.056)	(0.154)
FC Schalke 04 vs. FC Augsburg	0.103***	0.643***	-0.066*	0.417***
	(0.036)	(0.153)	(0.036)	(0.151)
Borussia M'gladbach vs. TSG 1899 Hoffenheim	-0.036	0.641***	-0.126***	0.196
	(0.038)	(0.152)	(0.037)	(0.154)
1. FSV Mainz 05 vs. SV Werder Bremen	-0.048	-0.115	0.004	0.172
	(0.034)	(0.165)	(0.032)	(0.156)
Hannover 96 vs. Eintracht Frankfurt	0.053*	0.094	0.043	0.133
	(0.032)	(0.161)	(0.033)	(0.158)
VfB Stuttgart vs. VfL Wolfsburg	0.009	0.182	-0.011	0.476***
	(0.035)	(0.161)	(0.040)	(0.152)
Hamburger SV vs. Bayer 04 Leverkusen	-0.029	0.653***	-0.015	0.475***
	(0.045)	(0.158)	(0.039)	(0.151)
1. FC Köln vs. SC Freiburg	0.069**	0.171	-0.054*	-0.001
	(0.033)	(0.163)	(0.033)	(0.160)
Panel member			-0.053	
			(0.080)	
Constant	-0.791* (0.418)		-0.439 (0.398)	
Observations	26,587	10,341	29,040	11,073
Number of clusters / ID	2,983	1,158	3,253	1,238
Log-likelihood	-13,839.75	-1528.725	-14,835.874	-1,835.524

Notes: Matches in the second survey pair the same teams with home and away teams flipped (reference category: SC Paderborn 07 vs. Hertha Berlin). Pooled models have been estimated with clustered errors by individuals. FE, fixed effects. Standard errors are given in parentheses. Significance levels are: *p≤10%, **p≤5%, ***p≤1%.

Table D2. Logit Model Estimates with Bundesliga Interest Interactions.

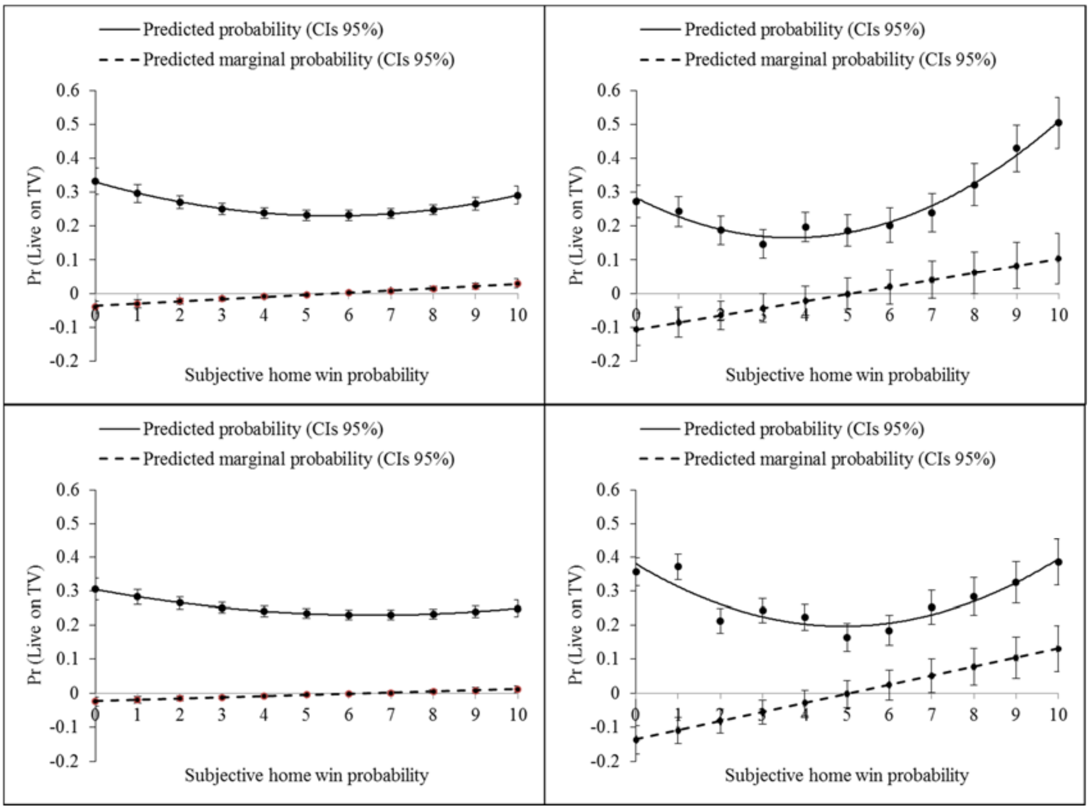
Dependent Variable: 1 If the Respondent Intends to Watch That Game Live on TV, 0 Otherwise	First Survey (10th matchday)		Second Survey (27th matchday)	
	Pooled	**FE**	**Pooled**	**FE**
Perceived suspense	0.258***	0.636***	0.321***	0.702***
	(0.027)	(0.045)	(0.024)	(0.045)
High Bundesliga interest × perceived suspense	-0.110***	-0.095*	-0.140***	-0.071
	(0.030)	(0.053)	(0.026)	(0.053)
High Bundesliga interest	1.462***		1.652***	
	(0.337)		(0.285)	
Subj. home win probability	-0.286***	-0.576***	-0.194***	-0.761***
	(0.081)	(0.132)	(0.071)	(0.117)
Subj. home win probability squared	0.027***	0.057***	0.015**	0.075***
	(0.007)	(0.012)	(0.007)	(0.011)
High Bundesliga interest × subj. home win probability	0.115	0.183	0.082	0.309**
	(0.090)	(0.151)	(0.080)	(0.136)
High Bundesliga interest × subj. home win probability squared	-0.012	-0.020	-0.007	-0.034***
	(0.008)	(0.014)	(0.007)	(0.013)
Single	-0.277**		-0.456***	
	(0.116)		(0.112)	
Female	0.129		0.230***	
	(0.086)		(0.085)	
Age in years	-0.038*		-0.076***	
	(0.020)		(0.020)	
Age squared	0.000*		0.001***	
	(0.000)		(0.000)	
Distance to the venue of the home team by car (in km)	-0.002***	-0.007***	-0.001*	-0.002***
	(0.000)	(0.001)	(0.000)	(0.001)
Distance squared	0.000***	0.000***	0.000*	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
FC Bayern München vs. Borussia Dortmund	0.778***	2.528***	0.540***	1.888***
	(0.070)	(0.177)	(0.065)	(0.159)
FC Schalke 04 vs. FC Augsburg	0.164***	0.670***	-0.029	0.412**
	(0.042)	(0.159)	(0.042)	(0.162)
Borussia M'gladbach vs. TSG 1899 Hoffenheim	0.052	0.502***	-0.090**	0.207
	(0.045)	(0.158)	(0.043)	(0.166)
1. FSV Mainz 05 vs. SV Werder Bremen	-0.007	-0.053	0.024	0.285*
	(0.040)	(0.172)	(0.037)	(0.167)
Hannover 96 vs. Eintracht Frankfurt	0.095**	0.217	0.035	0.103
	(0.037)	(0.168)	(0.036)	(0.172)
VfB Stuttgart vs. VfL Wolfsburg	0.056	0.135	0.082*	0.386**
	(0.041)	(0.170)	(0.047)	(0.164)
Hamburger SV vs. Bayer 04 Leverkusen	0.095*	0.660***	0.078*	0.504***
	(0.051)	(0.164)	(0.045)	(0.161)
1. FC Köln vs. SC Freiburg	0.091**	0.306*	-0.034	0.151
	(0.039)	(0.169)	(0.037)	(0.171)
Panel member			-0.141*	
			(0.084)	
Constant	-1.700***		-1.508***	
	(0.515)		(0.504)	
Observations	21,560	8,462	24,035	9,300
Number of clusters / ID	2,415	947	2,686	1,038
Log-likelihood	-10,887.436	-1,507.088	-11822.567	-1,671.269

Notes: Matches in the second survey pair the same teams with home and away teams flipped (reference category: SC Paderborn 07 vs. Hertha Berlin); Bundesliga interest is measured on 4-point scale. High interest≡1 (else 0) if Bundesliga interest≡4; Models are calculated with .25 quality threshold and strict sample correction for "fan" and "age" (see Appendix A for more information on this). Pooled models have been estimated with clustered errors by individuals. FE, fixed effects. Standard errors are given in parentheses. Significance levels are: *p≤10%, **p≤5%, ***p≤1%.



Notes: These figures are derived from the logit model estimates (see Table D1). Figures above: first survey (10th matchday), left: derived from the pooled model, right: derived from the FE model. Figures below: second survey (27thmatchday), left: derived from the pooled model, right: derived from the FE model. Marginal effects for the pooled models were computed with the help of the STATA command margins with the range of home win probability values being specified by using the "at()"-option. By using factor variable notations, the margins command is able to identify the different components of interaction terms. Marginal effects for the FE models cannot be estimated since the individual fixed effects are not consistently estimated in logit models. However, by substituting $Pr(y_{it} = 1|x_{it}, \alpha_i)$ and $Pr(y_{it} = 0|x_{it}, \alpha_i)$ with the relative frequencies of intentions to watch (or not) any of the games live on TV, we are able to *approximate* the discrete change in the probability of TV viewership at each level of $hwin$, i.e. the *predictive marginal probability*. The *predicted probability* is then calculated by subtracting the *predictive marginal probability* from each *hwin*-specific portion of TV viewership. Details on these calculations are provided in Appendix C.

Figure D1. Predicted (marginal) probability of watching live based on estimates in Table D1.



Notes: These figures are derived from the logit model estimates (see Table D2). Figures above: first survey (10th matchday), left: derived from the pooled model, right: derived from the FE model. Figures below: second survey (27thmatchday), left: derived from the pooled model, right: derived from the FE model. Marginal effects for the pooled models were computed with the help of the STATA command margins with the range of home win probability values being specified by using the "at()"-option. By using factor variable notations, the margins command is able to identify the different components of interaction terms. Marginal effects for the FE models cannot be estimated since the individual fixed effects are not consistently estimated in logit models. However, by substituting $Pr(y_{it} = 1|x_{it}, \alpha_i)$ and $Pr(y_{it} = 0|x_{it}, \alpha_i)$ with the relative frequencies of intentions to watch (or not) any of the games live on TV, we are able to *approximate* the discrete change in the probability of TV viewership at each level of $hwin$, i.e. the *predictive marginal probability*. The *predicted probability* is then calculated by subtracting the *predictive marginal probability* from each *hwin*-specific portion of TV viewership. Details on these calculations are provided in Appendix C.

Figure D2. Predicted (marginal) probability of watching live based on estimates in Table D2.

5.3 Reference-dependent preferences and the international demand for sports (Study 3) *

Abstract: Demand studies in sports relying on *within*-country settings are suggestive of cross-continental differences with regard to reference-dependent preferences: While North Americans seem to have a preference for tighter games, Europeans' preferences for game uncertainty are dominated by loss aversion. Our study is the first to test this suggested pattern in a *between*-country setting with individual-level data. In contrast to the existing evidence from *within*-country settings, our demand models show that US consumers' preferences for game uncertainty in European soccer are *also* dominated by loss aversion for live viewing, while no links between game uncertainty and tape-delayed or highlights viewing emerge.

Keywords: reference-dependent preferences, loss aversion, game uncertainty, demand, sports, soccer

JEL classification: L83, D12, Z2

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Reference-dependent preferences and the international demand for sports

Introduction

Understanding decision making under uncertainty is of major relevance in different contexts, such as financial (e.g., Shefrin and Statman 1985) and insurance markets (e.g., Hogarth and Kunreuther 1985) or professional sports, in which many extra-market rules have been instituted, since consumers are expected to value uncertain outcomes of sports contests.[1] Rottenberg (1956) and Neale (1964) were the first to argue that consumers' interest in (and consequently the demand for) a sports contest is higher the more uncertain its outcome is expected to be. Decades of empirical research, however, have not been successful in establishing *clear* evidence for this uncertainty of outcome hypothesis (UOH), either for the attendance demand or for TV viewing.

Quite recently, Coates, Humphreys, and Zhou (2014) developed a theoretical model (CHZ model from now on) based on the concept of reference-dependent preferences, which is able to explain the ambiguity of the previous findings. By distinguishing pure "consumption utility" from "gain–loss utility" generated by deviations between the expected and actual game outcome, their model is able to explain both a preference for close games and a preference for games involving a favourite. In detail, the UOH only emerges when the marginal utility of an unexpected win exceeds the marginal utility of an unexpected loss. When, however, the marginal utility of an unexpected loss exceeds the marginal utility of an unexpected win, commonly referred to as loss aversion (Kahneman and Tversky 1979), consumers derive more utility from seeing an upset, which by definition requires a favourite team ex ante.

1. Measures such as salary caps, entry drafts, or revenue-sharing devices have been instituted with the objective of increasing or maintaining a certain level of balance between competitors. See Fort and Quirk (1995) for a detailed introduction to the cross-subsidization, incentives, and outcomes in professional team sports leagues.

Reconsidering the empirical evidence [2] on the relation between the expected game outcome and the attendance demand in the light of this theoretical model reveals an interesting pattern, that is, the existence of apparently cross-continental differences with regard to the relevance of game uncertainty. More precisely, most of the literature suggesting that fans have a preference for tighter games tested the UOH in North American Major League sports – such as the North American Basketball Association (NBA) or Major League Baseball (MLB) – while the majority of previous studies on European sports, that is, predominantly European soccer (football), detected that the fans' preferences for game uncertainty are dominated by loss aversion. These cross-continental differences become even more evident when comparing previous studies on TV viewing.[3]

In general, such cross-continental differences might be attributed to cross-cultural variations with regard to preferences for *loss aversion*, the *type of sports watched*, and/or the *mode of consumption*, that is, the manner in which a sports event is watched. *First*, it is well established in more general settings that risk and uncertainty attitudes vary between countries (Vieider et al. 2015). Moreover, significant cross-cultural differences exist in both risk aversion (Rieger, Wang, and Hens 2015) and loss aversion (Wang, Rieger, and Hens 2016). Since these studies reveal that North Americans display on average lower levels of loss aversion than Europeans, this might be one explanation for the observed pattern mentioned earlier. *Second*, the most popular North American and European sports differ with regard to revenue allocation schemes[4] and various competition design elements, such as scoring systems and the average number of points scored per game. Since these elements have previously been found to influence competitive balance and the degree of (game) uncertainty (e.g., Haugen 2008), it seems plausible to assume that the type of sports analysed influences the relation between the expected game outcome and the demand for sports. *Third*, while watching a sports event live is the most popular form of sports demand in Europe, time-shifted/tape-delayed

2. See Coates, Humphreys, and Zhou (2014) or Pawlowski (2013) for recent reviews of the literature on attendance demand and Nalbantis and Pawlowski (2016) for a recent review of the literature on the demand for televised sports events.
3. Note, the CHZ model was initially developed for the context of *in-stadium attendance demand* and tested empirically with *game-level* data. As will be discussed in Section II, the concept of reference-dependent preferences can also be applied to and tested in the context of *TV viewing* (once *individual-level* data is available, see Pawlowski, Coates, and Nalbantis 2017 for a recent application).
4. A recent discussion regarding the different revenue allocation schemes in North American and European professional leagues is provided by Budzinski and Müller-Kock (2017).

viewing of sports events is equally popular in North America (Nalbantis and Pawlowski 2016). As supposed by Coates et al. (2014), the mode of observation might generally affect the predictions about the relationship between outcome uncertainty and the demand for sports.

Disentangling the impact and relevance of the aforementioned three channels is important for sports policy makers and league organizers considering the ever-increasing relevance of internationalization to professional sports. Moreover, it seems highly pertinent to unravel further the mystery of the relation between the game uncertainty and the demand for sports. This paper is the first to test the CHZ model in a *between-country* setting with *individual-level data*, thereby contributing to both enhancing our understanding of international sports demand in general[5] and shedding further light on the (ir)relevance of game uncertainty in particular.

The focus of our study is the US demand for European soccer telecasts – a practically highly relevant setting considering the US soccer broadcasting market's evolution in recent years as well as the fact that the market is dominated by international soccer events.[6] Moreover, in contrast to previous research focusing on live viewership in the US *only*, our survey data, collected from a US-wide representative online panel, allow us not only to test the relation between perceived game uncertainty and demand *in general* but also to examine *simultaneously* its effect on *all* the viewing alternatives available to the soccer audience in the US, namely live viewing, tape-delayed viewing, and "only highlights" viewing, by employing multinomial logit regressions. Overall our findings suggest that US consumers' preferences for game uncertainty in soccer are *also* dominated by loss aversion for live viewing, while we could not find any significant relation either for "tape-delayed" or for "only highlights" viewing.

The remainder of the paper begins by discussing the general applicability of the CHZ model in a TV demand context before presenting the empirical methodology, including

5. To the best of our knowledge, only one study has previously investigated the demand for sports between countries by focusing on a within-Europe setting, specifically German fans' demand for English Premier League games (Schreyer, Sascha, and Torgler 2016).
6. In 2015 Major League Soccer (MLS) reported gross viewership of around 30 million US viewers (a 50% gain over 2013), whereas the English Premier League (EPL) reported a total of 115.5 million US viewers for the 2013–2014 season (a 114% gain over the previous season) (Waugh 2014).

information about the survey design, sample selection, and measures used. Subsequently, the econometric specification is displayed, followed by the presentation of the findings and the discussion of their robustness. The final section concludes.

Reference-Dependent Preferences and TV Demand

The CHZ model is based on the concept of reference-dependent preferences and distinguishes between "consumption utility" that corresponds to the utility generated from attending a game and "gain–loss utility" that corresponds to the sensation of a gain (or loss) caused by deviations between expected (reference point) and actual game outcome. The model was initially developed to explain *in-stadium attendance demand* under the premise that the vast majority of the attendees are fans of the home team. When transferring the model in the context of *TV viewing* where the majority of viewers are expected to be neither a fan of the home nor the away team that is they are regarded as "neutral" fans, two major issues arise.

First, it remains unclear whether fans with no particular loyalty to either of the competing teams do form any reference point at all. "Pure neutrality" in this regard would mean that such viewers derive the same "consumption utility" from both a home win and a home loss, while they do not experience any "gain–loss utility". While this is expected to describe a trivial portion of potential attendees at sporting events (Coates et al. 2014), it is often argued that such "neutral" fans make up the majority of TV viewers of sports contests (Szymanski 2001). We, however, argue that "pure neutrality" as defined before can hardly be observed in practice since each sports consumer forms some kind of expectations about wins and losses which, importantly, might also stimulate demand. Empirical proof for this assumption is provided by Pawlowski, Nalbantis, and Coates (2017) analysing the soccer fans' intentions-to-consume televised games played in the German Bundesliga based on a representative sample of the German population. Their findings suggest that the majority of "neutral" fans in soccer indeed forms a reference point and that the fans' preferences for game uncertainty are dominated by loss aversion *independently* of fanship status.

Second, in contrast to in-stadium attendance where most of the consumers have a home win preference, it remains unclear what the “neutral” fans’ preferences towards / against certain game outcomes might be. For instance, one may cheer for the underdog or perceive a threat for the own favourite club when a team in a given game is close in league rankings or has similar aspirations. In this regard, “neutral” fans might build preferences towards or against any of the competing teams. Furthermore, “neutral” fans might build preferences against teams which are considered as traditional rivals and preferences for teams which are perceived as “friendly” towards their own team. Moreover, preferences can be formed, even without cheering for any other team, when one of the competing teams comes from a region with which the “neutral” fan has some sort of connection (direct or indirect) or when the fan has a disposition towards particular individuals (e.g., players or coaches) that compete in this team. Summing up, in contrast to home team fans (home win preference) and away team fans (away team preference), “neutral” fans’ preferences are highly idiosyncratic. Since, however, we have access to *individual level* data we are able to control for such type of *heterogeneity* between consumers in our models. As a consequence, observing heterogeneous consumer preferences towards / against certain game outcomes should not be a problem in our context.

Data and Methodology

The US broadcasting market is different from the European broadcasting market and peculiar in many ways. *First*, several (European) soccer games are usually aired simultaneously on more than one channel (typically at least in the English and Spanish languages). *Second*, the vast majority of these telecasts are also available online via livestream on the broadcaster’s dedicated web page, on over-the-top internet television services (e.g., FuboTV, PlayStation Vue), and on some occasions even on free-to-access video hosting services (e.g., YouTube). Secondary data, such as TV viewing figures, do not provide a full overview of the market, as they inevitably overlook the audience inside the household, for instance online streaming, as well as those in environments outside the household, for example bars and other public places, where sporting events are frequently viewed by large numbers of individuals.[7] *Third*, watching time-shifted and tape-delayed broadcasts of European soccer games is quite a common practice among viewers and US broadcasters given the time zone differences between North America and Europe (Nalbantis and Pawlowski 2016).[8] Despite the efforts over the last few years in the field of ratings' measurement to track and incorporate online media consumption as well as time-shifted/tape-delayed viewing, these two viewing options are still measured separately. As a result, it is hard, if not impossible, to detect and consider any overlap between live TV, live streaming, and time-shifting viewers of an event. *Fourthly*, there are no individual (per game) TV ratings available for the highlights viewership of sporting events and no aggregated viewing audience for time-shifted/tape-delayed events. Therefore, to overcome the aforementioned drawbacks and examine *simultaneously* all the viewing alternatives available to the soccer audience, we rely on survey data based on a stated preference approach.

Sample Selection

The data gathered in two surveys contain information about the perceptions and viewing intentions of *soccer-interested* US consumers. The respondents were recruited randomly via an automated fielding process from a US-wide representative online panel. To ensure that the respondents were familiar with the sport, a filter question at the beginning of the survey enabled us to identify individuals with a *minimum* interest in soccer. All the individuals who indicated "no interest" in soccer were screened out (for detailed information see Appendix B). In total two online surveys were conducted, which differ with regard to the selection of soccer games.

Survey 1 was online between 15 and 26 May 2015 and contains information about perceptions and ITC for five (national) cup finals, specifically the DFB Cup (Germany), Coupe de France, FA Cup (England), Copa del Rey (Spain), and UEFA Champions

7. According to Nalbantis and Pawlowski (2016), about six out of ten regular soccer viewers in the US watch at least one game per match day/week in a public place (e.g., in a sports bar).
8. In this regard it is indicative that the live broadcast of the German Bundesliga game between FC Bayern Munich and FC Augsburg (12 September 2015; EST: 9.30 a.m.) attracted 40,000 US viewers, while the game's tape-delayed broadcast 1 day later (13 September 2015; EST: 4.00 p.m.) attracted 926,000 viewers (Wöckener 2015).

League (Europe).[9] Survey 2 was online between 31 August and 9 September 2015, that is, during the leagues' "break" for national team fixtures (friendly games and UEFA EURO 2016 qualifying round games) to avoid possible spillover effects from ongoing league games. In total this survey contains information about perceptions and viewing intentions for eight games, namely the league games of the English Premier League (two games), German Bundesliga, Spanish La Liga, Italian Serie A, French Ligue 1, and North American MLS (two games). The games in Survey 2 were selected by game importance and by the popularity of the contestants, which was based on Survey 1's statistics on stated supporter status. The Survey 1 participants were invited to participate in Survey 2 to generate a two-period panel. Those respondents from Survey 1 who did not respond to Survey 2 were replaced with randomly selected new respondents.

By choosing two different types of soccer games, we were able to test whether the respondents' perceptions about the closeness of a game and consequently their viewing intentions are affected and/or moderated by the type of competition. *First*, unlike regular season soccer games, which can end in a tie, cup finals always produce a winner (and a loser), thereby resembling a typical game design in North American Major League competitions.[10] *Second*, cup finals are games with a high stake, that is, winning the cup, while the stakes in regular league games are arguably much lower, particularly at the beginning of the season. Since previous research has shown that fans' consumption behaviour depends on the importance of the sporting prize (see Scelles et al. 2016), a moderating effect of sporting prizes on fans' preferences for game uncertainty seems to be possible. *Third*, in contrast to regular league games, the "home" team's advantage in cup finals lies in rather negligible matters, such as the choice of jersey colour, the selection of locker rooms, and the seating arrangement of the fans (the two teams have an equal number of tickets at their disposal).[11]

9. The survey also contains information about the 2015 Coppa Italia Final. Unfortunately, however, the Coppa Italia Final (originally scheduled for 7 June) was rescheduled for 20 May due to a clash with the 2015 UEFA Champions League Final. Since our survey was already on-field, measures relevant to the perceptions of game uncertainty and others related to the Coppa Italia Final are arguably affected by its actual outcome. Therefore, we decided to exclude this game from all the estimations.

10. In soccer finals, a tie is a possible outcome during the *regular* time. However, such games involve extra time (similar to NBA games) and if necessary a penalty shootout afterwards (similar to National Hockey League [NHL] games).

11. In our analysis, the "home" team's winning probability refers to the formally determined "home" team in the cup final. In the FA Cup, the "home" team is determined by alphabetical order of the contestants. In

Table 1. Game Characteristics.

Competition (country)	Contestants [a]		Scheduling [b]			Home win prob. (%) [c]	
	"Home" team	"Away" team	Date	Time (EST)	TV network	Subj.	Obj.
Cup finals							
FA Cup Final (ENG)	Arsenal FC (*7*)	Aston Villa FC (*21*)	30 May	12.30 p.m.	FOX	53.4	62.6
DFB Cup Final (GER)	BvB Dortmund (*12*)	VfL Wolfsburg (*36*)	30 May	2 p.m.	ESPN	49.0	44.9
Coupe de France Final (FRA)	AJ Auxerre (-)	Paris St.-Germain FC (*9*)	30 May	3 p.m.	beIN Sports	43.7	5.7
Copa del Rey Final (ESP)	Athletic Club de Bilbao (-)	FC Barcelona (*6*)	30 May	3.30 p.m.	ESPN	36.8	6.7
UEFA Champions League	Juventus FC (*11*)	FC Barcelona (*6*)	6 June	2.45 p.m.	FOX	38.0	16.6
League games							
Ligue 1 (FRA)	Paris St.-Germain FC (*9*)	FC Girondins de Bordeaux (-)	11 Sept.	2.30 p.m.	beIN Sports	52.3	75.7
MLS (USA)	New York Red Bulls (-)	Chicago Fire (-)	11 Sept.	7.00 p.m.	Univision	48.1	60.1
Premier League (ENG)	Everton FC (*15*)	Chelsea FC (*5*)	12 Sept.	7.45 a.m.	NBC	40.0	25.3
Bundesliga (GER)	FC Bayern Munich (*2*)	FC Augsburg (-)	12 Sept.	9.30 a.m.	FOX	54.8	84.7
Premier League (ENG)	Manchester United FC (*1*)	Liverpool FC (*8*)	12 Sept.	12.30 p.m.	NBC	55.5	48.1
La Liga (ESP)	Club Atlético de Madrid (*23*)	FC Barcelona (*6*)	12 Sept.	2.30 p.m.	beIN Sports	40.8	28.1
MLS (USA)	Los Angeles Galaxy (-)	Montreal Impact (-)	12 Sept.	10.30 p.m.	TWCSN	53.4	64.0
Serie A (ITA)	Internazionale Milano (*20*)	AC Milan (*14*)	13 Sept.	2.45 p.m.	beIN Sports/RAI	43.9	43.6

Notes: [a] The choice of "home" teams in soccer cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings; [b] The time is displayed as Eastern Standard Time, that is, Coordinated ***Universal Time (***UCT) - 5 hours). The TV networks and not the channels that broadcasted the games are displayed; [c] The objective "home" win probabilities were derived from betting odds (source: www.betbase.info). The subjective "home" win probabilities were transferred from the mean values of the answers to the corresponding questions in the surveys. Brand rankings provided by *Brand Finance* (2015) are reported in parentheses next to the team names ("-" denotes that a club is not included in the Top 50 soccer brands list for 2015). *Abbreviations*: DFB ≡ German Football Association; ENG ≡ England; ESP ≡ Spain; EST ≡ Eastern Standard Time; FA ≡ The Football Association; FRA ≡ France; GER ≡ Germany; ITA ≡ Italy; UEFA ≡ Union of European Football Association; USA ≡ United States of America.

contrast, in the finals of the German DFB Cup, Coupe de France, and UEFA Champions League, the "home" team is determined by an additional draw, while the "home" team in the Spanish Copa del Rey final is the longest-founded club among the contestants.

Table 1 provides an overview of the selected games. Importantly, as denoted by the brand rankings, the team pairings in our data set do not disclose any "brand ordering". Thus, the preference for strong brands (Pawlowski and Anders 2012) and/or for high-quality contestants (Humphreys and Zhou 2015) is less likely to affect the overall findings of this research. All the games were broadcasted on US TV networks live and tape-delayed in full length, with the exception of the German cup final, which was available only online via livestreaming and was afterwards also offered on tape delay in ESPN's programming. Although few scheduling conflicts exist (e.g., with regard to the Copa del Rey and the Coupe de France finals), live streaming via online platforms generally allowed fans to watch all of the games live.

After quality corrections of the data and omitting observations with missing values for certain responses, information on 2,645 (2,637) respondents remained for analysis from Survey 1 (Survey 2). Although the possibilities to assess the representativeness of the survey's sample are somewhat limited, rough comparisons with the existing studies suggest that there is no clear evidence of over- or underrepresentation of specific types of soccer consumers in our data. Moreover, comparisons of our sample's demographics with US Census data do not suggest any substantial deviations between the soccer-interested respondents and the general population in the US.[12]

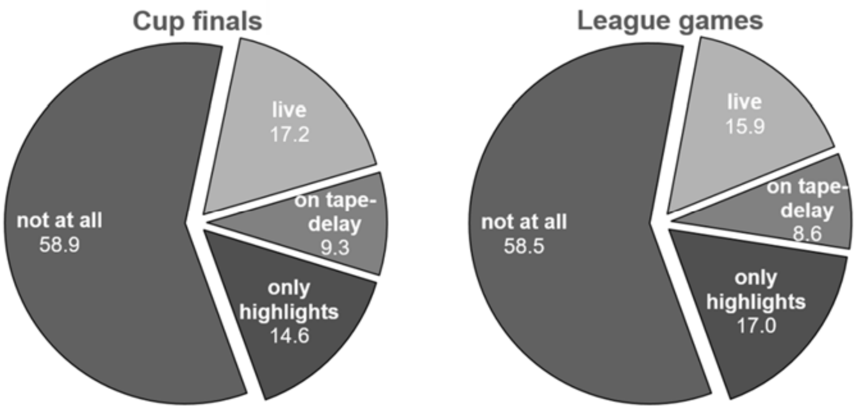
Measures

Our dependent variable measures the consumers' intention to watch European soccer games in the US. Following Pawlowski et al. (2017), the respondents were required to state their ITC regarding *upcoming* games, that is, their intention to consume a clearly defined product in the immediate future. In detail, the survey participants were asked: "Will you be watching live any of the upcoming soccer games?" and had to choose among four possible options (not live; live; tape delayed; only highlights). The question focused intentionally on "watching live" instead of "watching live on TV" to make sure that the ITC measure would also take into account the portion of consumers who prefer to view

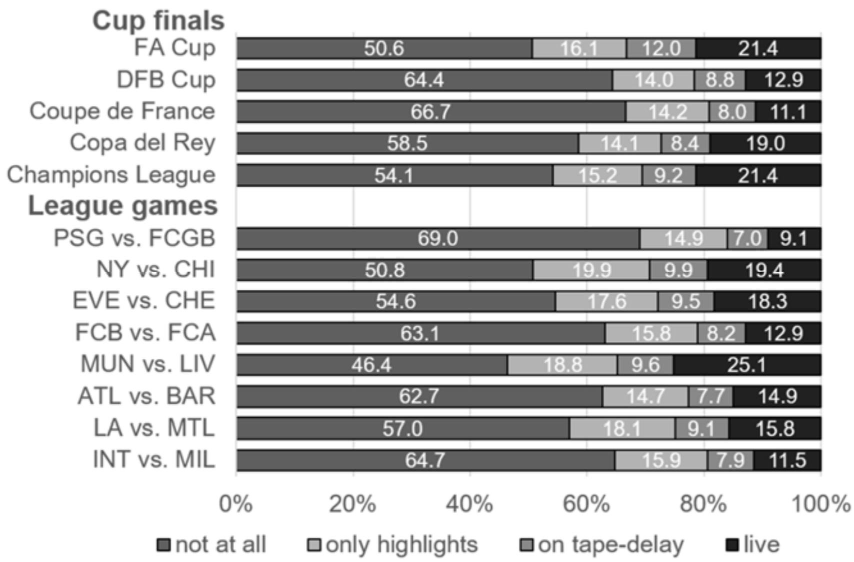
12. Detailed information on the quality corrections of the data as well as comparisons of the sample characteristics with other studies and the US Census are provided in Appendix B.

the games via online streaming on their computer, tablet, phone, or favourite connected device (see Figure 1). Moreover, it includes also individuals who prefer to view the games outside of their household (e.g., at a friend or relative, in bar, restaurant etc.). In that way it was possible to mitigate any accessibility issues.

Overall



Per Game



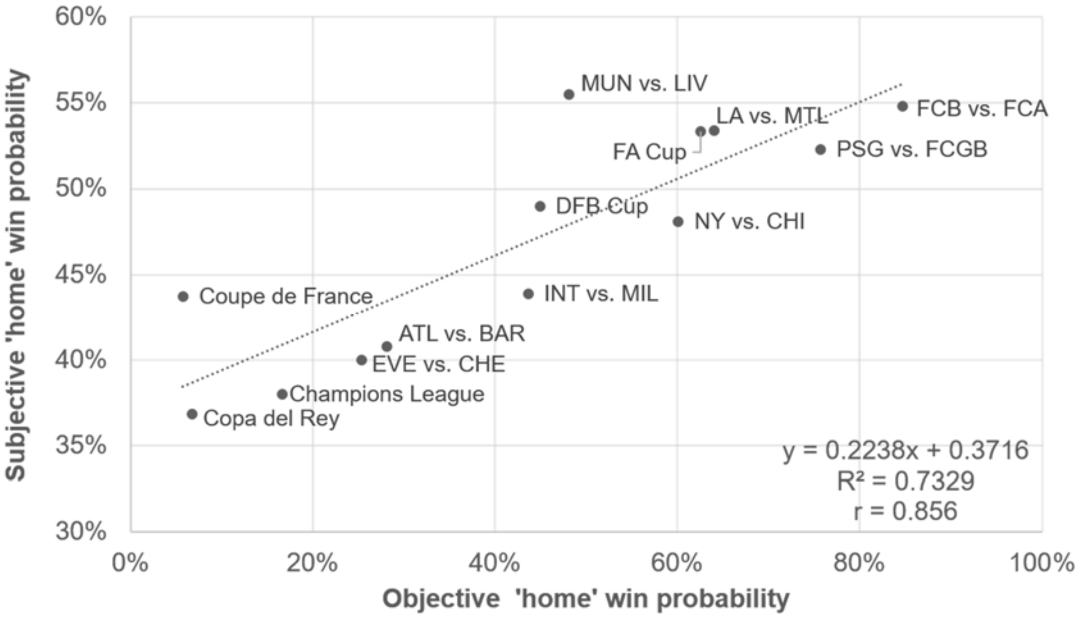
Abbreviations: ATL ≡ Club Atlético de Madrid; BAR ≡ FC Barcelona; CHE ≡ Chelsea FC; CHI ≡ Chicago Fire; DFB ≡ German Football Association; EVE ≡ Everton FC; FA ≡ The (English) Football Association; FCA ≡ FC Augsburg; FCB ≡ FC Bayern Munich; FCGB ≡ FC Girondins de Bordeaux; INT ≡ Internazionale Milano; LA ≡ Los Angeles Galaxy; LIV ≡ Liverpool FC; MIL ≡ AC Milan; MTL ≡ Montreal Impact; MUN ≡ Manchester United FC; NY ≡ New York Red Bulls; PSG ≡ Paris St.-Germain FC.

Figure 1. Distribution of the intention-to-consume statements (in percentages).

While the implemented choice scenario means (to a certain degree) that respondents' statements will disclose rather accurate representations of their real viewing behaviour, it does not rule out false statements. False statements might arise when the respondents (for whatever reason) choose to lie, namely "liars", or when their plans change shortly before the games' kick-off, namely "switchers" (Pawlowski et al. 2017). Since the aim of this paper is to discriminate between the different viewing options rather than predicting accurately each game's total audience, both types of false statements should not be a major problem as long as they are randomly distributed across the respondents. Like Pawlowski et al. (2017), we do not see any argument for why this assumption should be violated in our setting. In contrast to Pawlowski et al. (2017), who elaborated on this argument *theoretically*, however, we were able to test this assumption *empirically* by taking advantage of our panel design.[13] Finally, asking fans about ITC could arguably act as indirect advertisement of the concerning games and therefore trigger the probability to consume. This, however, would influence *all* survey participants for *all* games in a similar way irrespectively of their individually perceived game uncertainty.

Our uncertainty measure is adopted from Pawlowski et al. (2017) and based on the subjective evaluations of the "home" team's winning probability (and its squared term). The survey respondents were asked on an 11-point scale from 0 to 10 (0 ≡ Team A will definitely win ... 10 ≡ Team B will definitely win) which team they think is more likely to win the upcoming game.[14] Like Pawlowski et al. (2017), we found these perceptions about the "home" win probabilities to be closely related to the "home' win probabilities that can be derived from betting odds (r = 0.86; see Figure 2). Moreover, it is important to note that regardless of whether the game is a cup final or a league game, a 50% 'home' win probability in our questionnaires infers automatically also a 50% 'away' win probability and as such it translates directly into a close contest.[15]

13. This will be explained in more depth in the result section.
14. We avoided using the term "home" team in the first survey, since (as mentioned above) the choice of the "home" team is a formality in cup finals.
15. Based on data from a previous survey project focusing on the demand for televised Bundesliga games (see Pawlowski, Nalbantis and Coates 2017), we were able to compare the fans' perceived home win probabilities with their expectations about the final outcome of the concerning games. Overall, 80 to 90% of the respondents who stated 50% home win probability for a league game, anticipated the game to end either in a draw or that the game will be decided by a one-goal margin.



Notes: [a] The choice of "home" teams in soccer cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings. The objective "home" win probabilities were derived from fulltime (1X2) betting odds (source: www.betbase.info) excluding overtime. The betting odds were transformed into probabilities by excluding the bookmaker's margin. The subjective "home" win probabilities were transferred from the mean values of the answers to the corresponding questions in the surveys. *Abbreviations*: ATL ≡ Club Atlético de Madrid; BAR ≡ FC Barcelona; CHE ≡ Chelsea FC; CHI ≡ Chicago Fire; DFB ≡ German Football Association; EVE ≡ Everton FC; FA ≡ The (English) Football Association; FCA ≡ FC Augsburg; FCB ≡ FC Bayern Munich; FCGB ≡ FC Girondins de Bordeaux; INT ≡ Internazionale Milano; LA ≡ Los Angeles Galaxy; LIV ≡ Liverpool FC; MIL ≡ AC Milan; MTL ≡ Montreal Impact; MUN ≡ Manchester United FC; NY ≡ New York Red Bulls; PSG ≡ Paris St.-Germain FC.

Figure 2. Objective vs. subjective "home" win probabilities.[a]

The analysis further controls for the interest in the respective leagues, the respondents' supporter status (supporter of a club in the domestic league of the corresponding cup final/league game and/or supporter of a competing club in the games under consideration) and the self-reported accessibility to the respective leagues' telecasts, as well as several socio-demographic characteristics, such as Hispanophone, European background, race, marital status, education, occupation, income, age, gender, and household size. Moreover, the empirical models include game dummies to control for the individual and joint impacts of games on the sports consumers' viewing decisions as well as time zone dummies to consider whether local time variations affect the viewership behaviour. Furthermore, we controlled for whether the respondents' residence is within a 50-mile radius from a city hosting an MLS club to account for possible spillovers in soccer interest. Finally, since the analysis is focused on "imported" sports telecasts, the models also control for the perceived friendliness of the "exporting" country (i.e., the country where the league/competition is based) towards the USA with a measure adopted from Parameswaran and Yaprak (1987). Table 2 summarizes the corresponding descriptive statistics.[16]

Table 2. Descriptive Statistics.[a]

	Cup finals				League games			
	Mean	**SD**	**Min.**	**Max.**	**Mean**	**SD**	**Min.**	**Max.**
Perceived home win probability								
Home win probability	4.423	2.490	0	10	4.859	2.493	0	10
Home win probability squared	25.763	24.360	0	100	29.822	26.139	0	100
Interest in soccer leagues								
Moderate league interest	0.138	0.345	0	1	0.147	0.354	0	1
High league interest	0.336	0.472	0	1	0.386	0.487	0	1
Supporter status								
Supporter of a club in the league	0.174	0.379	0	1	0.219	0.414	0	1
Supporter of a club in the game	0.036	0.187	0	1	0.054	0.226	0	1
Accessibility of the leagues								
TV prog. includes league	0.303	0.459	0	1	0.369	0.483	0	1
Socio-demographic characteristics								
Hispanophone	0.113	0.317	0	1	0.104	0.305	0	1
European background	0.043	0.202	0	1	0.042	0.200	0	1
White	0.805	0.396	0	1	0.778	0.415	0	1
Some college	0.339	0.473	0	1	0.352	0.478	0	1
College graduate	0.528	0.499	0	1	0.510	0.500	0	1
Unemployed	0.062	0.241	0	1	0.057	0.232	0	1
Income 20K–49.9K	0.278	0.448	0	1	0.278	0.448	0	1
Income 50K–74.9K	0.229	0.421	0	1	0.242	0.428	0	1
Income 75K–99.9K	0.154	0.361	0	1	0.156	0.363	0	1
Income 100K–149.9K	0.163	0.370	0	1	0.168	0.374	0	1
Income more than 150K	0.070	0.254	0	1	0.071	0.256	0	1
Age	47.987	13.979	18	83	50.796	14.718	17	96
Age squared (× 100)	24.982	13.277	3.24	68.89	27.968	14.879	2.89	92.16
Male	0.528	0.499	0	1	0.560	0.496	0	1
Married	0.630	0.483	0	1	0.645	0.478	0	1
Household size	2.744	1.361	1	7	2.642	1.308	1	7
Time zone								
Eastern	0.512	0.500	0	1	0.510	0.500	0	1
Central	0.260	0.439	0	1	0.262	0.440	0	1
Mountain	0.062	0.242	0	1	0.055	0.229	0	1
Pacific/Alaska/Hawaii	0.167	0.373	0	1	0.173	0.378	0	1
MLS city residence								
Within a 50-mile radius	0.366	0.482	0	1	0.366	0.482	0	1
Perceived friendliness towards the USA								
Friendly	0.671	0.470	0	1	-	-	-	-

Notes: [a] The descriptive statistics are based on the pooled multinomial logit model sample. A description of the variables is provided in Appendix A in Table A1. For the cup finals' sample (Survey 1), there are 13,225 game observations for 2,645 survey respondents. For the league games' sample (Survey 2), there are 21,096 game observations for 2,637 survey respondents.

16. An overview of all the variables, their definitions, and their measurements is provided in Table A1 in the Appendix A.

Econometric Specification

The viewing behaviour of fans is modelled as a utility-maximizing choice. Let the utility of individual *i* from viewing a game in fashion *j* be $U_{ij}\ (X, P, C)$, where *P* is a vector of personal characteristics, *X* is a vector of game/league characteristics, and *C* is the consumption of other goods and services. Assuming that each respondent chooses to experience the game in fashion *j* only if the utility that she derives from it is greater than that from all the other alternatives in the choice set, then this utility-maximizing choice can be expressed as

(1) $$U_{ij}\ (X, P, C) > U_{ik}(X, P, C)\ \forall j \neq k$$

The random utility of viewing a game in fashion *j* for individual *i* can be expressed in a linear-in-parameters form as

(2) $$U_{ij} = \beta_j\, x_i + \varepsilon_{ij}$$

where β_j is a vector of parameters that relates to a column vector of explanatory variables *x* while unobserved and unobservable influences are captured in an error term, ε_{ij}. Although the individual's utility is not observable, the probability of an individual's utility-maximizing choice can be estimated as

(3) $$\begin{aligned} P_{ij} &= P\ (U_{ij} > U_{ik},\ \forall\, j \neq k) \\ &= P\ (\beta_j\, x_i + \varepsilon_{ij} > \beta_k\, x_i + \varepsilon_{ik},\ \forall\, j \neq k) \\ &= P\ \left((\beta_j - \beta_k)\ x_i > \varepsilon_{ik} - \varepsilon_{ij},\ \forall\, j \neq k\right) \end{aligned}$$

which can simply be expressed as

(4) $$P_{ij} = e^{\beta_j X_i} \Big/ \sum_{k=1}^{J} e^{\beta_k X_i}$$

To estimate the parameter vectors in β_j, the individuals' reported viewing intentions are utilized with $j \equiv 0, 1, 2, 3$. The value 0 indicates the individual's choice not to watch the game at all, 1 her intention to watch the game live, 2 her intention to watch the game on tape delay, and 3 her intention to watch only the game's highlights. By arbitrarily setting choice 0 as the basis of comparison, the probability for each outcome can be rewritten as

(5)
$$\begin{aligned}
P_i(j=0) &= 1 \Big/ 1+\sum_{k=1}^{3} e^{\beta_k X_i} \\
P_i(j=1) &= e^{\beta_1 X_i} \Big/ 1+\sum_{k=1}^{3} e^{\beta_k X_i} \\
P_i(j=2) &= e^{\beta_2 X_i} \Big/ 1+\sum_{k=1}^{3} e^{\beta_k X_i} \\
P_i(j=3) &= e^{\beta_3 X_i} \Big/ 1+\sum_{k=1}^{3} e^{\beta_k X_i}
\end{aligned}$$

Based on this multinomial logit (MNL) estimation scheme, the parameter vectors β_1, β_2, and β_3 can be estimated using maximum likelihood. The MNL approach in general relies on the assumption of independence from irrelevant alternatives (IIA). To test whether the viewing alternatives are indeed distinct and weighted independently in the eyes of the sports consumers, the Small–Hsiao test (Small and Hsiao 1985) was employed, providing evidence that the assumption has not been violated. Moreover, the Wald test statistics reject the assumption that any pair of the viewing alternatives can be combined. All in all, these post-estimation tests suggest that an MNL estimation scheme is appropriate in our setting.

Finally, since the respondents stated their intentions separately for every single game under consideration, the data contain repeated game observations for each survey participant and are organized in a balanced panel. Though the individuals were selected randomly and can therefore be assumed to be independent of each other, the intentions of the same individual may be correlated. To account for such within-individual correlation, pooled models with error terms clustered by individuals were used.

Results

The coefficients of the MNL models can be found in Appendix A (Table A2: Cup finals; Table A3: League games).[17] Based on these estimates, the average marginal effects (AMEs) for both European cup finals and league games are reported. Since the AMEs for the nonlinear relationships with the perceived home win probability and age just depict the instantaneous rate of change for these variables, we estimated the average adjusted predictions for each level of the concerning variables and report them graphically to provide a better overview of the underlying relationships. The discussion of the results begins by considering the ITC for the cup finals and league games and the impact of perceived game uncertainty. The instantaneous rate of change for the perceived "home" win probability is negative for both live and tape-delayed viewership for both types of games and positive for watching highlights only for league games (see Table 3).

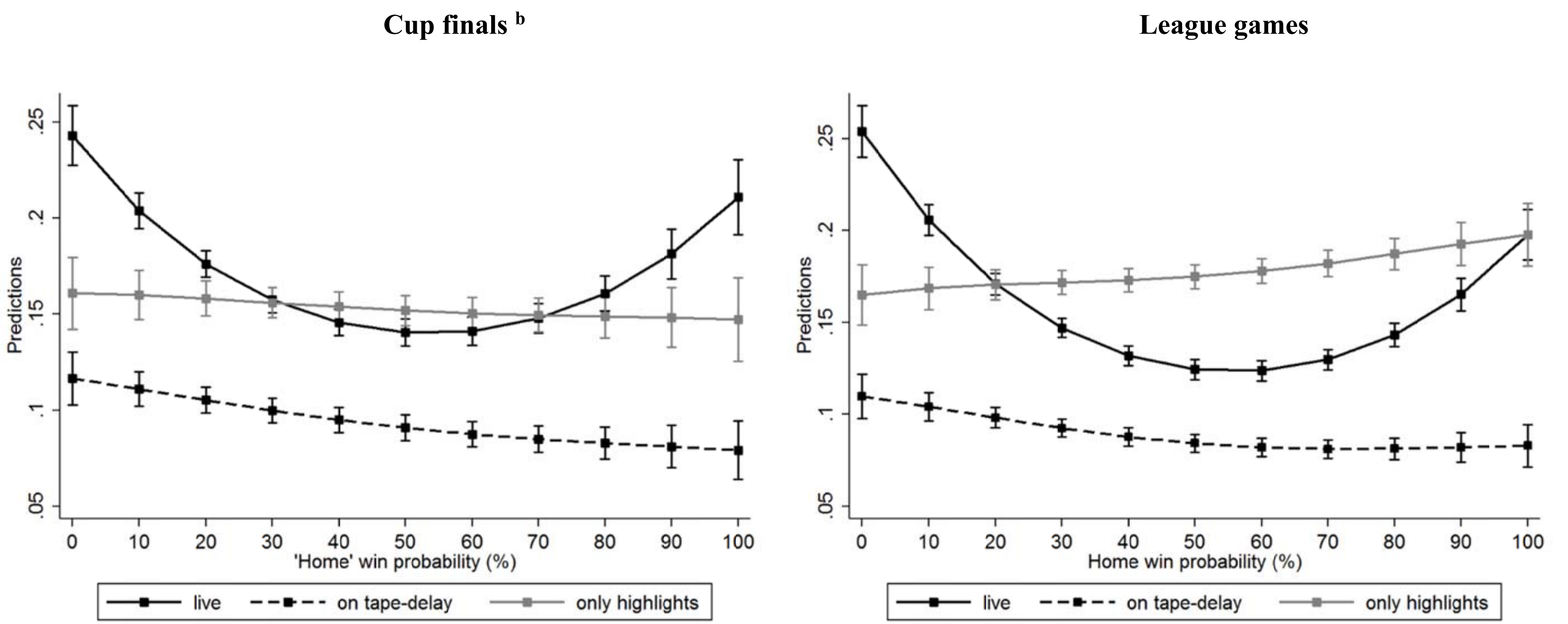
Figure 3 shows how the predictive margins evolve. Both for cup finals and for league games, the results show that the relation between the perceived "home" win probabilities and the probability of watching a game live is u-shaped, suggesting that US consumers' preferences for game uncertainty are dominated by loss aversion. In detail, they imply that either the possibility of witnessing an upset of a strong favourite or the possibility to watch the strong favourite "home" team defeating weaker opponents both generate a higher live viewership likelihood than games expected to be close. In contrast, however, we could not detect any significant relation between the "home" win probabilities and the probability of watching only highlights of the games or full-length tape-delayed games.

17. The estimated variance inflation factors (VIFs) of all the estimated models suggest that there is no linear dependence on other predictors.

Table 3. Robust Marginal Effects.[a]

	Cup finals			League games		
	LIVE	TD	HLs	LIVE	TD	HLs
Perceived home win probability						
Home win probability [b]	-0.009***	-0.002***	0.0001	-0.008***	-0.001***	0.005***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Interest in soccer leagues						
Moderate league interest	0.036***	0.069***	0.077***	0.047***	0.052***	0.159***
	[0.011]	[0.009]	[0.008]	[0.007]	[0.006]	[0.009]
High league interest	0.121***	0.087***	0.070***	0.173***	0.113***	0.140***
	[0.009]	[0.008]	[0.008]	[0.007]	[0.006]	[0.009]
Supporter status						
Supporter of a club in the league	0.079***	0.026***	0.022**	0.054***	0.002	0.016**
	[0.006]	[0.006]	[0.010]	[0.005]	[0.005]	[0.007]
Supporter of a club in the game	0.078***	0.016	0.055*	0.067***	0.022***	0.030**
	[0.014]	[0.014]	[0.030]	[0.007]	[0.008]	[0.015]
Accessibility of leagues						
TV prog. includes league	0.060***	0.026***	0.021***	0.081***	0.011**	0.033***
	[0.006]	[0.006]	[0.008]	[0.005]	[0.004]	[0.006]
Socio-demographic characteristics						
Hispanophone	0.018**	-0.008	0.003	0.023***	0.005	-0.011
	[0.007]	[0.007]	[0.010]	[0.006]	[0.006]	[0.009]
European background	0.011	0.002	0.020	0.003	0.024***	0.021*
	[0.011]	[0.011]	[0.014]	[0.008]	[0.008]	[0.012]
White	-0.010	-0.024***	-0.033***	0.003	-0.021***	-0.017***
	[0.006]	[0.006]	[0.008]	[0.005]	[0.005]	[0.007]
Some college	-0.040***	-0.011	0.047***	-0.004	-0.005	0.018**
	[0.009]	[0.008]	[0.010]	[0.007]	[0.007]	[0.008]
College graduate	-0.030***	-0.011	0.034***	-0.012*	0.014**	0.003
	[0.009]	[0.008]	[0.011]	[0.007]	[0.006]	[0.008]
Unemployed	-0.010	-0.041***	0.028**	-0.035***	-0.003	-0.004
	[0.013]	[0.014]	[0.013]	[0.012]	[0.009]	[0.012]
Income 20K–49.9K	0.028**	0.004	0.027**	0.014	-0.002	-0.000
	[0.013]	[0.011]	[0.012]	[0.010]	[0.009]	[0.010]
Income 50K–74.9K	0.021	-0.010	0.042***	0.020*	-0.006	0.004
	[0.013]	[0.011]	[0.013]	[0.010]	[0.009]	[0.011]
Income 75K–99.9K	0.047***	-0.027**	0.022	0.014	-0.005	-0.008
	[0.014]	[0.012]	[0.014]	[0.011]	[0.010]	[0.012]
Income 100K–149.9K	0.043***	-0.010	0.033**	0.010	0.003	-0.015
	[0.014]	[0.012]	[0.015]	[0.011]	[0.009]	[0.012]
Income more than 150K	0.015	-0.018	0.020	0.001	-0.010	0.010
	[0.016]	[0.014]	[0.018]	[0.013]	[0.011]	[0.014]
Age [b]	-0.002***	-0.0004***	-0.0001	-0.002***	-0.001***	0.0003
	[0.0002]	[0.0002]	[0.0002]	[0.0001]	[0.0001]	[0.0002]
Male	0.025***	-0.004	0.021***	0.017***	0.012***	0.009*
	[0.005]	[0.005]	[0.006]	[0.004]	[0.004]	[0.005]
Married	0.003	0.018***	0.001	0.016***	0.017***	-0.008
	[0.007]	[0.006]	[0.007]	[0.005]	[0.005]	[0.006]
Household size	0.010***	0.002	-0.006**	0.010***	-0.000	-0.005**
	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.002]
Time zone						
Central	-0.001	-0.007	0.006	0.002	-0.001	-0.002
	[0.006]	[0.006]	[0.007]	[0.005]	[0.005]	[0.006]
Mountain	0.023**	-0.018	0.006	0.010	-0.003	-0.004
	[0.011]	[0.012]	[0.013]	[0.009]	[0.008]	[0.011]
Pacific/Alaska/Hawaii	-0.002	0.012*	0.008	-0.008	0.018***	0.019**
	[0.007]	[0.006]	[0.009]	[0.005]	[0.005]	[0.007]
MLS city residence						
Within a 50-mile radius	0.016***	0.003	-0.020***	0.012***	-0.001	-0.024***
	[0.005]	[0.005]	[0.007]	[0.004]	[0.004]	[0.005]
Perceived friendliness towards the USA						
Friendly	0.023***	0.001	0.006	-	-	-
	[0.007]	[0.006]	[0.007]	-	-	-
Game dummies	*included*	*included*	*included*	*included*	*included*	*included*
Observations	13,225	13,225	13,225	21,096	21,096	21,096

Notes: [a] The description of the variables is provided in Appendix A in Table A1. The marginal effects are calculated from the pooled multinomial logit models (Table A2: Cup finals; Table A3: League games). The robust standard errors are in square brackets. The significance levels are: * p ≤ 10%, ** p ≤ 5%, and *** p ≤ 1%; [b] These estimates report the instantaneous rate of change. The predictive margins are provided in Figure 3 (home win probability) and Figure 4 (age). *Abbreviations*: HLs ≡ only highlights; TD ≡ tape delayed.



Notes: [a] The average adjusted predictions are based on the pooled multinomial logit model estimates. CIs ≡ confidence intervals; [b] The choice of “home” teams in soccer cup finals is a formality, yet we account for the respondents’ “home” win perceptions to facilitate a more straightforward interpretation of the findings.

Figure 3. Predictive margins for win probabilities (95% CIs).[a]

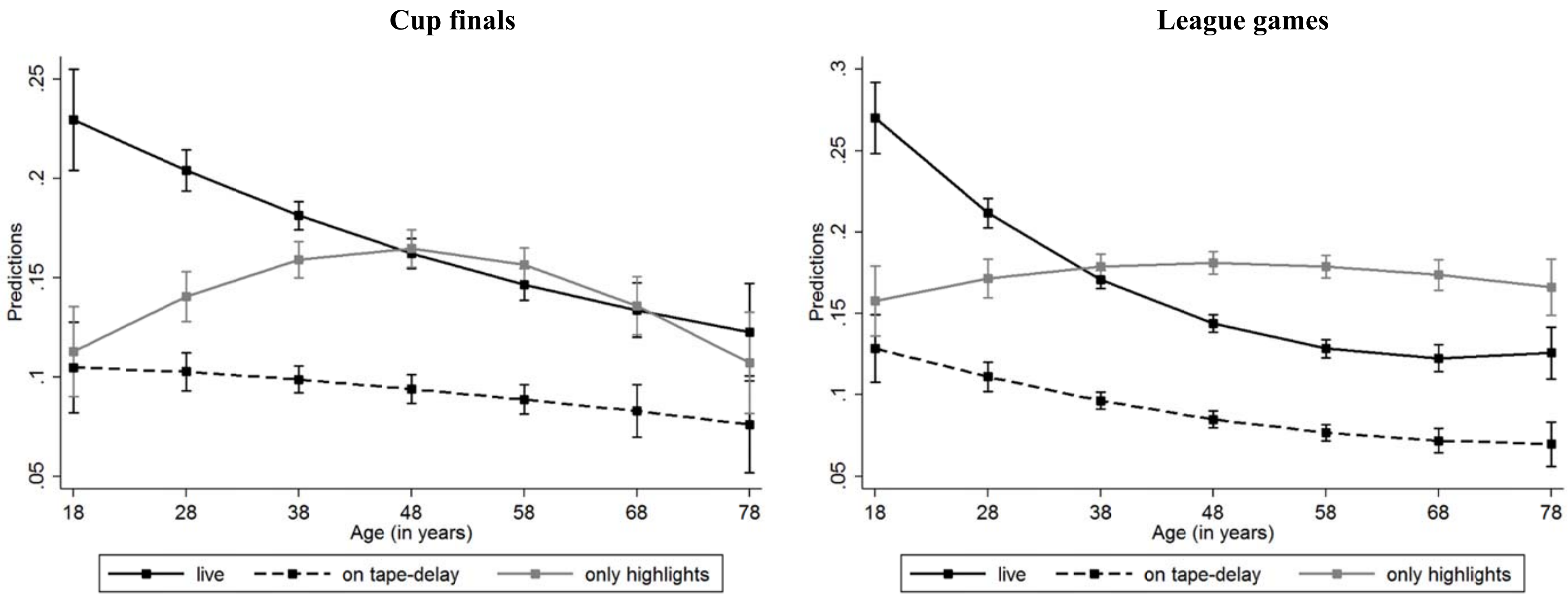
These findings are also robust to the original sample, that is, without quality threshold and consistency response corrections (see Figure B1 in Appendix B), and are accompanied by some expected signs for the control variables. As anticipated, a greater interest in the respective league and the inclusion of the league's telecasts in the respondent's programming increase the probability of watching the games live, on tape delay, or only their highlights. Moreover, being a supporter of a club in the respective league is positively associated with all three viewing alternatives for the cup finals and just with live and "only highlights" viewership for league games. Supporters of a club competing in the game concerned are positively associated with the likelihood of watching cup finals live or only their highlights. [18] For league games a positive association is further evident for tape-delayed viewership.

The AMEs of the socio-demographic variables show that Hispanophone consumers have a greater live viewership likelihood for both cup finals and league games. Having a European (emigrational) background is positively associated with the tape-delayed and "only-highlights" viewership of league games. White respondents are less likely to watch cup finals and league games on tape delay or only their highlights. Comparably highly educated individuals are in general less likely to watch both types of games live. However, they are positively associated with "only highlights" viewership for both types of games and with the tape-delayed viewership for league games. Unemployment is negatively associated with the live viewership of league games and tape-delayed viewership of cup finals. At the same time, it is positively related to the "only highlights" viewership of cup finals. Overall, the survey participants reporting relatively high household incomes are more likely to watch cup games live or only their highlights. Being male is positively associated with the likelihood of watching both types of games live or only their highlights. Moreover, males are positively related to the tape-delayed viewership of league games. Married respondents are more likely to watch live league games as well as tape-delayed broadcasts of both types of games. The larger the household size, the higher (lower) the likelihood of watching the league games and cup finals live (only highlights). As far as age is concerned, for cup finals the probability of

18. In line with Pawlowski et al. (2017) we could not find any moderating effect of supporter status by including interactions between supporter status (home and away team fans vs. neutral fans) and our game uncertainty measure in our models (results are available upon request).

live and tape-delayed viewership declines with increasing age, while the probability of watching only the highlights has an inverted u-shape, reaching each maximum at about the age of 48. For league games the findings point towards a threshold value of age at about 58 years, beyond which the probability of watching league games live and on tape delay (only highlights) no longer diminishes (rises) (see Figure 4).

The time zone dummies are neither jointly nor individually significant, with the exception of the respondents who stated that they reside in the Mountain and in the Pacific/Hawaii Standard Time region. These respondents (in contrast to the Eastern Standard Time respondents) are associated with a greater likelihood of viewing the cup finals live (Mountain Time region) and on tape delay (Pacific/Hawaii Standard Time region). Pacific/Hawaii Standard Time region residents are more likely to watch leagues on tape delay or to watch only their highlights. Respondents living within a 50-mile radius from a city hosting an MLS club are more (less) likely to watch both types of games live (only highlights). When the league that hosts (or competes in) the games is perceived as being “friendly” towards the US (in contrast to “less friendly”), there is a greater likelihood of live and “only highlights” viewership for both types of games. Finally, the dummies denoting each individual game under study are jointly significant.



Notes: [a] The average adjusted predictions are based on the pooled multinomial logit model estimates. CIs ≡ confidence intervals.

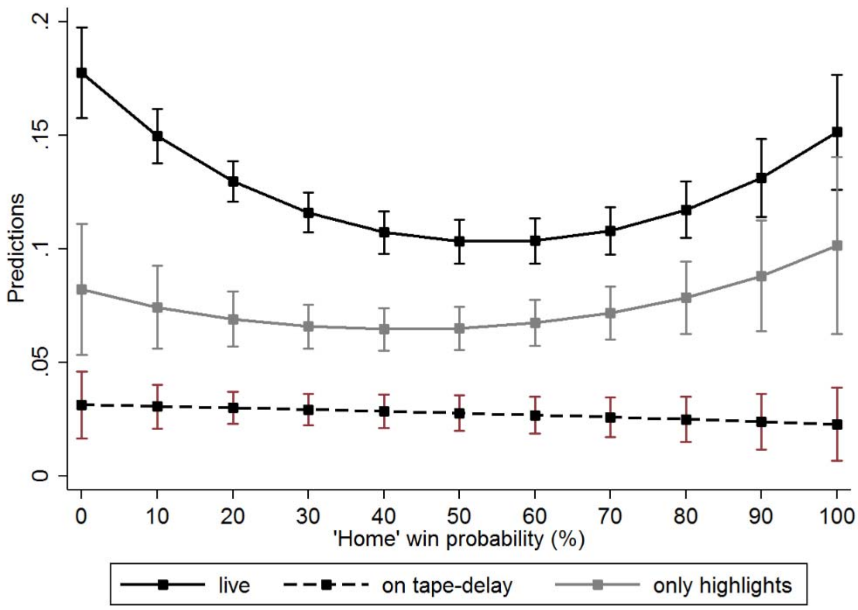
Figure 4. Predictive margins for age (95% CIs).[a]

Robustness Checks

To assess the robustness of our findings with regard to the impact of game uncertainty on the ITC for European soccer, we reran several regressions on specific subsamples.

First, to account for unobserved heterogeneity and to remove any potential common method bias (see Antonakis et al. 2010 and Pawlowski et al. 2017), MNL models with individual fixed effects (FEs) for both the cup finals and the league games were estimated. These models only use within-individual differences, discarding any information about differences between individuals. However, since the conditional likelihood estimators only make use of observations for which the dependent variable (i.e., ITC) varies, that is, individuals who did not state that they would watch all (or none) of the games in the same manner, the sample size of our FE models was reduced (cup finals: 1,280 respondents with 6,400 game observations; league games: 1,561 respondents with 12,488 game observations). To estimate the MNL models with FEs, the femlogit command was employed. The implementation of femlogit was introduced by Pforr (2014) and uses FEs as derived by Chamberlain (1980). Unfortunately, due to the lack of information on the distribution of the individual heterogeneity, the estimation of marginal effects (comparable to those of a simple MNL model) is not feasible (see Pforr 2014). Therefore, only coefficient estimates relevant to the base outcome for both types of games individually are reported. Despite this limitation, the comparison of the two models' coefficient estimates reveals no significant differences from our pooled models concerning the impact of game uncertainty on the viewing alternatives (see Table A2: Cup finals; Table A3: League games).

Second, a major limitation of survey data is that there could be a disparity between the respondents' statements and their actual behaviour; that is, there might be "liars" or "switchers" (see Pawlowski et al. 2017 as well as the general discussion in the "Measures" Section in this paper). To evaluate whether the impact of "home" win probabilities is moderated by the "accuracy" of the viewing statements, the panellists were asked in Survey 2 to state whether they had actually watched any of the European cup finals. Among those who participated in both surveys, approximately 64.5% of the "intended viewing" and "actual viewing" statements matched. Based on this subsample, the predictive margins of the game uncertainty measure were re-estimated. Our main findings remain, revealing a u-shaped relation between the perceived "home" win probabilities and the intention to watch a game live on TV (see Figure 5).



Notes: [a] The average adjusted predictions are based on pooled multinomial logit model estimates. CIs ≡ confidence intervals. The choice of "home" teams in cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings.

Figure 5. Predictive margins for win probabilities based on the subsample with "accurate" viewing statements (95% CIs).[a]

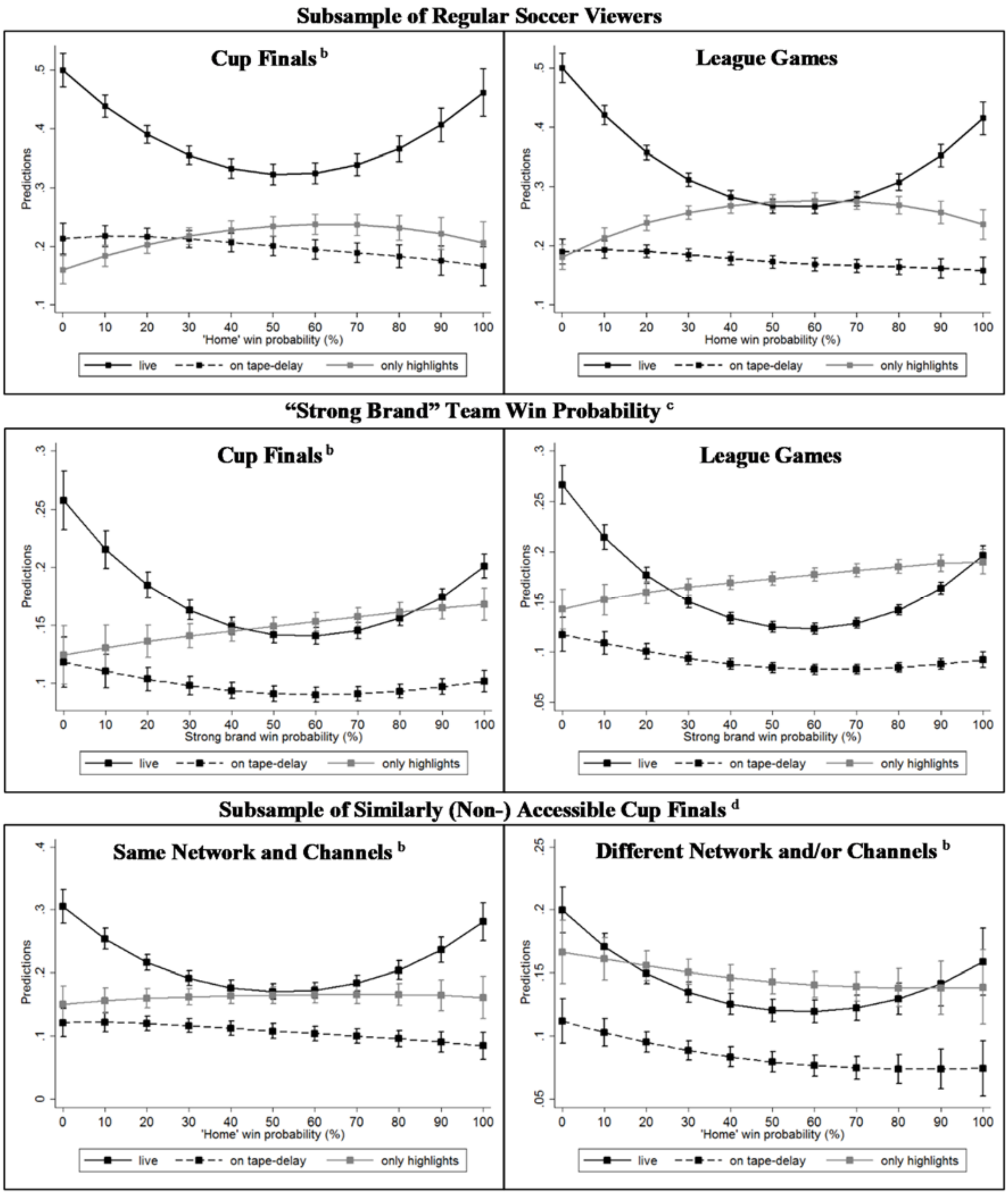
Third, we tested whether the relation between "home" win probabilities and viewing intentions is moderated by the frequency of consumption. The idea is that regular viewers' perceptions/evaluations may be more "reliable" than those whose average behaviour is not to watch any games. A similar ex post technique was implemented by Morgan and Whitehead (2015) to account for potential hypothetical bias in willingness-to-pay statements. In both surveys US respondents were asked (also) to state the number of (European) soccer games that they watch on a typical match day/week. The models were re-estimated excluding those who stated that they do not *regularly* watch league games live. Based on the subsample of regular soccer viewers, we re-estimated the impact of perceived game uncertainty on the ITC for cup finals and league games. Again our main findings remain, revealing a u-shaped relation between the perceived “home” win probabilities and the intention to watch a game live on TV (see Figure 6).

Fourth, since preferences of “neutral” fans for certain game outcomes might unfold from empathy such as cheering for the underdog (as discussed in Section II), we re-estimated our models by substituting subjective “home win” probabilities with the win probabilities of the team with the (relatively) stronger brand in the concerning game. In three out of five cases in the cup finals dataset and in four out seven cases in the league games dataset the team with the (relatively) stronger brand was the away team. The findings show that the u-shaped relation remains, indicating that both an expected loss and an expected win by the team with the (relatively) stronger brand generate a higher probability for live viewership (see Figure 6).

Fifth, since games are broadcasted on different networks and channels, the accessibility of games varies. To test whether this influences our results we re-estimated our models including only the FA Cup Final and the UEFA Champions League Final which were broadcasted by the same network and the same channel.[19] Still, however, the findings show that the u-shaped relation remains, indicating that the accessibility of a game is less likely to have affected our main findings with regard to the impact of game uncertainty (see Figure 6).

Summing up, regardless of the game’s constellation (cup final vs. league game), the estimation approach (pooled models vs. FE models), the “accuracy” of the viewing statements (degree of overlap between ex-ante intentions and ex-post statements to consume), the frequency of soccer consumption, the type of reference point (home vs. strong brand team win), and the accessibility of the games, our findings reveal that the relation between the perceived win probabilities and the probability of watching a game live is u-shaped, suggesting that US consumers’ preferences for game uncertainty are *also* dominated by loss aversion.

19. While league games of the Ligue 1, the La Liga and the Serie A were broadcasted by the same network, they were available on different channels. The same applies also for the DFB Cup Final and the Copa del Rey Final.



Notes: [a] The average adjusted predictions are based on pooled multinomial logit model estimates. CIs ≡ confidence intervals; [b] The choice of "home" teams in cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings; [c] The choice of "strong brands" is based on the rankings provided in Table 1. For the two MLS games, we chose as strong brands Los Angeles Galaxy and Chicago Fire, since these two teams are among the most popular MLS clubs (see Nalbantis and Pawlowski 2016); [d] Finals on the same network and channels are: the FA Cup Final and the UEFA Champions League Final. The finals on different networks and/or different channels are: the German DFB Cup Final, the Spanish Copa del Rey Final and the Coupe de France Final.

Figure 6. Robustness checks on the predictive margins for win probabilities (95% CIs).[a]

Discussion and conclusion

Despite the theoretical relevance of the UOH and its prominence as justification for regulations in sports leagues around the globe, studies analysing the impact of game uncertainty on sports demand have not been successful in establishing clear evidence showing whether fans indeed have a preference for tighter games. This has motivated further research suggesting behavioural anomalies such as loss aversion as possible explanations (the CHZ model by Coates et al. 2014). Reconsidering the empirical evidence on the relation between the expected game outcome and the demand for sports in the light of the CHZ model reveals an interesting pattern: While previous studies focusing on North American sports have regularly found support for the UOH, European studies have rarely shown that TV audiences increase the more uncertain a soccer game's outcome is. In contrast, most studies have suggested that European fans' preferences for game uncertainty are dominated by loss aversion.

The cause of these apparent cross-continental differences in the relevance of the UOH could be threefold. First, they may be ascribed to cross-cultural differences with regard to preferences for *loss aversion*, which indeed exist based on empirical evidence from more general settings. Second, they may be driven by *the type of sports* watched, since usually different sports apply different competition formats and rules, which in turn influence the degree of (game) uncertainty. Third, they may arise from differences in the *mode of consumption*, that is, the way in which sports are watched. Disentangling the impact and relevance of these channels is not possible with comparative study from *within-country* settings.

This paper is the first to test the CHZ model in a *between-country* setting with *individual-level data*, specifically the US demand for European soccer telecasts. Since secondary data have a number of serious drawbacks (e.g., a lack of informative individual-level data, traditional vs. online viewing, overlapping audiences), the analysis relied on survey data. Based on US respondents' stated intentions to watch European soccer games live, tape delayed, or only their highlights, we modelled *simultaneously* the respondents' intentions as a utility-maximizing choice and analysed the impact of their perceptions or expectations of the closeness of these games.

Overall, the econometric findings suggest that the probability of viewership is *not* maximized when the two teams have (perceived) equal chances of winning. Furthermore, they show that the impact of game uncertainty differs amongst the various viewing options. In detail US respondents' live viewing decisions display a *u-shaped* relationship with the perceived home win probability, while the probability of watching European soccer games on tape delay or just their highlights is *not* related to game uncertainty.

The herein reported lack of support for the UOH in the demand for televised soccer is in line with recent European studies utilizing both game-level data (e.g., Buraimo and Simmons 2015; Scelles 2017) and individual-level data (e.g., Pawlowski et al. 2017), though for the first time it is established in a between-country setting. On this basis we can conclude that that cross-continental differences can be attributed to the *type of sports* analysed rather than the differences in the degree of loss aversion. Moreover, we found some evidence that the *mode of consumption* is important in this regard, as the finding about the preferences for game uncertainty being dominated by loss aversion does not hold for tape-delayed or highlights viewing.

All in all, we found no cross-continental differences in the consumption behaviour when examining the *same* sport (here: soccer). In contrast, soccer fans' preferences seem to be quite similar (at least in Europe and North America), and it seems to be important to watch top clubs competing, while the possibility of witnessing an upset is also of some relevance. This finding is highly relevant from a managerial perspective, considering that nowadays – and due to the increasing relevance of international media revenues – league organizers need to configure a product that aligns with the demand of a *global* market. Since our analysis is focused on soccer only, however, it would be valuable in future studies to test this demand pattern also for Major League sports, such as American football or baseball, which is currently progressing within Europe in a between-country setting.

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Appendix A – Data and Models

Table A1. Description of the Variables

Variables	Type	Description
Viewing behaviour		
ITC	N	Intention to consume/watch the corresponding soccer game (0 if "not at all"; 1 if "live"; 2 if "tape delayed"; 3 if "only highlights")
Perceived home win probability		
Home win probability [a]	O	Perceived win probability of the "home" team: 11-point scale (0 ≡ Team A will definitely win … 10 ≡ Team B will definitely win)
Interest in soccer leagues		
Moderate league interest	D	Moderate interest in league *k*: 7-point scale (1 if value ≡ 4)
High league interest	D	High interest in league *k*: 7-point scale (1 if value ≥ 5)
Supporter status		
Supporter of a club in the league [b]	D	Supporter of a club in the league *k* (1 if "yes")
Supporter of a club in the game	D	Supporter of a club competing in game *g* (1 if "yes")
Accessibility of the leagues		
TV prog. includes league	D	Respondents' TV programming includes league *k* telecasts (1 if "yes")
Socio-demographic characteristics		
Hispanophone	D	Language at home apart from English (1 if "Spanish")
European background	D	European background (1 if "born in EUR" and/or is (was) "EUR citizen")
White	D	Racial background (1 if "white")
Some college	D	Highest educational level is some college/associate degree (1 if "yes")
College graduate	D	Highest educational level is college graduation or higher (1 if "yes")
Unemployed	D	Currently unemployed and/or seeking a job (1 if "yes")
Income 20K–49.9K	D	Gross household income between USD 20K and 49.9K (1 if "yes")
Income 50K–74.9K	D	Gross household income between USD 50K and 74.9K (1 if "yes")
Income 75K–99.9K	D	Gross household income between USD 75K and 99.9K (1 if "yes")
Income 100K–149.9K	D	Gross household income between USD 100K and 149.9K (1 if "yes")
Income more than 150K	D	Gross household income more than USD 150K (1 if "yes")
Age	M	Age (in years)
Male	D	Male (1 if "yes")
Married	D	Marital status (1 if "married")
Household size	M	Household size
Time zone		
Eastern	D	Residence in EST region (UTC - 5h) (1 if "yes")
Central	D	Residence in CST region (UTC - 6h) (1 if "yes")
Mountain	D	Residence in MST region (UTC - 7h) (1 if "yes")
Pacific/Alaska/Hawaii [c]	D	Residence in PST (UTC - 8h), AKST (UTC - 9h), or HST (UTC - 10h)
MLS city residence		
Within a 50-mile radius	D	Residence within a 50-mile radius of an MLS city (1 if "yes")
Perceived friendliness towards the USA		
Friendly [d]	D	Cup finals' country *k* is friendly towards the USA: 5-point scale (1 if value ≥ 4)

Notes: [a] The choice of "home" teams in cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings; [b] A dummy indicating fans of either the Italian Serie A or the Spanish La Liga was included for the UEFA Champions League Final; [c] The Pacific, Alaskan, and Hawaii Standard Time regions were merged, as fewer than 1% of the respondents reported residence in the Alaskan/Hawaiian Standard Time region; [d] For the UEFA Champions League Final, we considered the respondents' highest perceived level of friendliness towards either Italy (Juventus FC) or Spain (FC Barcelona). Since we also included MLS games in the league games model, this variable is excluded. *Abbreviations*: D ≡ dummy variable; K ≡ one thousand; M ≡ metric variable; MLS ≡ Major League Soccer; N ≡ nominal variable; O ≡ ordinal variable; USD ≡ United States dollars; UTC ≡ Coordinated Universal Time.

Table A2. Cup Finals – Multinomial Logit Models Estimates with the Base Category "Not at All".[a]

	Pooled model			Fixed-effects model		
	Live	TD	HLs	Live	TD	HLs
Perceived home win probability						
Home win probability	-0.592***	-0.378***	-0.217***	-0.646***	-0.567***	-0.397***
	[0.057]	[0.058]	[0.052]	[0.099]	[0.102]	[0.084]
Home win probability squared	0.052***	0.029***	0.017***	0.063***	0.053***	0.035***
	[0.006]	[0.006]	[0.005]	[0.010]	[0.010]	[0.008]
Interest in soccer leagues						
Moderate league interest	1.488***	1.844***	1.266***	1.202***	1.105***	0.706***
	[0.157]	[0.158]	[0.105]	[0.242]	[0.229]	[0.157]
High league interest	2.948***	2.812***	1.684***	2.021***	1.585***	0.933***
	[0.142]	[0.151]	[0.110]	[0.230]	[0.233]	[0.176]
Supporter status						
Supporter of a club in the league	1.557***	1.176***	0.714***	1.229***	0.895***	0.585***
	[0.127]	[0.136]	[0.125]	[0.188]	[0.191]	[0.177]
Supporter of a club in the game	1.637***	1.152***	1.005**	2.415***	1.816***	1.349***
	[0.378]	[0.390]	[0.399]	[0.477]	[0.488]	[0.469]
Accessibility of leagues						
TV prog. includes league	1.267***	1.032***	0.622***	0.626***	0.681***	0.373***
	[0.106]	[0.106]	[0.095]	[0.160]	[0.164]	[0.140]
Socio-demographic						
Hispanophone	0.235	0.009	0.076			
	[0.178]	[0.180]	[0.171]			
European background	0.286	0.213	0.262			
	[0.224]	[0.263]	[0.219]			
White	-0.512***	-0.653***	-0.493***			
	[0.138]	[0.146]	[0.125]			
Some college	-0.500***	-0.304	0.239			
	[0.180]	[0.189]	[0.154]			
College graduate	-0.408**	-0.282	0.150			
	[0.178]	[0.185]	[0.155]			
Unemployed	-0.357	-0.688**	0.053			
	[0.245]	[0.330]	[0.204]			
Income 20K–49.9K	0.600**	0.409	0.425**			
	[0.263]	[0.262]	[0.187]			
Income 50K–74.9K	0.455*	0.177	0.483**			
	[0.273]	[0.279]	[0.203]			
Income 75K–99.9K	0.632**	-0.012	0.325			
	[0.287]	[0.286]	[0.219]			
Income 100K–149.9K	0.755***	0.300	0.497**			
	[0.290]	[0.287]	[0.224]			
Income more than 150K	0.187	-0.115	0.196			
	[0.328]	[0.341]	[0.276]			
Age	-0.016	0.001	0.047*			
	[0.028]	[0.032]	[0.026]			
Age squared	-0.000	-0.000	-0.001**			
	[0.000]	[0.000]	[0.000]			
Male	0.467***	0.216*	0.312***			
	[0.109]	[0.114]	[0.094]			
Married	0.201	0.350**	0.107			
	[0.136]	[0.138]	[0.110]			
Household size	0.154***	0.093**	-0.002			
	[0.043]	[0.046]	[0.040]			

Table A2. [*Continued*]

	Pooled model			Fixed-effects model		
	Live	**TD**	**HLs**	**Live**	**TD**	**HLs**
Time zone						
Central	-0.050	-0.107	0.020			
	[0.131]	[0.140]	[0.111]			
Mountain	0.252	-0.111	0.090			
	[0.211]	[0.251]	[0.191]			
Pacific/Alaska/Hawaii	0.101	0.235	0.126			
	[0.144]	[0.151]	[0.131]			
MLS city residence						
Within a 50-mile radius	0.171	0.079	-0.121			
	[0.111]	[0.117]	[0.099]			
Perceived friendliness towards the USA						
Friendly	0.405***	0.222*	0.177**	0.221	0.023	0.011
	[0.112]	[0.116]	[0.087]	[0.170]	[0.170]	[0.137]
Cup final dummies						
DFB Cup	0.008	0.332***	0.046	-1.399***	-0.771***	-0.673***
	[0.095]	[0.101]	[0.072]	[0.172]	[0.173]	[0.140]
FA Cup	-0.435***	-0.089	-0.137*	-0.066	0.354**	0.179
	[0.097]	[0.099]	[0.074]	[0.161]	[0.166]	[0.138]
Copa del Rey	0.411***	0.379***	0.180***	-0.237	-0.226	-0.238*
	[0.090]	[0.096]	[0.066]	[0.152]	[0.161]	[0.130]
Coupe de France	-0.065	0.275***	0.077	-1.933***	-1.186***	-0.865***
	[0.098]	[0.104]	[0.071]	[0.182]	[0.180]	[0.142]
Constant	-2.349***	-2.714***	-2.934***			
	[0.709]	[0.724]	[0.625]			
Observations		13,225			6,400	
Clusters/IDs		2,645			1,280	
Pseudo R^2		0.304			0.226	
Log likelihood		-10,273.259			-2,368.615	

Notes: [a] The pooled models have been estimated with clustered errors by individuals. The standard errors are in square brackets. The significance levels are: * p ≤ 10%, ** p ≤ 5%, and *** p ≤ 1%. The reference category for the cup final dummies is the UEFA Champions League Final. *Abbreviations*: DFB ≡ German Football Association; FA ≡ The (English) Football Association; HLs ≡ only highlights; TD ≡ tape delayed; UEFA ≡ Union of European Football Associations.

Table A3. League Games – Multinomial Logit Models Estimates with the Base Category "Not at All".[a]

	Pooled model			Fixed-effects model		
	Live	**TD**	**HLs**	**Live**	**TD**	**HLs**
Perceived home win probability						
Home win probability	-0.706***	-0.437***	-0.239***	-0.838***	-0.600***	-0.459***
	[0.054]	[0.056]	[0.045]	[0.073]	[0.077]	[0.062]
Home win probability squared	0.063***	0.037***	0.023***	0.084***	0.063***	0.046***
	[0.005]	[0.005]	[0.004]	[0.007]	[0.007]	[0.006]
Interest in soccer leagues						
Moderate league interest	1.620***	1.676***	1.433***	1.111***	1.325***	1.161***
	[0.172]	[0.145]	[0.091]	[0.201]	[0.183]	[0.113]
High league interest	3.321***	2.880***	1.868***	2.277***	2.068***	1.530***
	[0.155]	[0.145]	[0.095]	[0.186]	[0.180]	[0.123]
Supporter status						
Supporter of a club in the league	0.962***	0.520***	0.422***	1.049***	0.535***	0.238**
	[0.095]	[0.101]	[0.088]	[0.124]	[0.127]	[0.107]
Supporter of a club in the game	1.382***	1.035***	0.703***	2.689***	2.138***	1.385***
	[0.162]	[0.177]	[0.162]	[0.220]	[0.228]	[0.212]
Accessibility of leagues						
TV prog. includes league	1.267***	1.032***	0.622***	0.626***	0.681***	0.373***
	[0.106]	[0.106]	[0.095]	[0.160]	[0.164]	[0.140]
Socio-demographic characteristics						
Hispanophone	0.357**	0.220	0.034			
	[0.167]	[0.182]	[0.161]			
European background	0.330	0.549**	0.315			
	[0.221]	[0.246]	[0.209]			
White	-0.192	-0.435***	-0.238**			
	[0.127]	[0.136]	[0.113]			
Some college	-0.018	-0.045	0.125			
	[0.161]	[0.168]	[0.131]			
College graduate	-0.069	0.180	0.033			
	[0.161]	[0.165]	[0.132]			
Unemployed	-0.602**	-0.331	-0.224			
	[0.290]	[0.238]	[0.205]			
Income 20K–49.9K	0.203	0.064	0.054			
	[0.233]	[0.242]	[0.172]			
Income 50K–74.9K	0.293	0.058	0.107			
	[0.237]	[0.245]	[0.179]			
Income 75K–99.9K	0.154	-0.013	-0.031			
	[0.253]	[0.268]	[0.193]			
Income 100K–149.9K	0.106	0.059	-0.081			
	[0.255]	[0.265]	[0.195]			
Income more than 150K	-0.004	-0.120	0.061			
	[0.302]	[0.313]	[0.227]			
Age	-0.116***	-0.082***	-0.028			
	[0.022]	[0.023]	[0.018]			
Age squared	0.001***	0.001**	0.000			
	[0.000]	[0.000]	[0.000]			
Male	0.403***	0.386***	0.218***			
	[0.099]	[0.108]	[0.083]			
Married	0.346***	0.400***	0.080			
	[0.130]	[0.131]	[0.100]			
Household size	0.130***	0.048	-0.002			
	[0.046]	[0.048]	[0.040]			

Table A3. [*Continued*]

	Pooled model			Fixed-effects model		
	Live	TD	HLs	Live	TD	HLs
Time zone						
Central	0.020	-0.006	-0.015			
	[0.117]	[0.120]	[0.098]			
Mountain	0.108	-0.006	-0.004			
	[0.214]	[0.233]	[0.191]			
Pacific/Hawaii/Alaska	0.099	0.341**	0.213*			
	[0.137]	[0.145]	[0.116]			
MLS city residence						
Within a 50-mile radius	0.063	-0.037	-0.179**			
	[0.103]	[0.107]	[0.086]			
League game dummies						
FCB vs. FCA	1.380***	1.148***	0.788***	0.373**	0.306*	0.215*
	[0.107]	[0.109]	[0.079]	[0.161]	[0.165]	[0.129]
EVE vs. CHE	0.682***	0.539***	0.456***	0.878***	0.832***	0.531***
	[0.092]	[0.102]	[0.070]	[0.143]	[0.150]	[0.116]
MUN vs. LIV	1.643***	1.143***	0.894***	2.276***	1.738***	1.360***
	[0.094]	[0.101]	[0.072]	[0.146]	[0.155]	[0.121]
ATL vs. BAR	1.309***	0.990***	0.744***	0.561***	0.384**	0.180
	[0.108]	[0.117]	[0.080]	[0.162]	[0.168]	[0.132]
PSG vs. FCGB	1.069***	0.925***	0.689***	-0.570***	-0.420**	-0.240*
	[0.111]	[0.116]	[0.079]	[0.178]	[0.176]	[0.136]
INT vs. MIL	1.116***	0.952***	0.750***	0.209	0.252	0.197
	[0.105]	[0.113]	[0.078]	[0.165]	[0.167]	[0.131]
NY vs. CHI	0.520***	0.360***	0.337***	1.084***	0.871***	0.693***
	[0.074]	[0.087]	[0.062]	[0.135]	[0.144]	[0.111]
Constant	-1.357**	-1.599**	-1.539***			
	[0.607]	[0.643]	[0.512]			
Observations		21,096			12,488	
Clusters/IDs		2,637			1,561	
Pseudo R^2		0.294			0.230	
Log likelihood		-16,642.063			-5,306.435	

Notes: [a] The pooled models have been estimated with clustered errors by individuals. The standard errors are in square brackets. The significance levels are: * p ≤ 10%, ** p ≤ 5%, and *** p ≤ 1%. The reference category for league game dummies is the MLS game of LA vs. MTL. *Abbreviations*: ATL ≡ Club Atlético de Madrid; BAR ≡ FC Barcelona; CHE ≡ Chelsea FC; CHI ≡ Chicago Fire; EVE ≡ Everton FC; FCA ≡ FC Augsburg; FCB ≡ FC Bayern Munich; FCGB ≡ FC Girondins de Bordeaux; HLs ≡ only highlights; INT ≡ Internazionale Milano; LA ≡ Los Angeles Galaxy; LIV ≡ Liverpool FC; MIL ≡ AC Milan; MTL ≡ Montreal Impact; MUN ≡ Manchester United FC; NY ≡ New York Red Bulls; PSG ≡ Paris St.-Germain FC; TD ≡ tape delayed.

Appendix B: Data Quality and Consistency Corrections

General Information

The surveys were designed and administered by Questback, which is a global leader in enterprise feedback management software. The respondents were recruited randomly via an automated fielding process from a US-wide representative online panel provided by Lightspeed GMI, which is one of the largest online sample providers in the world. For Survey 1 the panel provider distributed 6,590 invitations and around 47% (3,085) of the respondents successfully took part in the questionnaire (i.e., completed the survey), whereas 45% were screened out as they indicated "no interest" in soccer and 8% did not start the survey at all. For Survey 2 the panel provider distributed 5,805 invitations and around 54% (3,152) of the respondents completed the survey, whereas 36% were screened out as they indicated "no interest" in soccer and 9% did not start the survey at all.

Data Quality

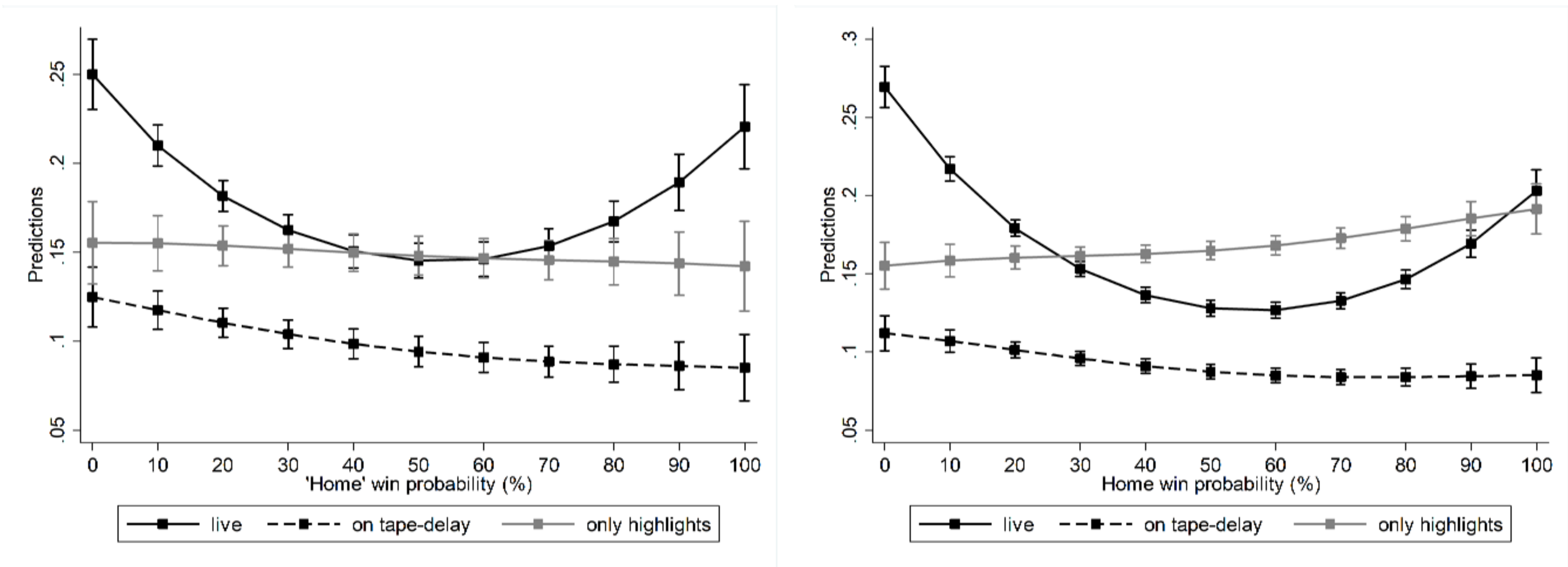
Questback offers a quality correction add-on to identify and remove survey speedsters, namely respondents who rush through the survey without paying particular attention to the questions that they answer. In detail this feature allows the estimation of an individual quality variable based on the time that each participant needed to complete a particular page of the survey in relation to the average processing time of the entire sample for this page. For our estimations and following Questback's recommendation, we set a quality threshold, which allowed us to include in our estimations those respondents who needed at least more than half as long as the average processing time (per page). After deleting all the prospective speedsters, the sample amounted to 2,717 (2,699) respondents in Survey 1 (Survey 2).

Consistency Response Corrections

After utilizing the quality threshold, the panellists (i.e., those who participated in both surveys) amounted to 1,386. Taking advantage of the fact that approximately 50% of the total sample (used in this paper) consists of panellists and to enhance the quality of the survey data further, we checked whether the panellists' responses were consistent with regard to age and gender in both waves. In general any inconsistency among panellists can be attributed either (i) to wrong statements or (ii) to the fact that they may belong to the same household (i.e., they are different persons whose responses must then be considered to be truthful and accurate). To determine the cause of such inconsistencies, we examined whether "switchers" differed (apart from age and gender) in more than 1 characteristic (i.e., education, occupation, income, marital status, household size, US citizenship status). Those who differed in more than 1 characteristic apart from gender were awarded a new ID (17 cases), as this inconsistency may be attributed to the participation in the survey of different members of the same household. The respondents who differed just in gender were awarded a missing value for gender, as we are fairly confident that in these cases the inconsistent statement can be attributed to a mistype (3 cases). Concerning age, those who differed in more than 1 characteristic apart from age were awarded a missing value for age (72 cases). The respondents whose response inconsistency concerned just the age statement were awarded the mean age based on both surveys' statements, as this inconsistency may be attributed to a mistype (43 cases). Overall, after the further exclusion of missing responses, the final sample utilized in our estimations amounted to 2,645 (2,637) respondents for Survey 1 (Survey 2).

To examine whether our findings remain robust regardless of the quality and consistency corrections, we re-estimated our models with the original (i.e., uncorrected) sample. Figure B1 reports the findings with regard to the impact of game uncertainty on respondents' viewing intentions, indicating that our main findings are unaffected by these corrections (the full set of results is available on request).

Cup finals [b] **League games**



Notes: [a] Predictive margins are based on pooled multinomial logit model estimates without consistency and quality corrections (cup finals: 15,290 respondent-game observations; league games: 25,112 respondent-game observations). Details of the consistency and quality correction procedure are provided in Appendix B. CIs ≡ confidence intervals; [b] The choice of "home" teams in cup finals is a formality, yet we account for the respondents' "home" win perceptions to facilitate a more straightforward interpretation of the findings.

Figure B1. Predictive margins for win probabilities (95% CIs) without consistency and quality corrections.[a]

Representativeness of the Survey's Sample

Regarding the generalizability of the results and the representativeness of the survey's sample, rough comparisons suggest that it is representative of the US population with a general interest in sports and in soccer. In detail, by comparing the sample with a survey conducted by Upshot in cooperation with YouGov on behalf of the *New York Times* (2014),[20] it became apparent that the portions of the soccer-interested US population are very much alike (Table B1).

Table B1. Soccer Interest in the US – A Comparison Between Different Studies.

US population		**NY Times survey** [a]	**Cup finals sample** [b]	**League games sample** [b]
Soccer interest		**%**	**%**	**%**
	Very	11	12	13
	Somewhat	11	14	19
	Slightly	18	21	24
	Not at all	60	53	44

Notes: [a] Survey conducted by Upshot in cooperation with YouGov on behalf of the *New York Times* (2014); [b] The "not at all" figure is based on the survey's screen-out statistics.

Moreover, the distribution of several socio-demographic characteristics of the survey data was compared with that of an independent research conducted by Scarborough USA (SBD 2010) for fans of popular North American sports leagues.[21] What becomes apparent is that generally the socio-demographic characteristics between the various sports differ, however, relative comparisons between our sample of European soccer fans and that of Scarborough USA unveil a similar pattern, with individuals in our sample being on average slightly more affluent than that of the Scarborough survey (Table B2).

20. The data were collected between 19 May and 2 June 2014 via online surveys of 1,197 US residents. Quotas were employed to generate a sample that is representative of the total population with regard to age, gender, race, education, and Internet usage.
21. The survey was conducted in 2009 using computer-assisted telephone interviews among 218,313 individuals aged 18 years and over in the US. The data were weighted for geography, age within gender, household size, education, race, and Hispanic ethnicity (where applicable).

Table B2. Characteristics of North American Sports Fans – A Comparison Between Different Sports.[a]

US fans of…	MLB	MLS	NASCAR	NBA	NFL	NHL	EUR soccer (cup finals) [b]	EUR soccer (league games) [b]
Gender	%	%	%	%	%	%	%	%
Men	59	60	63	60	59	64	60	64
Women	41	40	37	40	41	36	40	36
Age								
Age 18-34	28	38	29	32	30	33	34	31
Age 35-49	29	32	30	29	29	32	35	32
Age 50 or older	43	30	41	39	41	34	31	36
Race / Ethnicity [c]								
White	85	82	86	78	83	86	76	84
Black	10	11	10	16	12	9	8	8
Hispanic	12	23	9	14	11	9	10	17
Household income								
Less than $25K	11	11	13	12	11	9	10	9
$25-$35K	11	11	12	11	11	9	8	8
$35-$50K	18	17	20	18	18	17	12	11
$50-$75K	18	17	19	18	18	19	22	24
More than $75K	42	44	36	41	41	47	48	48

Notes: [a] Demographics for the fans of MLB (Major League Baseball), MLS (Major League Soccer), NASCAR (National Association for Stock Car Auto Racing), NBA (National Basketball Association), NFL (National Football League) and NHL (National Hockey League) are based on a survey conducted by Scarborough USA+ 2009 (SBD 2010). As "fans" Scarborough defines those adults who watched one broadcast of the concerning sport during the past year; [b] In our sample we define as European (EUR) soccer fans those who stated in our surveys to be a fan of a club competing in the German Bundesliga, the English Premier League, the Italian Serie A, the Spanish La Liga and/or in the French Ligue 1; [c] Note that the elicitation design used for race/ethnicity in the league games' survey corresponds to the elicitation design used by Scarborough, that is two separate questions. In the cup finals there was a combined race and ethnicity question.

Finally, several characteristics of the sample were compared with the US Census data (2012) to obtain a better overview of whether soccer-interested respondents differ from the general population (Table B3). Rough comparisons suggest that no substantial deviations exist between the two groups. One exception is the annual gross household income, with the survey's respondents stating on average a higher income than the general US population. However, as shown in Table B2, sports fans in the US are be more likely to have a higher income than the average American household; therefore, the deviation from the US Census data in this regard seems to be plausible.

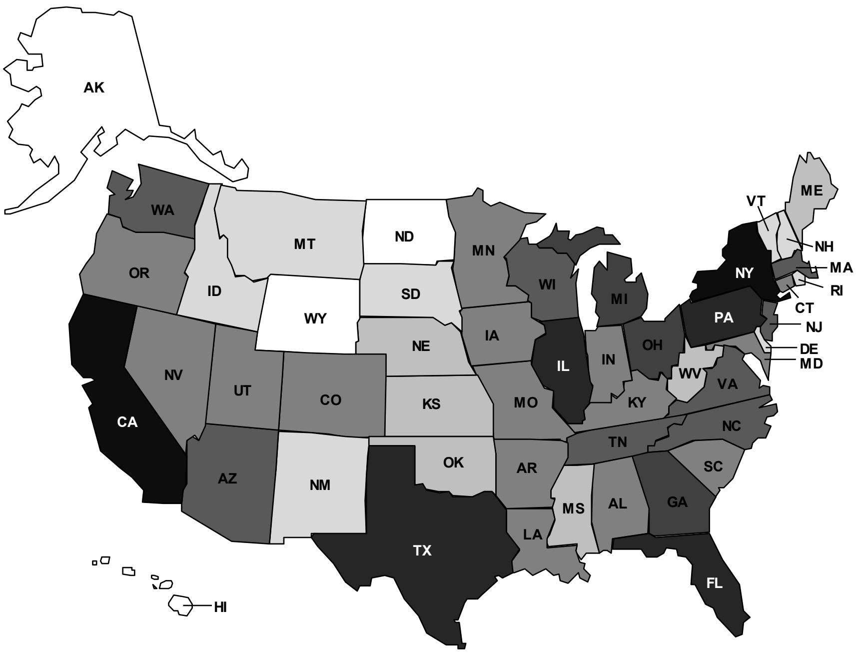
Table B3. Individual Characteristics – A Comparison Between the Sample and US Census Data.

	US Census survey [a]	Cup finals sample	League games sample
Employment status	%	%	%
Employed [b]	91.6	90.9	91.2
Unemployed [b]	8.4	9.1	8.8
Language			
Hispanophone	12.2	11.3	10.3
Income [c]			
Less than $19.9K	19.1	10.6	8.8
$20K–$49.9K	30.7	27.8	27.8
$50K–74.9K	17.6	23.0	24.2
$75K–99.9K	11.5	15.4	15.6
100K and over	21.1	23.3	23.9
Household size			
Average number of members	2.6	2.7	2.6
Geographical distribution			
Eastern Time region	47	51.2	51.0
Central Time region	32.9	26.0	26.2
Mountain Time region	5.4	6.2	5.5
Pacific/Alaskan/Hawaii Time region [d]	14.7	16.7	17.3

Notes: [a] Including armed forces living off post or with their families on post; [b] Percentage based on persons in the civilian labour force. For the survey, all are defined as civilian labour except for homemakers, students, retired people, and disabled people; [c] Households in which at least one member is related to the person who owns or rents the occupied housing unit; [d] In the cup finals' sample, there are no respondents living in the Alaskan Standard Time region.

Apart from that, the geographical distribution of the survey's respondents based on the time zone regions, as well as on the state level (see Figure B2), is very much like the overall distribution of the US population. Summing up, even though the possibilities to assess the survey's sample are somewhat limited, there is no clear evidence of over- or underrepresentation of a specific type of soccer-interested individuals in our data.

Sample



US General Population

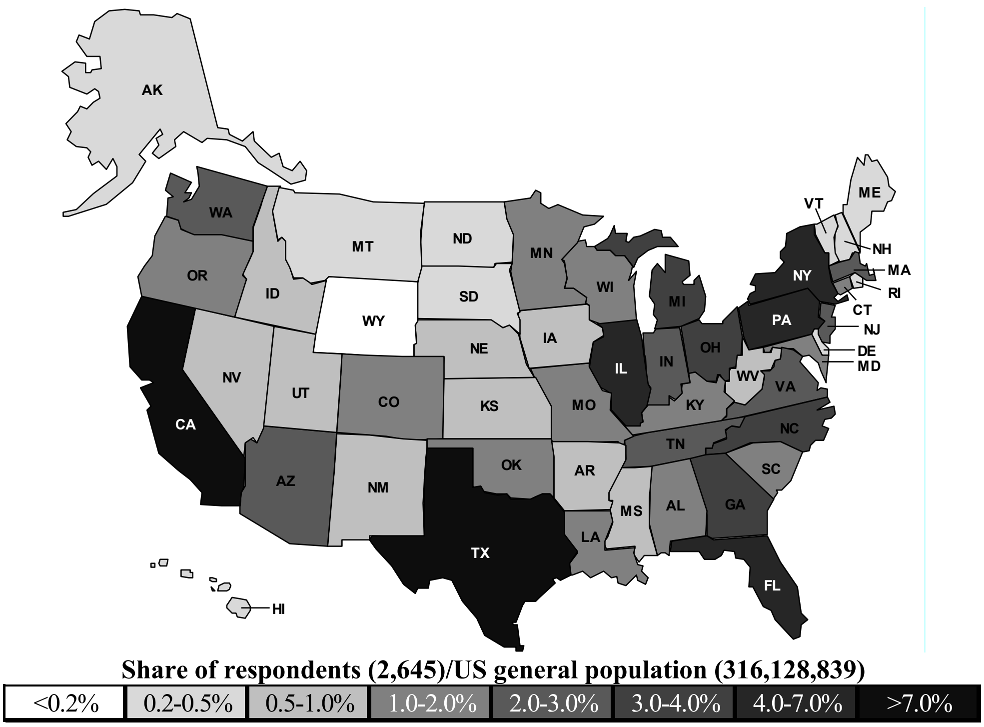


Figure B2. Geographical distribution – A comparison between the sample and the US general population

6 Discussion

The previous chapter presented the empirical studies which deliver fruitful insights on the relation between perceived game uncertainty/ suspense and the demand for sports. What follows is a discussion of the central findings and their theoretical implications (section 6.1). Subsequently, managerial implications are provided (section 6.2), followed by a discussion of the limitations of the studies presented and avenues for future research (section 6.3).

6.1 Central findings and theoretical implications

To deepen our understanding of how consumer perceptions of uncertainty unfold and how these are related to their choices, all three studies drew on survey data. The unique data (in particular in Study 2 and Study 3) allowed the testing of various assumptions (e.g., common-method bias, divergence between ex ante intentions and ex post statements to consume), which have usually been found to be problematic when employing a stated preference approach. It was possible to demonstrate both theoretically and empirically that many of these issues are manageable as long as the elicitation design is carefully designed. All in all, the survey designs guaranteed that the data generated would not only yield valid and reliable results, but also – and most importantly – results comparable with studies using game-level data. What follows is the discussion of these findings, as well as their theoretical implications, focusing on the empirical evidence with regard to perceived game suspense (section 6.1.1) and perceived game uncertainty (section 6.1.2).

6.1.1 Perceived game suspense

Using WTP scenarios much more concrete, accurate and easier for fans to evaluate than the previous PCB literature, Study 1 related for the first time consumers' perceptions of suspense with the demand for single games. The results showed that the greater the perceived suspense of a game and/or the league, the higher the fans' WTP for a ticket. A similar positive impact was also confirmed by Study 2 with regard to TV viewership, i.e. perceived game suspense was found to be positively related with a higher likelihood of live viewership. What follows is a discussion with regard to: (i) how game suspense is associated with various game characteristics; (ii) the relation between perceived game suspense and game uncertainty; (iii) the presence of threshold effects; (iv) the moderating role of supporter status.

Game characteristics: While both studies seem in accordance concerning the positive impact of perceived game suspense on sports demand, a major shortcoming of Study 1 was that it could not shed light on what game suspense really means as it contained data just from one game. Since Study 2 had information on 18 different games, it could relate suspense to different game characteristics in order to provide some insights into what fans understand under high or low suspensefulness. In this regard, simple correlations with secondary data revealed that feelings of suspense in relation to a given game are more likely to be associated with the game's relevance regarding the championship contention and with the quality and brand strength of the contestants.[1] Interestingly, econometric findings could provide some further evidence on the relation between game suspense and seasonal uncertainty, as they showed that the impact of game suspense on demand is larger at the end of the season than at the beginning of the season. This finding is in line with studies using game-level data (e.g., Scelles, 2017) and can be explained by the fact that in the last stages of the season, the competition intensity / match relevance increases as more is at stake.

Perceived game suspense vs. game uncertainty: At the same time, the demand models in Study 2 revealed that the concepts of perceived game suspense and perceived game uncertainty are quite *distinct* from each other. This suggests that the findings from Study 1 are more likely to depict seasonal uncertainty (i.e., mid-term CB) and contestants' quality, rather than short-term CB as argued. Distinguishing perceived suspense from the perceived closeness of a game is of important theoretical relevance as it suggests that a sporting event, even when both contestants are of equal strength, is not sufficient to generate feelings of suspense unless the consequences of the event's outcome are compelling in the course of achieving a particular milestone (e.g. winning the

1. The fact that it is not only uncertainty that is depicted by the measurement of game suspense is in line with Pawlowski (2013a, 2013b), who suggested that the league-wide PCB measure reflects more than just CB.

championship, securing a spot in continental competitions). This is in line with psychological research on emotions, which states that uncertainty concerning the outcome of a particular event does not always engender suspense and that it is the appraisal (i.e., [un]desirability) of the prospective event's consequences and the emotions they generate that are suspense-inducing (see Ortony, Clore, & Collings, 1988). This finding also provides some further insights into the "attention-level effects" elaborated by Pawlowski and Budzinski (2014, 2017). The fact that the PCB literature finds a divergence between perceived league suspense and the objective measures of long-term CB, while on the other hand evidencing a convergence between suspense and mid-term CB measures, may exactly rest on the aforementioned underlying mechanisms of suspense generation.[2] In this regard – and complementing the PCB literature – Study 2 showed that perceptions not only of league-wide suspense but also of single game suspense are more likely to be driven by seasonal uncertainty.

Threshold effects: It should be noted that the finding of Study 1 that demand increases only to a certain level, after which the degree of increase in suspense has no additional impact, could not be validated for TV viewership. The lack of reproducibility of such discontinuity, a "saturation point" or "satisficing" threshold, in Study 2 could simply be ascribed to the fact that the two studies used different proxies for demand and that such effects might arise only in the context of WTP scenarios for ticket purchases. This is quite possible as similar effects also arose in a similar context as reported by the previous PCB literature (e.g., Pawlowski & Budzinski, 2013). However, since perceived game suspense seems to be related to various game characteristics (e.g., match relevance and brand strength) it may also be that the threshold effects in Study 1 unfolded only in the particular circumstances of this game. In addition, it should be noted that for season ticket holders and those who had already purchased tickets, Study 1 could not find discontinuity. Determining whether, in what context and at what magnitude discontinuity, a "saturation point" or "satisficing" threshold emerges in stadium attendance is the task of future research.

2. In later project Nalbantis and Pawlowski (2016) asked the fans directly how *balanced* the respective leagues are on a scale of 0–10 (0≡extremely unbalanced...10≡extremely balanced). Their findings indicated that fans' perceptions of balance or more likely to be shaped by both static and dynamic components of long-term CB. However, again a divergence between OCB and PCB was present.

Supporter status: Another central finding concerning the impact of perceived game suspense on sports demand is that the fans' degree of involvement with the club seems to affect the influence of suspense on demand; however, this is only the case as far as very specific fan types are concerned and only in particular situations. Against this background, Study 1 found that for club members the impact of game suspense on WTP is greater at specific (high) suspense levels than for non-members. However taking a look at those club members neither attending nor holding season tickets, no moderating effects could be found. Similarly, Study 2 did not find a moderating effect of being a home, away or "neutral" fan on the impact of perceived game suspense on TV demand. However, it was found that (as anticipated) home and away fans perceived on average the games to be greater in terms of suspense than "neutral" fans. These findings reveal that while the anticipation of suspense in a game depends on the affective/emotional dispositions of the fans with the teams (see Zillmann et al., 1989), the impact of perceived game suspense on sports demand *per se* remains largely unaffected.

Finally, it should be noted that Study 3 did not include the measure of perceived game suspense. The reasons were threefold. First and foremost, the aim of Study 3 was to test the fans' preferences for game uncertainty. As shown in Study 2, game suspense unfolds as distinct from the perceptions of a game's closeness. Second, Study 2 showed that suspense is related to the quality of the contestants as well as seasonal uncertainty. In Study 3, the data contained information on cup finals; as such, all games were equally relevant. Moreover, it included league games at the very beginning of the season, when seasonal uncertainty is at its lowest. Third, the selection of league games in Study 3 was based on the (high) quality and (high) popularity of the competing teams. For all these reasons, including suspense in Study 3 would only have served as a further control variable to increase the explanatory power of the econometric models. Due to financial, time and capacity constraints, it was necessary to refrain from doing so.

6.1.2 Perceived game uncertainty

Study 2 introduced for the first time a measure of perceived game uncertainty based on fans' expectations of the win probabilities of the competing teams. An interesting aspect of this measure is that it depicts pretty accurately fans' perceptions of the prospective closeness of a game. Herein – and based on the sample of Study 2 – it was possible to show that the vast majority of the respondents who indicated a .5 win probability in a game anticipated that this game would either end in a tie or that its final outcome would be decided by just a one-goal margin. Study 3 adopted this measure of game uncertainty and – together with Study 2 – was able to show that on average, fans' perceptions of the winning probabilities of the home teams were quite similar to those derived by the bookmakers. This finding shows that the measure and consequently the findings of Study 2 and Study 3 are comparable with studies using betting odds and secondary data. Moreover, it provides some evidence that win probabilities derived from betting odds can indeed provide an *average* picture concerning how close the fans perceive a game to be, supporting the assumption of the CHZ model. Nevertheless, they also reveal that fans' perceptions of the closeness of a game are highly *idiosyncratic* as the standard deviation of home win probability statements was fairly high (between .25 to .27 from the average).

By controlling for this heterogeneity for the first time, Study 2 and Study 3 showed that the relation between perceived home win probabilities and live viewership is u-shaped. Fans seem to prefer watching a game in which either the home or away team have higher chances of winning, rather than a game in which both contestants have equal winning opportunities. Indeed, the probability of viewership reaches its minimum at around .5. The relation thus ascertained points to the presence of fans with reference-dependent preferences and the fact that game uncertainty preferences are *dominated* by loss aversion. While this does not entirely reject the existence of preferences for game uncertainty, it demonstrates that compared to loss aversion and preferences for games involving favourites, game uncertainty is the *least important* determinant of fans' consumption behaviour (Humphreys & Zhou, 2015). The lack of support for the UOH demonstrated herein is in line with recent soccer studies using game-level data (e.g., Buraimo & Simmons, 2015; Scelles, 2017), suggesting that discriminating between and within individuals choices and controlling for individual specific heterogeneity does not affect the dominant role of loss aversion in fans' preferences and the established notion that soccer fans do not value game uncertainty. What follows is a discussion concerning: (i) the role of supporter status, consumption experience and the notion of "pure neutrality" in the demand for televised sports; (ii) the manifestation of reference-dependent preferences and loss aversion in between-country settings and the role of the type of sports in this regard; (iii) the relevance of the type of games and consumption modes.

Supporter status, "pure neutrality" and experience with soccer: In Study 2 and Study 3, the "neutral" fans accounted for approximately 90% of the live viewership audience. This is consistent with the belief that the majority of the TV audience consists of "neutral" fans. However, in line with some prior initial empirical evidence (Tainsky et al., 2014), both studies found no proof of "pure neutrality" as set out by Coates et al. (2014). In contrast, both studies point to the vast majority of "neutral" fans forming a reference point, as well as that some sort of expectations about wins and gains being formed. This is based on the fact that instead of an insignificant relation between game uncertainty and sports demand for "neutral" fans both studies, whilst controlling for individual heterogeneity, report a u-shaped relation *independent* of supporter status. Against this background, in Study 3 it was further possible to show that the type of reference point does not affect the relation between the perceived win probabilities and the probability of watching a game live. In detail, taking into account the fact that "neutral" fans' preferences for game outcomes might unfold from empathy (see Zillmann, 1991) for relatively less strong brands, models depicting the winning probability of the relatively stronger brand in the respective games showed the same u-shaped relation. Finally, both studies provided empirical evidence that the dominant role of loss aversion in fans' preferences not only arises regardless of their supporter status, but also regardless of their level of interest in the league (Study 2) and their frequency of soccer consumption (Study 3). Given that the level of interest in soccer leagues and the frequency of soccer consumption convey (to a certain degree) the fans' level of experience with the product, these results – in line with those of Pope et al. (2011) and Allen et al. (2017) – suggest that the experience spectrum does not affect the manifestation of reference-dependent preferences.

Between-country settings and the type of sports: This finding is also consistent in a between-country setting (Study 3). As such , it seems that the opposing findings between North American (for the UOH) and European TV demand studies (against the UOH), cannot be attributed to cross-cultural variations in loss aversion. This could signal that the apparent differences (on average) in degrees of loss aversion between European and North American individuals (e.g., Vieider et al., 2014; Wang et al., 2016), are not so great that they would reveal systematic differences in sports-related consumption behaviour. In contrast, it seems to be rather the type of sports which triggers (or not) the dominant role of loss aversion in the fans' preferences. This could be attributed to the way in which the different sports are regulated. Typically, in soccer a loss bears direct financial consequences due to presence of performance-based allocation schemes.[3] Such losses of income translate into limited spending for talent/quality over the medium- and long-term, which in turn leads to inferior performance (see Hall, Szymanski, & Zimbalist, 2002), fuelling a vicious cycle. Soccer fans could be aware of these consequences. Therefore, loss aversion in soccer could unfold not only with regard to the expected outcome of a single game, but also due to its arguable influence on expected gains or losses of talent/quality and thus performance over the medium- and long-term. On the other hand, in North American sports (e.g., baseball, basketball, football), a loss is less consequential – at least financially – given the equal allocation of revenues, the absence of a promotion/relegation system and the presence of regulations such as the draft lottery system, which favours less successful teams in the allocation of playing talent.[4] Moreover, it is well documented in the literature that emotion plays an integral role in loss aversion (De Martino et al., 2010) and it may be that the way in which fans express and regulate emotions with regard to the outcome of a game (see Bizman & Yinon, 2002) depends on the sport they are watching. Some indications of this could be drawn from behavioural economic research on investor sentiment. In this regard, scholars focusing on sports sentiment and stock returns have shown that losses in international soccer games

3. For a discussion of the revenue allocation schemes in European soccer and North American Major Leagues see Budzinski and Müller-Kock (2017).

4 On the question of why do then North American fans exhibit loss aversion when attending sports events and not when it comes to televised (North American) sports, Coates et al. (2014, p. 972) posit that "the costs of attending a game are larger, and the consequences of attending a game with an outcome that differs from the reference point are very different from the consequences of watching a game on television that turns out to have an outcome different from the reference point". This, however, requires further exanimation.

have a greater (negative) effect on the losing country's stock market than losses in international cricket, rugby and basketball games (Edmans et al., 2007). To sum up, the findings in Study 3 provide some first evidence that loss aversion arguably has a greater impact on soccer TV viewers' preferences than on viewers of the Big 4 Major Leagues (i.e., MLB, NBA, NFL, NHL). While this could be possibly related to the different emotions and consequences a loss can generate in these sports, more research is required to reach safe conclusions.

The type of games and consumption modes: Concerning the type of the game and how this affects consumers' preferences for game uncertainty, it should be noted that not only pooled models but also separate regressions for each individual game reveal the same u-shaped relation between win probabilities and live viewership in Study 2 and Study 3. This signifies – in line with Coates et al. (2014) and Humphreys and Zhou (2015) – that regardless of whether a game contains a traditional rivalry and/or high quality contestants (e.g., FC Bayern Munich vs. BvB Dortmund) or less popular clubs (e.g., SC Paderborn vs. Hertha Berlin) the dominant role of loss aversion in the fans' preferences remains. The same is also evident when distinguishing between the viewing behaviour for cup finals and league games. Despite the fact that the characteristics of these two types of games differ significantly, fans' preferences remain the same. Similarly, and in contrast to findings showing otherwise (e.g., Forrest et al., 2005; García & Rodríguez, 2006), the point of the season (first matchdays vs. last matchdays), as well as the accessibility of the games do not seem to alter the conclusions concerning the relevance of the UOH. With regard to the consumption modes, Study 3 showed that in contrast to live viewership, and in line with some prior initial evidence (e.g., Dietl et al., 2009), tape-delayed or highlights viewership is *not* related to game uncertainty, suggesting that the mode of consumption does indeed play an important role. The fact that the fans will be most likely aware of the game's final outcome before watching its highlights or tape-delayed broadcast arguably mitigates the manifestation of loss aversion in this context.

6.2 Managerial implications

The findings presented herein with regard to perceived game suspense and game uncertainty offer valuable insights for league organisers, broadcast networks and club managers.

Perceived game suspense: The implications that can be derived from the findings with regard to perceived game suspense are threefold. First, league organisers are advised to ensure a certain level of seasonal uncertainty in their competitions. This could be done by adopting a more balanced allocation of media revenues. In this regard, it is not surprising that among the TOP 5 leagues, the English Premier League has currently the highest degree of seasonal uncertainty. In the season 2016–17 the first-to-last ratio in the distribution of media revenues was 1.6:1 in the Premier League, but much lower in the German Bundesliga (3.2:1), Spanish La Liga (3.7:1), French Ligue 1 (3.4:1) and Italian Serie A (4.7:1) (KPMG, 2017). Note that these four leagues are currently “suffering” the long-term dominance of single teams and have a rather predictable championship race. [5] Another means of increasing seasonal uncertainty and consequently perceived suspense would be to introduce regulations targeting explicitly an increase in the number of teams competing for the championship. Against this background, the introduction of postseason games – such as in the North American Major Leagues, in which the champion is decided by a play-off system – could be conceivable for some leagues. Second, it seems important for broadcast networks to focus on creating suspense-inducing commercials for games, highlighting their decisiveness and relevance in the fight of the championship title. By contributing to the generation of game suspense notions, broadcasters may benefit from increased audiences and ensuing advertising revenues. Against this background, there are also benefits for the companies advertised (excitation transfer, see Zillmann, 1996). In this regard, recent findings from the advertising literature have shown that TV viewers react positive to advertisements appearing after the conclusion of games exhibiting high suspense (Bee & Madrigal, 2012). Third, investments in talent and boosting the on-field quality of the clubs may generally enhance the perceived suspense of a league/game and consequently foster demand. While the presence of threshold effects in stadium

5. German Bundesliga: FC Bayern Munich; Spanish La Liga: Real Madrid and Barcelona; French Ligue 1: Paris St-Germain; Italian Serie A: Juventus FC.

attendance remains to be confirmed, the fact that there is no such tipping point for TV demand suggests that although attendance revenues might eventually become stagnant once a saturation point is reached, club management would still be able to benefit in the mid- to long term from increased TV revenues.

Perceived game uncertainty: Regarding perceived game uncertainty the implications that can be derived are also threefold. First, as the findings suggest that a lack of CB between contestants in a game will not harm viewing figures, no particular counter-measures are required. In contrast, clubs and broadcasters should take advantage of fans' loss aversion and their preferences for games involving strong favourites. Nevertheless, it is important that these games involve high-quality teams, as well as the possibility of witnessing an upset (i.e., an underdog winning) remaining open. Regarding the latter, broadcasters might want to exploit a mental shortcut of TV viewers decision-making frequently discussed in the media literature (e.g., Shrum, 1999), i.e. the availability heuristic (Tversky & Kahneman, 1973). The availability heuristic posits that when an infrequent event can be brought easily and vividly to mind, people tend to overestimate its likelihood. Broadcasters and sports commentators, by highlighting and including in their narratives previous Cinderella stories and past upsets, may drive sports viewers to overestimate the likelihood of such events, which in turn may lead to increased audiences. Second, the fact that the findings with regard to game uncertainty do not deviate between North America and Europe is also highly relevant from a managerial perspective. While international media revenues nowadays constitute an integral part of clubs' and leagues' overall revenues, configuring a product that tries to align with *distinct* preferences in a global market may alienate local consumers, leading to discontent and endangering the unique character of the sport. The fact that soccer fans seem to have quite similar preferences should be a relief for league management. Third, concerning the finding with regard to the consumption modes, broadcasters should not worry too much about the ex ante closeness of the games when it comes to highlights or tape-delayed broadcasts. It seems that quality-related aspects, such as the number of goals (see Dietl et al., 2009), are more likely to foster demand for highlights and tape-delayed viewership than the fans' ex-ante expectations about the outcome of the games.

6.3 Limitations and future research avenues

There are limitations in any empirical research. In what follows, four major shortcomings are discussed.

First, the studies presented report a lack of support for game uncertainty (short-term CB); however, examining the impact of the other two dimensions (mid-and long-term CB) remains equally important. While Study 2 showed that perceived suspense is able to depict (to a certain degree) seasonal uncertainty and together with Study 1 ascertained its importance for sports demand, more direct and straightforward measures of perceived mid-term CB are advisable. It also appears that it would be worth exploring whether and how the notion of within-game suspense as developed by Ely, Frankel, and Kamenica (2015) is related to survey responses concerning both ex ante and ex post perceived game suspense.[6] In this regard – and given the findings of Study 2 – modifying the measure of Ely et al. (2015) by introducing weights with regard to match relevance and the quality of the opponents seems to be a promising future project as it would arguably reflect to a greater extent the audience's beliefs when it comes to discriminating between different games/competitions.

Second, Study 1 reports the presence of threshold effects with regard to in-stadium attendance demand; however, these findings need to be validated with data containing more games. The empirical examination of such effects is crucial, given the current developments in leagues such as the German Bundesliga. The drop in attendance figures, combined with the apparent low degree of seasonal uncertainty could signify that the league is currently moving below the "satisficing" threshold. However, so far little is known concerning how much uncertainty is required to reach (again) such a threshold. Given that efforts to increase uncertainty come at a cost, knowing the concrete figure of such thresholds is imperative (Budzinski & Pawlowski, 2017).

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6. Within-game suspense is measured by taking into account information on the progress of the contestants' win probabilities during a given game/competition. For a recent application and further detail on the construction of the suspense index as introduced by Ely et al. (2015) see Bizzozero, Flepp, and Franck (2016).

Third, a caveat for every empirical investigation that uses (solely) first- and second-order terms of home win probabilities, is that the u-shaped relation between these and the sports demand proxy does not per se rule out the existence of fans' preferences for game uncertainty. As such, the findings presented in this dissertation, as well as the related empirical work using game-level data, can only infer that fans' preferences for game uncertainty are dominated by fans' loss aversion. The advantage of Study 2 and Study 3, however, is that they took into account differences between and within individuals and made use of their subjective and highly idiosyncratic expectations of the outcome of a game, while studies using game-level data are only able to infer individual-level behaviour from associations at the aggregate-level. To be able to rule out preferences for game uncertainty, future studies should incorporate in their econometric estimations all relevant preference parameters, namely fans' preferences for home wins, game uncertainty and loss aversion all together. Approximating their *actual* sizes would be very insightful.

Fourth, in Study 3 while no cross-continental differences with regard to the preference for game uncertainty could be detected, the conclusion was solely based on soccer-interested individuals. To be able to reach safer conclusions about the lack of such differences, future research should expand the analysis also on other sports and regions (e.g., demand for NBA telecasts in Europe). Moreover, it would be highly relevant to examine to what extent the sports type determines the degree of loss aversion and how these probable systematic differences across sports are related to generic differences in loss aversion between cultures and regions. Given that the sports industry is radically globalized and international media revenues are an integral part of club and league revenues, examining such matters is imperative for the internationalization strategies of the leagues.

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