

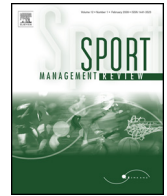


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# Estimation of game-level attendance in major league soccer: Outcome uncertainty and absolute quality considerations

Hojun Sung\*, Brian M. Mills

Department of Tourism, Recreation, & Sport Management, College of Health & Human Performance, University of Florida, P.O. Box 118208,  
Gainesville, FL 32611, United States

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### ABSTRACT

Despite its continued growth, there are doubts about the sustainability of demand for Major League Soccer, which has a strong focus on superstar externalities through its designated player rules. Yet there is relatively limited research directly focusing on classical determinants of demand for league attendance. The authors set out to establish an estimate of the relative importance of relative quality – outcome uncertainty – and absolute quality in game attendance. They find that fans behave in ways more consistent with the loss aversion hypothesis than the uncertainty of outcome hypothesis, with considerable interest in both home and away team absolute quality.

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## 1. Introduction

Soccer is perhaps the most popular sport internationally, both at the amateur and professional levels. Professional soccer in the United States, however, has thus far not experienced nearly the success of its counterparts in Europe. The historical lack of success of the sport reached a peak with the failure of the North American Soccer League (NASL) in the mid-1980s. However, the failed league was replaced with Major League Soccer (MLS) in 1996, which has grown considerably, particularly since 2004 with almost doubling its league member teams in last decades. Despite this growth, there has been skepticism about whether a professional soccer league can survive as an equivalently major league sport within the U.S. setting that includes incumbents such as the National Football League (NFL), Major League Baseball (MLB), the National Hockey League (NHL), and the National Basketball Association (NBA; [Mendelsohn, 2003](#)).

Nevertheless, as both the men's and women's U.S. national soccer teams increase their international competitiveness – 2018 World Cup qualification for the men notwithstanding – a burgeoning interest in the sport within the U.S. has seemingly followed. In 2014, an estimated 26.5 million U.S. soccer fans watched the men's World Cup Final ([Stubits, 2014](#)), a game that did not even feature the country's own team, while an estimated 23 million people tuned into the 2015 women's World Cup Final. MLS has also been slowly exerting greater influence on sports fans throughout the U.S. by expanding its reach to new markets like Orlando, Florida. Moreover, average attendance for MLS games in the 2015 season was recorded at 21,546 ([Soccer Stadium Digest, 2015](#)), nearly 4000 more than the average game attendance in both the NBA (17,809) and in the NHL (17,503), albeit lower than that of in the NFL (68,776) and MLB (30,346). The increase in interest, however, brings forth

\* Corresponding author.

E-mail addresses: [hsung@ufl.edu](mailto:hsung@ufl.edu) (H. Sung), [bmmillsy@hnp.ufl.edu](mailto:bmmillsy@hnp.ufl.edu) (B.M. Mills).

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relevant questions regarding the determinants of this growth, and how the league can foster continued future increases in fan interest.

MLS has also received some academic attention due to its peculiar single-entity organizational structure. The syndicate structure is generally shown to negatively impact both consumer and labor welfare through the centrally controlled organization (Kessenne, 2015). Outside of the welfare reducing possibilities, centralized league control over the distribution of talent may reduce liability for investors (Jakobsze, 2010), control player salaries (Twomey & Monks, 2011), or (supposedly) improve balance between teams (Mendelsohn, 2003). Control over talent raises the question of how soccer may optimize the distribution of talent across the league to ensure increased demand among fans. As the league's effort is presumably focused upon balancing the competitiveness of teams within the league and placing players with the highest values in the largest markets, there is a question as to whether the league would be best served concentrating on balance – as predicted by Rottenberg's (1956) Uncertainty of Outcome Hypothesis (UOH) – or on improving absolute quality through creating superstar teams that attract fans when playing both home and away.

In particular, there is a lack of extended dialogue related to the role of UOH in MLS fan interest, though recent work has begun to address some of these questions. Paul and Weinbach (2013) have directly estimated the relationship between uncertainty and MLS demand in the context of national broadcast viewership, confirming its predictions that fans prefer uncertain outcomes. However, as noted in Mongeon and Winfree (2012), demand for television may be determined differently than for attendance. This may be particularly relevant in the face of recent evidence from Coates, Humphreys, and Zhou (2014) related to the role of uncertainty on consumers' choices to attend games, which have a larger cost commitment than viewing on television. In contrast to findings in broadcast viewership, Jewell (2017) found limited evidence of a relationship between uncertainty and MLS attendance in the direction predicted by UOH using the absolute points per game difference between two competing teams. However, this measure is not a direct measure of match uncertainty, but relative team quality based on past outcomes, and the purpose of the central model was to test marquee player influences, rather than evaluate UOH itself. Further, the measure was susceptible to more fluctuation early in the season that could obscure regression estimates, a problem described in McDonald and Rascher (2000).

More robust empirical evidence is therefore needed to establish any relationship between uncertainty, performance quality, and MLS attendance demand to guide further managerial or policy prescriptions for league development. Hence, we investigate the determinants of attendance demand by separating UOH-related variables with absolute quality related variables. We estimate game-level attendance as a function of betting lines converted into home team win probability to identify the impact of uncertainty while controlling for absolute quality through Elo ratings – a dynamic measure of team strength – and superstar effects using MLS designated player indicators and superstar salaries. Our empirical results reveal a convex relationship between home win probability and attendance, consistent with the predictions of Coates et al. (2014). Specifically, high quality home or away teams are important to fans, while attendance is lower when there is substantial uncertainty over the outcome of the game.

## 2. Background and literature review

### 2.1. The landscape of U.S. professional soccer

In the 1970s, the U.S. had apparently witnessed a peak of interest in professional soccer with the presence of the NASL. The signing of world class athletes, such as Pele from Brazil, generated great interest for soccer in North America (Francis & Zheng, 2010). The New York Cosmos, the biggest club in the NASL at the time, had enjoyed an average of 40,000 fans per game after acquiring many star players. Nevertheless, not all teams in the NASL could keep up with the financial burdens associated with signing superstar players, and the league eventually ceased operations in 1984 after continuous attendance decline and teams exiting the league. After 12 years without a division one professional soccer league in the U.S., MLS launched in 1996 as part of an agreement made to International Federation of Association Football (FIFA) for hosting 1994 World Cup.

As the successor to the NASL, MLS structured itself in a way to prevent similar failures of operation that resulted in the shuttering of its predecessor's (Francis & Zheng, 2010). The major obstacle for MLS to achieve any success was to attract star athletes while suppressing the associated costs (Mendelsohn, 2003). To overcome these hurdles, MLS adopted a single-entity league structure to ensure the stability of the new league and to lure potential investors with reduced financial risks (Francis & Zheng, 2010; Twomey & Monks, 2011). The single-entity structure allowed centralized control of the distribution of talent around the league, presumably reducing the likelihood of dominance of a single team at the expense of many other teams that could not afford top flight talent, and avoiding substantial bidding up of the price of player talent. Yet, in order to attract investors and offer stronger incentives to be a part of the league, MLS enabled its stakeholders to gain partial control of a team and oversee daily operations, where each owner was responsible for employment of staff while sharing a large portion of the revenue generated by ticket sales and concessions (Jakobsze, 2010). Nonetheless, the single-entity structure did little to reduce league dominance of a single team early on, as D.C. United appeared in the league's championship game in each of the first four seasons of MLS operation, winning three times.

Furthermore, this single-entity structure facilitated monopsony power of the league, given that player contracts have largely been determined centrally, rather than by individual teams, therefore effectively suppressing player salaries. For example, Twomey and Monks (2011) found that spending on player salaries in MLS made up only about 25 percent of

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