

Evidence on soccer-specific stadiums and attendance: The Major League Soccer case

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KEYWORDS: Soccer-specific stadium, Soccer, Attendance, Atmosphere, MLS

ABSTRACT: The aim of this study is to test the influence of soccer-specific stadiums on attendance figures in the Major League Soccer. For that purpose, we use a regression model that analyzes all regular season games from 2004 to 2014 (2538 observations). The logarithm of attendance is the dependent variable, while the type of stadium, uncertainty of outcome, performance of teams, weather conditions, year, month and game day are the independent variables. The results show a significant positive influence of the soccer-specific stadiums and the performance of teams.

Demand in professional sports competitions has been widely analyzed in the literature during recent decades due to the important economic and social impact of these events. García-Villar and Rodríguez (2003) identify the necessity of incorporating in these demand analyses not only the classic economic factors of attendance, but also those related to the opportunity cost, event quality or uncertainty of outcome, among others. The English Premier League (soccer) or the North American NBA (basketball) and MLB (baseball) are the most studied competitions in the field. The emerging soccer competition in North America, Major League Soccer (MLS), remains quite overlooked in the literature. However, this competition is a tempting scenario for sports economists and managers because of its singular format and economic regulations, fast growth, and expansion strategies. The construction of soccer-specific stadiums is one of the most important growth strategies in the MLS (Strutner, Parrish and Nauright, 2014). Several teams have switched their multi-purpose stadiums for soccer-specific stadiums with the aim of decreasing the total capacity and increasing the attendance figures during the last decade. A soccer-specific stadium in the MLS is characterized by having fewer seats available when compared to big multi-purpose stadiums (baseball and American football) and hosting an only sport. This expansion strategy is related to the influence that environmental stimuli have on spectators' behavior, which has been studied by environmental psychology. The atmosphere in recreational contexts is a factor that determines spectators' satisfaction and willingness to return and recommend it (Wakefield and Blodgett, 1999). To determine the environmental factors that contribute to the unique atmosphere in sports stadiums, Urich and Benkenstein (2010) used the opinion of a panel of experts, which consisted of fan commissioners for first

and second division soccer teams in Germany. These authors found that certain architectural characteristics of the stadiums, besides other organizer-induced visual and acoustic stimuli or uncertainty of outcome issues, promote a good atmosphere for the spectators. The change from a multi-purpose stadium to a soccer-specific stadium, which occurred in several franchises in the MLS, allows us to analyze empirically the effect that new stadiums have on attendance figures. Love, Kavazis, Morse and Mayer (2013) show a positive novelty effect on teams' attendance figures in the MLS after moving into soccer-specific stadiums, which is extended up to 3 years for the studied teams. The aim of this study is to test the influence of soccer-specific stadiums on the attendance figures in the MLS through a demand analysis.

Method

To determine the influence of soccer-specific stadiums on the demand study in the MLS we used a regression analysis. All MLS regular season games during 11 seasons (2004-2014 period) were included in the analysis with a total number of 2538 observations. The data regarding game results, characteristics of the stadiums and attendance figures were obtained from the official MLS and ESPNFC websites.

The sports betting odds needed to build the variables of team performance were obtained from the Oddsportal website. The logarithm of attendance is the dependent variable of this research, while the dummy variable soccer-specific stadium is the main independent variable.

To analyze the uncertainty of outcome hypothesis (Forrest and Simmons, 2002), which assumes that higher levels of uncertainty before the game, *ceteris paribus*, are positively correlated with attendance figures, we included the Theil index.

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This index is a prospective measure that has been used in previous demand studies to test the uncertainty about the outcome prior to the game (Buraimo and Simmons, 2008; Pawlowski and Anders, 2012). The Theil index value increases when the game is expected to be uneven. Therefore, we expect a negative effect of this variable on attendance.

The probability of a home win was also incorporated to the regression analysis as previous demand studies did. The number of spectators is expected to increase when the local team has higher probabilities of victory (Czarnitzki and Stadtmann, 2002; Buraimo and Simmons, 2008).

In a different way, to test whether the performance of teams in comparison to what was expected has an effect on the number of spectators, we included a coefficient of efficiency. This variable is based on the idea of efficiency used by Dawson, Dobson and Gerrard (2000) to measure the performance of coaches in the English Premier League. This coefficient measures the actual performance of teams with respect to the performance that fans were expecting using probabilities of winning extracted from betting odds (del Corral, Maroto and Gallardo, 2016). The coefficient of efficiency tries to approach the effect that a good streak team may have on the behavior of spectators. We expect a positive effect of this variable on the attendance figures.

Weather conditions, used in previous research to control for potential opportunity costs (Pawlowski and Anders, 2012), are also incorporated to the analysis. We expect adverse weather conditions (i.e., rainy and snowy) to affect negatively the attendance figures in MLS stadiums. To create this categorical variable we used information extracted from the website wunderground.com.

The variables month and game day help to control for certain preferences of spectators. We expect an increase in attendance figures at the end of the season (i.e., September and October), when the decisive games determining the play-off positions take place. Home team and year fixed effects are also included in the regression.

Results and Discussion

Table 1 shows the most relevant results of the regression analysis. The most important result of the analysis is the significantly positive influence that soccer-specific stadiums have on attendance figures in the MLS during the analyzed period ($p < .01$).

The sounds of the crowd, applause, booming and songs, are identified as elements that belong to the sport place and improve the atmosphere (Westerbeek and Shilbury, 1999). Big multipurpose stadiums with low occupancy rates might decrease the positive effect of the interaction between spectators. Fans are sometimes too far from each other in big stadiums, there are empty spaces and the echoes affect negatively the acoustics. The soccer-specific stadiums in the MLS have fewer available seats, higher social density and closer crowds. These characteristics improve the acoustics and contribute positively to the atmosphere and spectators' emotional experience in the stadiums (Uhrich and Benkenstein, 2010).

The Theil index has a negative sign in the regression but it is not significant. Thus, this result weakly (i.e., non-significant) supports the uncertainty of outcome hypothesis, which assumes that higher levels of uncertainty prior to the game are positively

correlated with attendance. The probability of a home win has a positive influence on attendance figures but this is also not significant.

The coefficient of efficiency, however, plays a more important role in the behavior of spectators. This new prospective variable presents a significant positive influence on attendance figures ($p < .01$). So, teams performing above expectations manage to attract more spectators to the events. Therefore, this indicator, which aims to complement variables previously used in the literature to measure the influence of teams' performance on demand (e.g., points collected in previous games), shows results that are consistent with previous research (Forrest and Simmons, 2002; Johnsen and Solvoll, 2007; Pawlowski and Anders, 2012).

Adverse weather conditions (i.e., rainy and snowy), incorporated to the analysis as dummy variables, do not have a significant impact. However, these conditions have a negative influence on stadium attendance as it was expected.

Last month of competition (i.e., October), when teams play the decisive games for the play-off positions, also has a significant positive impact on attendance figures ($p < .01$). This result coincides with previous findings that show how the last games of competition, when promotion-relegation and play-off battles are being fought, have a positive influence on demand in the English Premier League (Forrest and Simmons, 2002) or the Swiss and Austrian first divisions (Pawlowski and Nalbantis, 2015).

The variable year does not yield any significant results. Thus, the year in which games are played has both negative and positive unremarkable influences on attendance figures in the MLS over this period of time. Finally, the variable game day shows how spectators have a significant preference for attending the games that are played on Sunday ($p < .10$). On contrary, games played on weekdays (i.e., Wednesday and Thursday) have a significantly negative influence on attendance ($p < .05$ and $p < .01$, respectively) as it was expected due to work-related reasons.

Conclusions

The use of a soccer-specific stadium has a significant positive influence on attendance figures in the MLS. Small sports clubs using big stadiums (e.g., youth teams playing in the main stadium) or minority sports using big multipurpose stadiums (e.g., American football) might increase the number of spectators if using sports facilities that better fits their needs.

Some architectural elements of the stadiums, such as the number of seats available in the standings, seem to have an important influence on the atmosphere of sports events. Future research will allow us to test the variable of efficiency in other professional leagues as its prospective nature can provide the literature on sports demand with a complementary perspective.

This research contributes to increasing the knowledge about the stadiums' architectural elements that improve the atmosphere and increase the attendance figures in sports events. Our study also helps to understand the interactions between spectators and teams in sports competitions. These results have important practical implications for managers who want to increase the attendance figures using measures that promote a close interaction between spectators and a better atmosphere. Still, further research is needed on this topic.

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>
Soccer-specific stadium	.165***	.023
Theil index	-.116	.192
Probability of a home win	.121	.124
Coefficient of efficiency	.072***	.023
Sunny (omitted)		
Partly cloudy	.013	.015
Cloudy	.010	.036
Rainy	-.037	.015
Snowy	-.053	.066
March (omitted)		
April	-.024	.034
May	-.029	.034
June	.020	.034
July	.054	.034
August	.056	.034
September	.039	.034
October	.131***	.035
Monday (omitted)		
Tuesday	.113	.092
Wednesday	-.107**	.038
Thursday	-.105***	.035
Friday	.001	.045
Saturday	.037	.031
Sunday	.053*	.030
2004 (omitted)		
2005	-.040	.035
2006	-.056	.034
2007	.042	.034
2008	.035	.034
2009	-.076	.034
2010	-.040	.035
2011	.013	.034
2012	.037	.034
2013	.017	.035
2014	.044	.034
Home team fixed effects	Yes	
Constant	9.201***	.077
R2	.484	
Observations	2538	

Note: * $p < .10$; ** $p < .05$; *** $p < .01$

Table 1. Results of the regression analysis

EVIDENCIA SOBRE LOS ESTADIOS DE FÚTBOL ESPECÍFICOS Y LA ASISTENCIA: EL CASO DE LA MLS

PALABRAS CLAVE: Estadio específico; Fútbol; Asistencia; Ambiente; MLS.

RESUMEN: El objetivo de este artículo es examinar la influencia de los estadios específicos de fútbol en los números de asistencia de la Major League Soccer. Para ello, se ha estimado un modelo de regresión que analiza todos los partidos de la liga regular desde 2004 hasta 2014 (2,538 observaciones). El logaritmo de la asistencia es la variable dependiente mientras que el tipo de estadio, incertidumbre del resultado, rendimiento de los equipos, condiciones meteorológicas, año, mes y día de partido representan las variables independientes. Los resultados muestran una influencia significativamente positiva de los estadios específicos de fútbol y del rendimiento de los equipos.

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