Journal of Sports Economics

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Journal of Sports Economics 2008; 9; 266 originally published online Jun 12, 2007;
DOI: 10.1177/1527002507302026

The online version of this article can be found at:
http://jse.sagepub.com/cgi/content/abstract/9/3/266

Published by:

http://www.sagepublications.com

On behalf of:

The North American Association of Sports Economists

Journal of Sports Economics
Volume 9 Number 3
June 2008 266-286

10.1177/1527002507302026
http://jse.sagepub.com
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Local Heroes and Superstars

An Empirical Analysis of Star Attraction in German Soccer

Leif Brandes
Egon Franck
Stephan Nüesch
University of Zurich, Switzerland

Recent studies of the demand for sports clearly indicate that stars play an important role in promoting fan interest. However, on theoretical grounds it is controversial if a star's talent superiority and/or a star's popularity drive match attendance and hence increase gate revenues. Using longitudinal match attendance data of all clubs in the first German soccer league in a 9-year period, the authors analyze star attraction of national superstars and of so-called "local heroes" defined as the most valued players of teams without national superstars. The authors find empirical evidence that these groups differ in the way they attract fans: whereas superstars enhance attendance both at home and on the road, the star attraction of local heroes is limited to home games. In addition, superstars attract fans by outstanding field performances, whereas local heroes facilitate fan support by mere popularity.

Keywords: *superstar effect; consumer demand; soccer; talent; popularity*

Introduction

Team composition plays a fundamental role in facilitating fan support: 69% of the European soccer fans say that their identification with and affiliation to a team is largely determined by the particular players the team engages (Sportfive, 2004). Recent studies in the widely and fast growing literature on the demand for sports[1] clearly indicate that outstanding players—so-called stars—play an important role in attracting fans (see e.g., Berri, Schmidt, & Brook, 2004; Berri & Schmidt, 2006; Hausman & Leonard, 1997; Mullin & Dunn, 2002). Because soccer fans tend to form attachments to particular teams mostly on the basis of geographic proximity

Authors' Note: We are grateful to Stefan Boes, Rainer Winkelmann, and two anonymous referees for helpful comments. The usual disclaimer applies. Financial support from the Swiss National Fund is gratefully acknowledged. Please address all correspondence to Egon Franck, University of Zurich, Institute for Strategy and Business Economics, Plattenstrasse 14, CH-8032 Zurich, Switzerland; phone: +41 44 634 28 45; fax: +41 44 634 43 48; e-mail: egon.franck@isu.uzh.ch.

(Szymanski, 2003b), we argue that not only well-known superstars but also "local heroes" may play an important role in enhancing fan interest. Defining superstars as players whose market values are in the top 2% quantile of the league's distribution of market values[2] and a "local hero" as the most valued player of a particular team that has no superstars, we want to shed more light on the still quite obscure relationship between star players and match attendance. In the theoretical star literature it is controversial whether stars drive demand by their talent superiority (see MacDonald, 1988; Rosen, 1981) or simply by their comparably higher popularity (see Adler, 1985). Analyzing longitudinal match attendance data of all clubs in the first German soccer league during the seasons 1995–1996 through 2003–2004, we explore star attraction by both a star's field performance and his popularity. Furthermore, we distinguish between locally dominating stars and national superstars and we investigate their star attraction both in home games and on the road. Our data show that local heroes attract fans only in home games, namely because of their popularity. Superstars, however, facilitate fan support both at home and on the road—not because of mere celebrity status but rather because of their outstanding talent. However, robustness checks reveal that a star attraction analysis requires a precise definition of superstardom.

Related Literature

Noll (1974) was the first to analyze star attraction by introducing a superstar variable in his match attendance study. This superstar variable captured the effect of stars on attendance beyond their contribution to team victories. However, it was not significant. Scully (1974) stated that players can influence club revenues in Major League Baseball in a twofold way: "Ability contributions to team performance and victories raise gate receipts. (. . .) Additionally, it is possible that some players may attract fans over and above their individual contribution through the team" (p. 916). Unfortunately, Scully (1974) did not include the latter effect in his econometric framework. Using a two-equation model, he only related player-specific performance statistics to team success and, in a second step, team revenue to the team's win–loss record and other market characteristics. Scully (1974) did not consider star attraction by sheer popularity in his econometric framework.

Hausman and Leonard (1997) empirically analyzed superstar effects on team revenues in professional basketball.[3] They found that the mere presence of stars had a substantial positive impact on club revenues even after controlling for team quality measured by the number of all-star players on a team. By analyzing all National Basketball Association (NBA) local and national television ratings as well as match attendances, Hausman and Leonard (1997) singled out that—back in 1993—the estimated value of Michael Jordan for the NBA was $53 million. The

study of Hausman and Leonard (1997), however, does not analyze whether the star's performance and/or popularity increases team revenues.

Mullin and Dunn (2002) define "star quality" in Major League Baseball as the residual in a fit of a player's card prices to performance statistics. They acknowledge that star quality brings fans to the stadium and impacts team revenues in a significant way beyond pure field productivity. Mullin and Dunn (2002) determine a player's marginal revenue product running a three-step process involving the sequential determination of (1) the effect of an individual's performance on team performance, (2) the effect of team performance on winning percentage, and (3) the impact of winning percentage and a player's star quality on attendance and hence on revenues. They found clear evidence that stars may influence gate revenues both by their talent which is translated into field success and by their popularity.[4]

Berri, Scmidt, and Brook (2004) investigated the two-sided relationship between match attendance and both team performance and the team's mere employment of star players in the NBA. By choosing a multiplicative model, they regressed a team's home gate revenue on team performance, star popularity measured with received all-star votes, franchise and market characteristics. Their results suggest that it is performance on the court, not star popularity, which attracts fans.

Berri and Schmidt (2006) extended the study of Hausman and Leonard (1997) via an examination of road attendance in the NBA. They found evidence of a superstar externality. Whereas an additional all-star vote increases aggregate road attendance by only 0.005 fans, each team win leads to an estimated 1,011 increase in attendance on the road. According to Berri and Schmidt (2006) Michael Jordan's productivity, for example, was worth approximately $2.2 million whereas his star appeal only generated $156,123. Thus, they suggest that showmanship cannot replace actual court performance. However, the studies of Berri et al. (2004) as well as Berri and Schmidt (2006) treat team wins as exogenously given by the stars' talent. They do not analyze how stars exactly influence team performance.

Stylized Facts on German Soccer

German soccer enjoys high popularity. According to a representative survey of the Sportfive company, 77% of the German population are interested in soccer. 39% of them quote that they cannot even imagine a life without soccer (Sportfive, 2004). This high enthusiasm is reflected in hard facts: the financial turnover of the German soccer leagues topped €1.5 billion in the 2004–2005 season (Bundesliga, 2006). At the same time, average match attendance in the first Bundesliga increased to 36,900. No other soccer league in Europe attracts more fans at the gate than the first Bundesliga (Jones & Boon, 2005).

Most soccer supporters express allegiance to a particular club. Their attendance is largely an expression of support for that club. Spectators who attend out of purely

neutral interest tend to represent a minority at soccer matches (Simmons, 1996). Supporters are often organized into supporter clubs, which raise the social component of a sports event. The geographical distribution of fan bases varies largely between different teams of the league. Although some are more locally rooted, others have supporter clubs all over Germany (Czarnitzki & Stadtmann, 2002). Bayern Munich, for example, appeals rather nationally. Only 29% of all Bayern fans actually live in Munich. Hansa Rostock, on the other hand, has strong local roots. 68% of their fan base lives in Rostock. Even though Bayern Munich had an average home match attendance of 54,882 in the 2003–2004 season, this only represents 9.1% of Munich's male population. In the case of Hansa Rostock, however, match attendance corresponds to 22.9% of the male population in the hometown (see Table 1).

Although Bayern Munich had six superstars with a market value in the top 2% quantile of the league and six players were nominated for "Player of the Year"[5] in the season 2003–2004, Hansa Rostock had none of these superstars. However, supporters of Hansa Rostock are very unlikely to regard a Bayern Munich match as a perfect substitute for watching "their" team. Explanations for this imperfection may be found either in economic reasons like travel costs or in the intangible allegiance or loyalty to a particular team. Therefore, the market for admission to Hansa Rostock home games bears features of a local monopoly. Of course, Hansa competes for spectators with other clubs (including those in other leagues) and with other leisure attractions. No club has a monopoly in an absolute sense (Forrest, Simmons, & Feehan, 2002). However, the high affiliation of local fans leads to a situation in which Hansa Rostock has discretion over a level of admission prices. And, therefore, outstanding players of small teams, such as Hansa Rostock, may attract fans without having a nationwide appeal. We call them local heroes. A local hero is defined as the most expensive player in a team, given that his market value does not belong to the highest 2% of the league. Therefore, the definition of a local hero does not necessarily imply that the respective player is a homegrown young player who has just made the starting team. Local heroes may not achieve league-wide superstardom. However, they take the number one position within their teams.

We rule out the possibility that both superstars and local heroes exist in the same team because of the following reasons. First, as already mentioned, fans largely focus on the team they support. Within a particular team, the star attraction of a superstar is expected to dominate over the potential star attraction of a local hero. Second, talented players consciously select a team to maximize their individual utility. In doing so, not only the salary or the absolute quality of a team but also the relative position and rank in the team enter their utility function. People in general constantly compare themselves to others and enjoy a sense of well-being when they out-perform their peers (see e.g., Clark & Oswald, 1996 or Ferrer-i-Carbonell, 2005). Therefore, given a certain team quality, we assume a local hero to prefer being the best within a team instead of being just an interchangeable player among stars.

Table 1
Comparison of Bayern Munich and Hansa Rostock in the 2003–2004 Season

	Bayern Munich	Hansa Rostock
Average match attendance	54,882	22,323
Portion of local attendance	29%	68%
Male population	602,708	97,567
Match attendance in percentage of male population	9.1%	22.9%
Number of superstars	6	0
Number of players in national teams	14	4
Number of players nominated for "Player of the Year"	6	0

Source: Sportfive, 2004; own calculations.

To check the robustness of our results, we also run the regressions using broader star definitions. One alternative model defines the highest 5% quantile of the league's market value distribution as superstars and the two most valuable players of a team which has no superstars as local heroes. A second alternative model accounts even the 8% players with the highest market values as superstars and the three most valuable players in teams without superstars as local heroes. This sensitivity analysis is necessary because it is not a priori clear how many players within a team may exhibit a particular star attraction or on how many star players viewers are able to focus simultaneously. On theoretical grounds, we clearly prefer the 2% superstar definition because the superstar literature argues that one single actor—the best—dominates the whole market (Schulze, 2003). Based on the fact that the market for gate attendance may be considered as a local monopoly, it makes sense to assume a strong concentration of viewer interest on a very restricted number of players *per team*.

Star Attraction

The existing theoretical literature on superstars (Adler, 1985; MacDonald, 1988; Rosen, 1981) suggests two main ways that stars attract fans: by outstanding talent and exceptional performance and/or by remarkable popularity.

Star Performance

Sherwin Rosen, who wrote a seminal article on "The Economics of Superstars" in 1981, derives the existence of superstars from the premise that consumers consider lower quality as an imperfect substitute for higher quality. According to Rosen, spectators want to see the best players under the ceteris paribus assumption.

Watching, for example, a succession of mediocre dribblings does not add up to a single outstanding dribbling performance. Therefore, small differences in talent translate into large differences in fan support. In line with Rosen (1981), we postulate that stars attract fans and generate disproportionally high match attendance by their outstanding field performance.

Soccer is a highly interactive game based on the combination of complementary player skills. Together with relatively low scores and limited "set" plays, the interactivity does not facilitate decomposition, record, and measurement (Carmichael, Thomas, & Ward, 2001). Hence, in soccer we do not have the depth of player performance indicators available for more individualistic North American team sports such as baseball and basketball (Lucifora & Simmons, 2003). However, one performance characteristic that is clearly identifiable and measurable is goal scoring. Since winning depends on a positive goal difference, goal scoring and preventing the opposition to score are the critical success factors of a game. In our empirical study we, therefore, measure field performance by counting the goals and the assists defined as final pass before a goal is scored. Since forwards and midfielders are more likely to score than defenders, we divided the performance of each star by the league average of goals and assists of players in the same position in the corresponding season.[6] The sum of weighted goals and assists—namely the weighted scoring points—of a local hero (SCORELHWP) or of a superstar (SCORESSWP) in a particular team serve as Rosen talent variables. In addition, we incorporate a dummy if a team has a local hero or a superstar as goalkeeper.

Star Popularity

In contrast to Rosen (1981), Adler (1985) stated that stars do not necessarily need to have superior talent. They may just be more popular and attract fans by their high profile and celebrity status. In Adler's (1985) logic the appreciation of a star's performance increases with the knowledge the consumer has about the star. The more popular a soccer player is, the easier it is to accumulate this so-called "consumption capital."[7] According to Adler (1985) there is more than mere quality that attracts fans. Mullin and Dunn (2002) describe the star's popularity of a baseball player as an intangible characteristic that attracts fans who pay to see these stars even when their playing performance is not more than mediocre: "Star quality thus consists of both reputation based on past performance and charisma above and beyond actual playing ability" (p. 621). Stars may have a "personal appeal" that activates fan interest even after controlling for their team's (increased) quality (Hausman & Leonard, 1997).

To identify the Adler-star effect, we measure a player's popularity by counting how often star players are quoted with name and first name in more than 20 German newspapers and magazines (MEDIALHP and MEDIASSP).[8] Of course, press

citation rather reflects publicity and is only a proxy of a player's popularity. However, publicity such as coverage in tabloids, magazines, or newspapers is strongly related to popularity (Adler, 2006).

Econometric Framework

Data and Dependent Variable

The analyzed sample contains data on all 18 clubs in the first German league over nine seasons—beginning with the 1995–1996 season and concluding with the 2003–2004 season. Because of the high profile of the first Bundesliga as the highest German soccer league, we rule out substantial star attraction for players appearing in lower leagues.[9] The composition of European soccer leagues changes annually through promotion and relegation. The three best teams from the second Bundesliga are promoted to the first league in the following year, whereas the weakest three clubs of the first Bundesliga are relegated. Our sample consists of 28 clubs in total. Some of them played only one season in the highest soccer league (Uerdingen, SSV Ulm) whereas others like Bayern Munich, Hamburg, or Leverkusen were never relegated.

Studies about the star attraction in sports either concentrate on home games (Berri, Schmidt, & Brook, 2004; Mullin & Dunn, 2002; Noll, 1974; Scully, 1974) or away games (Berri & Schmidt, 2006; Hausman & Leonard, 1997). In this article we analyze star attraction of both home and away attendance in two separate models, because we assume the star effect to be different based on where the game is played. The dependent variable for home games is the logarithm of the aggregate seasonal match attendance. The logarithm of the sum of attendance of all away games of a particular team denotes the dependent variable analyzing star attraction on the road.

To identify the relationship between a team's star performances and a team's star popularity with match attendance, a set of control variables is needed to eliminate alternative explanations such as team or market characteristics.

Controls

Besides a simple time trend, we also control for club idiosyncratic factors such as a team's reputation (REP20) or the stadium capacity (CAPACITY) and market characteristics. Czarnitzki and Stadtmann (2002), who analyze the determinants of match attendance in the first German soccer league for the seasons 1995–1996 and 1996–1997, identified a strong relationship between reputation, measured by past field success, and match attendance. Teams that enjoyed success in the past are expected to have stronger fan support than other teams which had less success. The

measure REP20 takes into account the performance of a particular team over the last 20 years according to the following formula:

$$REP20 = \sum_{t=1}^{20} \frac{18}{x_t \sqrt{t}} \quad (1)$$

x_t is the team's final rank in the championship t years ago. In the case that the team did not play in the first German league in season t, the corresponding summand is set equal to zero. By weighting the rankings with the square root of the number of years past, the index is constructed to reflect the depreciating effect of time (Czarnitzki & Stadtmann, 2002).

The aggregate seasonal stadium capacity (CAPACITY) is expected to have a positive impact on a team's gate attendance. The variable CAPACITY for home games is calculated using the weighted average of all sold-out games of a particular club in a given season, which is then multiplied with the number of home games. In doing so, we incorporate capacity changes within a season, for example, because of stadium reconstruction.[10] Concerning attendance on the road, the variable CAPACITY is the sum of stadiums' capacities of all other clubs in a given season. In general, we expect that the higher a stadium capacity, the more people may attend a game without increasing ticket prices. Berri, Schmidt, and Brook (2004) found a significant positive relationship of stadium capacity and gate revenues in the NBA.

In addition to the mentioned team characteristics, we also use three variables controlling for specific market characteristics like the male population (MEN), the unemployment rate (UNEMP) in the hometown, and the competitive balance of the league (CB).

European soccer fans typically tend to form attachments to particular teams on the basis of geographic closeness (Szymanski, 2003b). Thus, the size of the population in the potential market for a particular team is expected to positively relate to gate attendance (Borland & MacDonald, 2003; Falter & Pérignon, 2000). Schmidt and Berri (2001) suggest that the size of the metropolitan statistical area is a common proxy for the size of a team's market.[11] Since soccer is rather a men's game,[12] we only count the number of males in the hometown.[13]

Borland and MacDonald (2003) claim that attendance at sporting events may constitute a social outlet for unemployed persons, so that (other things equal) attendance is higher as the rate of unemployment increases. On the other hand, average income, which is positively associated to match attendance, decreases. Therefore, the forecasted effect of the unemployment rate on match attendance is not clear.

In addition, we also control for seasonal competitive balance using the Herfindahl index, which measures the concentration of points among the participating teams. The higher the Herfindahl index, the lower the competitive balance. According to the uncertainty-of-outcome hypothesis (Rottenberg, 1956), higher competitive balance increases fan interest.

The control variable BUTT denotes a dummy variable for the goalkeeper Hans-Jörg Butt. Butt is a peculiarity in German soccer, because he scored 23 goals in the considered time period—all through penalties. In Table 2, the set of variables as well as descriptive statistics are listed.

Table 2 indicates that teams with superstars have 50.7% more home attendance and 13.9% more attendance on the road than teams with a local hero. Although a local hero accounts for almost 3 times as many goals and assists, a superstar accounts for even more than 6 times as many goals and assists as the league average of players in the same position. Superstars enjoy high popularity. They have 292 citations in the German press whereas a local hero is mentioned 155 times on average.

Estimation Approach

Recall from above that our data set contains all teams that played in the first Bundesliga during the period from 1995–1996 to 2003–2004. It is well known that panel data structures like ours require special econometric modeling, namely fixed effects or random effects. We choose the fixed-effects models as our estimation approach. Let us first quickly restate the underlying assumptions of these models to show why we believe this choice to be appropriate for our analysis. The fixed-effects model assumes the following specification:

$$y_{it} = \alpha_i + x'_{it}\beta + \varepsilon_{it}, \tag{2}$$

where x_{it} is a K-dimensional vector of explanatory variables.[14] Unlike the fixed-effects model, the random-effects model does not allow the fixed effects (α_i) and the regressors to be correlated, that is $\text{cov}(\alpha_i, x_{it}) = 0$; $t = 0, 1, \ldots, T$. However, in our empirical setting, this assumption does not seem reasonable. The fact that Bayern Munich may always have higher attendance than Hansa Rostock can be expected to be correlated with some regressors. For example, higher attendance might come from a higher degree of continuity in different fan generations. This might well be correlated with the team's reputation. Thus, we expect the fixed-effects model to provide superior performance. This reasoning is supported by the empirical results of the Hausman specification test.[15]

Besides this specification test, we also test for strict exogeneity of our regressors where we take the results from the Hausman test into account. Following Wooldridge (2002), we specify the following regression equation:

$$y_i = \alpha_i + x'_{it}\beta + w'_{it+1}\delta + \varepsilon_{it}, \tag{3}$$

where w'_{it+1} denotes a subset of x'_{it} for club i in the subsequent year $t+1$. A test of the null hypothesis of strict exogeneity is equivalent to testing $H_0 : \delta = 0$. First we have to choose the relevant elements of w'_{it+1}. Here, it is crucial to analyze for

Table 2
Variables and Descriptive Statistics

Variable	Description	Teams With Local Heroes		Teams With Superstars	
		M	*SD*	M	*SD*
Dependent variables					
LNATTHOME	Logarithm of match attendance at home	13.03	0.35	13.44	0.39
LNATTAWAY	Logarithm of match attendance on the road	13.18	0.10	13.31	0.12
Independent variables					
Star performance					
SCRORELHWP	Weighted goals and assists of a local hero within a team	2.88	2.04	–	–
SCORESSWP	Weighted goals and assists of a superstar within a team	–	–	6.15	3.21
GKLH	Dummy = 1 if goalkeeper is a local hero	0.04	0.20		
GKSS	Dummy = 1 if goalkeeper is a superstar	–	–	0.13	0.34
Star popularity					
MEDIALHP	Average citations of a local hero in the German press (in 100)	1.55	2.75	–	–
MEDIASSP	Average citations of a superstar in the German press (in 100)	–	–	2.92	2.25
Control variables					
REP20	Reputation: weighted average of final rankings in the past 20 years	14.49	12.33	44.10	26.25
CAPACITY	Aggregate seasonal stadium capacity (in 10,000)	68.53	27.65	84.57	31.55
MEN	Male population in the hometown (in 10,000)	31.30	33.22	36.83	40.16
UNEMP	Unemployment rate (in %)	12.30	3.79	12.08	3.85
CB	Competitive balance (Herfindahl-Index in %)	5.93	0.10	5.92	0.11
BUTT	Dummy = 1 if goalkeeper is Hansjörg Butt	0.00	0.00	0.01	0.09

Note: The model also includes a time trend, which is not reported.

which regressors future values might be correlated with ε_{it}. Therefore, we decided to include all of our regressors except for MEN and UNEMP.[16] For the latter two, it seems highly implausible that a shock in current match attendance should be correlated with future values for inhabitants or the unemployment rate. Based on the specification from Equation 3, we are not able to reject the null hypothesis on the 10% level of significance for both attendances at home and on the road.[17] Thus, our regressors may be considered adequate.

A final aspect lies in the nature of our data set: because of promotion and relegation we have an unbalanced panel, as some teams do not always play in the first Bundesliga. Because the reason why a team gets promoted or relegated (called attrition) is not random and therefore expected to be correlated with the idiosyncratic error—those unobserved factors that change over time and affect match attendance—resulting sample selection possibly causes biased estimators. However, through our choice of a fixed-effects model, this problem is already moderated because fixed-effects analysis allows for the attrition to be correlated with the unobserved effect (Wooldridge, 2003). Therefore, we explore star attraction only within one team. While model 1 estimates the influence of star attraction on home game attendance, model 2 measures star attraction of local heroes and superstars on the road.

Results

Table 3 shows all the β-coefficients, the estimated White-robust standard errors as well as the levels of significance of both home and away games.[18]

Table 3 reveals that superstar performance significantly increases both home game and away game attendance. If a superstar scores one more goal than the average of players in the same position, match attendance at home increases by 1.4% and on the road by 0.7%.[19] A local hero draws viewers into the home stadium by his popularity, but he does not have a nationwide appeal. MEDIALH does not significantly increase attendance on the road. An evaluation of the marginal effects $\beta_{SCORESSWP}$ and $\beta_{MEDIALHP}$ at the corresponding mean values for SCORESSWP and MEDIALHP shows that based on pure star attraction, superstars have a greater impact on home attendance than local heroes.[20]

Concerning the control variables, we see that German soccer enjoys increasing fan interest. Our data deliver a significant positive time trend. The aggregate seasonal capacity strongly influences match attendance at home and on the road. The unemployment rate in the hometown is positively related to attendance on the road. It seems that the lower opportunity costs of unemployed persons dominate over the negative income effect. But this only applies to away games where travel time is considerably higher. The greatest, statistically significant impact is derived for Hans-Jörg Butt concerning home gate attendance. It seems that the peculiarity of a goalkeeper shooting penalties is an exciting and thus viewer-drawing spectacle.

Table 3
Estimates of a Team's Star Attraction (2% Superstar Definition)

	Match Attendance at Home		Match Attendance on the Road	
Variable	β-coefficient	*SE*	β-coefficient	*SE*
SCORELHWP	−0.0046	0.0071	0.0023	0.0028
SCORESSWP	0.0137**	0.0043	0.0066**	0.0028
GKLH	−0.0549	0.0939	−0.0137	0.0386
GKSS	−0.0606	0.5220	−0.4785	0.0357
MEDIALHP	0.0070*	0.0041	0.0032	0.0043
MEDIASSP	−0.0127	0.0091	−0.0036	0.0049
REP20	−0.0048	0.0025	0.0013	0.0014
CAPACITY	0.0070**	0.0008	0.0133**	0.0022
MEN	0.0493	0.0294	−0.0130	0.0087
UNEMP	0.0113	0.0091	0.0109*	0.0050
CB	0.0960	0.1000	0.0797	0.0476
YEAR	0.0114*	0.0056	0.0151**	0.0027
BUTT	0.2757*	0.1295	−0.0254	0.0431
R^2 within	0.39		0.62	
F statistic	12.63		24.68	
Number of observations	162		162	

Note: Significance tests are one-tailed for directional independent variables and two-tailed for control variables. Standard errors are White-heteroscedasticity robust standard errors.
*Significance at 5%. **Significance at 1%.

The pooling of both superstar and local hero teams allows a direct comparison of the superstar versus local hero coefficients. The null hypothesis of an equivalent star attraction of a superstar and of a local hero is rejected both for the performance and the popularity variables. This indicates that these two star groups significantly differ in the way they activate fan interest.[21]

Robustness Analysis

Within this section we perform several robustness tests. Robustness is analyzed with respect to two different aspects: (1) the number of stars per team and (2) different measures for star performance.

Increasing the Number of Superstars and Local Heroes

A natural starting point for robustness checks is to ask whether our estimation results would be affected by a change in the number of superstars (or local heroes) employed by the teams. In the literature there exist many different star definitions; in

studies of the NBA, superstars are often defined as players who have made the All-Pro team or the All-Star game for certain times (Berri, Schmidt, & Brook, 2004; Berri & Schmidt, 2006; Brown, Spiro, & Keenan, 1991; Burdekin & Idson, 1991; Scott, Long, & Scompii, 1985). Hausman and Leonard (1997) defined two players only, Michael Jordan and Shaquille O'Neal, as superstars for whom they assumed a positive externality on the attendance of other clubs. In soccer, Lucifora and Simmons (2003) defined a superstar as a player who scored more than 0.25 goals per game. However, Sherwin Rosen, who is seen as the founder of the "economics of superstars", defined superstars as "the relatively small numbers of people who earn enormous amounts of money and dominate the activities in which they engage" (Rosen, 1981, p. 845). Obviously, Rosen (1981) bases his definition of superstardom on the distribution of earnings among the suppliers of a certain good or service. However, Rosen does not propose a clear percentage number as "boundary" between "normal" suppliers and superstars. We, therefore, decided to shift our "boundary" to increase the number of both superstars and local heroes for a sensitivity analysis. In the first alternative model, superstars are defined as the 5% most valuable players in the league. The two most expensive players in teams without superstars are denoted as local heroes. Finally, we defined the 8% most expensive players in the league as superstars. For this broader definition of stardom, the number of local heroes per team without superstars corresponds to three. The estimations from this specification are displayed in Table 5.

If the superstar definition is modified to encompass 5% or even 8%, the field performance of superstars no longer significantly increases attendance (except for home games in the 8% superstar definition[22]). The more balanced talent distribution in top teams could offer an explanation for this finding: Bayern Munich, for example, engaged 4 to 12 (5% model) or even 7 to 14 (8% model) superstars. It is easier for the 2% most expensive players to stick out than for a larger group of superstars who sometimes even have to compete to be in the starting squad. By enlarging the number of players covered by the superstar definition, the (average) talent of superstars loses its distinctive ability to differentiate them from the rest of the team.

The popularity variable of local heroes is not very robust. In the original model MEDIALHP has a significant positive impact on home game attendance. At the 5% superstar level it increases attendance both for home and away games. Concerning the 8% model, only attendance on the road is significantly influenced by the popularity of local heroes. However, the fact that local heroes draw viewers by popularity and not by outstanding talent is unambiguous.

High robustness is seen for the control variable YEAR referring to attendance on the road and for CAPACITY. These variables have positive coefficients at the 1% significance level regardless of the exact star definitions.

A test of joint significance of performance variables, that is SCORESSWP and GKSS, confirms that superstar performance does not affect match attendance any more in the 5% and 8% superstar models. As can be seen from Table 6, this result is independent of the location of the match. This finding may be driven by the fact

Table 4
Estimates of a Team's Star Attraction (5% Superstar Definition)

	Match Attendance at Home		Match Attendance on the Road	
Variable	β−coefficient	*SE*	β−coefficient	*SE*
SCORELHWP	−0.0022	0.0062	−0.0012	0.0028
SCORESSWP	0.0042	0.0052	0.0005	0.0022
GKLH	0.0392	0.0626	−0.0095	0.0193
GKSS	0.0387	0.0871	−0.0461*	0.0217
MEDIALHP	0.0262*	0.0129	0.0168**	0.0047
MEDIASSP	0.0091	0.0113	0.0026	0.0056
REP20	−0.0054*	0.0023	0.0012	0.0013
CAPACITY	0.0058**	0.0011	0.0131**	0.0023
MEN	0.0456	0.0259	−0.0101	0.0080
UNEMP	0.0125	0.0093	0.0113*	0.0056
CB	0.0618	0.1043	0.0861*	0.0432
YEAR	0.0044	0.0061	0.0124**	0.0028
BUTT	0.1815	0.1079	−0.0417	0.0218
R^2 within	0.34		0.60	
F statistic	6.83		31.32	
Number of observations	162		162	

Note: Significance tests are one-tailed for directional independent variables and two-tailed for control variables. Standard errors are White-heteroscedasticity robust standard errors.
*Significance at 5%.**Significance at 1%.

that a larger basis of "superstars" results in the inclusion of nonsuperstars, which leads to the insignificance of our performance measures.

However, the fact that a broader range for the superstar definition should result in flawed estimations of star attraction is also mirrored in the specification tests about strict exogeneity. Whereas we could not reject the assumption of strict exogeneity in the 2% definition, the same does not hold for the broader star definitions. In both cases, strict exogeneity is rejected concerning match attendance on the road. Thus, we are extremely careful about implications from these estimates. In particular, it seems as if serial correlation is introduced to the away attendance model by a move toward a broader star definition. We consider this as further support for our choice of a narrow star definition.

Having discussed the consequences of relying on varying databases, we now turn to a robustness check of the applied measures themselves.

Alternative Measures for Star Performance

Our choice of the position-weighted scores (measured by the sum of goals and assists) was motivated by the ease of evaluating goals and assists. As noted above,

Table 5
Estimates of a Team's Star Attraction (8% Superstar Definition)

	Match Attendance at Home		Match Attendance on the Road	
Variable	β-coefficient	*SE*	β-coefficient	*SE*
SCORELHWP	−0.0069	0.0107	0.0006	0.0042
SCORESSWP	0.0105 *	0.0061	0.0030	0.0025
GKLH	0.0227	0.0385	−0.0195	0.0141
GKSS	−0.0246	0.0351	0.0008	0.0177
MEDIALHP	0.0675	0.0505	0.0352*	0.0174
MEDIASSP	0.0065	0.0110	0.0067	0.0050
REP20	−0.0052*	0.0021	0.0007	0.0012
CAPACITY	0.0062**	0.0011	0.0138**	0.0023
MEN	0.0483	0.0245	−0.0120	0.0076
UNEMP	0.0120	0.0087	0.0098	0.0056
CB	0.0556	0.1043	0.0587	0.0436
YEAR	0.0056	0.0059	0.0115**	0.0028
BUTT	0.2599**	0.0868	−0.0426	0.0246
R^2 within	0.37		0.60	
F statistic	7.31		31.00	
Number of observations	162		162	

Note: Significance tests are one-tailed for directional independent variables and two-tailed for control variables. Standard errors are White-heteroscedasticity robust standard errors.
*Significance at 5%. **Significance at 1%.

Table 6
Joint Significance Tests

	Match Attendance at Home		Match Attendance on the Road	
	p value	*F* statistic	*p* value	*F* statistic
Main model (2% superstars)				
Joint signficance of a local hero's performance	0.35	0.7060	0.63	0.5366
Joint significance of superstar's performance	7.05**	0.0010	8.40**	0.0004
Alternative models				
5% superstar definition/two local heroes				
Joint signficance of a local hero's performance	0.27	0.7609	0.17	0.8417
Joint significance of superstar's performance	0.38	0.6818	2.57 $^{+}$	0.0810
8% superstar definition/three local heroes				
Joint signficance of a local hero's performance	0.45	0.6387	1.04	0.3564
Joint significance of superstar's performance	1.68	0.1909	0.72	0.4872

$^{+}$ Significance at 10%. *Significance at 5%. **Significance at 1%.

Table 7
Estimates of a Team's Star Attraction Using BEST11 as Performance Indicator

	Match Attendance at Home		Match Attendance on the Road	
Variable	β-coefficient	*SE*	β-coefficient	*SE*
BEST11LH	−0.0038	0.0069	−0.0030	0.0040
BEST11SS	0.0212 **	0.0068	0.0153 **	0.0037
GKLH	−0.0392	0.0971	−0.0179	0.0277
GKSS	−0.0747	0.0533	−0.0311	0.0276
MEDIALHP	0.0065	0.0046	0.0037	0.0032
MEDIASSP	−0.0092	0.0087	−0.0080*	0.0042
REP20	−0.0059*	0.0027	0.0002	0.0013
CAPACITY	0.0067 **	0.0008	0.0132 **	0.0020
MEN	0.0532	0.0280	−0.0092	0.0071
UNEMP	0.0129	0.0093	0.0113	0.0049
CB	0.0731	0.1014	0.0738	0.0418
YEAR	0.0104	0.0055	0.0152 **	0.0024
BUTT	0.2557	0.1312	−0.0336	0.0312
R^2 within	0.37		0.65	
F statistic	13.13		26.35	
Number of observations	162		162	

Note: Significance tests are one-tailed for directional independent variables and two-tailed for control variables. Standard errors are White-heteroscedasticity robust standard errors.
*Significance at 5%. **Significance at 1%.

the talent of soccer players is rather blurred, because the game specific characteristics complicate the measurement of individual performance. Therefore, we decided to apply another performance measure to test the robustness of the performance variables. On every match day, *Kicker* soccer magazine publishes the "team of the day," comprising the 11 players who played best. We estimated a model that includes the number of appearances of a superstar or local hero in the BEST11 team. An important advantage of this measure is that players of each tactical position have similar chances to be elected for the BEST11 team. However, a disadvantage of the BEST11 variable is the fact that it is published by the same source that estimates the players' market values.

Table 7 shows the estimates of a team's star attraction using the BEST11 variable instead of scores. As in the original model, superstars are defined as the 2% quantile in the league's market value distribution whereas the most valuable player in teams without superstars counts as local hero.

Table 7 illustrates that the average number of nominations of superstars for the "team of the day" significantly influences their team's gate attendance both at home and on the road. This confirms our results from Table 2. The use of another

performance measure does not change the finding that only superstars are able to draw spectators by their outstanding field performance. However, in analyzing the popularity variables we see that the results change. MEDIALHP no longer has statistical significance, and the press citations of superstars decrease attendance on the road. The latter effect may be explained from the ceteris paribus interpretation of the coefficient estimates: the negative coefficient on MEDIASSP refers to a change of media citations while holding the number of nominations for the "team of the day" constant. The results in Table 6 indicate that nonperformance related media citations of superstars lowers attendance on the road. It seems that publicity might not improve attendance per se.[23] Alternatively, we could say that a superstar substituting media presence for performance will lower his positive externality for matches on the road.[24]

Conclusion

Analyzing seasonal match attendance data we find evidence for star attraction in the first German soccer league. However, the exact channel of generating this attraction (by field performance or popularity) largely differs depending on firstly whether a player is a nationwide superstar or a local hero and secondly whether attendance at home or on the road is investigated. Although superstars enhance attendance both at home and on the road, the star attraction of local heroes is limited to home games. Superstars attract fans by outstanding field performances, whereas local heroes facilitate fan support by mere popularity. Robustness tests reveal that the estimations of star attraction are influenced by the chosen star definition. If the superstar and local hero categories are extended to encompass larger numbers of players, that is, the superstar category to account for the 5% or 8% (instead of 2%) of the most expensive players of the league, specific performance-related star attraction is no longer observed in the data. Superstardom is a "small number" phenomenon, just as postulated in the economic star literature (see Rosen, 1981).

Our results indicate that superstars produce a positive externality for home teams when playing on the road. This is an important finding with respect to the question of who should bear the costs of paying these superstars (see also the recent article by Berri & Schmidt, 2006). More precisely, this externality gives rise to a de facto system of revenue sharing in the German Bundesliga between teams that employ superstars and those that do not. Based on our results, the value of the average superstar externality was about €430.000 per season.[25] Furthermore, our results show that there is a trade-off for a league between an increase of its level of competitive balance and allowing for dominant teams.

Regarding future research, we believe that investigating two aspects would be especially worthwhile. First, it would be interesting to see whether the positive externality imposed by visiting superstars varies with the number of superstars in

the home team, allowing for a more precise quantification of the value of this externality. A second aspect relates more directly to the superstars themselves: although our study provides new evidence for different types of star attraction in German soccer, we do not explicitly address transitions between local heroes and superstars. We are not able to link individual career paths with the team's financial or field success. Therefore, it still remains to be examined how player-specific star attraction changes as rising stars climb the career ladder.

Notes

1. See Szymanski (2003a) or Borland and MacDonald (2003) for a review.

2. The market values used were collected from special editions of the *Kicker* soccer magazine at the beginning of each season. For the 1997–1998 season, the market values were published in the weekly *Kicker* edition No. 61 in 1997.

3. Brown, Spiro, and Keenan (1991); Burdekin and Idson (1991); and Scott, Long, and Scompii (1985) already controlled for the effect of a team's star attraction in their analyses of match attendance in the NBA prior to Hausman and Leonard (1997). However, the existence of a potential superstar effect was not their main focus. Of these studies, only Brown, Spiro, and Keenan (1991) were able to find a statistically significant relationship between match attendance and the number of stars in a team.

4. Note that the term "star quality" from above only reflects the popularity aspect of stars.

5. The *Kicker* soccer magazine organizes an annual voting for "Player of the Year." At the end of the 2003–2004 season, approximately 3,400 sports journalists were asked to vote for any player in the German league or any German player in any other league.

6. We are grateful to an anonymous referee for suggesting the standardization of performance according to the tactical position.

7. The notion "consumption capital" was introduced by Stigler and Becker (1977).

8. The database used contains quality nationwide newspapers (including *Frankfurter Allgemeine Zeitung*, *Süddeutsche Zeitung*, *Stuttgarter Zeitung*, *Hamburger Abendblatt*, *Die Welt*, *taz*, *Berliner Morgenpost*, *Financial Times Deutschland*) and weekly magazines (including *Der Spiegel*, *Stern*, and *Bunte*).

9. The average match attendance in the second Bundesliga is approximately one third of the match attendance in the first Bundesliga.

10. We are grateful to an anonymous referee for bringing the issue of stadium reconstruction to our attention.

11. However, an anonymous referee as well as Buraimo, Forrest, and Simmons (2006) state that the metropolitan statistical area may be a flawed measure for market size. For example, if a club is located in a town with twice the population of another, it cannot be considered as having double market size. The bigger the town, the higher the mean travel costs for residents to reach the stadium, implying that the ticket demand will not linearly increase with the size of the hometown. Therefore, Forrest, Simmons, and Feehan (2002) or Buraimo, Forrest, and Simmons (2006) employed modern GIS software to measure population within a certain distance from the stadium and also included a measure of competition from neighboring clubs. Unfortunately, we could not obtain the corresponding data for Germany.

12. Stollenwerk (1996) shows that the share of women among spectators in Bundesliga matches usually varies between 3% and 18%.

13. This further enables us to control for differences in relative shares of men in the population.

14. The reader should note that we are implicitly assuming that superstars and local heroes affect a team's capacity to attract additional consumer demand in an additive way only. Of course, as it was rightly

pointed out to us by an anonymous referee, it might also be that star performance influences attendance in a multiplicative way, as well. However, the fact that our model contains several discrete explanatory variables prevents us from specifying a Log/Log-specification (where the associated coefficients would have to be interpreted as elasticities).

15. Performing the Hausman specification test (Hausman, 1978), which compares the fixed-effects model with the random-effects model, we can reject the null hypothesis for home and away games on a 1% level of significance. The Hausman specification test, therefore, confirms that team-level effects are inadequately modeled by a random-effects model because they are correlated with the explanatory variables.

16. For example, future values of media coverage might be correlated with current shocks in match attendance because a positive shock in match attendance might lead the media to increase their coverage of a team's players as they could expect a higher interest from consumers. Similar relationships could be derived for other regressors.

17. If a broader definition of superstars is chosen (see section about the robustness checks), the null hypothesis of strict exogeneity is rejected at the 5% significance level. We take this as an additional confirmation of a rather narrow definition of stars.

18. Whenever correlational designs are used, concerns about internal validity such as possible reverse causality may be raised. However, the issue of reverse causality (impact of revenues on the number of stars a team engages) is appeased by the lag structure of our model. We identify the stars in the beginning of a season, whereas the performance, popularity, and attendance data is collected during the season.

19. The fact that the scores of superstars even increase attendance on the road may be puzzling at first glance. On one hand, match attendance in German soccer is generally dominated by home-team supporters who want "their" team to win (see e.g., Borland & MacDonald [2003] for the overwhelming evidence that attendance is positively related to home-team winning percentage). The more goals the opposite stars score, the lower the winning probability of the home team becomes, which then decreases demand. On the other hand, a greater value of SCORESSWP should be related to a higher expected match quality, which would increase match attendance. Based on our results, it seems as if the latter effect dominates. We view this result to be in line with previous results that show the dominating influence of team quality variables for match attendance (see Garcia & Rodriguez [2002] for evidence from Spanish soccer). In the NBA, Berri and Schmidt (2006) found a positive impact of the winning percentage of the visiting team on attendance on the road.

20. The average marginal effect of SCORESSWP is 8.4% (0.0137×6.15), whereas the popularity of the local hero increases home attendance only by 1.1% (0.007×1.55).

21. Slope equality of SCORELHWP and SCORESSWP (MEDIALHP and MEDIASSP) is rejected at the 5% level of significance. In addition, we also tested for the joint significance of the performance measures regarding home and away match attendance. Whereas the null hypothesis could be rejected for SCORESSWP and GKSS, the same did not hold for SCORELHWP and GKLH. The detailed results are available from the authors on request.

22. However, based on test results on joint significance (see Table 6), we do not put too much emphasis on this finding. The same applies to the negative coefficient of GKSS in Table 4.

23. The consumer response possibly differs between positive and negative publicity. For the latter see, for example, Dean (2004).

24. The reader might wonder why a similar reasoning would not apply to our specification including SCORESSWP. However, recall that the BEST11 measure accounts for a potential bias of SCORESSWP toward midfielders and strikers in spite of our standardization with respect to the player's position. Thus, it is possible that the exceptional performance of a defender might be the reason for an increased number of media citations which would not automatically be reflected in an increase in SCORESSWP. As argued earlier, such a performance of a defender would most likely result in a nomination for the "team of the day." In other words, for midfielders and strikers, SCORESSWP should be a much better

predictor for a nomination for the "team of the day" than for defenders and goalkeepers. As a result, the impact of MEDIASSP differs for the BEST11 and SCORESSWP specifications because, under the ceteris paribus condition, an increase of MEDIASSP might well refer to different types of media coverage in the two models.

25. Superstars increase match attendance on the road by 4%, which results in 24,484 tickets sold additionally. Given an average admission price of €17.50, this totals €428,470.

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Leif Brandes received his diploma in mathematical finance from the University of Konstanz, Germany, in 2004. Since then, he has been working as a research assistant at the Institute of Strategy and Business Economics, University of Zurich, Switzerland. His current research interests lie in the econometric modelling of heterogeneity and choice heuristics in consumer demand, on which he is also writing his PhD thesis.

Egon Franck is a professor of strategic management and director of the Institute of Strategy and Business Economics at the University of Zurich. His research interests lie in the economic analysis of governance structures.

Stephan Nüesch is a post-doctoral assistant at the Institute of Strategy and Business Economics of the University of Zurich. He currently focuses his research on personnel economics, in particular on the effect of wage dispersion on team performance and turnover, as well as on superstar and sports economics.