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Benchmarking Sports Sponsorship Performance: Efficiency Assessment With Data Envelopment Analysis

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Over the last decades, sports sponsorship has become a popular and expensive marketing instrument. However, in business practice, projects are often not evaluated properly and academic research considering both costs and benefits of sponsorship is limited. In response to the concern that investments in sports sponsorship should be made more accountable, we propose data envelopment analysis (DEA) as a method for benchmarking sponsorship efficiency, and illustrate its usefulness by applying it on a sample of 72 major Dutch sports sponsorship projects. We find an average efficiency level of almost 0.3, which implies that the average project would have attained the same results with 30% of its fee if it had been performing as well as its benchmark. The results reveal that 12.5% of the investigated sponsorships are fully efficient. Moreover, we find a high degree of variety in efficiency scores; 37.5% of the projects with an efficiency below 0.1. In addition, we show how DEA scores may be used by sponsor managers to identify peers, which are those projects that attain roughly the same sponsorship outcomes, but at lowest budgets. After estimating the efficiency scores, a second step in the analyses involves investigating which sponsorship characteristics affect sponsorship efficiency. For this purpose, we use the DEA scores as a dependent variable in a Tobit regression model. The findings suggest that sponsorship clutter negatively affects sponsorship efficiency, whereas sponsorship duration has a positive effect.

Keywords: benchmarking, sponsoring, sponsorship, effectiveness

Over the last few decades the international sponsorship market has grown considerably. Most of these sponsorships concern sports properties. In particular, IEG estimates that worldwide expenditures on sponsorship were equal to $53 billion in 2013 (IEG, 2014). Sponsorship thus has become an important source of income for sport organizations and is considered an attractive marketing tool from a corporate point of view.

In general, there is a growing consensus that marketing expenditures should be made more accountable (Rust, Ambler, Carpenter, Kumar, & Srivastava, 2004). Likewise, the efficiency of sports sponsorship is questioned in the light of the significant investments required to become an official sponsor of a major event, federation,

or team. However, despite the high investments in sports sponsorship and the resulting growing pressure on managers to demonstrate the effectiveness, many companies do not evaluate their sponsorships properly (Crompton, 2004; Meenaghan & O'Sullivan, 2013). Therefore, in this paper, we propose and illustrate an alternative method for benchmarking sponsorship performance.

Sponsorship effect measurement is in practice often based on exposure reports, which only provide insight into the opportunity to see a sponsorship linkage, whereas the particular consumer impact of sponsorship remains unknown (Cornwell, Weeks, & Roy, 2005; Meenaghan & O'Sullivan, 2013). In case of measuring consumer impact, only a single outcome variable, such as awareness, is analyzed at a time, whereas sponsorship can have multiple outcomes. Furthermore, information about the input resources used (sponsorship expenditures) and about other sponsorships is generally not incorporated in brand tracking research, and therefore, benchmarking sponsorships' relative performance at this point is uncommon in business practice.

Previous academic research (see for a review: Walraven, Koning, and van Bottenburg, 2012) addressed

the issue of sponsorship productivity by examining differences in consumer outcome variables (awareness, attitude, and purchase intent) over time, between groups and for different sponsors (Nufer & Bühler, 2010; Quester & Farrelly, 1998), and by investigating whether sponsorships lead to shareholder value (Deitz, Evans, & Hansen, 2013). In addition, scholars investigated the effect of one or more antecedents (e.g., perceived fit and involvement of the target audience) on one or more outcome variables (Olson, 2010; Speed & Thompson, 2000). Thus, previous research identified several factors that contribute to higher sponsorship outcomes, but the relative performance of different sponsorships taking into account differences in sponsorship fees has not yet been investigated.

Therefore, the contribution of this research is to (a) present and illustrate data envelopment analysis (DEA) as a method for benchmarking sponsorship efficiency, and (b) examine relative efficiency of sports sponsorships and relating sponsorship (in)efficiency to project characteristics. Thereby, this paper offers sponsorship managers an alternative method for evaluating and benchmarking their sponsorships. We apply DEA on a sample of sports sponsorship projects to evaluate the relative efficiency, to illustrate the usefulness of the method, and to investigate which sponsorship characteristics (such as number of other sponsors involved and the age of the project) affect sponsorship efficiency.

Conceptual Framework

Previous Research on Sponsorship Effectiveness and Efficiency

This study examines efficiency of sponsorship deals. Therefore, we discuss earlier academic work on sponsorship effects and efficiency studies in the related field of marketing and sports research.

As noted by Walraven et al. (2012), previous studies of sponsorship effects focused on either consumer processing of sponsorship or capital market effects of sponsorship announcements. With regard to consumer processing of sponsorship, various scholars followed an associative memory pathway (Cornwell et al., 2005). From this perspective, sponsorship awareness, measuring the extent to which the association between sponsor and sponsored property is memorized by the consumer, is considered a crucial step before higher level processing of sponsorship (Wakefield & Bennett, 2010; Walraven, Bijmolt, & Koning, 2014). Then, favorable evaluation of the sponsorship in terms of positive attitude toward the sponsorship and high-perceived fit between the sponsor and sponsored property is strongly related to positive higher level effects on the sponsoring brand (Olson, 2010). Studies of higher level processing of sponsorship comprised sponsee–sponsor image transfer (e.g., Chien, Cornwell, & Pappu, 2011; Meenaghan, 2001) and sponsorship's effect on attitude, commitment, and purchase intent toward the sponsoring brand (Biscaia, Correia, Rosado, Ross, & Maroco,

2013; Lacey, Close, & Finney, 2010; Sirgy, Lee, Johar, & Tidwell, 2008).

Previous research on consumer processing of sponsorship provided valuable insights into the various determinants of sponsorship processing and how consumer reactions to sponsorship differ across sponsors and over time. However, the required resources for sponsorships have not yet been taken into account, so an explicit comparison of the efficiency (i.e., the actual investment related to the minimum investment required to attain the same outcome levels) of different sponsorships was not possible. Moreover, in many studies a single output variable (such as awareness) was investigated, whereas sponsors can have multiple objectives, and thus would like to take more than one effect into account.

Another stream of research analyzed how shareholders value corporate announcements of sponsorship investments, using an event study approach (Deitz et al., 2013; Miyazaki & Morgan, 2001). This approach enables an objective financial estimate of sponsorship return, which can be directly compared with sponsorship investment. With this method one gains insight into the relative impact of sponsorship on shareholders, but the impact of sponsorship on the primary communication target group (i.e., consumers) is not incorporated. Furthermore, because not all sponsors are publicly listed, the method is not suitable to compare performance of all sponsorships.

This study is concerned with the relative efficiency of sponsorship projects. Efficiency is a construct related to, but not the same as, return on investment. In our research, sponsorship output is not quantified financially, but incorporates consumer impact measures. Furthermore, efficiency is a relative measure, which benchmarks a project against projects with similar output levels, regarding sponsorship familiarity and attitude toward the sponsorship, for example. We identify an efficiency frontier, the shape of which is defined by those projects that attain given combinations of outputs with lowest budgets. If a project is close to this frontier, it has a relatively high efficiency level (Coelli, Rao, O'Donnell, & Battese, 2005). We estimate efficiency of sponsorship projects using DEA.

Previously, DEA was used in both marketing and sports research to investigate relative performance of properties. To the best of our knowledge though, DEA has not yet been applied in sponsorship research. Examples of the application of DEA in marketing included estimating and evaluating the relative efficiency of advertising campaigns (Büschken, 2007; Färe, Grosskopf, Seldon, & Tremblay, 2004; Lohtia, Donthu, & Yaveroglu, 2007; Luo & Donthu, 2001) and benchmarking retailer efficiency (Donthu, Hershberger, & Osmonbekov, 2005; Donthu & Yoo, 1998). In sports literature, scholars frequently applied DEA to investigate relative performance with samples of athletes or clubs. For example, Haas (2003) measured the efficiency of Major League Soccer clubs with points awarded, number of spectators, and revenues as output variables. From these studies, we learn that the purpose of DEA fits very well in a sports context where benchmarking performance is crucial.

Drivers of Sponsorship Efficiency

While this study is concerned with the explicit estimation of efficiency of sponsorship projects, this kind of analysis naturally involves the follow-up issue in which variables influence sponsorship efficiency. Previous research investigated the influence of several sponsorship characteristics on consumer processing of sponsorship. We test whether these previously established relationships also hold with sponsorship efficiency as dependent variable. The specific hypotheses are discussed in the following sections.

Sponsorship clutter.   Scholars generally recognized that sponsorship exposure positively influences cognitive and affective consumer processing of the sponsorship (Olson & Thjømøe, 2003; Wakefield, Becker-Olsen, & Cornwell, 2007). Popular sponsorship properties normally have multiple sponsors at different sponsorship levels. This has consequences for the exclusivity in sponsorship exposure. The various sponsors of a property compete for attention from the media and subsequently from the consumers. In this respect, Wakefield et al. (2007) found that high-level sponsorships, which generally offer a higher degree of exclusivity and more prominent exposure, achieve higher sponsorship awareness levels than lower level sponsorships. However, such high-level sponsorships usually require larger budgets, and the relative return of investment in terms of reaching stronger sponsorship effects is unclear.

Cornwell, Relyea, Irwin, and Maignan (2000) reported that environmental clutter, measured by the total number of promotional communications at an event, negatively impacts sponsor recall and recognition, and Breuer and Rumpf (2012) found that higher clutter in sponsorship exposure is related to lower attention for the sponsor. Likewise, in an advertising context, several authors found that advertising effectiveness is negatively affected by the number of advertisements by competing brands (Danaher, Bonfrer, & Dhar, 2008; Pieters & Bijmolt, 1997).

Following these arguments, we hypothesize that sponsorship efficiency is negatively related to sponsorship clutter, because the level of exclusivity is lower in a cluttered sponsorship environment, making it more difficult for consumers to identify a sponsor.

> H1: Sponsorship efficiency is negatively related to sponsorship clutter.

Sponsorship duration.   Repeated exposure enhances cognitive processing of the sponsorship and strengthens the association between the sponsor and sponsored property (Wakefield et al., 2007). Therefore, it can be expected that long-term sponsorships are more effective than one-shot projects. Moreover, the sponsor would be perceived as more committed when a sponsorship has a long-term character. Indeed, several authors found a positive impact of sponsorship duration on sponsorship awareness (McAlister, Kelly, Humphreys, & Cornwell, 2012; Pitts & Slattery, 2004; Walraven et al., 2014) and

on consumers' perceptions of the sponsoring brand (Mazodier & Quester, 2014; Pope, Voges, & Brown, 2009). In addition, marketing expenditures often have an effect that spills over to future periods, leading to a long-term effect that is larger than the short-term effect (Vakratsas & Ma, 2005). This could lead to increased efficiency if the sponsorship lasts for several years. Therefore, we expect a positive relationship between sponsorship duration and sponsorship efficiency:

> H2: Sponsorship efficiency is positively related to sponsorship duration.

Sports popularity.   Sponsors often choose to sponsor properties in popular sport categories due to the positive expected exposure and attention effects. Because media exposure and attention for popular sports are higher, it is more likely that the target group is confronted with the sponsorship, generating positive cognitive and affective effects for the sponsoring brand. Moreover, popular sports often have a larger group of involved spectators. Previous research indicated that involvement leads to stronger cognitive processing of sponsorships because highly involved consumers are more willing to engage in active processing of information regarding the sport, and thus are more likely to pay attention to sponsorships (Ko, Kim, Claussen, & Kim, 2008; Wakefield et al., 2007). Likewise, Olson (2010) found that involvement with the particular sports category (soccer, cycling, etc.) is positively related to attitude toward related sponsorships. From this perspective, one would expect a positive relationship between sports popularity and sponsorship consumer impact. However, sponsoring popular sport properties often also requires larger investments, so the relative efficiency of these kind of projects is less obvious. In particular, Wishart, Lee, and Cornwell (2012) found that media coverage and attendance level of sport events are important determinants of sponsorship right fees.

In all, we hypothesize a positive relation between sports popularity and sponsorship efficiency, because we expect the positive exposure and attention effects in popular sports to offset the higher contract investment:

> H3: Sponsorship efficiency is positively related to sports popularity.

Method

Data Envelopment Analysis

The efficiency of a marketing decision can be evaluated by examining the amounts of outputs relative to the amounts of inputs, and comparing these numbers across various situations. DEA is a nonparametric method involving linear programming to construct a frontier of efficient decision-making units (DMUs). The DMUs in this research are sponsorship projects. We use DEA because it does not require the ex ante specification of a functional form of the relation between inputs and

outputs and because it can deal with multiple outputs (Coelli et al. 2005).

Coelli et al. (2005) provided an accessible introduction into the mathematics underlying the basic DEA models. Here, we focus on the intuition behind the method. Let us consider an example with two output variables ($q1$ and $q2$). For any given input level, one could draw an efficiency curve connecting the efficient cases at that particular input level, such as the one depicted in Figure 1 (Coelli et al. 2005).

The efficient cases (those units that are on the efficiency frontier) are the projects with the highest combination of outputs for a particular level of input in comparison with the inputs and outputs of other comparable projects in the sample. In the example (Figure 1), *A, B,* and *C* are efficient, because they are on the frontier. The efficiency frontier envelopes the inefficient projects and the distance to the frontier marks the degree of inefficiency. Inefficient projects are benchmarked against the nearest cases on the frontier. Such efficient projects with similar output proportions are called the *peers.* In the example, the inefficient project *P* is benchmarked against *B* and *C* (its peers), which produce the two outputs in roughly the same proportions as *P.* For this unit to be efficient, outputs should be increased to reach point *P** on the frontier. The ratio between the distance from the origin to *P* and the distance from the origin to *P** is the efficiency score for *P.* An efficient DMU like *A* does not play a role in determining the efficiency of *P,* because it is producing a completely different mix of the two outputs.

A DEA research comprises several steps. First, input and output variables are selected. To apply DEA, input and output variables should be positively correlated (Luo & Donthu, 2001) and the total number of variables should be restricted, because a dimensionality problem may arise when the number of included variables is large compared with the sample size (Coelli et al. 2005). Second, an output orientation or an input orientation has to be chosen. The output orientation (Figure 1) assumes that DMUs
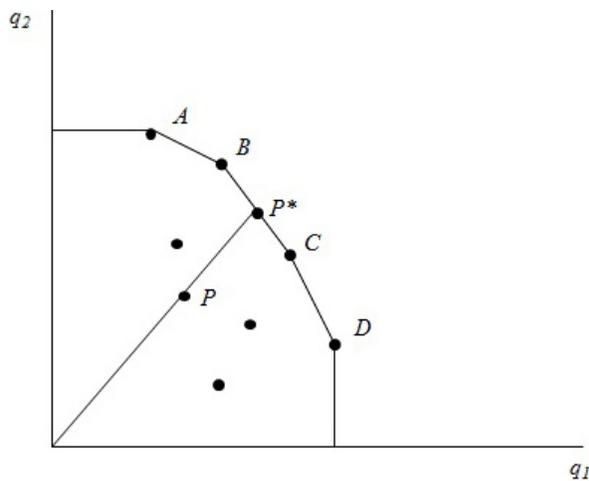
maximize outputs at given input levels, whereas the input orientation supposes that DMUs minimize inputs for given output levels. We choose the input orientation, because sponsorship investment is the key decision variable in the context of sponsorships and sponsorship objectives are typically set before a sponsored property is selected and budgets for the deal are allocated. As we do not expect that an increase (decrease) in sponsorship expenditures results in a proportionate increase (decrease) in output scores, we estimate a variable return to scale DEA model, to control for scale economies in sponsorship projects. Then, running DEA yields an efficiency frontier, determined by a set of efficient projects: projects with an efficiency score of 1, having the lowest input for a particular combination of output levels. Based on the frontier, efficiency scores for all projects in the sample are obtained. These scores are bounded by 0 and 1, where a low score means that the project considered is relatively inefficient and lies far off the frontier. Inspection of the individual project results allows one to estimate by how much inputs should be reduced to become efficient. Finally, DEA efficiency scores can be used as a dependent variable in a regression analysis to identify different factors that influence (in)efficiency. More specifically, we address the question of which sponsorship characteristics influence the efficiency levels of sponsorships.

Input Variables for DEA

Luo and Donthu (2001) proposed several ways of defining inputs for measuring advertising efficiency, including dollars spent on advertising campaign development, the length of the campaign, and media budgets. Similarly, we select the estimated yearly rights fee per sponsorship as input variable for the DEA, because we aim to analyze efficiency at the sponsorship level rather than at the brand/sponsor level. The input data come from SponsorMonitor, a market research report including data on the 50 Dutch firms with the largest total sponsorship expenditures (SponsorMaps & Respons, 2011). The report is published every year in March after the respective calendar year; in this work, we use the 2011 data.

In total, we collect data on 72 sponsorships involving sponsors from different industries. The selected sponsorships include sports properties only and have estimated annual rights fee investments of at least €100,000. We exclude endorsement deals and sponsorships in which the corporate brand is not communicated. Some sponsors are involved with several sponsored properties and some properties have more than one sponsor. We investigate whether synergy affects our efficiency scores by testing the difference in mean DEA scores between the group of single sports projects and the group of multiple projects in a single sports category.

Output Variables for DEA

We include several sponsorship-specific output variables, measuring the extent of consumer processing

Figure 1 — DEA example with one input and two outputs.

of sponsorship at a cognitive (sponsorship familiarity) and affective level (attitude toward the sponsorship and perceived sponsorship fit). As the purpose of this study is determining the performance of different sponsorship projects, we choose output data on the sponsorship level (relating expenses on sponsorships to sponsorship-specific outcomes), rather than including output data on the firm level (relating expenses on sponsorships to firm-specific outcomes). Several of the selected sponsoring firms are involved in multiple sponsorship projects and we want to isolate the efficiency of individual projects, which is difficult with brand- or firm-level data. More-over, we expect sponsorship-specific output data to be more strongly correlated to sponsorship investments than output data on the firm level, which is desirable given the deterministic nature of DEA. Output data on the firm or brand level such as market share or brand-perception fig-ures are influenced by many other variables than sponsor-ship, so the relation between inputs and outputs might be diluted. In addition, we believe sponsorship-specific data are better comparable than output data on the firm level for sponsoring firms operating in different industries.

To collect output data, we developed a short survey for an online panel of Dutch consumers older than 16 years. All panel members complete the questionnaires anonymously, which makes their answers less likely to be image enhancing. The management of the panel attempts to keep respondents in the panel as long as possible and to motivate them to answer questions seriously. In total, 1,906 of the 2,746 panel members filled in the question-naire (response rate 69.4%). The average age of the respondents is 54.7 years with a standard deviation of 15.7 years. The sample consists of 54% males and their educa-tion levels varied. Each panel member answered the same questions for a maximum of eight randomly assigned sponsorship projects. The output scores per sponsorship are based on a minimum of 172 and a maximum of 200 respondents. Output data were collected in May 2012, before the large sports events that year.

Our output data are similar to the variables selected by Lohtia et al. (2007), who evaluated the efficiency of banner advertisements and included advertisement-related measures, such as attitude toward the advertise-ment and advertisement recall. We use one item for sponsorship familiarity ["Did you know (Brand X) is sponsor of (sponsored property X)]?": percentage of respondents answering "yes"); one item for attitude toward the sponsorship ["I value the sponsorship by (Brand X) of (sponsored property X)]": 5-point Likert-type scale, with anchors "completely disagree to com-pletely agree," recoded as percentage of respondents answering "agree" or "completely agree"; and one item for perceived fit ["(Brand X) fits as a sponsor of (sponsored property X)"]: 5-point Likert-type scale, with anchors "completely disagree to completely agree," recoded as percentage of respondents answering "agree" or "completely agree." We use single-item measures for the practical reason of minimizing respondents' admin-istrative burden. As Rossiter (2002) argued, the use of

single-item measurement is appropriate when the object and construct are concrete, as is the case in our research considering sponsorship effects. Moreover, Bergkvist and Rossiter (2007) showed that for the often-used constructs, attitude toward the brand and attitude toward the adver-tisement, similar to our variables, predictive validity of single-item measurement does not differ from multi-item scales of these constructs.

Table 1 displays descriptive statistics and correla-tions. An important requirement of DEA is that inputs and outputs are positively and significantly correlated (Luo & Donthu, 2001); in this study, all output variables fulfill this criterion. The restricted number of variables limits dimensionality problems.

Tobit Regression Model

After the calculation of efficiency scores, we estimate a Tobit regression model to investigate the drivers of sponsorship efficiency. Because the efficiency scores are censored (with an upper bound of 1 and a lower bound of 0), a traditional linear regression model is not appropriate. Therefore, we use the two-limit Tobit model (Heckman, 1979) to assess the roles of a number of spon-sorship characteristics in explaining variation in relative efficiency. Luo and Homburg (2007) also applied this model in their investigation of DEA-estimated advertis-ing and promotion efficiency. The model specification is formulated as follows:

$$y_i^* = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \beta_5 x_{5i} + \varepsilon_i$$

$$y_i \begin{cases} 0 \text{ if } y_i^* \leq 0 \\ y_i^* \text{ if } 0 < y_i^* < 1 \\ 1 \text{ if } y_i^* \geq 1 \end{cases}$$

where y_i represents the DEA efficiency score of sponsor-ship i and y_i^* represents the latent variable sponsorship efficiency. The five variables that we include to explain efficiency are x_{1i}, the level of clutter of the sponsorship i; x_{2i}, its duration; x_{3i}, the popularity of the sports category of sponsorship i; x_{4i}, the sponsored property type; and x_{5i}, the industry of the sponsor; ε_i is a normally distributed disturbance term, assumed to be independent between sponsorships.

We measure sponsorship clutter as the total number of sponsors involved with the property at the same sponsoring level. Sponsorship duration is measured by the number of contract years up to the moment of data collection. Because sponsorship duration may be determined simultaneously with efficiency (as one could expect efficient projects to be continued more often than inefficient projects), we conduct a test for possible endogeneity of sponsorship duration. Sports popularity is measured by a sports popularity index on a scale from 0 to 100. The index was constructed by Dutch research agency Duodecim, based on the number of Internet queries per sport category and based on the estimated number of practitioners in each sport (Duodecim, 2011).

Table 1 Descriptives and Correlations Between Input and Output Variables (N = 72)

Variable	M	SD	Minimum	Maximum	Correlation with input	Correlation with familiarity	Correlation with attitude	Correlation with perceived fit
Input variable[a]: Sponsorship budget	2,088.89	2,595.71	100	15,000	–	.505***	.393***	.385***
Output variable: Sponsorship familiarity	23.59%	18.69%	3.05%	88.37%	.505***	–	.675***	.683***
Attitude toward the sponsorship	33.68%	7.98%	16.75%	70.47%	.393***	.675***	–	.836***
Perceived fit	22.42%	11.36%	5.53%	58.55%	.385***	.683***	.836***	–
N	72							

Note. [a]Variable in thousands of Euros; *p < .1, **p < .05, ***p < .01.

Besides testing the formulated hypotheses, we want to investigate whether sponsorship efficiency varies with the category of sponsorship properties and sponsor industries. Therefore, we include dummy variables for the sponsorship property categories "league/event" and "sports federation," where team sponsorship serves as the reference category (none of the sponsorships in our sample concern individual athletes). Furthermore, we include four dummy variables for the important sponsor industry categories "beer brands," "financial service providers," "sports brands," and "B2B services," where the sponsors in other industries serve as a reference category.

We explicitly test for endogeneity of the independent variable of sponsorship duration, because of the concern that sponsorship duration and sponsorship efficiency are determined jointly. To address this concern, we use the exogeneity test for Tobit models by Smith and Blundell (1986). Under the null hypothesis, the model is appropriately specified and all explanatory variables are exogenous; under the alternative hypothesis, sponsorship duration is determined endogenously. To test this hypothesis, we estimate an additional regression equation where sponsorship duration is determined by several instruments: measures for size of the sponsor (in terms of revenue and number of employees), the number of years the brand name exists, the sponsored property type, and whether the head office of the sponsor is located in The Netherlands. Next, we include the residuals of this auxiliary regression in the original Tobit model. If the regression coefficient of these residuals is not significant, endogeneity of sponsorship duration is not a problem.

Results

Efficiency Scores

Figure 2 displays the distribution of the DEA scores. The efficiency scores of the total sample range from 0.016 to 1.0, with an average score of 0.29. A total of 9 of 72 sponsorships are found to be efficient (projects with an efficiency score of 1, lying on the frontier), whereas 37.5% of the sponsorships in the sample have efficiency scores lower than 0.1 (Figure 2).

Table 2 describes the efficient sponsorships. These projects involve only six different sponsors, because three sponsors are efficient with two sponsorship properties: the Amstel beer brand (sponsoring the cycling event Amstel Gold Race and soccer team Ajax), insurance company Univé (sponsoring the Bam-Univé marathon skating team and the Univé Gym Gala, a gymnastics event), and financial service provider Rabobank (sponsoring 2 cycling properties: the professional Rabobank cycling team and the Dutch cycling federation).

The efficient projects differ greatly from each other, as can be seen in Table 2. The Rabobank cycling team has by far the largest estimated sponsorship fee with €15 million and the highest score on familiarity, where perceived fit and attitude toward the sponsorship are also relatively high. In comparison, Essent achieves above-average scores with relatively low deal expenditures (€200,000) and the two projects of Univé (the marathon skating team and the gymnastics event) have the lowest estimated rights fees in the sample (both €100,000), average scores on attitude toward the sponsorship, and below-average scores on familiarity and perceived fit.
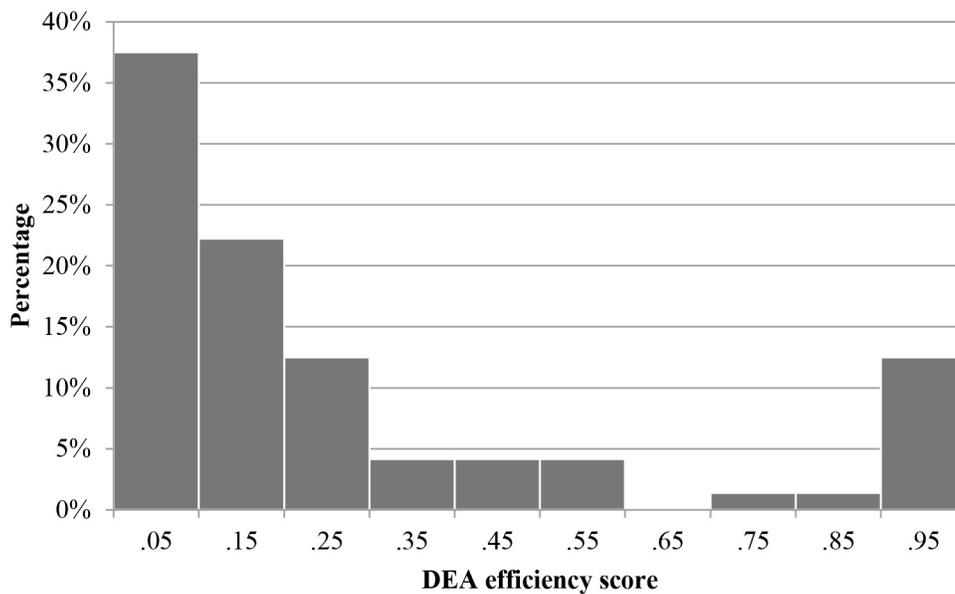
Figure 2 — Distribution of the DEA efficiency scores.

Table 2   Efficient Sponsorships

Sponsor	Sponsor category	Sponsored property	Sports category	Property type	Input: budget[a]	Output 1: Familiarity	Output 2: Attitude to the sponsorship	Output 3: Perceived fit
Rabobank	Financial services	Rabobank Cycling Team	Cycling	Team	15,000	88.37%	54.11%	46.86%
Rabobank	Financial services	Dutch Cycling Federation	Cycling	Federation	600	49.02%	45.00%	35.00%
Philips	Durables	PSV	Soccer	Team	7,000	82.87%	58.55%	70.47%
Amstel	Beer brand	Amstel Gold Race	Cycling	Event	2,000	68.06%	51.08%	46.77%
Amstel	Beer brand	Ajax	Soccer	Team	600	16.42%	43.35%	38.92%
Grolsch	Beer brand	FC Twente	Soccer	Team	1,000	40.44%	43.83%	44.68%
Essent	Energy	Thialf	Speed skating	Stadium	200	31.77%	48.44%	31.25%
Univé	Financial services	BAM-Univé team	Speed skating	Team	100	20.41%	33.81%	19.52%
Univé	Financial services	Univé Gym Gala	Gymnastics	Event	100	7.39%	31.77%	14.58%

Note. [a]Variable in thousands of Euros.

In our sample, 10 sponsors have more than one project in the same sports category. To see whether this affected the efficiency scores, we calculated average DEA scores separately for the group of single sports projects and for the group of multiple projects in a single sports category. Single sports projects have a lower overall efficiency score than the sponsorships with another property sponsored in the same sports category (0.249 vs. 0.391), although the difference is not statistically significant (t test, $p = .125$).

To illustrate how DEA results can help individual sponsorship managers in improving the efficiency of a sponsorship, we conducted peer analyses for the two inefficient sponsorships with the highest efficiency score: financial service provider Aegon sponsoring the Dutch rowing federation (efficiency score 0.821) and beer brand Jupiler as the sponsor of the Eerste Divisie (the second highest league of Dutch professional soccer; 0.714). Aegon paid a sponsorship fee of €150,000 and the output scores are 4.7% (familiarity), 19.1% (fit), and 37.1% (attitude). This sponsorship is compared with the efficient peers Univé with the speed skating team (rights fee €100,000) and Essent with the Thialf ice stadium (rights fee €200,000). If it had been efficient, the Aegon sponsorship would have attained its actual output levels with a sponsorship fee of about €123,000 (= 0.821 × 150,000), instead of the actual €150,000. By contrast, Jupiler (with a DEA score of 0.714) has two different peers, namely, Rabobank with the Dutch cycling federation and Amstel with the cycling race event. If it had been the best practice, the same effects on consumers would have been attained with an investment of about €928,000 instead of the actual €1,300,000.[1]

Furthermore, as an example, we conducted the same analysis for a relatively inefficient project: the Nike sponsorship of the Dutch soccer federation (DEA score: 0.073). This sponsorship has an estimated contract investment of €7.5 million and output scores of 22.1% (familiarity), 37.7% (perceived fit), and 42.2% (attitude toward the sponsorship). These output scores follow a similar pattern as the output scores of Essent with the Thialf ice stadium, Amstel with Ajax soccer team, and Grolsch with FC Twente soccer team, and therefore, these three efficient sponsorships are assigned as peers. The peer projects have much lower contract fees though, which causes the low efficiency score for Nike soccer federation sponsorship. If this sponsorship had been efficient, the targets would have been attained with a contract deal of about €544,928. These kind of results should warrant further investigation by the sponsor and they should be interpreted carefully, because it does not automatically mean that the sponsorship is invaluable or not worth the investment made. A score like this may rather be treated as a signal and starting point for evaluation of the sponsorship (and formulated objectives), the characteristics of peer projects, and input and output measurements, as we discuss in the "Discussion" section.

Tobit Results: Drivers of Sponsorship Efficiency

As a second step in this benchmarking study, we explain efficiency scores obtained with the DEA model, as expressed in Eq. (1). The effects of the covariates are given in Table 3. To check for multicollinearity, we computed the variance inflation factor for each explanatory variable. All variance inflation factors are below the commonly used threshold of 10 (Hair, Anderson, Tatham, & Black, 2006). Hence, the model estimation does not suffer from multicollinearity problems.

As can be seen in Table 3, sponsorship efficiency is significantly negatively related to sponsorship clutter ($\beta = -.037$, $p = .002$), so we find empirical support for H1. Sponsorship duration has a significant positive impact on sponsorship efficiency ($\beta = .008$, $p = .019$), which confirms H2. H3 reflects our expectation of a positive effect of sports popularity on sponsorship efficiency. In Table 3, the effect of sports popularity on sponsorship efficiency is not significant ($\beta = -.002$, $p = .236$), so we find no empirical support for H3.

With regard to the control variables, we do not find a significant effect of sponsored property type on sponsorship efficiency, but there are differences between sponsor industries. In particular, we find that beer brands ($\beta = .344$, $p = .002$) and to a smaller extent financial service providers ($\beta = .177$, $p = .052$) have a higher degree of sponsorship efficiency than sponsors operating in other industries.

The results of the endogeneity test can be found in the last three columns in Table 3. Because the effect of the residuals is not significant ($p = .538$), we conclude that possible endogeneity of sponsorship duration does not bias our results.

Robustness of the DEA Results

To assess the robustness of our results regarding the efficient set of sponsorships, we estimate three alternative DEA models, each with a different combination of two of the three output variables. The correlations with the original DEA model are high; 0.934 for DEA 2, 0.896 for DEA 3, and 0.998 for DEA 4, thus confirming the stability of our results. Table 4 provides an overview of the efficiency scores and rankings of the 20 best-performing sponsorships for the three different models.

In DEA Model 2, we use only attitude toward the sponsorship and sponsorship awareness as output variables. Thus, we exclude perceived fit from the model. Compared with the first DEA, we find seven sponsorships remaining efficient. Two sponsorships are inefficient compared with the first DEA model; both soccer sponsorships with a beer brand as sponsor (Amstel sponsoring Ajax and Grolsch sponsoring FC Twente). This suggests that the level of perceived fit between these beer brands and the soccer clubs was high, which causes high sponsorship efficiency when fit is included as an output variable.

Table 3 Tobit Results: Explaining Sponsorship Efficiency Scores

Dependent variable: DEA efficiency score	Tobit without endogeneity control			Tobit with endogeneity control		
Independent variable	β	Standard error	p	β	Standard error	p
Sponsorship clutter	−.037	.011	.002	−.036	.011	.002
Sponsorship duration	.008	.003	.019	.016	.012	.197
Sports popularity	−.002	.001	.236	−.001	.001	.339
Property Type (Reference: Team)[a]						
Event/league	−.016	.099	.869			
Federation	−.060	.093	.520			
Sponsor Industry (Reference: Other Industries)						
Financial service	.177	.089	.052	.149	.088	.097
Beer brand	.344	.105	.002	.295	.113	.011
Sports brand	.002	.129	.987	−.004	.144	.977
B2B services	.009	.111	.932	−.017	.115	.882
Residuals auxiliary regression				−.008	.013	.538

Note. [a]The property-type variables have been used as predictors in the auxiliary regression, and therefore, these variables were left out of the model with endogeneity control.

Table 4 DEA Scores and Rankings of the Highest-Scoring Sponsorships

	Sponsor	Property	Score DEA 1	Ranking DEA 1	Score DEA 2	Ranking DEA 2	Score DEA 3	Ranking DEA 3	Score DEA 4	Ranking DEA 4
1	Amstel	Amstel Gold Race (cycling event)	1	1	1	1	1	1	1	1
2	Philips	PSV (soccer team)	1	1	1	1	1	1	1	1
3	Univé	Bam-Univé marathon ice speed skating team	1	1	1	1	1	1	1	1
4	Essent	Thialf (ice hall)	1	1	1	1	1	1	1	1
5	Univé	Univé Gym Gala (gymnastics event)	1	1	1	1	1	1	1	1
6	Rabobank	Royal Dutch Cycling Federation	1	1	1	1	0.659	9	1	1
7	Rabobank	Rabobank Cycling Team	1	1	1	1	0.268	14	1	1
8	Grolsch	FC Twente (soccer team)	1	1	0.401	15	1	1	1	1
9	Amstel	Ajax (soccer team)	1	1	0.275	18	1	1	1	1
10	Aegon	Royal Dutch Rowing Federation	0.821	10	0.821	8	0.821	8	0.667	11
11	Jupiler	Jupiler League (first division soccer)	0.714	11	0.714	9	0.139	34	0.714	10
12	ABN AMRO	ABN AMRO World Tennis Tournament	0.576	12	0.576	10	0.066	60	0.576	12
13	Univé	NOS Studio Sport (sports TV program)	0.571	13	0.571	11	0.521	11	0.571	13
14	Delta Lloyd	Hiswa (sailing event)	0.529	14	0.500	12	0.529	10	0.529	14
15	Bavaria	Bavaria City Racing (car racing event)	0.482	15	0.482	13	0.259	15	0.482	15
16	Rabobank	Indoor Brabant (horse riding event)	0.446	16	0.262	19	0.446	12	0.446	16
17	ABN AMRO	Ajax (soccer team)	0.441	17	0.441	14	0.186	25	0.441	17
18	TVM	TVM speed skating team	0.398	18	0.398	16	0.047	66	0.398	18
19	Eneco	Eneco Tour (cycling event)	0.383	19	0.383	17	0.080	47	0.383	19
20	Delta Lloyd	Delta Lloyd Regatta (sailing event)	0.338	20	0.250	21	0.338	13	0.338	20

Note. DEA 1 output variables = sponsorship familiarity, attitude toward the sponsorship and perceived fit; DEA 2 output variables = sponsorship familiarity, attitude toward the sponsorship; DEA 3 output variables = attitude toward the sponsorship and perceived fit; DEA 4 output variables = sponsorship familiarity and perceived fit.

Next, we estimate DEA Model 3 with perceived fit and attitude toward the sponsor as output variables, so excluding sponsorship familiarity. In this case, we also find seven efficient sponsorships. Compared with the baseline DEA model, the two Rabobank sponsorships in cycling are not efficient anymore. Furthermore, several sponsors that possess naming rights of the sponsored property (such as TVM speed skating team, Jupiler soccer league, the ABN AMRO Tennis Tournament, and the Eneco Tour, a professional cycling event) have notably lower efficiency scores when sponsorship awareness is excluded. These sponsorships thus derive their efficiency particularly from a relatively high level of sponsorship familiarity.

The results from DEA Model 4 with sponsorship familiarity and perceived fit as output variables are highly similar to the results with the three output variables. Thus, the elimination of attitude toward the sponsor does not affect the efficiency scores to a large extent.

Discussion

In this study, we show how DEA can be applied to investigate the relative efficiency of sponsorships. This is an important extension of previous research on sponsorship effects, because multiple consumer outputs of sponsorship in relation to the sponsorship fee are assessed simultaneously, rather than examining consumer processing or capital markets effects in isolation. In our application of DEA, sponsorships are benchmarked against efficient projects operating with similar situations and scales, so sponsorship heterogeneity is accounted for. Furthermore, DEA works well with multiple inputs and outputs, without having to assign subjective weight specifications. This is suitable for sponsorship because sponsors may have multiple objectives and some sponsors will focus on different objectives than others.

The application of DEA in this study of 72 major Dutch sport sponsorships reveals that nine of the investigated sponsorships are efficient, which is equal to 12.5%. This number of efficient projects is similar to the results reported by Luo and Donthu (2001), who found nine of 63 firms to be efficient. This similarity in results is plausible, because their research setup is similar to ours with a sample including companies from different industries, a model consisting of five input/output variables in total (which is close to four in our model), and a similar input variable definition, namely, advertising budgets.

The average efficiency score in our research is 0.3, which implies that the average project would have attained the same results with 30% of its budget if it had been performing as well as its benchmark. An inspection of the efficient projects leads to the conclusion that efficiency can be achieved at any sponsorship budget level. Among the efficient projects are sponsorships that achieve high output levels with high fees and also sponsorships that attain more modest output levels with relatively low rights fees. This is an illustration of the ability of DEA to benchmark projects against similar projects only, thereby providing sponsorship managers of inefficient projects with clues

(in particular, characteristics of their efficient peers) to investigate how efficiency can be achieved. We show with an input-oriented model how an analysis of peers allows one to calculate by how much sponsorship rights fees could be decreased if the projects would be conducted efficiently. For sponsorship managers, results from a DEA could be viewed as the starting point for evaluation of their sponsorship projects and as input for contract negotiations with sports properties. In particular, a relatively low DEA score has a signaling function, suggesting that further investigation into the costs and benefits of a sponsorship is warranted. Moreover, a high DEA score could indicate a relatively lucrative contract deal, high effectiveness of sponsorship project management, as well as high-quality design of leverage activity and/or a high leverage budget. A next step would be an in-depth case study analysis of the value of a particular sponsorship project taking into account the quality of sponsorship management decisions and the level of the acquired rights fee. This evaluation involves questions such as the following:

- Are predefined sponsorship objectives achieved and is achieving predefined objectives worth the total costs (rights fee and leverage investments)?
- Could the project have additional beneficial synergy effects on other projects in the total sponsorship portfolio or in the total marketing communication mix?
- What characterizes the efficient peer sponsorships in terms of sponsorship rights, integrated marketing communication strategy, and leverage activity?

Our sample includes some projects of the same sponsor, which are most probably not entirely independent. Efficient sponsorships could have profited from other complementary sponsorships of the same sponsor and this should be taken into account when interpreting the results. For example, the Essent ice stadium sponsorship is found to be efficient with a relatively low sponsorship fee, but this could be due to the other Essent sponsorship in the sports category speed skating, which has a higher estimated rights fee. By further inspection of these synergy effects, we find that single sports projects have a lower overall efficiency score than the sponsorships with another property sponsored in the same sports category, but the difference is not significant. We encourage further examination of this issue, as we discuss in the "Limitations and Directions for Further Research" section.

The results of our Tobit analysis reveal that drivers of sponsorship efficiency are to a large extent similar to the factors previously found influencing consumer processing of sponsorship, which underlines their importance. Previous research reported a negative effect of sponsorship clutter (Cornwell et al., 2000) and a positive effect of sponsorship duration on consumer processing of sponsorship (McAlister et al., 2012; Walraven et al., 2014). Consistent with our hypotheses, we find that sponsorship clutter has a negative effect on sponsorship efficiency, whereas sponsorship duration has a positive effect. For sponsorship managers, this implies that contract duration

and the number of other sponsors are important selection criteria that should be taken into account during sponsorship contract negotiations.

From the opposite perspective, we recommend managers of sports properties to consider the effects of sponsorship duration and clutter while designing their sponsorship packages. For example, although it may seem attractive for a sports property to have as many sponsors as possible, one could question whether the sponsorship relation will be successful from a sponsor's perspective. The findings of Carrillat, Harris, and Lafferty (2010) also emphasize that contracting multiple sponsors should be considered carefully; they demonstrate that image transfer (or contrast) between concurrent sponsors may be a side effect of sponsorship. Furthermore, the results of this study provide managers of sponsored properties with an empirical argument to convince sponsors of the added value of long-term agreements.

Contrary to our hypothesis, we find a significant effect of sports popularity on sponsorship efficiency. Managers should be aware that positive exposure and attention effects may be offset by the higher rights fees required for properties in popular sports categories. Wishart et al. (2012) reported a positive influence of media coverage and attendance on sponsorship asking prices. Therefore, as sponsors realize the potential benefit of a popular sports category in terms of media exposure and involvement of the target group, agreements become more expensive and possibly less efficient.

The results do not indicate significant differences in efficiency for different property types. This would imply that efficiency is not influenced directly by choosing for one sports category or property type rather than another; rather, different efficiency scores could be due to differences in acquired sponsorship rights and in leverage design per project. For example, sponsorship of a team may or may not involve naming rights, shirt logo exposure, and acquisition of additional commercial airtime, leading to differing degrees of efficiency. Future research could further explore these sponsorship management factors, as we suggest in the next section.

Some industry effects are present; in particular, sponsorship by beer brands seems to be relatively efficient compared with other sponsor industries. An explanation for the finding might be that alcohol brands have a long tradition of being involved in sponsorship (Meenaghan, 1983) and that these brands have established a strong reputation as sports sponsors and built up a high level of experience in sponsorship project management, making it perhaps more likely for the public to identify these brands as sponsors and to judge these partnerships as matching.

Limitations and Directions for Future Research

This study is, to the best of our knowledge, the first DEA application to sponsorship, and subject to several limitations, which create interesting opportunities for future research. First, we use data on a sample of Dutch sponsorships for 1 year, so the findings cannot directly be generalized to other sponsorship markets or periods. Therefore, we would encourage replication of this study with samples from other countries (or cross-national samples) and with longitudinal data. Furthermore, it is important to acknowledge that the data used in this study come from different external sources and publications (e.g., data on the estimated sponsorship fees and sports popularity). Therefore, the quality of the underlying data-collection processes could not be fully evaluated. A replication of this study with other data sources would yield insights into the robustness of the results. In this respect, particularly the role of sports popularity and sports involvement could be an interesting avenue for further research. In this study, we use a measure based on Web traffic and number of practitioners as a proxy for general consumer interest per sports category. However, this does not reflect individual involvement with a particular sport, which could also affect sponsorship's success. A less popular sports category may have a smaller group of spectators or practitioners, but their involvement level may be relatively high, contributing to the efficiency of sponsorship. Therefore, future research could include a more direct measure of individual sports involvement as a determinant of sponsorship efficiency.

Second, we deliberately choose to use sponsorship consumer processing variables as outputs in our DEA model. Yet, these variables can be considered means-to-end variables, rather than true firm outcomes. Future research could aim at applying DEA with brand-specific outcomes, such as increases in brand awareness, provided that a positive correlation with sponsorship budgets is observed. Furthermore, although most sponsorships are directed at contributing to customer-based brand equity (Crompton, 2004), accounting for other objectives would be appropriate. As such, different outputs of sponsorships, for example, merchandise sales figures, customer data (reflecting relationship marketing objectives), or employee data (as sponsorships can be directed at an internal audience), could be incorporated.

Third, this research does not directly take the composition of the sponsorship rights package and sponsorship leverage into account. Sponsorship leverage involves communicating the sponsorship agreement and developing activities to profit from it. Previously, scholars recognized that a sponsor should spend substantial additional resources for leverage to be able to fully profit from signing a sponsorship agreement (Fahy, Farrelly, & Quester, 2004). Accordingly, previous research indicated that sponsors who invest in proper leverage of their sponsorship achieve more favorable consumer processing (Wakefield et al., 2007; Weeks, Cornwell, & Drennan, 2008). Moreover, different rights can be acquired for the same property types, for example, naming rights, shirt exposure, boarding. We would welcome DEA applications using both sponsorship rights fees and leverage budgets as input variables. Moreover, it would be valuable to investigate the effects of different sponsorship package and leverage options on sponsorship efficiency.

Finally, synergies between different sponsorships would be another interesting topic for further research. Many sponsors pursue a multiple sponsorship strategy with several projects as part of a portfolio. Sometimes sponsored properties fall in the same sports category, whereas sometimes projects in other sports or even other sectors (such as culture) are sponsored. In this respect, Speed and Thompson (2000) previously reported a positive influence of perceived ubiquity of the sponsor (consumers' perception of the degree of focus in sponsorship activity) on consumer's affective and conative reactions to the sponsorship. Our results also indicate a positive effect of focus in sponsorship strategy, as we find a higher efficiency score for sponsorships with complementary sponsored properties in the same sports category, while the result is not significant. Future studies could further explore the synergies in sponsorship projects and investigate sponsorship's efficiency on a strategy level rather than on the project level.

Conclusion

Sponsorship has become a crucial element in today's marketing (communication) mix and the required investments for major sponsorship deals are significant. However, while marketing expenditures are being increasingly subjected to accountability, research on sponsorship's effectiveness stays behind in both business practice and academics. Therefore, this paper proposes DEA as a method for benchmarking the efficiency of sponsorship deals. In total, we collected data on 72 sponsorship deals involving sponsors from different industries.

We find a high degree of variety in efficiency scores and an efficiency level of 12.5% in the sample; nine of 72 sponsorships are efficient. We suggest to use the individual DEA scores for a peer analysis to identify efficient sponsorship projects (peers) and to show the difference in what would make an inefficient sponsor efficient. Moreover, we use the DEA scores as a dependent variable in a Tobit regression model and find that sponsorship clutter negatively affects sponsorship efficiency, whereas sponsorship duration has a positive effect. We do not find a significant effect of sports popularity on sponsorship efficiency.

As this research is a first attempt to apply benchmarking in a sponsorship context, we encourage future research in this area to consider different sponsorship markets and different sets of inputs and outputs. Moreover, researchers could examine the effect of other determinants of efficiency, such as sponsorship leverage and project synergy.

Notes

1   The maximum number of peers for an inefficient DMU equals the sum of the numbers of inputs and outputs. The stronger the pairwise correlations between inputs and outputs, the fewer peers per inefficient DMU will be assigned. High pairwise correlations

among outputs suggest that these are generally not substitutable for each other (O'Donnell, Chambers, & Quiggin, 2010). In the present context, the pairwise correlation coefficients for the output levels of the set of efficient sponsorships are .886, .815, and .906. This explains why Aegon's sponsorship of the Dutch rowing federation and Jupiler's sponsorship of the Eerste Divisie in soccer are benchmarked against two peers instead of four.

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