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**Implications for tourism management of including uncertainty in the estimation of the economic impact of sports events.**

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3 **Implications for tourism management of including uncertainty in the estimation of the**  
4 **economic impact of sports events.**  
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10  
11 **Abstract**  
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15 **Purpose:** Studies that measure the economic impact of events usually disclose deterministic  
16 results. This situation implies a methodological problem that compromises the veracity of the  
17 estimates. This aspect is particularly relevant in the field of sports tourism. For these reasons,  
18 we empirically analyse the estimate of the initial injection of money from sporting events  
19 considering uncertainty and show its variability.  
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26  
27 **Methodology:** Using surveys from five sporting events, a database with a total of 2,902  
28 responses is analysed. With these cases as illustration to show the problem, the initial  
29 injection of money from the events is estimated. To include the uncertainty derived from the  
30 use of data gathered in the surveys, the confidence intervals are obtained using bootstrap.  
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37 **Findings:** We find remarkable differences between our results and deterministic results. In  
38 general, except for one of the events studied, the adverse possible scenario of being in the  
39 lower limit is higher than the more positive possible scenario. Moreover, in some cases, the  
40 lower limit is around 1/3 of the average or higher. It can imply an important cut in the  
41 expected impact. The results obtained allow us to show the differences between deterministic  
42 studies and those which include uncertainty.  
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51 **Originality:** The work presents prominent implications. Empirically, the inclusion of  
52 uncertainty in economic impact studies provides greater reliability to the results, defeating the  
53 idea of deterministic estimates. Managerially, working only with deterministic results limits  
54 the decision-making capacity of managers and speculation increases in impact studies.  
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## Introduction

The estimation of the economic impact of events presents some limitations. Some of them have been widely reflected in the literature. This problem can be clustered in three main aspects: conceptual, statistical, and methodological (Barajas et al., 2012; Pedrosa & Salvador, 2003). The identification of these limitations and the key actions for their improvement has been developed by Hunter (1988), Crompton (1995), and Matheson (2006). Besides, the dishonest computation of impact studies profoundly affects the accuracy of the estimates. This trait has been analysed by Baade and Dye (1990), Baade (1994), Coates and Humphreys (1999, 2001, 2003a, 2003b), Hudson (2001), Baade et al. (2005, 2008), and Crompton (2006).

Regarding the methodology, there is no unanimity on which one is the most appropriate for estimating the economic impact. Barajas et al. (2012), and Pedrosa and Salvador (2003) explain that input-output tables and Cost-Benefit analysis are the most widely used methodologies. These methods are not mutually exclusive but can be used complementarily (Barajas et al. 2012). Regardless of the applied methodology, it is necessary to consider the measurement of three effects (substitution, displacement, and leakage effect) in order not to incur errors in the estimation (Matheson, 2006). Crompton (1995) and Mules and Faulkner (1996) were among the first authors to point out a latent problem in measuring economic impact. In this way, these authors empirically identify that the organisation of a sporting event does not imply an indisputable benefit for the host city and that errors also occur in the measurement, either due to ignorance or on purpose. In this sense, Crompton (2006) carries out a compilation of economic impact studies of events that make mistakes in their elaboration, overestimating the results. Consequently, wrong estimates with deviations concerning the real economic impact appear given the intrinsic limitations in the estimating

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3 process. For this reason, it is necessary to include the deviation that may occur in the  
4  
5 measurement of the economic impact.  
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8 Gezt and Page (2016) explain that previous studies have mainly focused on mega-events and  
9  
10 their economic impact. However, there is no consensus around the economic effects generated  
11  
12 by them. Even in practice, as Huei-Wen and Huei-Fu (2018) explain, the real benefits of  
13  
14 mega-events are outweighed by the costs associated with the event preparation. Currently,  
15  
16 there is a stream of research that defends the importance of small and medium-sized events in  
17  
18 generating benefits for the host cities (Taks et al., 2011; Taks et al., 2013). Veltri et al. (2009)  
19  
20 and Ziakas and Costa (2011) explain that these events are easier to manage, have lower costs,  
21  
22 and can generate economic and tourist impact on the host city. In any case, analysts face the  
23  
24 same problem in estimating their economic impact as when evaluating it in the case of mega-  
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26 events.  
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32 For the reasons mentioned, the veracity of the estimates in impact studies is jeopardised. On  
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34 top of that, even if the methodology is properly applied and the economic impact guidelines  
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36 are followed, all estimates involve uncertainty. Indeed, the aspect of uncertainty has been  
37  
38 poorly included in the estimation of the economic impact in general and particularly in the  
39  
40 study of event tourism. Besides, dealing with uncertainty has not been considered  
41  
42 theoretically in economic impact studies in the sports tourism field of scientific literature.  
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47 The key issue on what we draw attention to is that economic impact reports rarely conduct  
48  
49 any sort of sensitivity analysis or address the fact that responses to surveys are estimates from  
50  
51 a sample of a population rather than the exact number representative of that whole population.  
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53 Had a different sample of individuals responded to the survey, the mean reported spending  
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55 and days would be different, so the implied impact would also be different. Consequently,  
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57 rather than rely on the single point estimate, we suggest that a range of values for spending  
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3 and length of stay be used. Thus, the objective of this work is to show the estimate of the  
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5 initial injection of money from sporting events considering the influence of uncertainty. For  
6  
7 this, five previous economic impact studies on sporting events are considered. The estimation  
8  
9 is replicated including uncertainty. The selected events are medium in size and were  
10  
11 organised in different towns in Spain. This exercise allows us to distinguish the implications  
12  
13 for management when considering the effect of uncertainty in the results. It is important to  
14  
15 remark that the studies presented here do not claim to be a sample but study cases that allow  
16  
17 us to illustrate the problem introduced in the paper. Similar results would be obtained in other  
18  
19 sports events.  
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25 When analysing economic impact of events, there certainly is an opportunity cost to the  
26  
27 public funds. However, for the purpose of this paper this is not a problem. Our argument is  
28  
29 that decision-makers are given poor information about the benefits, and a means of improving  
30  
31 this information is to provide best and worst case scenarios regarding benefits. Whatever the  
32  
33 opportunity cost of the funds, the net impact of the event will be smaller in the worst case  
34  
35 scenario than in the average case typically reported, and the decision made with this more  
36  
37 complete information will tend to be better than decisions made with incomplete information.  
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#### 41 **Literature review**

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44 Articles that include uncertainty in economic impact studies are scarce, especially in areas  
45  
46 such as sports and tourism. Furthermore, there is a gap in recent bibliometric studies on the  
47  
48 consideration of uncertainty in studies of the economic impact of events. This absence occurs  
49  
50 not only in the field of the economic impact of sports (Li & Jago, 2013; Salgado-Barandela et  
51  
52 al., 2017; Sánchez & Castellanos, 2011) but also in the field of sports tourism (Comerio &  
53  
54 Strozzi, 2019; Getz & Page, 2016). Even when these papers present exhaustive reviews, they  
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3 do not find the measurement of uncertainty as an aspect explicitly considered in the literature.

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5 However, it is possible to find a set of works where uncertainty is included in the analysis.

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Uncertainty is considered in the studies of the impact of universities. Findler et al. (2019) show this reality. The paper by Pastor et al. (2013) includes uncertainty in the economic impact study of Valencian public universities. These authors use Monte-Carlo simulations to introduce stochastic elements in the estimate of economic impact. They remark the importance of considering uncertainty in the use of multipliers from Input-Output tables. Pastor et al. (2016) study the effect of Spain's universities on its economy. They introduce uncertainty considering several scenarios and analyse the theoretical impact on the Spanish economy. Roessner et al. (2013) use Input-Output tables with several scenarios to estimate the contribution of university licensing in the U.S. economy.

In the field of tourism, Comerio and Strozzi (2019) performed a bibliometric analysis of tourism and its economic impact. They explain – citing the paper by Zhou et al. (1997) – that the study of the economic impact of tourism at the national and regional level was analysed using Computable General Equilibrium (CGE). This model allows to predict changes in prices, production, or economic welfare by developing different scenarios. However, the CGE rarely has been used in studies of economic impact of sporting events. Massiani (2018) identifies twenty mega-events whose impact has been estimated using CGE and remarks that CGE is a powerful tool for estimating the economic impact of mega-events. The research from this author illustrates the existence of errors in the adaptation of this methodology when applying it to specific events. In addition, it is a tool based on the assumptions and conceptions of the analyst, which can generate manipulation of the results.

Getz and Page (2016) indicate that the economic impact of events is among the main topics analysed in the field of event tourism. In turn, they suggest the need to standardise the

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3 evaluation of economic impact. However, neither Getz and Page (2016) nor Comerio and  
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5 Strozzi (2019) point to the inclusion of uncertainty in impact studies as an option to improve  
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7 estimates.  
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10  
11 It is worth mentioning the papers by Barajas et al. (2014) and Salgado-Barandela et al. (2019).  
12  
13 The former uses confidence intervals to measure the economic impact of a massive religious  
14  
15 event. The second includes the measurement of uncertainty through confidence intervals  
16  
17 using bootstrap to estimate the initial injection of money from a portfolio of sporting events.  
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21 Not considering uncertainty in the studies of the economic impact of events has two main  
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23 implications which make the deterministic results less reliable. First, the figures of the  
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25 economic impact that do not take into account uncertainty are unrealistic. The initial  
26  
27 consequence of that is the creation of the false idea of obtaining a level of impact that does  
28  
29 not exist. Some authors have analysed the consequences of presenting results in which an  
30  
31 inadequate application of the impact methodology is carried out; this is the case with the  
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33 works of Pedrosa and Salvador (2003), Barajas, Salgado, and Sánchez (2012), Hunter (1988),  
34  
35 Crompton (1995), Matheson (2006), Baade (1994), Crompton (2006), and Hudson (2001).  
36  
37 Complementarily, the acceptance in the scientific field of deterministic results validates the  
38  
39 dishonest use of economic impact studies, which profoundly affects the precision of the  
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41 estimates. The dishonest use of impact studies to offer overvalued results has been pointed out  
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43 in the scientific literature in studies such as those carried out by Baade and Dye (1990), Baade  
44  
45 et al. (2005, 2008), and Coates and Humphreys (1999, 2001, 2003a, 2003b).  
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51 Second, deterministic results invalidate their use for strategic decision-making in the field of  
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53 tourism. In this way, Csob'an and Serra (2014), Veltri et al. (2009), Agha and Taks (2015),  
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55 Kwiatkowski and Oklevik (2017), and Malchrowicz-Mos'ko and Poczta (2018) highlight that  
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57 the tourist and economic development of an area through the organisation of sporting events  
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3 requires correct strategic planning. Thus, if the impact studies do not use the right a priori  
4 results considering their implicit variability, the decision-making and the strategies proposed  
5 will not be valid.  
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## 10 **Data and methodology**

### 11 *Data*

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17 A database including data of five sporting events is used. The events have been organised in  
18 different towns in Spain. The original data was collected by a research group from the  
19 University of Vigo that carried out economic impact studies for each event. These studies  
20 used the Cost-Benefit Analysis methodology in estimating the direct economic impact  
21 generated. Using the data obtained in the surveys carried out, here the initial injection of  
22 money for the host city is re-estimated by taking into account the uncertainty.  
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32 Four of those competitions correspond to annual events with a change of venue –which means  
33 that each year the event is hosted in a different city. These events are the Spanish Master  
34 Swimming Championship (hereinafter Master Championship), the XVIII Spanish Senior  
35 Swimming Championship (hereinafter Senior Championship), the Spanish Schools Boys  
36 Basketball Championship (hereinafter Children’s Basketball Championship), and the Spanish  
37 Children’s Kickboxing Championship (hereinafter Children’s Kickboxing Championship).  
38 This type of event ensures the attraction of attendees regardless of the venue of the event,  
39 since most of the spectators are relatives and/or friends of the participants. Finally, the fifth  
40 event is the participation of the *Monbus Obradoiro* team from the city of Santiago de  
41 Compostela in the Spanish League of Basketball (ACB).  
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55 Master Championship is a four-day event where swimmers over the age of 25 participate.  
56 This event attracts a large number of participants (more than a thousand) who are in turn the  
57 spectators themselves. In addition, it is an event with a high average expenditure since it  
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3 attracts attendees from an age range with good purchasing power (Salgado et al., 2018a).  
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6 Meanwhile, the Senior Championship is the most important national swimming competition,  
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8 where the best Spanish swimmers come to achieve the necessary marks to access the  
9  
10 European championships. This event lasts four days and attracts attendees and participants  
11  
12 from all over Spain. The attendees are mostly relatives of the participants. The average  
13  
14 expenditure is lower than in the case of the Master Championship, as explained in the work  
15  
16 by Salgado et al. (2020).  
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19  
20 Children's Basketball Championship is a competition that lasts seven days, with a multi-stage  
21  
22 structure. Thirty-two teams from the different Spanish regions take part. They are divided into  
23  
24 eight groups during the initial phase. Participants come along with their families, which  
25  
26 ensures the attendance of spectators. The Children's Kickboxing Championship is a three-day  
27  
28 event where athletes participate nationwide. Almost all the spectators are relatives of the  
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30 participants, and due to the dynamics of the event itself, they remain in the host city  
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32 throughout the whole competition.  
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37 Finally, a league-type event is included in the study. Thus, it is a regular event that does not  
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39 change venue. *Monbus Obradoiro* participates in the Spanish professional basketball league  
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41 (*Liga Endesa*). In this way, the league competition attracts attendees throughout the year from  
42  
43 all over the autonomous community of Galicia and from the cities from which the visiting  
44  
45 team comes. In this case, the spectators do not have a family or friendship bond with the  
46  
47 participants, but rather come to enjoy the event given their sporting and competitive level.  
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51 In this way, events with distinctive characteristics are presented. This allows a broader  
52  
53 outlook on the variability that the consideration of uncertainty generates in the impact results.  
54  
55 Table I shows the host city of the event, the population, and the number of respondents to the  
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57 surveys conducted in each case. So, we work with a database that presents a total of 2,902  
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3 responses. For each event, the sampling error is 5% with a confidence level of 95%. Thus, the  
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5 database is representative of the spending behaviour of the attendees.  
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9 **INSERT TABLE I AROUND HERE**  
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11 The main elements for the estimation of the initial injection of money in the city are the days  
12 of stay, the total spending, and the number of persons that produce impact. It is worth noting  
13 some features of the two first variables. Table II introduces the descriptive statistics of the  
14 spending and days of stay at the events chosen to illustrate the problem of uncertainty. Figure  
15  
16 1 shows how the spending is clearly skewed to the left. The skewness for days of stay and  
17 spending have been tested using the Skewness/Kurtosis tests for Normality in Stata 14 and the  
18 Mardia mSkewness test for Normality. In all cases, skewness was found. We can extrapolate  
19 this intuition to most of the events as there will be a high level of concentration on low  
20 expenses and days of stay.  
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33 **INSERT TABLE II AROUND HERE**  
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36 **INSERT FIGURE 1 AROUND HERE**  
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### 42 *Methodology*

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44 The methodology proposed by Salgado-Barandela et al. (2019) is implemented in this paper.  
45 They propose a model to estimate the initial injection of cash for sports event portfolios.  
46 Taking it as a base, we will compare the estimations between a case in which uncertainty is  
47 considered and a case in which it is not. To include the uncertainty derived from the use of  
48 data from surveys, the calculation of confidence intervals using bootstrap is used. The data  
49 employed to estimate the economic impact of an event usually does not follow a normal  
50 probability distribution. This makes it inappropriate to estimate the confidence intervals using  
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3 the standard deviation. Monte Carlo simulation has been used as well. As Horowitz (1994)  
4  
5 explains, bootstrap largely eliminates the problem of incorrect finite-sample size. Monte  
6  
7 Carlo simulation and bootstrapping are very similar. The first method simulates data while  
8  
9 bootstrapping resamples the data repeatedly. The main advantage of bootstrapping is that it  
10  
11 does not make any assumptions regarding the distribution or its properties.  
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14  
15 The economic impact analysis of any event entails considering some data that are common  
16  
17 regardless of the methodology used. Usually, this information is obtained through estimates  
18  
19 based on evidence provided by the organisation along with conducted surveys. Thus, an  
20  
21 impact study needs three initial data:  
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- 24  
25 1. Daily Expenditure by person
- 26  
27 2. Days spent in the location
- 28  
29 3. Number of attendees with impact: The grounds of economic impact establish that only  
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31 non-resident attendees, whose main motivation is to attend the event, are the attendees  
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33 that inject new money into the territory (Preuss, Könecke, & Schütte, 2010)  
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38 Prior to the analysis, the Kruskal-Wallis H statistic is applied, which allows us to identify that  
39  
40 the variable days spent in the location is significant with respect to the dependent variable  
41  
42 daily expenditure by person, while the number of attendees is a certain data (no estimation is  
43  
44 needed). In the model proposed by Salgado et al. (2019), the daily expenditure per person  
45  
46 obtained from the surveys carried out in each event is used to estimate the confidence interval  
47  
48 for expenditure. Next, the confidence interval for spending is multiplied by the average  
49  
50 number of days of stay in the city due to the event. This allows for obtaining the range of total  
51  
52 spending per person. In obtaining the total injection of money from the spectators of the  
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54 event, the range of total spending per person is multiplied by the number of attendees with  
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56 impact.  
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3 We propose two measurement options based on the model proposed by Salgado et al. (2019).  
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5 Since the number of days of stay is also data with uncertainty, an estimate is also made using  
6  
7 the confidence interval of the number of days of stay by bootstrapping (option 1). Considering  
8  
9 a confidence interval for the number of days of stay, wider confidence intervals are obtained  
10  
11 for the initial injection of money. Option 2 uses the average number of days of stay,  
12  
13 considering it as a certain data. This second measurement option is proposed because it is  
14  
15 observed that the average number of days is close to the total duration of the event for all  
16  
17 cases. In this way, even if it is data estimated from the surveys, it presents a lower probability  
18  
19 of deviation with respect to the real figures.  
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24 Additionally, it must be considered that for some events the initial injection of money from  
25  
26 the participants is added. These are those cases in which this data is known with certainty and  
27  
28 for that reason, there is no uncertainty.  
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32 The results obtained while considering uncertainty are compared with those previously  
33  
34 estimated without including uncertainty in the studies of economic impact originally carried  
35  
36 out for these events. Likewise, the expenses generated by the event for the host city are  
37  
38 considered. Thus, decisions about the real economic impact of the event can be more  
39  
40 enlightening and allow different scenarios for planning.  
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## 44 **Results**

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47 The result of the initial injection of money is obtained for the five selected events. Table III  
48  
49 shows the estimate of the upper and lower limit of expenditure per person and number of days  
50  
51 that attendees stay in the territory due to the event using the bootstrap. This estimation option  
52  
53 may be more conservative as it considers not just the average but also uncertainty in the  
54  
55 expenditure and the days of stay. This table also presents the estimation using the  
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57 bootstrapped confidence intervals for the expenditure; it means that the average days obtained  
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3 from the survey data are used without considering its variability. Logically, the confidence  
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5 interval in the first case is wider than in the second option. Both cases offer an interval in  
6  
7 which the result of the initial injection of money would vary, and do not provide a  
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9 deterministic result that can misrepresent the true economic benefit for the territory. This  
10  
11 starts to point out the problem about which the present paper aims to warn.  
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15 **INSERT TABLE III AROUND HERE**  
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18 Table IV shows the difference in the results obtained through the use of confidence intervals  
19  
20 and the deterministic results obtained in the calculation of the economic impact of the events.  
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22 Naturally, the deterministic results are between the lower limit and the upper limit of the  
23  
24 range. The differences are remarkable. The result using confidence intervals allows  
25  
26 establishing different scenarios about what can happen. Meanwhile, the deterministic result  
27  
28 conveys the misconception that it is possible to accurately estimate the economic impact of an  
29  
30 event. However, that is not possible as the data come from surveys that allow estimating the  
31  
32 average, whereas the variance should not be ignored.  
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37 **INSERT TABLE IV AROUND HERE**  
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40 It is important to remark that bootstrapping was chosen to estimate the confidence intervals  
41  
42 because the distribution of the expenditures and days of stay are skewed to the left. Moreover,  
43  
44 the variance in the responses in the survey differs. For that reason, if we observe the  
45  
46 percentage of variation from estimates without considering uncertainty, we can see that this  
47  
48 difference varies notably. In general, except for the case of the Master Championship, the  
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50 adverse possible scenario of being in the lower limit is higher than the more positive possible  
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52 scenario. Moreover, in some cases, the lower limit is around 1/3 of the average or higher. It  
53  
54 can imply an important cut in the expected impact. This may be especially critical if subsidies  
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56 from the authorities are given based on that “expected” impact. Finally, it is also important to  
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3 point out that the variability will depend on the features of the attendees attracted by the event  
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5 and the conditions of the event itself. For example, the attendees to the matches of a  
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7 basketball team seem to be less dispersed, and for that reason, the range of variation is  
8  
9 narrower.  
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### 11 12 13 **Discussion** 14

15  
16 The inclusion of uncertainty in impact studies has important implications for estimating the  
17  
18 economic impact of sporting events. One aspect strongly criticised in the scientific literature  
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20 is the manipulation of the impact estimate for speculative purposes. Crompton (1995) and  
21  
22 Mules and Faulkner (1996) were pioneers in highlighting the existence of errors in the  
23  
24 estimates that led to offering overvalued results. Specifically, Crompton (2006) identified the  
25  
26 errors made in estimating the impact. Another aspect that has been widely analyzed is the  
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28 financing of new stadiums with public money based on the economic impact of professional  
29  
30 teams. Authors such as Baade and Dye (1990), Baade (1994), Coates and Humphreys (1999,  
31  
32 2001), Hudson (2001), or Baade et al. (2005, 2008) empirically demonstrate that the  
33  
34 economic impact of a professional team does not always justify the financing of a new sports  
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36 facility. In this way, considering uncertainty can reduce speculation in some studies by  
37  
38 avoiding presenting deterministic results. Thus, recipients of economic impact reports should  
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40 demand results that pose scenarios and allow them to develop contingency plans, bearing in  
41  
42 mind that a less positive impact than expected or even a negative impact may occur.  
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50 Considering management aspects, working only with deterministic results limits the decision-  
51  
52 making capacity of managers. Even though economic impact studies are often used only to  
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54 attract financial support from public administrations and sponsors, they also have important  
55  
56 implications for event management. Through economic impact studies, it is possible to  
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58 identify the specific economic activities where the economic impact of the event is directed  
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3 (Duglio & Beltramo, 2017; Salgado-Barandela et al., 2018a), the geographical distribution of  
4 the impact, the leakage of money to other territories (Daniels, 2007; Lee et al., 2017), and the  
5 analysis of the spending behaviour of the sports tourist (Brida and Scuderi, 2013; Salgado-  
6 Barandela et al., 2018b; Taks et al. 2009). This type of information about economic impact is  
7 very important in improving the efficiency of the event and making decisions in the financial,  
8 organisational, and strategic marketing fields. In this way, the approach of using different  
9 scenarios is a very useful tool for decision-making. Event managers can develop contingency  
10 plans based on the scenarios suggested by the lower and higher limits provided by the  
11 confidence intervals. Besides, they can analyse the possibilities of increasing tourist spending  
12 and study the spending profile of sports tourists. Public authorities can compare the impact  
13 generated by different events and thus also make a better distribution of resources. They can  
14 also understand the risk of subsidising events.

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31 No two events are the same from the perspective of economic impact measurement, since this  
32 depends both on the characteristics of the event and on the tourist resources and the  
33 infrastructure of the host city. Considering the events analysed, it can be seen that they  
34 present distinctive characteristics. Four of the events analysed are annual, changing venue  
35 every year. However, some differences are identified regarding the attraction of spectators,  
36 average expenditure generated, and the initial injection of money. Children's events  
37 (Children's Basketball Championship and Children's Kickboxing Championship) attract the  
38 parents and relatives of the participants. Meanwhile, the Master Championship does not  
39 attract spectators as such, but instead a very high number of participants, who are the ones  
40 who generate the impact. The Senior Championship implies a high competitive level but, as  
41 swimming does not attract the attention of the mass media, it does not bring spectators except  
42 the family and friends of the participants. Finally, *Monbus Obradoiro*, which is a league-type  
43 event, attracts spectators who come to watch the game, not motivated by having some kind of  
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3 relationship with the participants. In the last case, the attendance of spectators is more  
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5 unpredictable; for this reason, there is a marketing effort (partners, season tickets, promotions,  
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7 tickets raffle, etc.) to encourage attendance. This activity is not needed for the rest of the  
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9 events analysed, which already 'automatically' attract participants and spectators. In this  
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11 sense, a correct estimate of the impact, considering uncertainty, will be able to perfect the  
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13 strategies proposed for each type of event.  
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17 Previous literature review works find clues about future trends and developments in economic  
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19 impact studies. Although they do not make a direct reference to the inclusion of uncertainty,  
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21 they do refer to the need to continue improving the methods and estimates. In this sense,  
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23 future research in the area of impact must try to resolve the existing limitations (Salgado-  
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25 Barandela et al., 2017). Among these limitations, we can highlight: the need to unify the  
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27 conceptual framework (Getz & Page, 2016; Li & Jago, 2013; Salgado-Barandela et al., 2017),  
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29 the need to pursue transparency and integrity in the estimates (Getz & Page, 2016; Salgado-  
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31 Barandela et al., 2017), and the improvement and standardisation of the methodological  
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33 aspect (Getz & Page, 2016; Li & Jago, 2013). The inclusion of uncertainty in economic  
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35 impact studies provides greater reliability to the results, defeating the idea of deterministic  
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37 estimates. On the other hand, uncertainty should be applied to any impact estimation  
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39 methodology based on survey data. This will represent an improvement in the estimates and  
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41 will give them more credibility.  
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48 Regarding the specific aspects of the estimation process, it is considered important to identify  
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50 the data that are likely to present uncertainty and to include it when calculating the aggregate  
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52 result of the economic impact. It is also necessary to be cautious in the manner of reporting  
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54 the results. In that sense, it is more prudent to work with the lower limit approach. Besides, it  
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56 is always necessary to ensure that the lower limit of the economic impact exceeds the  
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58 expected expenses. If that is not the case, it would be necessary to consider how to cut  
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3 expenses. Additional actions should be taken, including checking whether spending can be  
4 increased in the territory by avoiding expenses outside the territory, and increasing the  
5 spending from tourists in the territory, among other measures.  
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11 The inclusion of uncertainty is performed using confidence intervals with bootstrap, thus  
12 obtaining a lower and upper limit for the initial injection of money made by the attendees with  
13 impact. By subtracting the money outflows from the territory generated by the events, which  
14 is an amount usually known with certainty, it is possible to obtain the direct economic impact  
15 of the events. The distribution of the responses from the surveys will determine the effect on  
16 the confidence intervals obtained. It may be the case that due to the features of the attendees  
17 or visitors the variance is small, and in that case, the problem of uncertainty is less relevant.  
18 Considering the information requested in the surveys that is needed to estimate the economic  
19 impact, a skewed distribution can be expected, and for that reason the most negative limit will  
20 be further from the average. This implies that the decisions taken should be more carefully  
21 monitored.  
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### 37 **Conclusions**

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40 This work makes an important contribution in the area of economic impact measurement,  
41 considering the inclusion of uncertainty to make the estimates more realistic. The findings  
42 supported by the cases analysed allow us to show the differences between deterministic  
43 results and the measurement of uncertainty in impact, as well as how it may affect the  
44 obtainment of more transparent figures and the management of the events.  
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52 It is necessary to consider that the existing limitations in the impact methodologies discourage  
53 continuing to offer deterministic results. The measurement of impact is accompanied by a  
54 certain level of uncertainty in the data that cannot be ignored. For this reason, it is important  
55 to internalise the need to raise estimates through different possible scenarios, so as not to offer  
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3 overestimated or unrealistic results. It is also advisable that analysts keep working on the  
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5 improvement of methodologies, avoid incurring the typical errors involved in measuring  
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7 economic impact, and not underestimate the existing expenses due to the event. The need to  
8  
9 educate about the multiple benefits of measuring economic impact remains in force. It is not  
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11 only economic data; it is valuable information for making strategic decisions about the  
12  
13 management of the event and for the public authorities.  
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## 16 17 18 **References**

- 19  
20  
21 Agha, N. (2013). The economic impact of stadiums and teams: The case of minor league  
22  
23 baseball. *Journal of Sports Economics*, 14(3), 227-252.  
24  
25 <https://doi.org/10.1177/1527002511422939>.  
26  
27  
28  
29 Baade, R.A. (1994). *Stadiums, Professional Sports, and Economic Development: Assessing*  
30  
31 *the Reality*. *The Heartland Institute*, 62. [https://www.heartland.org/\\_template-](https://www.heartland.org/_template-assets/documents/publications/8828.pdf)  
32  
33 [assets/documents/publications/8828.pdf](https://www.heartland.org/_template-assets/documents/publications/8828.pdf).  
34  
35  
36  
37 Baade, R.A., & Dye, R.F. (1990). The impact of stadium and professional sports on  
38  
39 metropolitan area development. *Growth and Change*, 21(2), 1-14.  
40  
41 <https://doi.org/10.1111/j.1468-2257.1990.tb00513.x>.  
42  
43  
44  
45 Baade, R.A., Baumann, R., & Matheson, V. A. (2005). Selling the big game: estimating the  
46  
47 economic impact of mega-events through taxable sales. *Holy Cross Working Paper*,  
48  
49 05-10. [https://college.holycross.edu/RePEc/hcx/Matheson\\_TaxableSales.pdf](https://college.holycross.edu/RePEc/hcx/Matheson_TaxableSales.pdf).  
50  
51  
52  
53 Baade, R.A., Baumann, R., & Matheson, V. A. (2008). Selling the game: estimating the  
54  
55 economic impact of professional sports through taxable sales. *Southern Economic*  
56  
57 *Journal*, 74(3), 794-810. <https://doi.org/10.2307/20111996>.  
58  
59  
60

- 1  
2  
3 Barajas, A., Lago-Peñas, S., & Sanchez-Fernández, P. (2014). On the regional economic  
4 effects of the Pope's journeys: evidence from the visit to Santiago de Compostela in  
5 2010. *Tourism Economics*, 20(2), 279-299. <https://doi.org/10.5367/te.2013.0270>.  
6  
7  
8  
9  
10  
11 Barajas, A., Salgado-Barandela, J., & Sánchez-Fernández, P. (2012). Problemática de los  
12 estudios de impacto económico de eventos deportivos [Problems of studies on the  
13 economic impact of sporting events]. *Estudios de Economía Aplicada*, 30(2), 441–462.  
14  
15  
16 <http://dx.doi.org/10.25115/eea.v30i2.3535>.  
17  
18  
19  
20  
21 Brida, J. G., & Scuderi, R. (2013). Determinants of tourist expenditure: A review of  
22 microeconomic models. *Tourism Management Perspectives*, 6, 28-40.  
23  
24  
25 <http://dx.doi.org/10.2139/ssrn.2048221>.  
26  
27  
28  
29 Buning, R.J., Cole, Z.D., & McNamee, J.B. (2016). Visitor expenditure within a mountain  
30 bike event portfolio: determinants, outcomes, and variations. *Journal of Sport &*  
31 *Tourism*, 20(2), 103–122. <https://doi.org/10.1080/14775085.2016.1239547>.  
32  
33  
34  
35  
36 Coates, D., & Humphreys, B.R. (1999). The growth effects of sports franchises, stadia, and  
37 arenas. *The Journal of the Association for Public Policy Analysis and Management*,  
38 18(4), 601–624. <https://www.jstor.org/stable/3325757>.  
39  
40  
41  
42  
43  
44 Coates, D., & Humphreys, B.R. (2001). The economic consequences of professional sports  
45 strikes and lockouts. *Southern Economic Journal*, 63(3), 737–747.  
46  
47  
48 <https://www.jstor.org/stable/1061462>.  
49  
50  
51  
52 Coates, D., & Humphreys, B.R. (2003a). The effect of professional sports on earnings and  
53 employment in the services and retail sectors in US cities. *Regional Science and*  
54 *Urban Economics*, 33(2), 175–198. [https://doi.org/10.1016/S0166-0462\(02\)00010-8](https://doi.org/10.1016/S0166-0462(02)00010-8).  
55  
56  
57  
58  
59  
60

- 1  
2  
3 Coates, D., & Humphreys, B.R. (2003b). Professional sports facilities, franchises, and urban  
4 economic development. *Public Finance and Management*, 3(3), 335–357.  
5  
6  
7  
8  
9 Collins, A., Flynn, A., Munday, M., & Roberts, A. (2007). Assessing the environmental  
10 consequences of major sporting events: The 2003/04 FA Cup Final. *Urban*  
11 *Studies*, 44(3), 457-476. <https://doi.org/10.1080/00420980601131878>.  
12  
13  
14  
15  
16 Comerio, N., & Strozzi, F. (2019). Tourism and its economic impact: A literature review  
17 using bibliometric tools. *Tourism Economics*, 25(1), 109-131.  
18 <https://doi.org/10.1177/1354816618793762>.  
19  
20  
21  
22  
23  
24 Crompton, J.L. (1995). Economic impact analysis of sports facilities and events: eleven  
25 sources of misapplication. *Journal of Sport Management*, 9, 15–35.  
26 <https://doi.org/10.1123/jsm.9.1.14>.  
27  
28  
29  
30  
31  
32 Crompton, J.L. (2006). Economic impact studies: instruments for political shenanigans?.  
33 *Journal of Travel Research*, 45, 67–82. <https://doi.org/10.1177/0047287506288870>.  
34  
35  
36  
37  
38 Daniels, M.J. (2007). Central place theory and sport tourism impacts. *Annals of Tourism*  
39 *Research*, 34(2), 332-347. <https://doi.org/10.1016/j.annals.2006.09.004>.  
40  
41  
42  
43 Duglio, S., & Beltramo, R. (2017). Estimating the economic impacts of a small-scale sport  
44 tourism event: The case of the Italo-Swiss mountain trail  
45 CollonTrek. *Sustainability*, 9(3), 343. <https://doi.org/10.3390/su9030343>.  
46  
47  
48  
49  
50  
51 Dwyer, L., Jago, L., & Forsyth, P. (2016). Economic evaluation of special events:  
52 Reconciling economic impact and cost–benefit analysis. *Scandinavian Journal of*  
53 *Hospitality and Tourism*, 16(2), 115-129.  
54 <https://doi.org/10.1080/15022250.2015.1116404>.  
55  
56  
57  
58  
59  
60

- 1  
2  
3 Findler, F., Schönherr, N., Lozano, R., Reider, D., & Martinuzzi, A. (2019). The impacts of  
4 higher education institutions on sustainable development: A review and  
5 conceptualization. *International Journal of Sustainability in Higher Education*, 20(1),  
6 23-38. <https://doi.org/10.1108/IJSHE-07-2017-0114>.  
7  
8  
9  
10  
11  
12  
13 Frechtling, D.C. (2006). An assessment of visitor expenditure methods and models. *Journal*  
14 *of Travel Research*, 45(1), 26–35. <https://doi.org/10.1177/0047287506288877>.  
15  
16  
17  
18 Getz, D., & Page, S. J. (2016). Progress and prospects for event tourism research. *Tourism*  
19 *management*, 52, 593-631. <https://doi.org/10.1016/j.tourman.2015.03.007>.  
20  
21  
22  
23  
24 Horowitz, J. L. (1994). Bootstrap-based critical values for the information matrix test. *Journal*  
25 *of Econometrics*, 61(2), 395–411. [https://doi.org/10.1016/0304-4076\(94\)90092-2](https://doi.org/10.1016/0304-4076(94)90092-2).  
26  
27  
28  
29 Hudson, I. (2001). The use and misuse of economic impact analysis: The case of professional  
30 sports. *Journal of Sport and Social Issues*, 25(1), 20-39.  
31 <https://doi.org/10.1177/0193723501251003>.  
32  
33  
34  
35  
36  
37 Hunter, W. J. (1988). *Economic impact studies: Inaccurate, misleading, and unnecessary*.  
38 Heartland Institute.  
39  
40  
41  
42 Lamla, M. J., Straub, M., & Girsberger, E. M. (2014). On the economic impact of  
43 international sport events: microevidence from survey data at the EURO 2008. *Applied*  
44 *economics*, 46(15), 1693-1703. <http://dx.doi.org/10.2139/ssrn.2159096>.  
45  
46  
47  
48  
49  
50 Lee, C.K., Mjelde, J.W., & Kwon, Y.J. (2017). Estimating the economic impact of a mega-  
51 event on host and neighbouring regions. *Leisure Studies*, 36(1), 138-152.  
52 <https://doi.org/10.1080/02614367.2015.1040828>.  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 Li, S., & Jago, L. (2013). Evaluating economic impacts of major sports events—a meta  
4 analysis of the key trends. *Current Issues in Tourism*, 16(6), 591-611.  
5  
6 <https://doi.org/10.1080/13683500.2012.736482>.  
7  
8  
9  
10  
11 Lin, H. W., & Lu, H. F. (2018). A longitudinal assessment on the economic effects of hosting  
12 major sporting events. *Applied Economics*, 50(56), 6085-6099.  
13  
14 <https://doi.org/10.1080/00036846.2018.1489117>.  
15  
16  
17  
18  
19 Massiani, J. (2018). Assessing the economic impact of mega events using Computable  
20 General Equilibrium models: Promises and compromises. *Economic modelling*, 75, 1-  
21  
22 9. <https://doi.org/10.1016/j.econmod.2018.05.021>.  
23  
24  
25  
26 Matheson, V. A. (2004). Economic multipliers and mega-event analysis.  
27  
28 [https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es](https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es/&httpsredir=1&article=1103&context=econ_working_papers)  
29  
30 [/https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es](https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es/&httpsredir=1&article=1103&context=econ_working_papers)  
31  
32 [/https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es](https://crossworks.holycross.edu/cgi/viewcontent.cgi?referer=https://scholar.google.es/&httpsredir=1&article=1103&context=econ_working_papers)  
33  
34 Matheson, V.A. (2006). Is smaller better? A comment on “comparative economic impact  
35 analyses” by Michael Mondello and Patrick Rishe. *Economic Development Quarterly*,  
36  
37 20(2), 192–195. <https://doi.org/10.1177/0891242405285872>.  
38  
39  
40  
41  
42 Mules, T., & Faulkner, B. (1996). An economic perspective on special events. *Tourism*  
43  
44 *Economics*, 2(2), 107-117. <https://doi.org/10.1177/135481669600200201>.  
45  
46  
47  
48 Pastor, J. M., Peraita, C., & Pérez, F. (2016). Estimating the long-term economic impacts of  
49  
50 Spanish universities on the national economy. *Papers in Regional Science*, 95(4), 673-  
51  
52 692. <https://doi.org/10.1111/pirs.12157>.  
53  
54  
55  
56 Pastor, J.M., Pérez, F., & de Guevara, J.F. (2013). Measuring the local economic impact of  
57  
58 universities: an approach that considers uncertainty. *Higher Education*, 65(5), 539-  
59  
60 564. <https://link.springer.com/article/10.1007/s10734-012-9562-z>.

- 1  
2  
3 Pedrosa, R., & Salvador, J.A. (2003). El impacto del deporte en la economía: problemas de  
4 medición [The impact of sport on the economy: measurement problems]. *RAE: Revista*  
5  
6 *Asturiana de Economía*, 26, 61-84.  
7  
8  
9  
10  
11 Peeters, T., Matheson, V., & Szymanski, S. (2014). Tourism and the 2010 World Cup:  
12 Lessons for developing countries. *Journal of African Economies*, 23(2), 290-320.  
13  
14 <https://doi.org/10.1093/jae/ejt031>.  
15  
16  
17  
18  
19 Preuss, H., Könecke, T., & Schütte, N. (2010). Calculating the primary economic impact of a  
20 sports clubs regular season competition. *A first model. Journal of Sporting Science and*  
21 *Physical Education*, 60, 17–22.  
22  
23  
24  
25  
26  
27 Roessner, D., Bond, J., Okubo, S., & Planting, M. (2013). The economic impact of licensed  
28 commercialized inventions originating in university research. *Research Policy*, 42(1),  
29 23-34. <https://doi.org/10.1016/j.respol.2012.04.015>.  
30  
31  
32  
33  
34 Salgado-Barandela, J., Barajas, A., & Sánchez-Fernández, P. (2017). Impacto económico del  
35 deporte: tema de interés creciente en la literatura científica [Economic impact of sport:  
36 Topic of growing interest for the scientific literature]. *Revista Internacional de*  
37 *Medicina y Ciencias de la Actividad Física y del Deporte*, 17(68), 729-755.  
38  
39 <https://doi.org/10.15366/rimcafd2017.68.010>.  
40  
41  
42  
43  
44  
45  
46 Salgado-Barandela, J., Barajas, A., & Sánchez-Fernández, P. (2018b). Determinants of the  
47 spending of sporting tourists: The case of attendees at professional  
48 basketball. *European Research on Management and Business Economics*, 24(3), 168-  
49 176. <https://doi.org/10.1016/j.iedeen.2018.05.001>.  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60



- 1  
2  
3 Salgado-Barandela, J., Barajas, Á., & Sánchez-Fernández, P. (2019). Sport-event portfolios:  
4  
5 An analysis of their ability to attract revenue from tourism. *Tourism Economics*.  
6  
7 <https://doi.org/10.1177/1354816619884448>.  
8  
9  
10  
11 Salgado-Barandela, J., Sánchez-Fernández, P., Pérez, M., & Barajas, A. (2018a). Economic  
12  
13 valuation of a medium-sized sporting event: impact of the Spanish Swimming  
14  
15 Championship. *Journal of Physical Education and Sport*, 18, 1349-1355.  
16  
17 <http://efsupit.ro/images/stories/august2018/Art%20200.pdf>.  
18  
19  
20  
21 Salgado-Barandela, J., Sánchez-Fernández, P., & Barajas, A. (2020). Differences in the  
22  
23 Behavior of Tourist Expenditure According to the Sports Category of the Event:  
24  
25 Evidence for a Master and Absolute Championship. In *Advances in Tourism,*  
26  
27 *Technology and Smart Systems* (pp. 357-367). Springer, Singapore.  
28  
29  
30  
31 Santos, J. M., & García, P. C. (2011). A bibliometric analysis of sports economics  
32  
33 research. *International Journal of Sport Finance*, 6(3), 222.  
34  
35  
36  
37 Taks, M., Chalip, L., Green, B. C., Kesenne, S., & Martyn, S. (2009). Factors affecting repeat  
38  
39 visitation and flow-on tourism as sources of event strategy sustainability. *Journal of*  
40  
41 *Sport & Tourism*, 14(2-3), 121-142. <https://doi.org/10.1080/14775080902965066>.  
42  
43  
44  
45 Taks, M., Green, B., Chalip L., Kesenne, S., & Marty, S. (2013). Visitor composition and  
46  
47 event-related spending. *International Journal of Culture, Tourism and Hospitality*  
48  
49 *Research*, 7(2): 132–147. <https://doi.org/10.1108/IJCTHR-04-2013-0020>.  
50  
51  
52  
53 Taks, M., Kesenne, S., Chalip, L, Green, B.C. (2011). Economic impact analysis versus cost  
54  
55 benefit analysis: the case of a medium-sized sport event. *International Journal of*  
56  
57 *Sport Finance* 6(3), 187-203. <https://scholar.uwindsor.ca/humankineticspub/29>.  
58  
59  
60

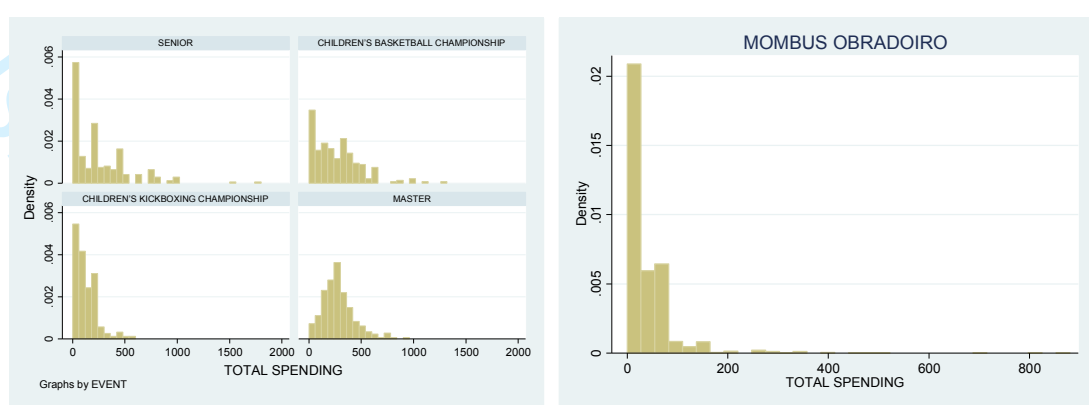
1  
2  
3 Teigland, J. (1999). Mega-events and impacts on tourism; the predictions and realities of the  
4 Lillehammer Olympics. *Impact assessment and project appraisal*, 17(4), 305-317.  
5  
6 <https://doi.org/10.3152/147154699781767738>.  
7  
8  
9

10  
11 Veltri, F.R., Miller, J.J., & Harris, A. (2009). Club sport national tournament: economic  
12 impact of a small event on a mid-size community. *Recreational Sports Journal*, 33(2):  
13 119–128. <https://doi.org/10.1123/rsj.33.2.119>.  
14  
15  
16  
17

18  
19 Zhou, D., Yanagida, J.F., Chakravorty, U., & Leung, P. (1997) Estimating economic impacts  
20 from tourism. *Annals of Tourism Research*, 24(1), 76–89.  
21  
22 [https://doi.org/10.1016/S0160-7383\(96\)00035-7](https://doi.org/10.1016/S0160-7383(96)00035-7).  
23  
24  
25

26  
27 Ziakas, V., & Costa, C. (2011). The use of an event portfolio in regional community and  
28 tourism development: creating synergy between sport and cultural events. *Journal of*  
29 *Sport & Tourism*, 16(2), 149–175. <https://doi.org/10.1080/14775085.2011.568091>.  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
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Figure 1. Distribution of spending in events analyzed



Source: own elaboration.

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**Table I. Analyzed events**

| Event                              | Host city              | Total Attendance * | Number of responses |
|------------------------------------|------------------------|--------------------|---------------------|
| Master Swimming Championship       | Pontevedra             | 1,249              | 308                 |
| Senior Swimming Championship       | Pontevedra             | 905                | 300                 |
| Children's Basketball Championship | Marín                  | 845                | 244                 |
| Children's Kickboxing Championship | Marín                  | 668                | 269                 |
| Monbus Obradoiro Club              | Santiago de Compostela | 97,890             | 1,781               |
| <b>Total number of responses</b>   |                        |                    | <b>2,902</b>        |

Source: own elaboration.

\*persons attending the event

**Table II. Descriptive statistics of spending and days of stay for all the events**

|   | Total Spending |        |           |     |       |
|---|----------------|--------|-----------|-----|-------|
|   | Obs            | Mean   | Std. Dev. | Min | Max   |
| <b>Mombus Obradoiro Senior Championship</b> | 1,781          | 41.47  | 47.31     | 0   | 880   |
| <b>Basketball</b>                           | 287            | 250.41 | 264.66    | 0   | 1,800 |
| <b>Kickboxing</b>                           | 244            | 259.59 | 222.32    | 0   | 1,270 |
| <b>Master</b>                               | 268            | 119.60 | 108.46    | 0   | 600   |
|   | 303            | 278.01 | 150.53    | 5   | 940   |
|   | Days of stay   |        |           |     |       |
| <b>Mombus Obradoiro Senior Championship</b> | 1,781          | 1.08   | 0.49      | 1   | 9     |
| <b>Basketball</b>                           | 299            | 3.89   | 1.94      | 1   | 15    |
| <b>Kickboxing</b>                           | 244            | 4.50   | 1.76      | 1   | 11    |
| <b>Master</b>                               | 269            | 2.94   | 0.84      | 1   | 10    |
|   | 305            | 3.86   | 0.85      | 1   | 7     |

Source: own elaboration.

**Table III.** Initial money injection from the attendees using the confidence interval for the average expenditure and the number of days (option 1) and using only confidence interval for expenditure (option 2)

| Events<br>(option 1)               | Expenditure |             | Days        |             | Attendees               | Initial money injection |             |
|------------------------------------|-------------|-------------|-------------|-------------|-------------------------|-------------------------|-------------|
|                                    | Lower limit | Upper limit | Lower limit | Upper limit |                         | Lower limit             | Upper limit |
| Senior Championship                | 54.62       | 75.05       | 3.67        | 4.11        | 902                     | 180,826                 | 278,172     |
| Children's Kickboxing Championship | 32.55       | 42.67       | 2.84        | 3.04        | 399                     | 85,791*                 | 100,706*    |
| Children's Basketball Championship | 40.63       | 63.39       | 4.28        | 4.72        | 574                     | 152,402*                | 224,416*    |
| Master Championship                | 67.62       | 83.69       | 3.77        | 3.96        | 1,443                   | 367,773                 | 477,676     |
| Obradoiro                          | 39.34       | 43.59       | 1.06        | 1.11        | 60,047                  | 2,507,133               | 2,897,467   |
| Events<br>(option 2)               | Expenditure |             | Days        | Attendees   | Initial money injection |                         |             |
|                                    | Lower limit | Upper limit |             |             | Lower limit             | Upper limit             |             |
| Senior Championship                | 54.62       | 75.05       | 3.90        | 902         | 192,154                 | 264,010                 |             |
| Children's Kickboxing Championship | 32.55       | 42.67       | 2.94        | 399         | 87,101*                 | 98,971*                 |             |
| Children's Basketball Championship | 40.63       | 63.39       | 4.50        | 574         | 157,453*                | 216,238*                |             |
| Master Championship                | 67.62       | 83.69       | 3.80        | 1,443       | 370,800                 | 458,885                 |             |
| Obradoiro                          | 39.34       | 43.59       | 1.08        | 60,047      | 2,560,126               | 2,836,585               |             |

Source: own elaboration. \* The initial injection generated by the participants is added, it is a certain data provided by the organization of the event (not from surveys).

**Table IV.** Comparison of the result of the initial injection of money with and without including uncertainty

| Events                             | Option 1    |             | Option 2    |             | Initial money injection (not considering uncertainty) |
|------------------------------------|-------------|-------------|-------------|-------------|---|
|                                    | Lower limit | Upper limit | Lower limit | Upper limit |   |
| Senior Championship                | 180,826     | 278,172     | 192,154     | 264,010     | 234,349   |
| Children's Kickboxing Championship | 85,791      | 100,706     | 87,101      | 98,971      | 96,633  |
| Children's Basketball Championship | 152,402     | 224,416     | 157,453     | 216,238     | 211,211   |
| Master Championship                | 367,773     | 477,676     | 370,800     | 458,885     | 401,154   |
| Obradoiro                          | 2,507,133   | 2,897,467   | 2,560,126   | 2,836,585   | 2,698,355   |

Source: own elaboration.