Valuing elite sport success using the contingent valuation method: A transnational study

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Title

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Abstract

This study presents an application of the contingent valuation method for valuing medal winning success on a transnational basis to test whether more medals won equates to more utility. To achieve this aim, a research project was set up in five countries: Belgium, Finland, Japan, the Netherlands, and the United Kingdom. Respondents were asked to state their willingness to pay (WTP) to avoid a hypothetical scenario in which a large-scale reduction in government funding for elite sport was implemented after the Rio 2016 Olympics resulting in a 50% reduction in medals won at the Tokyo 2020 Olympics. Our empirical results show that WTP for avoiding reduced medal winning performance differs significantly between countries with the more successful countries reporting higher WTP values than the relatively less successful countries. This finding indicates that more medals won appears to be linked with more utility. The validity tests on the regression models were generally consistent with the theoretical expectations. Implications are discussed in terms of how governments can promote elite sport development while being conscious of the public's acceptability of such investment.

Keywords: Olympic success; monetary value; welfare economics; willingness to pay; international comparison

1. Introduction

The rationale behind government investment in international sporting success is based on an assertion that success contributes positively to realising a wide-range of desirable outcomes. These outcomes can be inward-looking such as a feel-good factor amongst the population, or increases in mass participation sport; and also outward-looking such as increases in international prestige (De Bosscher, Sotiriadou, & van Bottenburg, 2013; Grix & Carmichael, 2012; Haut, Grix, Brannagan, & Hilvoorde, 2017). As an example, the Basic Act on Sports (2011), in Japan, recognises the internal benefits of elite sport success in the statement: "the great success of Japanese players in international competitions based on these efforts brings pride and joy, vision and excitement to citizens and enhances their interest in sport" (Supplementary provisions, para. 5). Similarly the UK Government's strategy for sport emphasises the importance of maximising international sporting success for two reasons: first, positive impacts on wellbeing and social development; and second as a form of inspiration to get more people involved in sport (HM Government, 2015).

Despite the increased desire for elite sport success and the investment made in achieving it, the academic evidence to support the 'success provides societal outcomes' argument is limited. Grix and Carmichael (2012) stated that "the rationale for investment in elite sport remained and remains unclear, under-researched and generally uncritically accepted" (p.3). Presumably, the weak evidence is attributable to the difficulty of quantifying such outcomes due to their intangibility (Stewart, Nicholson, Smith, & Westerbeek, 2005), and the unchallenged assumption that these claimed outcomes are self-evident (De Bosscher et al., 2013). The empirical evaluation of these outcomes is an area of increasing interest and an important emerging research topic in the field of sport management and economics.

The outcomes of elite sport that are claimed to occur in the existing literature can be observed in different contexts. These include: nations or athletes delivering outstanding performance; athletes and teams being viewed as role models; and the organisation of international sporting events as the host nation (De Bosscher et al., 2013). This scope of this paper is confined to the outcomes of international sporting success, that is, athletic performance.

In order to address part of the research gap, recent studies have used the contingent valuation method (CVM), which is a survey-based stated preference methodology, to estimate the value of Olympic medal success. CVM is a technique where respondents are asked their willingness to pay (WTP) for a certain level of provision of the goods, especially those goods not traded conventionally in markets. Such studies have been conducted previously in Germany (Wicker, Hallmann, Breuer, & Feiler, 2012), Japan (Funahashi & Mano, 2015), and Canada (Johnson, Mason, & Whitehead, 2018). This emerging body of literature has contributed significantly to demonstrating demand side information, elicited in monetary terms, to the debate around the justification for elite sport investment.

The practical problem, however, that confronts us is the comparability of the studies owing to differing definitions of success and the variations used in underpinning assumptions. Besides, there is a lack of transnational analyses allowing us to recognise the stylised determinants of an individual's valuation of Olympic success. The crucial question is if the value of elite sport success varies according to county-specific international sporting competitiveness, or if there are common transnational determinants. From a methodological point of view, implementing a multi-country research design allows us to demonstrate external scope tests, which are important constructs as validity tests have been ignored in the above-mentioned literature, which

will be elaborated later. Transnational assessment of the value of elite sport success was considered to be an important research direction by other researchers as well (Wicker, Prinz, & Hanau, 2012).

We propose to fill the gap in the extant literature in this area by presenting an international comparison of the monetary value of medal winning success in the Summer Olympic Games. To achieve this advance in knowledge, the authors formulated a research project designed to explore differences in the perceived value of elite sporting success in five nations, controlling for differences in international competitiveness (i.e., the number of medals won). The objective of this paper is to examine the relationship between national Olympic performance and the general public's value of elite sport success between the sample nations.

2. Literature review

2.1. A summary of the contingent valuation method

CVM is a valuation technique to elicit people's valuation of non-market goods, for which no implicit market exists, or for which there may be a limited or 'incomplete' market (Bateman et al., 2002; Champ, Boyle & Bishop, 2017; Mitchell & Carson, 1989; Whitehead, 2014). Unlike marketed goods, prices for non-market goods are not public knowledge in the market place. However CVM circumvents the absence of markets by presenting respondents with a hypothetical market for changes in the quantity and/or quality of a particular nonmarket good, which they have the opportunity to value. This method can be classified as a stated preference approach which directly asks respondents about the monetary value of goods or services (Bateman et al., 2002; Champ et al., 2017). Relative to revealed preference methods, in which data are derived from past individual behaviour, such as travel cost and hedonic methods; CVM is a

more flexible valuation approach to policy analysis as it can be used to estimate economic values under conditions of demand and supply uncertainty (Whitehead & Blomquist, 2006). Accordingly, any non-market goods are within the domain of CVM applicability (Mitchell & Carson, 1989). For this article, we confine the terms used for 'goods' to: marketed goods; non-market goods; and, public goods notably for non-excludable and non-rivalrous non-market goods.

In recent years, CVM has become a popular method for valuing a variety of sport-related non-market goods. For instance, it has been used to estimate the monetary values of non-market goods generated by professional sport clubs (Castellanos, García, & Sánchez, 2011; Johnson, Groothuis, & Whitehead, 2001), sport recreation programmes (Johnson, Whitehead, Mason, & Walker, 2007), voluntary sport coaching (Orlowski & Wicker, 2016), hosting mega-sporting events (Atkinson, Mourato, Szymanski, & Ozdemiroglu, 2008; Vekeman, Meulders, Praet, Colpaert, & Van Puyenbroeck, 2015; Walton, Longo, & Dawson, 2008; Wicker, Whitehead, Mason, & Johnson, 2017; Whitehead & Wicker, 2018), sport facilities (Johnson & Whitehead, 2000; Johnson, Whitehead, Mason, & Walker, 2012), sport success in football (Wicker et al., 2012b), and Olympic success (Funahashi & Mano, 2015; Humphreys et al., 2018; Wicker et al., 2012a). CVM provides important insight by which to assess the public's perception of non-market sport goods, which are not explicitly traded in markets (Walker & Mondello, 2007).

2.2. The application of CVM to elite sporting success

Many of the desirable outcomes of international sporting success (e.g., improved national morale, a feel-good factor, or national pride) are non-excludable and non-rivalrous—that is, once it has been provided to an individual, others cannot be prevented from enjoying the good, and all people can enjoy these benefits together with

no congestion in consumption. In other words, international sporting success produces public goods (Gratton &Taylor, 2010; Mitchell, Spong, & Stewart, 2012), for which the market mechanism is of little help. Therefore, unlike marketed goods, the suppliers (e.g., teams, athletes, administrators, etc.) cannot charge individuals for their consumption of these intangible outcomes (i.e., market failure). Hence, there is a potential role for public policy in the management of high performance sport systems; as well as a need for information on the values derived via policy implementation. These outcomes are also called passive use (or non-use) values, because they are not connected directly to actual usage or real purchase activities (use values) (Humphreys et al., 2018). Since passive use values do not leave a behavioural trail, that is, some behavioural change which affects a price or quantity which can be observed, revealed preference technique are unlikely to be applicable (Bateman et al., 2002). There is general agreement that passive use values can only be estimated using a stated preference approach, which includes CVM (Freeman, Herriges, & King, 2014; Mitchell & Carson, 1989).

How, then, can we measure the passive use value of public goods generated by medal success? The proposed answer is to apply welfare economics, which argue principally that rational individuals are willing to pay more so long as they can secure greater utility, or can improve their welfare (Mitchell & Carson, 1989). However, unlike marketed goods, public goods theoretically have no market price. Also, public goods are exogenous and each consumer cannot choose the quantity consumed. For these reasons, it is not possible to evaluate the consumer surplus as a measure of welfare change resulting from variation in price. Therefore, the surplus measure of non-market goods takes the form of a variation in quantity/quality. In rigorous economic terms, CVM estimates the Hicksian consumer surplus (Hicks, 1943) - either the compensating variation, or the equivalent variation, arising from quality/quantity changes in non-

market goods (Freeman et al., 2014). For instance, if a new project was started with the aim of doubling the number of medals won in the next Olympic Games, people's utility would probably increase if the nation's medal tally increased as a result of the project. By creating a hypothetical scenario, or contingent situation, and asking "how much would you be willing to pay to achieve the aim", we can assume a similar situation as is the case for conventional goods traded in a market - this is the essence of the CVM approach.

The first way to evaluate the welfare effects of changes in medal performance is to use the compensating surplus measure. The compensating surplus is the amount of money an individual would need to pay in order to obtain the initial utility level after a quality or quantity change in public goods (Freeman et al., 2014). When a policy change leads to a quality/quantity increase, the compensating surplus is the willingness to pay (WTP) to obtain the increase. A given individual's situation is positioned at point A, where their income is M' and number of medals is Q' (Figure 1). Then, suppose the number of medals increases from Q' to Q". When an individual's income remains as M', and the number of medals increases, their circumstances move from A to B, and the utility level increases from U' to U". Meanwhile, C, as with A, is a point on an indifference curve, and although income is low, the increase in the number of medals is higher than A. At the same time, point C is a situation where the amount of money is deducted from point B by the amount M' to M". In other words, this means that even if the increase in the number of medals increases to Q", when the amount of money M'-M" is paid, the utility level returns to the original U' at which performance does not increase. That is, this M'-M" is the maximum amount of money that the individual is willing to pay to gain a performance increase, even if it results in decreased personal income. Most literature to date has used the compensating surplus (an improvement in

performance levels in the future). For example, Wicker et al. (2012a) estimated the value of Germany being ranked first in medal table. Funahashi and Mano (2015) assessed the value of public goods that were created from the investment in elite sport policy designed to achieve Japan being ranked in the top five in gold medals won at the summer Olympics and in the top 10 at the winter Olympics.

For the second way to evaluate the welfare effects of changes in medal performance, we consider a case where medal performance would deteriorate based on equivalent surplus. The equivalent surplus is the amount of money an individual would need to be paid to obtain the subsequent utility level after a quality/quality change (Freeman et al., 2014). When a policy leads to a quality/quantity decrease, the equivalent surplus is the WTP to avoid the decrease. A given individual's situation is positioned at point B, where income is M' and performance is Q" (Figure 1). Then, suppose the number of medals decreases from Q" to Q'. If the individual's income stays at M' and the number of medals decreases, the individual's situation moves from point B to point A, and the utility level decreases from U" to U'. Point C means that when the amount of money M'-M" is paid, the utility level returns to the original U" where deteriorating medal performance is not avoided (utility level at point C = utility level at point A). In other words, this M'-M" is the maximum amount of money that the individual is willing to pay to avoid a decline in medal performance, even if it results in decreased personal income. Research using equivalent surplus is currently not evident in the elite sport literature to the best of our knowledge.

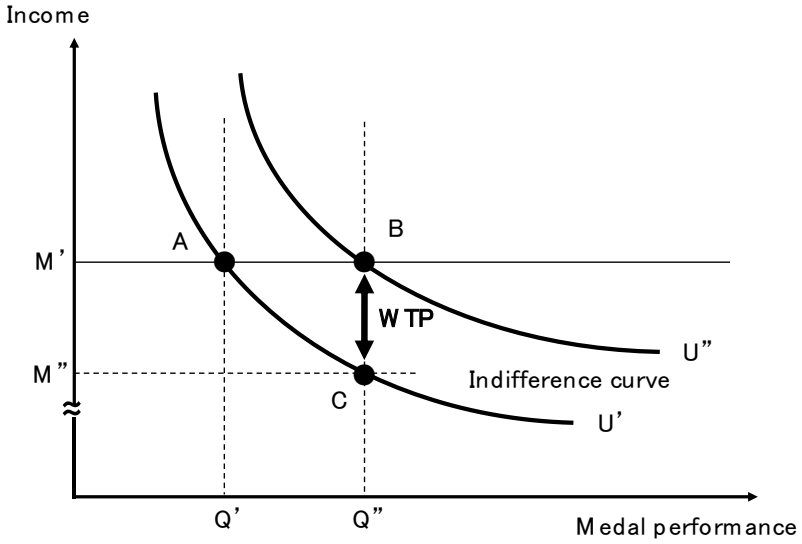


Figure 1. Surplus measures for changes in medal performance

In line with welfare economics theory, the WTP value should vary with the magnitude of the good in question: the greater the amount of the good, the higher the WTP should be and *vice versa* (Olsen, Donaldson, & Pereira, 2004). That is, a 'more medals equals more utility' assumption can reasonably be expected in the context of elite sport. This assumption can be tested by measuring the equivalent surplus for avoiding fewer medals won amongst countries with heterogeneous performance (i.e., goods of different magnitudes).

The transnational comparison research design also allowed for an external scope test to be run based on the quantity of medals won in each country. A scope test looks at whether respondents are willing to pay more (less) for a good that is larger (smaller) in scope, either in a quality or quantity sense (Carson, Flores, & Meade, 2001), and the test is widely recommended as a way to evaluate the validity of CVM (Heberlein, Wilson, Bishop, & Schaeffer, 2005). In the present study, if respondents in countries with greater medal performance presented a higher WTP, the CVM passes the scope test. Until now, only few sport CVM studies have applied scope tests (Johnson et al., 2007;

Johnson et al., 2012), and the results of our study provide important new evidence in this regard.

2.3. The determinants of WTP for elite sporting success

The public's WTP for elite sport success seems to be not only a simple function of medal performance, but also an interaction with other determinants. In any CVM studies, there are usually several expectations regarding the relationship between the WTP and indicators such as use of the good, reported attitudes regarding the good, membership of relevant interest groups, concern about the good, and the socio-economic characteristics of the respondents (Bateman, et al., 2002). Assessing the degree to which the findings of a study are consistent with theoretical expectations is an important approach to determine their expectations-based, or theoretical, validity (Mitchell and Carson, 1989). If crucial variables are found to be insignificant or affect the stated values in an inexplicable way, then the experiment's theoretical validity remains debatable. Most of those expectations are derived from findings in prior studies published in peer-reviewed papers, which seem intuitively logical, as outlined below.

Firstly, the relationship between use, or consumption, of elite sport, including the frequency of watching the Rio 2016 Olympic Games on TV or how actively individuals consume sports, and the WTP is expected to be positive. This assumption is based on prior CVM studies on elite sport which reveal that a high level of sport related consumption capital was an important determinant of the WTP for international sporting success (Wicker et al., 2012a; Wicker et al., 2012b). Secondly, a respondent's perceived benefits of elite sport success were expected to influence WTP positively. Previous CVM studies on elite sport have revealed that social and intangible factors, such as the effect of national pride (Humphreys et al., 2018), are positively associated with the WTP for sporting success. Similarly, personal benefits, such as the feelings of happiness

and pride through national sporting success (Wicker et al., 2012a), were also found to be significant factors. Thirdly, we would expect that having a stake, or interest, in elite sport success might be a positive predictor of stated values. Fourthly, another basic expectation is that WTP should vary in accordance with the concern about the risks associated with a good. Thus, those respondents who perceive fewer potential risks, such as unethical practices associated with elite sport development like doping and match fixing would be expected to increase WTP. This assumption is supported by the previous work which reported that the public's perceived value of elite sport policy was adversely influenced by the perception of negative impacts associated with elite sport development (Funahashi & Mano, 2015). With regard to socio-economic variables, an important expectation derived from prior empirical work is that there is a positive association between WTP and a respondent's household income. This assumption is supported by many previous findings notably (e.g., Wicker et al., 2012a). Conversely, there are typically no prior theoretical expectations in relation to the other demographic variables on the survey such as gender and age.

3. Methods

3.1. Research design

In order to test the relationship between national Olympic performance and the non-use value of elite sport success, this study employed cross-sectional survey design across five countries with different levels of sport performance, i.e., Belgium, Finland, Japan, the Netherlands, and the United Kingdom. The countries are a subset of the 15 nations that took part in the Sports Policy factors Leading to International Sporting Success 2.0 study (De Bosscher et al., 2015). They were selected on the basis of the differences in international competitiveness and allocation of government funding

between elite sport and grassroots sport (De Bosscher et al., 2015), cultural diversity (House et al., 2004), and the convenience of being willing to take part in an additional research collaboration.

3.2. Instruments

3.2.1. CVM scenario and WTP question

To estimate respondents' WTP for elite sporting success, the survey asked respondents to consider the hypothetical scenario presented below.

> Suppose that due to recent budgetary constraints, a large-scale reduction in government funding for all of elite sport expenditure is implemented after the Rio de Janeiro Games in 2016. Without the government's financial support for elite sports at the national level, it will be difficult to maintain current levels of sporting competitiveness. It is therefore highly likely that the country's performance at the Tokyo Games in 2020 will suffer.
>
> To compensate for the reduction in government funding, suppose that a group of elite athletes proposes to establish a 'high-performance sport fund'. The fund would be appropriately implemented by a new and highly transparent organisation and will enable the continuation of a range of projects and policies designed to deliver elite sport success as described above. As a result of this project, current performance standards would be maintained.
>
> By contrast, if the project is not implemented, we expect to see the number of medals won to fall to [#], only half as many, in the Tokyo Games in 2020 compared with the Rio de Janeiro Games in 2016.
>
> Assume that the 'high-performance sport fund' is set up with funds consisting of donations from the public. In the event that the total amount of donations is not sufficient to implement the project, these donations will be returned to each donor.
>
> If you were asked to contribute, would you agree to make a donation?

Each individual was asked to indicate their willingness to pay for the 'high-performance sport fund' in order to avoid the 50% decline in medal performance according to the following format: *I would donate* or *I would not donate*. That is,

respondents were asked to choose the alternative which maximized their utility between two situations. The first entailed the existing performance level being maintained in Tokyo 2020 because of a group of elite athletes establishing a 'high-performance sport fund' financed by voluntary donations, or reduction in his/her private consumption (i.e., *I would donate*). The second entailed a reduction of 50% in the total number of medals won in Tokyo 2020, compared with Rio 2016 as a result of a large-scale cut in government funding for elite sport (i.e., *I would not donate*). The scenario in which the number of medals won decreased by half, due to withdrawal of government financial support, is based on the inference that approximately 50% of medal success might be explained by the competitiveness of a nation's elite sport development system (De Bosscher et al., 2015). The creation of a scenario that a government withdraws funding from elite sport and medals decrease by 50%, based on the previous empirical study (De Bosscher et al., 2015), has merit in the sense that WTP can be also regarded as the monetary value of current elite sport policy. In mathematical terms, the passive use value of elite sport success was the integral of the marginal WTP from the number of medals won before change (Q") to the number of medals won after change (Q'). In this study, the value was estimated as the amount of money an individual was willing to pay to avoid a fifty percent drop in medals won (the influenced portion of policy), at Tokyo 2020 compared with Rio 2016.

Finland won only one medal at the Rio Olympics and for this reason the scenario was modified such that medals won in Tokyo 2020 would be zero. The hypothetical changes in the quantity of the medals won by each nation are summarised in Table 1. Prior to the WTP question, respondents were given descriptions and information about their national elite sport policy using visual aids: some major national

elite sport programmes, and changes in the number of medals won in the summer Olympic Games from 1988 to 2016.

Table 1.

The present state and the proposed changes in the quantity of the good

	UK	Japan	Netherlands	Belgium	Finland
Current situation (Q')[a]	67	41	19	6	1
Hypothetical situation (Q")[b]	33	20	9	3	0
Change in the quantity of medals	-34 (-50%)	-21 (-50%)	-10 (-50%)	-3 (-50%)	-1 (-100%)

[a] The number of medals won in Rio 2016.

[b] The hypothetical number of medals won in Tokyo 2020.

The questionnaire was developed initially in English, then translated into other languages by researchers with expertise in elite sport policy development in each country to ensure comparability and accuracy particularly in terms of the cultural context. The hypothetical scenario and the WTP question were audited and validated by an expert reviewer who had significant expertise and publications in CVM studies. Prior to the survey, several pilot tests were conducted on student panels and other samples of approximately 100 online respondents in each country in order to test respondents' cognition of the scenario and the general readability of the questionnaire. Modifications were made where wording was perceived to be ambiguous and an entire section discussing the positive and negative aspects of elite sports was entirely deleted on account of the potential for information bias.

3.2.2. Measures of the determinants of WTP

Consistent with Bateman et al. (2002), we included variables relating to the use of the good (i.e., frequency of watching Rio 2016 Olympics on TV, sports fanship intensity); attitude towards a good (i.e., perceived benefits of elite sport); concerns

about the good (i.e., perceived risks of elite sport); membership of interested groups (i.e., those who are, or used to be, a participant in competitive sport; those who were involved with an elite sport organisation); and a range of standard socio-economic variables (i.e. gender, age, age^2, and household income).

To measure the frequency of watching Rio 2016 on television, we used the following question: "How often did you watch the Rio 2016 Olympics on TV?" The item was scored on a 4-point Likert scale from 1 (not at all) to 4 (every day), which was converted to a dummy variable representing 1 for active viewer (everyday/most days) and 0 for others. For the measure of sports fanship intensity, the Modified Sports Fan Index (MSFI) (Levy, 2009), which is an overall measurement of an individual's sport consumption activities, was used and those who were classified as 'avid sports fan' (MSFI more than 17) were dummy coded 1, and others were coded 0. Items were modified with wording changes to refer to the new technology for consuming sport (i.e. mobile app, online news, and mobile devices).

For the measurement of the perceived benefits of elite sport, five items which are often argued to be the positive outcomes of elite sport success were extracted from the literature (Funahashi, De Bosscher, & Mano, 2015; Grix & Carmichael, 2012; Wicker et al., 2012a): national identity, economic impact, sports participation, a feel-good factor, and international reputation. These survey items were measured on a 7-point Likert-type scale (i.e. strongly agree to strongly disagree). A mean score 5 or more was coded 1 (high benefits perception group) and a score under 5 was coded 0 (low benefits perception group).

Two simple dichotomous choice questions were included in order to identify the individuals who are, or used to be, participants in competitive sport, or who were involved with an organisation that was concerned with elite sport.

The respondents' risk perception associated with elite sport development was measured using four items found in the existing literature (Funahashi and Mano, 2015; Park, Lim, & Bretherton, 2012; Volkwein, 1995), that is: elite sport: creates an unhealthy focus on winning at all cost; causes physical abuse and harassment of athletes; negatively affects athletes' education; and, causes unethical practices such as doping and match fixing. These survey items were measured on a 7-point Likert-type scale. A mean score 3 or less was coded 1 (low risk perception group) and a score greater than 3 was coded 0 (high risk perception group). A 5 point Likert scale was used by exception in the Belgian survey.

3.3. Surveys and sample collection

The web-based questionnaire surveys in five countries were conducted through recognised commercial market research companies between October 2016 and February 2017. Each company was able to target nationally representative samples in each country. In the CVM studies, as described later, a considerable number of responses will be lost in the process of analysing the WTP. Thus, with the objective of obtaining at least 1,000 usable responses of adults for the estimation of WTP (to achieve a 95% confidence interval of ±3%), the set sample size and attributes in the present study were as follows: approximately 1,500 adults, 18–69 years, stratified by a distributions equivalent to each country's population figures regarding key demographics (gender and age). Potential respondents were randomly selected by the survey companies according to the set sample size and attributes from the database and invited to complete the survey via email. The email invitations included the URL for accessing the survey, and potential respondents had a free choice as to whether they answered the questionnaire. To reduce self-selection bias (Bateman et al., 2002), the survey were titled 'Questionnaire about life' rather than 'Questionnaire about the value of

international sporting success'. In Belgium, the CVM questions were incorporated in a comprehensive survey investigating public perceptions of the societal impact of elite sport. For the Netherlands, the CVM questions were incorporated in the NOC*NSF's periodic market survey. There is no clear evidence of substantially lower quality or validity of Internet responses compared with other survey modes (Lindhjem and Navrud, 2011).

3.4. Analysis

3.4.1. WTP estimation procedure

There are many possible sources of bias in CV studies. Several bias mitigation techniques were employed to enable the WTP estimation to be more precise. In an effort to mitigate or calibrate for hypothetical bias and respondent uncertainty in the WTP survey responses, we employed both 'cheap-talk script' and follow up certainty statement calibration techniques (Broadbent, 2014). To include a cheap-talk script before the WTP question is a recognised solution for reducing bias, as first reported by Cummings and Taylor (1999). It encourages study participants to respond to the hypothetical question as if they were making an actual financial decision. Before stating their willingness to donate, each respondent was asked to answer by: carefully considering that the assumption actually occurred; noting that the donation was a one off occurrence; and, realising that by making the donation the amount of money they would have to spend on other things would decrease. As a follow up question, respondents who stated *I would donate* were asked how certain they were that they would really donate if asked to do so on a ten-point scale (with endpoints labelled: 1 = very uncertain and 10 = very certain). Experimental results suggest that levels of certainty greater than or equal to six are relatively consistent with an actual payment (Poe, Clark, Rondeau, & Schulze, 2002). As such, we defined those who gave a six or

higher as those who were certain about their willingness to pay and this subset was subsequently asked to state their maximum WTP via an open-ended question.

Another treatment that is common to CV literature is to design a survey that eliminates so-called 'warm glow' and 'protest zero' bidders (Grammatikopoulou & Olsen, 2013). Warm glow bias is where a respondent's WTP is for the purchase of moral satisfaction associated with giving for a good cause rather than for the good itself, leading to an upward-biased estimate of WTP (Andreoni, 1990). In order to identify warm glow respondents, those who answered *I would donate* with high certainty (i.e., ≥6), were asked their most appropriate reason for stating a positive WTP. Three possible reasons in a closed question format plus an open-ended opportunity to provide other comments were presented. One out of three reasons was interpreted as being consistent with a warm glow effect, showing moral satisfaction (i.e., because I think it is important that everyone makes a donation). The next set of follow-up questions was used to identify true zero and protest zero bidders by asking respondents their most important reason for answering *I would not donate*. Protest zeros is a WTP score of 0, which is given because a respondent wishes to make a protest against the payment vehicle or some other aspect of the survey, not because the respondent truly places zero value on the good being valued (Diamond and Hausman, 1993). Including protest zeros leads to the underestimation of WTP, because they are zero values. The range of options summarised in Table 2 was based on the findings of Funahashi and Mano (2015) and the methodological manual (Bateman et al., 2002). Figure 2 presents the flow chart of the questions asked in the WTP section of the survey.

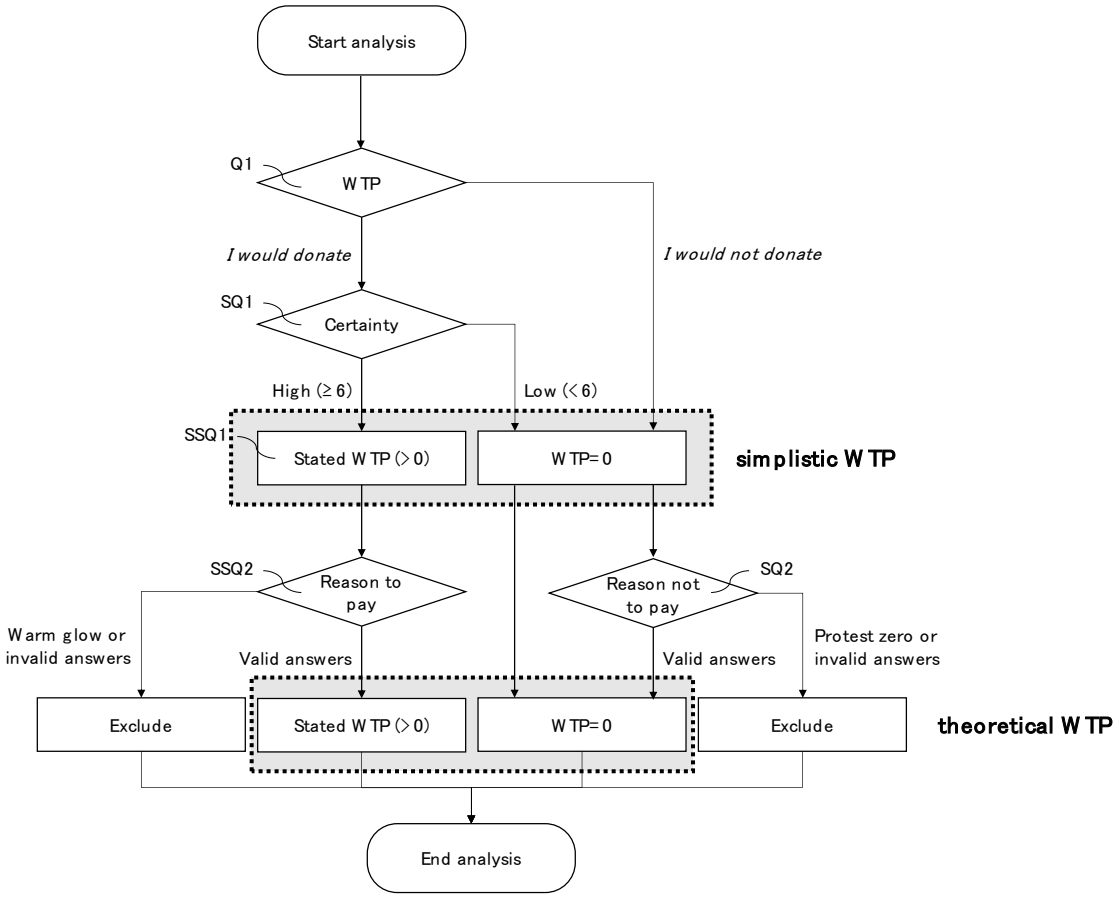
Table 2.

Survey options for reason questions on WTP and its classification

The reason	classification
to donate	
Because the fund has social importance that merits my donation	WTP>0
Because the fund is of personal benefit to me	WTP>0
Because I think it is important that everyone makes a donation	warm glow
Other[a]	WTP>0/warm glow[b]
NOT to donate	
Because this fund does not have social importance that merits my donation	WTP=0
Because making a donation to this fund is not of personal benefit to me	WTP=0
While it is important to support elite athletes, I cannot afford to make a donation	WTP=0
While it is important to support elite athletes, it should be funded by the government using tax that already been paid	protest zero
The scenario is not sufficiently realistic for me	protest zero
Other[a]	WTP=0/protest zero

[a] Those who answered 'Other' were asked to specify the reason.

[b] There was no respondent identified as warm glow



Q refers to question; SQ refers to sub question; SSQ refers to sub sub question; WTP refers to willingness to pay.

Figure 2. Flow chart of the questions asked in the WTP section

Two types of mean WTP were used in the valuation – the simplistic and theoretical WTP (Figure 2). The simplistic mean WTP was calculated on the basis of positive bids and zero bids by recoding uncertain positive bidders into zero WTP. By contrast, the theoretical WTP expresses the value obtained when accounting for warm glow answers, protest zero bids, unexplained no-bids, and other invalid answers. Weighting adjustments, in terms of age group (18 to 29, 30 to 39, 40 to 49, 50 to 59, and 60 to 69) as well as gender were applied to the theoretical WTP data to ensure a nationally representative sample. The latter could not be calculated for the Finland data due to a procedural error.

For purposes of international comparison, the stated WTP values were converted into purchasing power parity (PPP) US$ based on the OECD's conversion rate (OECD, 2017). Weighting adjustments for gender and age in CV surveys are particularly vulnerable to outliers because WTP amounts are unbounded at the upper end, and the mean WTP amount is sensitive to outliers (Mitchell & Carson, 1989). We therefore used the 5% trimmed mean as a more robust estimator of WTP, which is consistent with the recommendation of statisticians (Mitchell & Carson, 1989). As data are markedly non-normal, the distribution-free Kruskal-Wallis test was used to compare each nation's WTP.

3.4.2. Theoretical validity analysis

Two types of regression analyses were used to identify associations between the theoretical WTP and the independent variables outlined above. Firstly, a Tobit model was applied to examine factors that determine the stated WTP amount. The Tobit model was used because of the censored nature of the dependent variable (Halstead, Lindsay, & Brown, 1991), that is, there were many respondents who stated that their WTP was zero. The second technique is a two-part model (TPM), in which the first part models

the split between zero and non-zero WTP through a binary outcome model (i.e., Probit). The second part of the model is a linear regression (OLS) in which the outcome variable is the stated WTP amount for the subset whose WTP was greater than zeros. Our survey design was such that only respondents who are willing to donate with a high degree of certainty were offered the opportunity to state the amount they would donate. This non-random split at the first stage may affect the estimated WTP at the second stage due to a selection effect. Researchers often address the problem of non-random assignment by employing a Heckman selection model (Heckman, 1976). However, more recent literature demonstrated that this approach is likely to yield unsound results due to collinearity problems when effective exclusion restrictions (i.e., variables included the first stage selection equation model, but not in the second stage regression model) cannot be implemented (Puhani, 2000). Since the present analysis focused on theoretical validation by assessing whether WTP varies with a set of variables as predicted and no obvious exclusion restrictions were available, we considered the TPM used a more appropriate approach in this case (Bushway, Johnson, & Slocum, 2007).

Regression analyses were performed on each country's data as well as the pooled data (including dummy variables), to control for country effects (*UK*, *JPN*). Finland and the Netherlands were reluctantly excluded from the regression analyses: the dependent variables (i.e., theoretical WTP) are not available for Finland (see above); and for the Netherlands the variables outlined above were not included in the survey questionnaire because of limitations of space.

4. Empirical results

4.1. Descriptive statistics

Table 3 presents the demographic characteristics of valid respondents from each country. After excluding questionnaires with invalid answers to the key questions, 1,507, 1,551, 2,364, 1,233, and 1,690 observations were left for the UK, Japan, the Netherlands, Belgium and Finland respectively. The gender proportion was approximately equal in most countries. The mean age of respondents ranged from 43.2 years in the UK to 49.6 years in Finland. Respondents in the UK and Belgium were the least likely (51.0%) to be working full time; whereas the highest score for full time working (67.0%) was found in the Netherlands. The Netherlands had the lowest proportion of respondents who described themselves as married or a couple (43.4%), and Finland had the highest (66.2%). Those with degree level education or above ranged from a low of 31.4% in Belgium to a high of 49.0% in the Netherlands. Only 4.5% of the respondents from Belgium reported an annual household income one-and-a-half times higher than the national average compared with 35.1% of respondents from Finland.

A comparison of the demographic distribution of the sample and the national population, using population data from the World Bank, shows that the data is largely representative of the population in terms of its gender composition; however significant differences in the age distribution were identified. This indicated that data may need to be weighted for the sample results to be more fully representative of the populations from which they were drawn.

Table 3.

Demographic characteristics of the respondents

		UK				Japan				Netherlands				Belgium				Finland			
		sample		ref[c]		sample		ref[c]		sample		ref[c]		sample		ref[c]		sample		ref[c]	
		n	%	%	χ^2	n	%	%	χ^2	n	%	%	χ^2	n	%	%	χ^2	n	%	%	χ^2
Gender	Male	736	48.8	49.6	n.s.	775	50.0	50.4	n.s.	1,197	50.6	50.3	n.s.	631	51.2	50.1	n.s.	1,009	59.7	50.3	***
	Female	771	51.2	50.4		776	50.0	49.6		1,167	49.4	49.7		602	48.8	49.9		681	40.3	49.7	
Age[a]	18－29	347	23.0	20.6[d]	n.s.	240	15.5	15.8[d]	n.s.	279	11.8	19.2[d]	***	264	21.4	19.4[d]	***	197	11.7	19.3[d]	***
	30－39	304	20.2	20.5		303	19.5	19.7		401	17.0	18.2		230	18.7	20.3		263	15.6	19.6	
	40－49	316	21.0	21.2		357	23.0	23.0		603	25.5	22.0		252	20.4	21.4		306	18.1	18.8	
	50－59	302	20.0	20.5		301	19.4	19.2		541	22.9	21.9		220	17.8	21.6		369	21.8	20.9	
	60－69	238	15.8	17.1		350	22.6	22.4		540	22.8	18.7		267	21.7	17.3		555	32.8	21.3	
	M (SD)	43.2 (13.9)				46.0 (13.5)				47.5 (13.3)				44.5 (14.9)				49.6 (14.2)			
Employment status	Full-time worker	769	51.0			793	51.1			1,583	67.0			629	51.0			870	51.5		
	Others	738	49.0			758	48.9			781	33.0			604	49.0			820	48.5		
Marrital status	Married or couple	949	63.0			992	64.0			1,025	43.4			755	61.2			1,119	66.2		
	Others	558	37.0			559	36.0			1,339	56.6			478	38.8			571	33.8		
Educational qualification	Degree level or above	582	38.6			674	43.5			1,158	49.0			387	31.4			746	44.1		
	Others	925	61.4			877	56.5			1,206	51.0			846	68.6			944	55.9		
Annual hosehold income	More than 150% of NA[b]	497	33.0			307	19.8			485	20.5			56	4.5			594	35.1		
	Others	1,010	67.0			1,244	80.2			1,879	79.5			1,177	95.5			1,096	64.9		

[a] Since the legal age of majority is 20 in Japan, the minimum age of the study subjects was restricted to 20 years.

[b] NA indicates national average household income; actual values were displayed in each questionnaire.

[c] Reference numbers from World Bank (2015).

[d] Population composition ratio of 20s is shown.

4.2. WTP results

The upper part of Table 4 presents summary statistics regarding the simplistic WTP scores and the lower part shows the theoretical WTP scores. Regarding the theoretical WTP, the percentage of respondents indicating their willingness to donate with a certainty ranged from 15.1% in Belgium to 35.0% in the UK, that is, in all cases the majority of respondents had zero WTP. The chi-square test indicated that there was a statistically significant difference in the WTP distributions between the countries (χ^2 = 225.924, $p < 0.001$). The residual analysis showed that respondents who reported WTP with certainty were found in higher concentrations in the UK ($p < 0.001$). The 5% trimmed mean WTP scores were 11.0 (± 21.3) (in $ PPP) for the UK, 5.3 (± 15.7) for Japan, 4.2 (± 13.8) for Belgium, and 2.3 (± 6.4) for the Netherlands. The Kruskal-Wallis test indicates that there is a significant difference in mean rank between countries (Kruskal-Wallis χ^2 = 202.648, $p < 0.001$). The UK (2259.6) obtained the highest mean rank followed by Japan (1925.8), the Netherlands (1855.4), and Belgium (1807.1). Subsequent pairwise comparisons showed significant differences, with the exception of the Netherlands compared with Belgium. These observations are generally in agreement with the underlying assumption associated with welfare economics that more medals won, equates to more utility derived.

Table 4.

Summary statistics of the WTP

	UK			Japan			Belgium			Total		
	Two-part		Tobit	Two-part		Tobit	Two-part		Tobit	Two-part		Tobit
	Probit	OLS		Probit	OLS		Probit	OLS		Probit	OLS	
Intercept	−1.590 **	−139.700 n.s.	−1098.393 *	−2.179 ***	4.232 n.s.	−269.3594 ***	−3.328 ***	−214.015 n.s.	−597.5558 **	−2.219 ***	−125.975 n.s.	−1073.386 ***
WatchtvRio2016	0.593 ***	65.448 *	276.575 **	0.481 ***	2.627 n.s.	43.483 **	0.426 †	−12.205 n.s.	53.058 n.s.	0.600 ***	31.061 *	220.412 *
Avidfan	0.419 ***	114.722 †	224.095 *	0.500 ***	28.289 *	58.618 ***	0.909 ***	−42.173 n.s.	126.999 **	0.528 ***	68.603 *	212.633 ***
Benefit	1.138 ***	39.182 n.s.	521.269 **	0.869 ***	−27.336 n.s.	80.003 ***	−0.379 †	−14.244 n.s.	−64.931 †	0.803 **	8.988 n.s.	300.875 †
Risk	0.320 **	−24.432 n.s.	92.436 n.s.	0.312 **	−11.315 n.s.	23.386 *	−0.235 n.s.	−3.688 n.s.	−41.248 n.s.	0.231 *	−18.586 n.s.	62.151 †
Athlete	0.144 n.s.	−13.814 n.s.	46.043 n.s.	0.254 *	21.071 n.s.	35.540 *	0.085 n.s.	177.692 †	96.737 n.s.	0.184 ***	12.279 n.s.	65.825 ***
Organisation	0.417 *	49.270 n.s.	170.982 *	0.457 n.s.	29.862 n.s.	54.864 †	0.828 **	27.966 n.s.	126.272 **	0.437 ***	52.253 n.s.	157.341 ***
Gender	0.106 n.s.	−78.664 n.s.	−11.243 n.s.	0.079 n.s.	8.378 n.s.	9.830 n.s.	0.067 n.s.	47.846 n.s.	21.266 n.s.	0.073 ***	−30.377 n.s.	7.923 n.s.
Age	−0.007 n.s.	6.181 n.s.	1.387 n.s.	0.016 n.s.	1.853 n.s.	2.673 n.s.	0.087 *	12.934 †	16.102 *	0.016 n.s.	7.687 n.s.	9.144 †
Age^2	0.000 n.s.	−0.075 n.s.	−0.036 n.s.	0.000 n.s.	−0.014 n.s.	−0.025 n.s.	−0.001 †	−0.133 †	−0.167 *	0.000 n.s.	−0.087 n.s.	−0.106 †
Income	0.135 **	111.750 n.s.	118.077 †	0.304 **	6.051 n.s.	29.624 *	0.593 †	16.407 n.s.	98.826 *	0.238 ***	77.606 n.s.	118.964 ***
UK										0.252 ***	−2.923 n.s.	57.895 ***
JPN										0.140 ***	−20.197 n.s.	15.301 n.s.
Observation	1,076	377	1,076	1093	221	1,093	374	61	374	2,543	659	2,543
Log likelihood	−472.142		−3,171.414	−420.374		−1,595.330	−134.186		−499.814	−1065.975		−7389.241
Pseudo R^2	0.322	0.023	0.04	0.236	0.038	0.07	0.222	0.347	0.08	0.269	0.020	0.04

Data were weighted for gender and age structure according to national sample structure.

Displayed are the coefficients and Tobit β-coefficient.

Clustered-robust standard errors are computed in the pooled models.

n.s.not significant; †0.1, *p<0.05, **p<0.01, ***p<0.001.

4.3. Theoretical validation of results

Table 5 presents descriptive information for each variable included in the theoretical validity analysis. Significant differences in the proportion of respondents were observed in all variables. The UK sample has a higher percentage of people who watched the Rio 2016 Olympics on TV intensively (i.e., every day or most days) (44.6%), actively consume various types of sports-related activities (i.e., avid sport fan) (38.9%), and score highly for the level of perceived benefits linked to international sporting success (45.9%). The observed frequencies of people who are, or used to be, a participant in competitive sport and who are involved with an organisation that is concerned with elite sport, were also significantly higher in the UK sample. Belgium had the highest proportion of respondents who reported having a low score for the level of risk perception associated with high performance sport (38.5%).

Table 6 presents the results of the statistical analysis using the TPM and Tobit model to investigate the association of willingness to pay with the variables outlined above. The regression models for the entire sample confirm that declaring willingness to pay and the stated amount of willingness to pay are positively related to: the frequency of watching the Rio 2016 Olympics on TV (*WatchtvRio2016*); and being an avid sports fan (*Avidfan*). Being a member of the high benefits perception group (*Benefit*); being a member of the low risks perception group (*Risk*); being a participant in competitive sport (*Athlete*); working in elite sport-related sectors (*Organisation*); and the high income group (*Income*) proved to be statistically significant in Probit and Tobit models, but not the OLS estimation for positive WTP samples. There were mixed results with regards to the gender and age: the effects were statistically significant in the Tobit model only. With reference to the country dummy variables, the significant and positive coefficients in the both Probit and Tobit models imply that UK citizens (*UK*) value their

sporting success more than other countries. The Japan dummy (*JPN*) also had a significant and positive effect on WTP in the Probit model. The country dummy did not affect the stated WTP amount in the OLS estimate for the subset of individuals holding positive values.

When we focused on country-specific Probit and Tobit models, the effects of *WatchtvRio2016* and *Avidfan* were statistically significant in most models. *Benefit* showed significant association with the WTP in all models; however the coefficients were, unexpectedly, negative in the Belgium sample. Positive effects of *Risk* (i.e., perceiving low risk) were found in the Probit models for the UK and Japan cohorts; but the effects were not significant in Belgium. A significant relationship between *Athlete* and WTP was observed in both regressions for the Japan sample. The coefficients of the variable *Organisation* were positively significant in all models except for the Japan Probit model. *Age* and Age^2 were significant for Belgium, which suggests a curvilinear relationship between age and WTP. The income variable was found to have a significant effect in all cases. Overall, the explanatory variables used had the expected effect on WTP, that is; the contingent valuation responses in this study were not random, rather they followed a consistent pattern and thus can be said to be theoretically valid.

With regard to the country-specific OLS regressions, the stated amount of the WTP in the UK was positively associated with *WatchRio2016* and *Avidfan*. *Avidfan* was the only significant variable in the Japan OLS model. In the Belgium sample, the amount of WTP was affected by *Athlete*, *Age* and Age^2. Significant correlational findings were limited in the OLS among those with positive WTP.

Table 5.

Descriptive information of the explanatory variables

		UK		Japan		Belgium		p value
		n	%	n	%	n	%	
Frequency of watching Rio 2016 Olympics on TV	Every day	187	17.4 $^{+++}$	48	4.4 $^{---}$	31	8.3	< 0.001[b]
	Most days	292	27.2 $^{+++}$	167	15.3 $^{---}$	73	19.6	
	Occasionally	398	37.0 $^{---}$	628	57.5 $^{+++}$	174	46.6	
	Not at all	198	18.4 $^{--}$	249	22.8	95	25.5 $^{++}$	
Sports fanship habitus	Avid sports fan	419	38.9 $^{+++}$	209	19.1 $^{---}$	126	33.7	< 0.001[b]
	Involved sports fan	253	23.5 $^{--}$	335	30.6 $^{+++}$	76	20.3 $^{--}$	
	Casual sports fan	278	25.8 $^{---}$	430	39.3 $^{+++}$	113	30.2	
	Non sports fan	126	11.7	119	10.9	59	15.8 $^{-}$	
Benefits perception of elite sport success	High level (M ≥ 5)[a]	494	45.9 $^{+++}$	437	40.0	130	34.8 $^{--}$	< 0.001[b]
	Moderate or low level	582	54.1 $^{---}$	656	60.0	244	65.2 $^{++}$	
Risks perception involved in elite sport	Low level (M ≤ 3)[a]	243	22.6 $^{-}$	252	23.1	144	38.5 $^{+++}$	< 0.001[b]
	High or moderate level	833	77.4 $^{+}$	841	76.9	230	61.5 $^{---}$	
I am, or used to be, a participant in competitive sport.	Yes	442	41.1 $^{+++}$	281	25.7 $^{---}$	22	5.9 $^{---}$	< 0.001[b]
	No	634	58.9 $^{---}$	812	74.3 $^{+++}$	352	94.1 $^{+++}$	
Involvement with an organisation that is concerned with elite sport.	Yes	111	10.3 $^{+++}$	26	2.4 $^{---}$	22	5.9	< 0.001[b]
	No	965	89.7 $^{---}$	1,067	97.6 $^{+++}$	352	94.1	

Data were weighted for gender and age structure according to national sample structure.

[a] Cut-off values of Belgium were 4 for benefits and 2 for risks, since 5 point Likert scale was utilised.

[b] Chi-square test was applied.

$^{+++(---)}$ Significantly higher (lower) proportion by residual analysis ($p < 0.001$)

$^{++(--)}$ Significantly higher (lower) proportion by residual analysis ($p < 0.01$)

$^{+(-)}$ Significantly higher (lower) proportion by residual analysis ($p < 0.05$)

Table 6.

Results of the two-part and Tobit models

	UK			Japan			Belgium			Total		
	Two-part		Tobit	Two-part		Tobit	Two-part		Tobit	Two-part		Tobit
	Probit	OLS		Probit	OLS		Probit	OLS		Probit	OLS	
Intercept	−1.590 **	−139.700 n.s.	−1098.393 *	−2.179 ***	4.232 n.s.	−269.3594 ***	−3.328 ***	−214.015 n.s.	−597.5558 **	−2.219 ***	−125.975 n.s.	−1073.386 ***
WatchtvRio201	0.593 ***	65.448 *	276.575 **	0.481 ***	2.627 n.s.	43.483 **	0.426 †	−12.205 n.s.	53.058 n.s.	0.600 ***	31.061 *	220.412 *
Avidfan	0.419 ***	114.722 †	224.095 *	0.500 ***	28.289 *	58.618 ***	0.909 ***	−42.173 n.s.	126.999 **	0.528 ***	68.603 *	212.633 ***
Benefit	1.138 ***	39.182 n.s.	521.269 **	0.869 ***	−27.336 n.s.	80.003 ***	−0.379 †	−14.244 n.s.	−64.931 †	0.803 **	8.988 n.s.	300.875 †
Risk	0.320 **	−24.432 n.s.	92.436 n.s.	0.312 **	−11.315 n.s.	23.386 *	−0.235 n.s.	−3.688 n.s.	−41.248 n.s.	0.231 *	−18.586 n.s.	62.151 †
Athlete	0.144 n.s.	−13.814 n.s.	46.043 n.s.	0.254 *	21.071 n.s.	35.540 *	0.085 n.s.	177.692 †	96.737 n.s.	0.184 ***	12.279 n.s.	65.825 ***
Organisation	0.417 *	49.270 n.s.	170.982 *	0.457 n.s.	29.862 n.s.	54.864 †	0.828 **	27.966 n.s.	126.272 **	0.437 ***	52.253 n.s.	157.341 ***
Gender	0.106 n.s.	−78.664 n.s.	−11.243 n.s.	0.079 n.s.	8.378 n.s.	9.830 n.s.	0.067 n.s.	47.846 n.s.	21.266 n.s.	0.073 ***	−30.377 n.s.	7.923 n.s.
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Age^2	0.000 n.s.	−0.075 n.s.	−0.036 n.s.	0.000 n.s.	−0.014 n.s.	−0.025 n.s.	−0.001 †	−0.133 †	−0.167 *	0.000 n.s.	−0.087 n.s.	−0.106 †
Income	0.135 **	111.750 n.s.	118.077 †	0.304 **	6.051 n.s.	29.624 *	0.593 †	16.407 n.s.	98.826 *	0.238 ***	77.606 n.s.	118.964 ***
UK										0.252 ***	−2.923 n.s.	57.895 ***
JPN										0.140 ***	−20.197 n.s.	15.301 n.s.
Observation	1,076	377	1,076	1093	221	1,093	374	61	374	2,543	659	2,543
Log likelihood	−472.142		−3,171.414	−420.374		−1,595.330	−134.186		−499.814	−1065.975		−7389.241
Pseudo R^2	0.322	0.023	0.04	0.236	0.038	0.07	0.222	0.347	0.08	0.269	0.020	0.04

Data were weighted for gender and age structure according to national sample structure.

Displayed are the coefficients and Tobit β-coefficient.

Clustered-robust standard errors are computed in the pooled models.

n.s not significant, †<0.1, *p<0.05, **p<0.01, ***p<0.001.

5. Discussion and conclusions

This study is an important piece of research eliciting the passive use value of elite sporting success across five countries. From a methodological viewpoint, we applied CV techniques to the elite sport policy sector in a transnational setting by examining a hypothetical scenario in which respondents are asked to state their preferences for a given change (-50%) in the quantity of medals won by their nation in the Tokyo 2020 Olympics. This approach allows us to measure the monetary valuation of elite sport policy. Theoretically, this study examines the relationship between international competitiveness and WTP for elite sport success among the sample nations. This is the first example of such a study in an international context. In summary, we estimated the public's welfare change induced by the restriction of public goods (i.e., Olympic success) in monetary terms, and compared how the values across individuals differ on a transnational basis. As a key theoretical contribution, we found that, in line with the theory of welfare economics, more medals won appears to be linked with more total utility. Therefore, people in countries that have been relatively successful in winning medals are more likely to value their elite sport policy higher. The paper also identified some common transnational factors on which individual's valuation of elite sport success depends.

Our empirical results show that willingness to pay for elite sport success differs significantly between countries. We highlight that the more successful countries (i.e., UK and Japan) stated higher WTP (mean rank) than relatively less successful countries (i.e., the Netherlands and Belgium). This finding shows good agreement with the basic assumption of CVM, whereby an individual's utility is a function of the quantity, quality, and costs of goods consumed, indicating that more medals won maybe linked with more utility among the public. Additionally, a reasonable degree of consistency

was found in the differences in the number of medals won and the WTP. We therefore believe that it is reasonable to claim that our estimates successfully passed the scope test. However, no differences in people's WTP were found between the Netherlands and Belgium, which is perhaps a surprising finding given that the Netherlands consistently outperforms Belgium in Olympic sport (De Bosscher, De Knop, & van Bottenburg, 2008) as demonstrated by them winning approximately three times as many medals in the Rio 2016 Olympics. The interpretation should be that people's utility is not only a simple function of quantity of medals, but also an interaction with individual characteristics such as the use of, and attitude towards, the good. This finding needs further exploration in future research.

Meanwhile, we need to take a closer look at the fact that Finland's simplistic WTP was relatively higher. In the Finnish survey, we used a scenario in which winning medals will be zero in 2020 because there was only one medal won in Rio 2016. The results obtained in this study may imply that the law of diminishing marginal utility also applies to medal success: a single valuable medal might yield more utility than any subsequent medals (Downward & Dawson, 2000). It is also implicit that the identified levels of WTP were likely to be contingent upon a nation's history of success in the Olympic Games. In the future, it will be necessary to verify the effects of these economic laws using a different type of research design.

Our results indicate a certain level of objection towards donating for elite sport success exists in each sample nation. In all cases, those who were unwilling to pay represent a majority (64.9% to 84.9%). One plausible explanation is the adoption of a certainty scale to tackle the hypothetical bias. Since we identified the respondents 'certainly' willing to pay for elite sport success by using a follow up certainty statement calibration technique, the net effect was to increase the proportion of those classed as

unwilling to pay. Another possible explanation was that donation as a payment vehicle is known to result in lower WTP (Ivehammar, 2009), because it is an altruistic payment vehicle (Poder & He, 2016) and it could lead to 'free riding', where "someone pays less than a public good is worth to him in the expectation that others will pay enough to provide it nevertheless" (Mitchell & Carson, 1989, p.128). A third alternative explanation is there may be a large proportion of the population who do not enjoy the value of international sporting success even though sporting success is widely viewed as being a public good (Gratton and Taylor, 2010).

The validity tests on the regression models were generally consistent with the theoretical expectations. The variables relating to the use of the good (i.e., frequency of watching Rio 2016 Olympics on TV, and sports fanship intensity) had a significant impact on WTP in most models. The positive effect of the consumption variables concur with previous research (e.g., Atkinson et al., 2008; Wicker et al., 2012b). High recognition of the social and personal benefits from sporting success in international competitions and low perception of the negative aspects of elite sport both had a positive influence on the WTP in many cases. This finding is supported in similar research by Funahashi and Mano (2015) which indicated that attitudinal factors (i.e., perceptions of benefits and risks) were important constructs that explained the value of elite sport policy. The results underline the importance of policymaker intervention bring about attitudinal and behavioural changes among various population groups, if there is a goal to increase the proportion of people who are supportive of elite sport policy. Group factors, such as participation in competitive sport and involvement with elite sport organisations, show mixed results depending on the model used. Since motives for participation in competitive sport or engagement in elite sport-related organisations are diverse, these variables may not be entirely suitable as proxies for

expressing the underlying unobservable attitudes towards elite sport success. The positive contribution of income is in accordance with previous studies (e.g., Funahashi & Mano, 2015; Wicker et al., 2012b). When comparing the non-linear model (i.e., Probit and Tobit) with the OLS model using only positive observations, fewer significant associations were found between the independent variables and WTP for the latter. The findings resemble to the study of Wicker et al. (2012a) who demonstrated that intangible factors, or 'symbolic capital', such as feelings of happiness resulting from winning many medals, are particularly important to whether individuals set at least some value on elite sport success.

The empirical results of this study provide important data on the utility people derive from international sporting success. A high level of public support for elite sport success is one of the resources required for a successful sport system (Houlihan & Zheng, 2013). Our demand-side analysis leads to some useful policy implications for governments attempting either, to promote elite sport development, or to make arrangements for elite sport expenditure from public sources while being conscious of the public acceptability of such decisions. The estimation results imply that the value individuals attach to elite sport policy is most likely be maximised if accompanied by interventions to enhance people's perceived benefits of national sporting success, such as a high profile victory parade for Olympic medallists. It is presumed that the extent to which individuals form trust in the key elite sport policy actors and perceive national athletes to be role models is influential in building the perceived benefits of sporting success (Funahashi et al., 2015). Therefore, key actors responsible for high performance sport, namely the National Sports Agency, the National Governing Bodies, the National Olympic Committee, and so on, need to engage with trust management initiatives (e.g., increased transparency, anti-corruption measures) to ensure sustainable development. In

fact, according to PricewaterhouseCoopers (2017) the lack of trust in sports governing bodies is seen as the severest threat facing the sport industry. Another implication worthy of note is that as the study showed that use-of-goods variables significantly influence the value assessment of national sporting success, it is therefore important to increase public accessibility to repetitive consumption of sports (Wicker et al., 2012b). Currently, traditional free-to-air TV viewing continues to decline especially among younger viewers, and non-professionalised sports (i.e., most Olympic sports) will struggle to increase their exposure on television. National Sport Agencies and the Sports Governing Bodies need to be aware of changes in the consumption habits of young people and respond positively to the introduction of new platforms (e.g., apps, digital media, Over The Top distribution, social networks, etc.) that provide sport content to the public. In this regard, the authors propose that National Olympic Committees should proactively promote the Olympic Channel which provides complementary content that will enhance the viewing experience of the Olympic Games throughout an entire Olympiad. Winning many medals is highly effective for increasing the public's value of elite sporting success. However, for as long as policy level developments in isolation do not guarantee success, the recommendation made above, appears, at least in theory, to be a logical course of action.

It is important to highlight some limitations and features of our international collaborative study. The first limitation relates to a procedural problem. There was a technical error in the Finland questionnaire regarding the reason why respondents were unwilling to pay, hence protest zero answers were unidentifiable. In some countries, the present CV survey was conducted jointly with a different national survey, and due to limitations of space on the questionnaire, some important factors associated with WTP were not surveyed in the Netherlands. Future research endeavours should avoid such

methodological limitations by having clearer protocols to ensure homogeneity of methods. The second limitation, inherent in stated preference techniques, was that children were typically not covered in the CV survey, because they generally lack the independent financial means as well as cognitive ability needed to respond to WTP queries. Since the utility by winning a medal is not limited to adults, we recommend that future research measures the value of elite sport success for children. To do so, according to Freeman et al. (2014), there are three alternatives, but each involves some difficult questions with no easy answers: using values elicited directly from children; using parents' values as a proxy; or using values based on what the adults would have chosen for themselves in childhood. The third limitation to our analysis is that we assume that all medals have equal value. In practice, however, there must be appropriate weights for the value of gold, silver and bronze medals (Saaty, 2010) and also realisation that culturally some medals are of more value in certain nations than other medals, for example a Judo medal is likely to be more valued in Japan than a Modern Pentathlon medal. The final limitation is that we have not considered the tax-deductibility of the donation. Potential biases might arise from this limitation in the data if the tax treatment of donations of this type varies by jurisdiction.

The nations taking part in this research are a sub set of the nations which took part in the SPLISS 2.0 study and are known to be enthusiastic supporters of elite sport by global standards. Future research should include a more heterogeneous sample of nations, notably: poorer nations; nations without a track record of Olympic success; and nations with different government types other than democracies.

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