

## Article

# Sustainable Financing of Elite Athlete Development: An Empirical Analysis of Winter Sports in Austria

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**Abstract:** This study examines the value of professional winter sports to the Austrian resident population in the context of three major sporting events (the 2017 World Championships in Alpine Skiing, the 2018 Winter Olympics, and the 2019 World Championships in Nordic Skiing). In nationwide population surveys ( $n = 2289$ ), the contingent valuation method was employed, and the respondents were presented with two scenarios asking for their willingness-to-pay for live broadcasts and long-term athlete development. The aggregate willingness-to-pay amounted to €42 million (for live broadcasts) and about €800 million (for athlete development). However, only about 20% of the residents expressed a positive willingness-to-pay. The respondents' willingness-to-pay is not only determined by well-studied factors like consumption capital, intangible factors, and socio-demographics, but also by life satisfaction. The willingness-to-pay for live broadcasts is comparably higher for alpine skiing, while the willingness-to-pay for athlete development is higher for Olympic winter sports athletes. The findings have implications for sport policy and sport finance, highlighting the challenge of turning public sport consumption into a willingness to contribute financially to sustainable athlete development.

**Keywords:** contingent valuation method; elite sport; Olympic Games; skiing; willingness-to-pay; World Championships

## 1. Introduction

Many countries invest in elite sport with the aim of achieving sporting success in international competitions, such as World Championships and the Olympic Games [1,2]. International sporting success is desired because it generates a number of positive externalities and beneficial intangible effects. For example, sporting success produces public goods such as enjoyment, pride, happiness, and a feel-good factor in the population [3]. Moreover, elite athletes are considered to be role models because they demonstrate important traits—such as fairness, discipline, respect, performance, and endurance—which are worthy of imitation [1,4]. Furthermore, both sporting success and athlete role models have the potential to inspire especially the youth population to participate in sport [5].

For Austria, the research context of this study, sporting success in winter sports is particularly important, given its alpine location and its history and tradition of success in winter sports, which is accompanied by a history of much lower success in summer sports. The Austrian team won no medals at the 2012 London Games, and only one medal at the 2016 Rio Games (a bronze medal in sailing). Success in winter sports is important to Austria because it produces further positive externalities for the country [6]. For instance, national sporting success signals that Austria can be considered a recognized production site, creating positive image and advertisement effects for the whole sports industry, and even for firms outside that industry. Furthermore, sporting success in winter sports is

important to the perceived winter sport competency of a country, which in turn yields positive effects for small tourism businesses and sports goods manufacturers [6]. Hence, the sustainability of athletic success in winter sports represents a key part of cultural and economic sustainability in Austria.

Importantly, many of these positive externalities only occur when the population has the opportunity to watch athletes compete at international sport events—for example, through live broadcast on television—and when athletes are indeed successful. Hence, sustainable athlete development and the broadcasting of athletic competitions are interrelated. Sustainable athlete development through sustainable financing presents athletes with the opportunity to train full-time and in optimal conditions, while the outcomes of these training efforts can be observed by the resident population through live broadcasting—if competitions are broadcast on free-to-air networks which draw large audiences. The latter are relevant for the positive externalities in terms of economic development and winter sports competency, with sporting success representing a driving force behind those externalities.

Several preconditions need to be fulfilled in order for international sporting success to occur, with financial support representing one important pillar [7]. Importantly, the financing of elite athlete development must be sustainable in nature in order to increase the possibility of positive performance outcomes [8]. Generally speaking, the term ‘sustainable’ means that something is “capable of being maintained over the long term” (p. 17, [9]), suggesting that a long-term financial perspective is critical to the successful development of elite athletes. The concept of sustainability consists of several dimensions [9], with the focus of this research being the economic dimension and financial sustainability. However, financial sustainability and economic resources also affect the social dimension, meaning the social and family life of elite athletes [10].

From the athletes’ perspective, the pursuit of an elite sporting career is a precarious endeavor, as financial support largely depends on recent performances and results. Focusing on training and the delivery of superior performances is, however, difficult when economic conditions are unfavorable [11]. Hence, having policies and support schemes in place that guarantee sustainable athlete financing is important in order for a country to achieve elite sporting success.

Likewise, from the funding perspective, elite sport is a costly and risky endeavor. It is costly because other nations invest as well, with the same aim of achieving sporting success. It is risky because there is no guarantee that investment in athletes and young talents pays off. Elite sport skiing was identified as a particularly risky investment because sporting success often depends on factors that are beyond the athletes’ control, such as weather conditions [6]. Collectively, these risks make elite sport—and especially talent development—unattractive for private companies, implying that public investments are necessary. This is also the case in Austria, where €4.3 billion were spent on leisure, sport, and culture in 2016 [12], representing 2.4% of all public expenditures [13]. The same share of taxpayer money was spent in this area in 2017 and 2018.

However, public expenditure is increasingly scrutinized by the population and, therefore, policy makers have to legitimize it. Accordingly, a growing body of literature has evolved that evaluates the intangible effects of elite sport. Within this literature, a number of valuation approaches have emerged, which assign monetary values to these intangible effects, with the contingent valuation method (CVM) representing the most frequently-applied approach to the valuation of elite sport development and sporting success (for an overview, see [14]). CVM is a survey-based method that presents respondents with a hypothetical scenario and asks for their willingness-to-pay (WTP) for the scenario to occur or to be avoided, or their willingness-to-accept (WTA) the occurrence of the scenario [15,16].

The purpose of this study is to estimate the monetary value of winter sport to the Austrian population using CVM. The valuation was undertaken in the context of three important winter sport events which were held in three consecutive years, i.e., the 2017 World Championships in Alpine Skiing in St. Moritz (Switzerland), the 2018 Olympic Winter Games in Pyeongchang (Korea), and the 2019 World Championships in Nordic Skiing on home soil in Seefeld (Tyrol). Specifically, this study assesses the population’s WTP for long-term athlete development, and compares the figures with the

WTP for access to live broadcasts of these events, which is rather short-term in nature. This study seeks to answer the following three research questions: (1) how does the residents' WTP for athlete development compare with their WTP for live broadcasts on TV? (2) Which individual factors affect the WTP for athlete development, as well as the WTP for live broadcasts on TV? (3) Are there differences in the WTP and influencing factors between the three events?

## 2. Literature Review and Theoretical Background

### 2.1. Willingness-to-Pay for Elite Athlete Development

Orlowski and Wicker [14] recently provided a review of monetary valuation studies in sport. In the context of elite sport beyond professional football leagues in Europe and the North American Major Leagues, the previous research applied CVM in order to estimate the monetary value of the hosting of sport events [17–21], sporting success (e.g., [4,22]) live broadcasts on TV [23], as well as elite sport policies and athlete support (e.g., [23–26]).

Most closely related to this study are the latter studies, examining the WTP of the population for elite sport development in Japan [24], for the 'Own the Podium' program in Canada [26], and for long-term athlete development in alpine skiing [23]. Moreover, in a comparative study of five countries, Funahashi et al. [25] analyzed the population's WTP for elite sport in the light of reduced government funding in the UK, Japan, the Netherlands, Belgium, and Finland. In addition to this previous study, only a few comparative studies exist in CVM sport research. Specifically, comparative analyses of the population's WTP in the context of different sports events are rare. One exception is a study by Wicker et al. [22] comparing the WTP for sporting success between the 2012 European Football Championships and the 2012 London Olympic Games. Comparative studies provide important knowledge for decision-makers in the country [14,27]. When, for example, different sports or events are compared, such studies give information about the population's preferences for one or the other sport or event. Such information is important because financial resources are scarce, and decisions must be made upon where taxpayer money is spent. Hence, comparative analyses represent a critical source of information for public decision-makers when different alternatives for the spending of taxpayer money are available.

### 2.2. Determinants of WTP

Existing CVM studies have identified a number of factors that explain the level of WTP, including the consumption capital and intangible effects [3,4,28] (for an overview of the determinants see [27]). According to Stigler and Becker [29], individuals build consumption capital through the repetitive consumption of similar goods. Higher levels of consumption capital are associated with higher utility, implying that the activity of interest yields more enjoyment for individuals. Applied to sports, this means that individuals generate consumption capital through participation in sport themselves, watching sport on TV, and the demonstration of a general interest in sport, potentially resulting in the consumption of news about sports [3]. The same assumptions apply to the generation of skiing-specific consumption capital [23]. Higher levels of utility and enjoyment resulting from a higher stock of consumption capital are reflected in the higher monetary value individuals assign to a specific activity, as reflected in these individuals' WTP [3,30]. Previous research has confirmed that consumption capital adds to WTP (e.g., [3,4,28]). Consequently, the consumption capital generated through an individual's own participation, interest in skiing, and watching competitions on TV is expected to be positively associated with WTP.

Intangible effects are also relevant to the explanation of the level of WTP (e.g., [22,28]). As noted earlier, such intangible effects represent, for example, elite athletes acting as role models, happiness about sporting success, and the importance of sporting success to the international reputation of a country [3,4,24]. Previous research has shown that the importance of such intangible effects is positively

associated with individuals' WTP [3,4,24], also in relation to alpine skiing [30]. Hence, this study assumes that the perceived importance of intangible effects increases individuals' WTP.

A number of socio-demographics have been found to affect WTP in existing studies. Existing research has provided mixed findings with regard to the effect of gender: while some studies reported that women have a higher WTP [3,4], others found that men have a higher WTP (e.g., [19,21]). Likewise, previous research is inconsistent regarding the association between age and WTP. Some studies documented a negative age effect (e.g., [19,21]), others a u-shaped [3] or inverse u-shaped effect [22,25]. Hence, predictions regarding the nature of the impact of these factors are difficult. This is different for income, where the literature agrees that income is positively associated with WTP (e.g., [19,24–26]).

While the roles of consumption capital, intangible benefits, and socio-demographics have been widely studied (e.g., [3,24,28]), the role of respondents' subjective wellbeing has attracted less attention in previous research. However, with the increasing relevance of individuals' subjective wellbeing in the public policy debate (e.g., [31,32]), the role of individuals' life satisfaction as one component of subjective wellbeing has also gained importance [33]. Accordingly, scholars have attempted to understand how life satisfaction—or, synonymously, wellbeing or happiness [33]—is related to economic behavior (for a review, see [32]). Two facets of economic behavior fit the present research context of WTP for elite athlete development. These are selfishness and reciprocity, specifically positive reciprocity, which is referred to as “the act of rewarding others for behaviour which has benefited oneself” (p. 69) [34].

Applying these concepts to the present study, giving money to other people, such as elite athletes, can be considered to be generous behavior, and it qualifies as non-selfish. Although the empirical evidence on the effect of happiness on selfishness is mixed [34], there are some indications that, when selfishness is related to public goods, happier individuals act in a less selfish manner (e.g., [35]). Likewise, unhappiness was found to result in negative reciprocity (e.g., [35]). Put differently, happiness would result in positive reciprocity. The ideas of selfishness and positive reciprocity can be applied to the context of the present study examining the potential of giving money to other people, i.e., elite athletes. As noted earlier, in the case of sporting success, these athletes produce a number of public goods (e.g., [4]). Hence, the individuals benefiting from these public goods are expected to be more likely to give money to those people producing them.

While the subjective wellbeing literature was able to establish a theoretical link between happiness and economic behavior [34], life satisfaction has been largely neglected in previous sport CVM research, with a few exceptions (e.g., [23,30]). In the previous research, low levels of life satisfaction yielded a higher WTP [23,30]. In the study on local Football Bundesliga clubs, this finding was explained by a compensation mechanism, meaning that giving money to ensure that the local football team still plays in the first division was considered to be a way to improve one's wellbeing [28]. A similar explanation was provided in the skiing study [23]. This negative relationship is echoed by existing research, which shows that people in a positive mood act less generously than those in a negative mood (e.g., [36]), hence contradicting the previous theoretical assumptions about a positive relationship between happiness and WTP when public goods are involved. Thus, while the empirical evidence is inconsistent in previous research outside sport [34], the few existing CVM studies in sport suggest a negative association between life satisfaction and WTP.

### 3. Methods

#### 3.1. Data Collection

Primary survey data of the Austrian resident population were collected in the context of three major winter sports/skiing events in three consecutive years, i.e., the 2017 World Championships in Alpine Skiing, the 2018 Olympic Winter Games, and the 2019 World Championships in Nordic Skiing. The data were gathered in the weeks before the respective event. Specifically, the data for the 2017 event were collected between 15 December 2016 and 14 January 2017 [21]. The sampling period for the 2018 event was from 16 December 2017 to 14 January 2018, and for the 2019 event from 15 December

2018 to 13 January 2019. The survey and sampling process was in line with the ethical guidelines of the Austrian university where the research was conducted, and with which the second author was affiliated at the time of the data collection (Schloss Seeburg University).

The questionnaires were distributed in several Austrian communities using convenience sampling. For the 2017 event, 23 students assisted in the sampling process and distributed questionnaires in public places like coffee bars, and in the waiting rooms of public administration buildings and medical practices, where people typically have the time to complete such surveys. For the 2018 and 2019 events, the numbers of students were 21 and 20, respectively. Each student was asked to distribute 50 questionnaires, resulting in a total of 1150 (2017), 1050 (2018), and 1000 (2019) questionnaires being distributed.

The surveys used paper and pencil questionnaires to reach all of the population groups, including older people and females, who are typically under-represented in online surveys because of the still existing digital gender and age divide [37,38], and because of their lower interest in sport (e.g., [19,20]). The resulting sample sizes are  $n = 893$  for the 2017 event (response rate: 77.7%),  $n = 839$  for the 2018 event (response rate: 79.9%), and  $n = 700$  for the 2019 event (response rate: 70.0%), yielding a total sample of  $n = 2432$  respondents. Because of a few missing values, the empirical analysis is based on  $n = 2289$  observations (2017:  $n = 858$ ; 2018:  $n = 786$ ; 2019:  $n = 645$ ), yielding completed response rates of 74.6% (2017), 74.9% (2018), and 64.5% (2019), respectively.

With several thousand respondents, the sample size of this study is on the upper end of CVM studies in sport [14], where sample sizes range from a few hundred observations (e.g., [19,20,22,39,40]) to several thousand respondents (e.g., [3,4,21,25]). Moreover, the survey data were weighted by age and gender in order to improve the representativeness of the sample compared to the Austrian resident population. Collectively, the comparably large sample size, in combination with the weighting procedure, should improve the confidence in the present findings.

### 3.2. Questionnaire and Variables

The same questionnaire was used for all three events, with minor differences resulting from the wording being adjusted to the respective event and the performed sports. The three-page questionnaire started with a short introduction informing respondents about the aim of the survey, as well as guaranteeing the anonymity and confidential treatment of the data. The questionnaire was developed based on previous CVM studies assessing the value of sport to the resident population [21,27]. We drew on questions and item batteries that were found to be valid and reliable in previous research. The questionnaire was pretested with a handful of residents in order to ensure that the questions were understandable and appropriate in the Austrian context. In line with previous CVM studies, the survey contained questions about the respondents' consumption capital [3,22,28], the importance of intangible effects [4,21,22], the first CVM scenario assessing the WTP for live broadcasts, the second CVM scenario assessing the WTP for athlete development [4,24–26], and socio-demographics [27]. Table 1 gives an overview of the resulting variables and their measurement.

At the beginning of the survey, the respondents' consumption capital was assessed in line with previous research (e.g., [3,22]). They were asked to rate their level of interest in winter sports (Interest winter sport) on a five-point scale, and whether they also practice winter sports themselves (Active winter sport). Furthermore, the respondents were asked to report their level of interest in the respective event (Interest event). Afterwards, the first CVM scenario related to live broadcasting was presented to the respondents. The version for the 2019 event read as follows:

*Suppose, the organizer of the 2019 World Championships in Nordic Skiing has received an offer from a private broadcasting company which exceeds the payment by the public free-to-air network ORF by several millions. The organizer considers withdrawing the broadcasting rights from ORF and sell them to the private network. What is the maximum amount of money you would be willing to pay that the 2019 World Championships in Nordic Skiing can be watched on free-to-air television?*

**Table 1.** Overview of variables and summary statistics ( $n = 2289$ ).

Variable	Description	Mean	SD
pos WTP broadcast	Respondent has WTP for TV live broadcasts > 0 (1 = yes; 0 = no)	0.215	-
WTP broadcast	WTP for TV live broadcasts (in €)	5.67	16.16
pos WTP athlete	Respondent has WTP for long-term athlete development > 0 (1 = yes; 0 = no)	0.200	-
WTP athlete	WTP for long-term athlete development (in €)	1.98	6.32
WC Alpine Skiing	Survey completed before 2017 World Championships in Alpine Skiing (1 = yes; 0 = no)	0.375	-
Olympic Winter Games	Survey completed before 2018 Winter Olympic Games (1 = yes; 0 = no)	0.343	-
WC Nordic Skiing	Survey completed before 2019 World Championships in Nordic Skiing (1 = yes; 0 = no)	0.282	-
Interest winter sport	Interest in winter sports (1 = not at all; 5 = very high)	3.47	1.17
Active winter sport	Respondent practices winter sports (1 = not at all; 5 = very much)	2.83	1.34
Interest event	Interest in this event (1 = not at all; 5 = very much)	3.07	1.33
Identification	Identification with Austria (1 = not at all; 5 = very high)	4.03	1.01
Role models	Austrian athletes have a role model function (1 = not at all; 5 = very much)	3.61	1.06
Happy medals	Happiness when Austrian athletes win medals (1 = not at all; 5 = very much)	3.86	1.07
Importance medals	Importance to Austria that Austrian athletes win many medals (1 = not at all; 5 = very much)	3.50	1.11
Male	Respondent's gender (1 = male; 0 = female)	0.495	-
Age	Age (in years)	47.23	18.35
Age squared	Squared term of age ( $\text{Age} \times \text{Age}$ )	2567.79	1803.07
Income < 1000	Personal monthly net income is below €1000 (1 = yes; 0 = no)	0.234	-
Income_1001–2000	Personal monthly net income is between €1001 and €2000 (1 = yes; 0 = no)	0.412	-
Income_2001–3000	Personal monthly net income is between €2001 and €3000 (1 = yes; 0 = no)	0.211	-
Income_3001–4000	Personal monthly net income is between €3001 and €4000 (1 = yes; 0 = no)	0.040	-
Income > 4000	Personal monthly net income is over €4000 (1 = yes; 0 = no)	0.024	-
Income_not reported	Personal monthly net income was not reported (1 = yes; 0 = no)	0.080	-
Life satisfaction	Satisfaction with life as a whole (0 = completely dissatisfied; 10 = completely satisfied)	8.14	1.63



The respondents were asked to state whether they would be willing to pay anything  $> 0$  (pos WTP broadcast) and if so, how much they would be willing to pay (WTP broadcast). The consideration of an extensive margin of WTP, meaning a first distinction between those with a positive WTP and those reporting no WTP, and an intensive margin of WTP reflecting the overall amount of money of those with a positive WTP is in line with previous research [14,21,22,25,27].

Regarding the first CVM scenario, it could be argued that there might be no difference if residents pay for the broadcasting rights of the sport events to remain as free-to-air broadcasting without transferring them to a commercial broadcaster or if they directly pay the fee to a commercial broadcaster which allows them to watch the events. Such deliberations reflect a more narrow view, as it only considers each individual consumer. A broader view includes the general public and other consumers. The expression of a WTP for free-to-air broadcasts does not only allow oneself to watch the events on the free-to-air channels, but also allows others who might not have the additional financial resources. In fact, large audiences are important for the large-scale production of public goods and the positive externalities for the Austrian economy to occur [6]. Hence, it is important that other residents also have the possibility to watch the events. Moreover, Austrian free-to-air channels cannot only be received in Austria, but also in regions close to the border (e.g., in Germany and Italy), thus increasing the potential audience. Apart from this, if such winter sport events are not available on free-to-air TV, this would also represent a break with Austrian tradition and the self-concept of a winter sport nation, hence challenging the cultural sustainability outlined earlier. Thus, there are several arguments as to why paying for free-to-air broadcasts represents a suitable scenario.

Next, the importance of intangible effects was assessed in line with existing studies [3,4,24,30]. The respondents were asked to rate their level of identification with Austria (Identification) on a five-point scale, and to rate the role model function of Austrian athletes (Role models). Moreover, they were asked to state the extent to which they are happy when Austrian athletes win medals (Happy medals), and how important it is to them that Austrian athletes win many medals (Importance medals). Afterwards, the second CVM scenario related to long-term athlete development was presented. The wording of the 2019 version was as follows:

*Suppose, the Austrian Skiing Association (ÖSV) applies for an increase in financial support for their elite athletes at the Federal Government. The Federal Government plans a referendum where the Austrian population will be asked for their consent to the planned increase in financial support. The idea is to moderately increase taxes for a period of 5 years. What is the maximum amount you would be willing to pay more in taxes per month to improve the conditions of Austrian winter sport athletes?*

Again, the resulting variables include a dummy variable that captures whether the respondents would be willing to pay anything  $> 0$  (pos WTP athlete), and the amount they would be willing to pay (WTP athlete). Importantly, all of the respondents received both CVM scenarios within one questionnaire, with the first one assessing the WTP for live broadcasts and the second one assessing the WTP for athlete development.

The survey finished with a set of questions assessing the respondents' socio-demographic characteristics [3,4,22,27], including their gender (Male), age (Age), income, and life satisfaction (Life satisfaction). Their personal monthly net income was assessed using nine categories with intervals of €500 (from 1 = up to €500 to 9 = over €4000), which were collapsed into five variables consisting of €1000 intervals (Table 1). Moreover, another variable was added for those who did not report their income (Income\_not reported) [22]. Since the relationship between age and WTP can also be nonlinear (e.g., [23]), a squared term for age was also included in the estimation (Age squared).

### 3.3. Empirical Analysis

The statistical analysis consisted of several steps. First, paired sample *t*-tests were carried out in order to examine the differences between WTP for long-term athlete development and WTP for TV live broadcasts. Empirically, the application of paired sample *t*-tests is suitable because all of the

respondents received both CVM scenarios. Hence, each respondent reported a WTP for live broadcasts and a WTP for athlete development, which can then be compared via this test.

Theoretically, such a comparison between short-term and long-term WTP is rooted in scope issues, which have nurtured the debate about the validity of CVM studies [15,41]. The results of CVM studies should pass a scope test, meaning that the WTP estimates should “increase in a plausible manner with the quantity or scope of the good being provided” (p. 1416, [15]). Given its assessment of stated preferences and the reliance on hypothetical scenarios, CVM has drawn criticism, especially with regard to the potential of hypothetical bias and scope issues [41]. Therefore, scope tests are necessary and have been conducted in previous research [41], with the majority of CVM studies passing the scope test [15]. The previous CVM sport research controlled for the payment period in the empirical analysis (e.g., [40,42]), suggesting that the studies passed the scope test, and that the respondents considered temporal embedding in their answers [42]. Likewise, in the present study, such a scope test can check the respondents’ sensitivity to and consideration of the payment period outlined in both CVM scenarios. Naturally, the WTP should be larger for longer periods, but a scope test will help clarify empirically whether this is the case.

Regarding the comparison of the WTP for these two valuation goods, the goods are of course not similar, but they are interrelated. As outlined earlier, sustainable athlete financing presents athletes with the training and living conditions that they need in order to achieve superior sporting performances, while live broadcasting allows the population to watch the outcomes of their training efforts. The payment vehicles in both CVM scenarios are similar. Taxes are used in the athlete development scenario, while the broadcasting scenario is based on license fees. Although it is not explicitly noted (as self-explaining), license fees are the standard way in which money is transferred from the public to free-to-air networks in many countries, including Austria [43] and Germany. Ironically, every resident has to pay this license fee independently of their actual consumption, so the fee is actually very similar to a tax (and is, therefore, also subject to public criticism in many European countries).

Second, the aggregate WTP was estimated for broadcasting and athlete development. Specifically, in order to estimate the net present value of the benefits generated by the broadcasting activities of Austrian television, the mean WTPs for broadcasting and athlete development were multiplied by the number of adult Austrians older than 15 years, i.e., 7.4 million people [44].

Third, regression models were estimated in order to identify the factors associated with WTP. Given the large number of zeros in the data, the analysis distinguishes between positive WTP and the amount of WTP of only those respondents with  $WTP > 0$ , in line with previous research [3,4,21]. Specifically, two probit models were estimated, with the positive WTP dummies representing the dependent variables, as were two log-linear regression models with the natural logarithm of the amount of WTP as outcome variables. Several measures of consumption capital, intangible effects, socio-demographics, and life satisfaction were entered as independent variables. Prior to the analysis, the independent variables were tested for multicollinearity using correlation analyses. All of the correlation coefficients were below 0.8 [45], indicating that multicollinearity should not be a concern.

The three event-specific datasets were combined for the regression analysis in order to allow more general statements about the value of winter sports to the Austrian population—which include several years, events, and types of sports—while still being able to control for the type of event. Merging datasets that include valuations of the same good, but in different contexts or years, is a procedure that has been applied in previous research, for example, with regard to Football Bundesliga clubs [30] and cities in England [40]. The present study also conducts such a pooled analysis which controls for the type of event/year.

#### 4. Results

Table 1 reports the descriptive statistics. Following the weighting procedure, 49.5% of the respondents are male, and the average age is 47.2 years. About 40% of the respondents earn a monthly net income between €1001 and €2000, with another (approximately) 20% reporting an income level in



the next higher or lower category, respectively. The average life satisfaction is 8.14 on a scale from 0 to 10. Looking at the specific event sub-samples, 37.5% of the respondents completed the survey in the context of the 2017 World Championships in Alpine Skiing, 34.3% completed the survey before the 2018 Winter Olympics, and 28.2% completed the survey prior to the 2019 World Championships in Nordic Skiing.

Turning to consumption capital, the respondents were slightly more interested in winter sports in general ( $M = 3.47$ ) than in the respective event ( $M = 3.07$ ), with some of them also actively practicing winter sports themselves ( $M = 2.83$ ). Concerning intangible aspects, the average identification with Austria is high ( $M = 4.03$ ), and the respondents tend to be happy when Austrian athletes win medals ( $M = 3.86$ ). The respondents largely agree with the statements that Austrian athletes are role models ( $M = 3.61$ ) and that it is important for the country that Austrian athletes win many medals ( $M = 3.50$ ).

The two CVM scenarios for TV broadcasts and athlete development yield the following results. Across the events, 21.5% of the respondents reported a positive WTP for broadcasting, i.e., a WTP higher than zero. The average WTP for broadcasting (including zeros) amounts to €5.67. For athlete development, 20.0% of the respondents stated a positive WTP, with the average WTP amounting to €1.98 (including zeros). When zeros are excluded, the average WTPs are €26.40 (broadcasting) and €9.93 (athlete development), respectively.

Table 2 displays individuals' mean values for positive WTP and the amount of WTP for both CVM scenarios by event, with the  $t$ -tests indicating whether significant differences exist. For the 2017 event, the share of the respondents reporting a positive WTP for broadcasting is significantly higher than the share stating a positive WTP for athlete development (29.2% vs. 20.4%). For the 2018 event, the respective shares are not statistically different (19.5% vs. 19.8%). For the 2019 event, the share of the respondents reporting a positive WTP for broadcasting is 13.5%, which is significantly lower than for athlete development, for which it is 19.6%. Across the three events, the WTP for broadcasting (including zeros) is significantly higher than the one-time (monthly) WTP for athlete development, with WTP values decreasing as we move from 2017 to 2019. This is not the case for athlete development, where the 2018 event (i.e., the Winter Olympics) yielded the highest WTP values of the three events. While the monthly WTP values for athlete development are relatively low, aggregating those to the 5-year period shows that they are significantly higher than those for broadcasting for all three events. The 5-year values also demonstrate that small differences in monthly values of a few cents can result in large differences when considering the entire 60-month payment period.

**Table 2.** Differences in WTP for broadcasting and athlete development (paired sample  $t$ -tests; the mean values are displayed).

Event	$n$	pos WTP broadcast	pos WTP athlete	WTP broadcast	WTP athlete (monthly)	WTP athlete (5 Years)	$t$
2017 WC Alpine Skiing	858	0.292	0.204	-	-	-	6.137 ***
	858	-	-	7.05	1.65	-	9.868 ***
	858	-	-	7.05	-	98.68	-8.263 ***
2018 Olympic Winter Games	786	0.195	0.198	-	-	-	0.207
	786	-	-	5.18	2.44	-	5.440 ***
	786	-	-	5.18	-	146.64	-8.862 ***
2019 WC Nordic Skiing	645	0.135	0.196	-	-	-	-4.180 ***
	645	-	-	4.42	1.88	-	3.948 ***
	645	-	-	4.42	-	112.67	-8.173 ***

Note: \*\*\*  $p < 0.01$ ; WC = World Championships.

In addition to individuals' values, WTP was aggregated to the Austrian resident population in order to give an idea of the value of professional winter sports to the country's residents. The aggregate WTP for broadcasting is €42 million; a reasonable value for a traditional winter sport nation. The capitalized WTP for athlete support using additional taxes over a 5-year period is higher: using a discount rate of 5% (10%), the aggregate WTP for athlete development amounts to €796 (€720) million.

Table 3 summarizes the results of the regression analyses. The probit models analyzing the factors affecting positive WTP explain 24.4% (broadcasting) and 15.1% (athlete development) of the variation in the dependent variables, respectively. With 9.6% (broadcasting) and 13.0% (athlete development), the share of the explained variance is comparably lower in the log-linear regression analyses.

**Table 3.** Determinants of WTP for athlete development and broadcasting (regression analyses).

	Probit		OLS	
	pos WTP broadcast	pos WTP athlete	LN WTP broadcast	LN WTP athlete
WC Alpine Skiing	REF	REF	REF	REF
Olympic Winter Games	−0.42946 ***	−0.17976 **	0.05396	0.57648 ***
WC Nordic Skiing	−0.59520 ***	−0.11700	0.00529	0.46819 ***
Interest winter sport	0.09017 **	0.17143 ***	0.01701	0.12642 *
Active winter sport	0.08946 ***	0.01526	0.06424	−0.09508 **
Interest event	0.37502 ***	0.18412 ***	0.06841	0.07796
Identification	0.00788	−0.03007	−0.01613	−0.09201
Role models	0.07972 **	0.10906 ***	0.07940	−0.02085
Happy medals	0.06801	0.09534 **	0.02530	−0.07728
Importance medals	0.16990 ***	0.17107 ***	0.09352 *	0.19398 ***
Male	−0.13548 *	−0.07626	−0.03987	0.09118
Age	−0.02906 **	−0.01417	0.02939	0.03269
Age squared	−0.00029 *	0.00011	−0.00032	−0.00038
Income < 1000	REF	REF	REF	REF
Income_1001–2000	0.03250	0.17652 *	0.25091 **	−0.24571 *
Income_2001–3000	0.16015	0.44080 ***	−0.18244	−0.13826
Income_3001–4000	0.18903	0.28533	−0.06015	0.26256
Income > 4000	0.02227	0.20201	0.47535	0.16752
Income_not reported	−0.56671 ***	−0.07884	−0.40140	−0.36992
Life satisfaction	0.04269	−0.00544	0.05642 *	0.04512
Constant	−3.36785 ***	−3.07164 ***	0.48028	0.17241
LL null model	−1188.360	−1183.004	−	−
LL full model	−898.494	−1004.645	−	−
Pseudo R <sup>2</sup> /R <sup>2</sup>	0.2439	0.1508	0.0963	0.1301
F	−	−	2.75	3.83
n	2289	2289	484	480

Note: The coefficients are displayed; standard errors in parentheses; \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ; REF = reference category.

Starting with the WTP for broadcasting, a number of factors are statistically significant, especially in the probit model. The two event dummies are significant, indicating that the respondents were more likely to report a positive WTP for the Alpine Skiing World Championships than for the other two events. Furthermore, the consumption capital variables, the consideration of athletes as role models, and the importance of medals are all positively associated with the dependent variable. Concerning the socio-demographics, women were found to be more likely to report a positive WTP. Age has a u-shaped effect, with middle-aged people being less likely to state a positive WTP. Those who did not report their income had a lower likelihood than those in the first income category. The amount of WTP for broadcasting is only affected by three factors. Again, the importance of winning medals is significant and positive. Furthermore, the respondents earning between €1001 and €2000 net per month reported higher levels of WTP than those in the reference category of up to €1000. Moreover, the respondents' life satisfaction is significantly and positively associated with the amount of WTP for broadcasting.

Turning to the WTP for athlete development, the likelihood of reporting a positive WTP is significantly higher for the World Championships in Alpine Skiing than for the Olympic Games, while there is no significant difference to the World Championships in Nordic Skiing. As in the broadcasting model, consumption and intangible factors are significant. Specifically, interest in winter sports and the respective event, considering athletes as role models, happiness about winning medals,

and the importance of winning medals all have a significant and positive association with the likelihood of reporting a positive WTP for athlete development. Furthermore, people earning monthly net incomes between €1001 and €3000 are more likely to state a positive WTP than those in the reference category.

The amount of WTP of those reporting a positive WTP is significantly determined by the type of event, with WTP being significantly higher in relation to the 2018 and 2019 events than for the 2017 event. Actively practicing winter sports is negatively associated with the amount of WTP, while the importance of winning medals has a positive effect. Earning a slightly higher income than the respondents in the reference category significantly reduces the amount of reported WTP.

## 5. Discussion

The present study investigated the WTP of the Austrian resident population in the context of three winter sport events using CVM. Specifically, two scenarios were proposed that captured the short-term WTP for live broadcasts of the event on free-to-air television and the WTP for long-term athlete development. Securing financing for the support of elite athletes is critical to their sustainable development, and also to the chances of those athletes achieving sporting success. Hence, it is ultimately relevant to a nation's competitiveness in international sporting events.

Following the aggregate WTP estimates, the Austrian population attaches a substantial value to both live broadcasts of elite winter sports events and athlete development. The aggregate WTP for long-term athlete development of €796 million is significantly higher than the short-term WTP for live broadcasts (€42 million), suggesting that the value of long-term sporting success is substantial, and that the Austrian population has considered temporal embedding [42] in their answers. This means that the respondents have considered the payment period in their answers and distinguished between a lump-sum payment—i.e., a one-off payment—for live broadcasting and a recurring monthly payment over a 5-year period. Hence, the findings of this study have passed the scope test [15,41], and can be considered credible in this regard.

The findings also indicate that the contributions to the aggregate WTP values are unevenly distributed among the Austrian resident population. For both live broadcasts and athlete development, only about 20% of the residents expressed a positive WTP, meaning that only a certain share of the population drives the results: precisely one out of five Austrian residents. Put differently, the majority of residents have a WTP of zero. This relatively high number of zeros is similar to previous CVM studies on the WTP for elite sport (e.g., [20,21,39]). The findings of this study signal that elite sport's production of public goods—such as happiness from sporting success, having athletes as role models, increased identification with the country, and the increased prestige of the country from winning medals—tend to reach large parts of the general public, but only a comparably smaller share of people are willing to contribute to the financing of the preconditions of the production of those public goods. This aspect is especially relevant to elite athlete development, which is a risky endeavor for both the involved athletes and the institutions providing financial support [6]. In the absence of private companies engaging in the financial support in order to promote sustainable elite athlete development, public investments are necessary, which, in turn, require taxpayer money. The present study echoes the existing research (e.g., [4,40]) in that large parts of the population are not willing to take the risks and bear the respective costs.

Notably, the three different events are associated with different target groups of athletes. The 2017 event targets alpine skiers, the 2018 event encompasses athletes in all Olympic winter sports disciplines, and the 2019 addresses athletes in Nordic skiing disciplines (i.e., cross country skiing, ski jumping, and Nordic combined). With about 20%, the share of the respondents reporting a positive WTP for elite athlete development is similar across the events. Notable differences between the three events can be observed with regard to the amount of WTP for athlete development. Specifically, the WTP is lowest for alpine skiers and highest for Olympic athletes. This difference might be explained by the level of excellence these athletes have already reached. For example, at the 2014 Olympic Games, the Austrian team won a total of 17 medals, with nine of them being contributed by alpine skiers,

including three out of four gold medals. A similar result was obtained for the 2018 Games, which was, however, not known at the time of survey. Hence, the relatively higher WTP for the development of Olympic athletes suggests that Austrians feel a need to support athletes in other Olympic disciplines as well, and see the potential for positive development.

The WTP for live broadcasting shows a different pattern, with alpine skiing reaching the highest share of the respondents with a positive WTP and the highest WTP values when comparing the three events. It is possible that these values are driven by the level of success of alpine skiers. They suggest that winning medals is not only important to the country, but also to the population's interest in watching the event, and ultimately the residents' WTP for live broadcasts. Hence, having reasonable expectations about sporting success adds to the WTP, as broadcasting can be enjoyed more when athletes are successful. On the contrary, the 2019 event, which was hosted on home soil, yielded the lowest WTP values, indicating that success is more important to the Austrian population than hosting an event.

Turning to the factors associated with WTP, the regression analyses reveal that the share of the explained variance is lower in the models for the amount of WTP. Furthermore, fewer variables are statistically significant in these models, ultimately indicating that the respondents' level of WTP is more difficult to explain than the positive WTP. This pattern of results is similar to previous research [21], suggesting that the payment vehicle might play a role. In the present study, as in the already-quoted previous study by Wicker et al. [21], taxes were employed as the payment vehicle. Hence, the pattern of findings potentially indicates that residents generally support the proposal outlined in the CVM scenario, but not the payment vehicle, as they feel they already pay too many taxes [21]. Previous CVM research supported the notion that other payment vehicles are more preferred, such as a foundation or an account in trust managed by a group of lawyers [20]. Thus, residents do not express their reluctance against higher taxes through protest zeros [30,46], but rather through a low level of WTP, which is difficult to explain and cannot be attributed to the same determinants as positive WTP.

Turning to the determinants of WTP, the regression models supported the existing studies (e.g., [4,24,28]) in that consumption capital and intangible factors are relevant for positive WTP, and—to a lesser extent—for the level of WTP. An interesting effect, and at first glance a counterintuitive finding, is the negative association between actively practicing winter sports and the amount of WTP for athlete development. Intuitively, consumption capital theory would suggest that the higher consumption capital developed through active winter sport participation translates into higher WTP. However, such a negative relationship between sport participation and the financial support of elite sport is not new. From sport policy, debates about the prioritization of public funding are well-known; essentially, trying to find a balance between expensive support of a few elite athletes compared to the devotion of money to the development of grassroots sports, which benefit the wider population [2]. The active sport participants in this survey seem to opt for the latter, as demonstrated through their significantly lower WTP for athlete development. Another fear of active sport participants might be crowding-out, specifically the crowding-out of regular winter sport tourists by elite sport events. Hence, the respondents who are active participants themselves might fear that an increased support of elite athletes reduces their opportunities in popular winter sport destinations (e.g., [47,48]). Typically, when destinations host elite sport events, the hotel capacities for regular tourists decrease substantially while prices increase, ultimately limiting the possibility of active participants to practice their sport.

Notably, the importance of winning medals represents the only factor that is significant across all four models. This effect supports the importance of sporting success to the Austrian population's willingness to contribute financially to elite athlete development and the consumption of events through live broadcasting. However, for sustainable athlete development and the production of excellent athletic performances, the provision of continued public funding is important from the athletes' perspective [9]. This aspect relates back to the well-known causality debate in elite sport, i.e., whether sporting success or financial support should be provided first.

Turning to socio-demographics, women were found to be more likely to report a positive WTP for live broadcasts, while age had a u-shaped effect. Although it is difficult to observe clear patterns for gender and age effects in previous WTP research, at least a few possible explanations can be advanced for these findings. There are some tendencies in existing research that women enjoy cheering for national teams and athletes [3,4], as opposed to local football clubs [46]. This increased interest in and consumption of international sport events might result in a higher likelihood to dedicate money to watch these events live on TV. Concerning age, the u-shaped effect indicates that younger and older people were more likely to report a positive WTP than middle-aged residents. This finding might be rooted in the time of day when the events were held and consequently also broadcast live. Many winter sports—like alpine skiing, ski jumping, and many disciplines of cross-country skiing—require daylight conditions, which affects the time of day these events are held (typically between 10 a.m. and 3 p.m.). Younger and older residents might be more likely to watch these events, as they have fewer work-related obligations and family responsibilities during the day than middle-aged people. Hence, younger and older people might have more time and opportunities to watch TV during the day and, hence, the competitions of the winter sport events examined in this study.

While the determinants relating to consumption capital, intangible effects, and socio-demographics have been widely studied (for an overview, see [27]), the role of life satisfaction is less understood. In this study, it is one of the few factors that has a significant and positive effect on the amount of WTP for live broadcasting. This effect is contrary to previous CVM sport research documenting a negative effect of life satisfaction on WTP [23,30]. The present finding supports the theoretical explanations related to selfishness and positive reciprocity (e.g., [34,35]), showing that happier individuals behave less selfishly by giving money to other people, in this case elite athletes. Positive reciprocity reiterates the role of the public goods which are produced by elite athletes and their sporting success, which benefit the population and drives residents' WTP—at least for live broadcasts.

## 6. Conclusions

This study examined the value of professional winter sports to the Austrian resident population by looking at live TV broadcasts and sustainable athlete development. The findings reveal that Austrian residents are interested in winter sports athletes and events, and enjoy the public goods produced by them. The overall challenge for policy makers and sport governing bodies is to turn the widespread interest in winter sports in the population into a willingness to provide financial support for those who produce the respective public goods, i.e., the athletes. One way to close this gap between consumption and financing would be to increase the public awareness of the athletes' situation, including their financial situation. Moreover, creating awareness for the costs of practicing winter sports at the elite level, the associated deprivations, and the athletes' risks might contribute to a better understanding of the overall complex situation by the general public. Overall, this challenge is not unique to Austria, as other countries—such as Germany—share similar issues [49]. Collectively, this study enhances our understanding of the financial sustainability of publicly-funded sports programs, and the challenges of creating and maintaining widespread financial support for long-term athlete development.

The present research also makes several specific contributions to the body of research studying the intangible effects of sports using CVM. It is among the first to compare the WTP among different events. Such comparisons are important in order to identify differences over time and across events, as specific events are related to specific groups of athletes and types of sports. Another contribution is the comparison between short-term and long-term WTP, with the latter indicating that the population recognizes the importance of sustainability to athlete support and the financing of athlete development. Third, this study adds to the body of work examining the determinants of WTP. It does not only include individuals' life satisfaction as an additional factor in the empirical analysis, like previous studies [23,30], but also provides a theoretical underpinning for the role of life satisfaction by drawing on the subjective well-being literature. While previous research has mainly focused on the effects of sport on individuals' well-being—including life satisfaction—this study argues that there are also



reasons to believe that individuals' levels of happiness might affect their generosity in terms of giving money to other people, in this case elite athletes who contribute to the production of public goods through sporting success. This aspect is critical, and it enhances our understanding of the public goods discussion in relation to sport events and sporting success.

This work comes with some limitations which, in turn, provide perspectives for future studies. First, it shares the limitations of all studies relying on cross-sectional survey data, meaning that monetary values and relationships can only be examined at one point in time. Naturally, longitudinal data compromise the anonymity of the respondents, which is, however, critical to the receipt of honest responses on financial questions like WTP and income. The second limitation relates to the question format and the use of taxes as the payment vehicle. While this study was one of the first in the context of Austria, future research should diversify the question formats and payment vehicles, similar to recent research in Germany (e.g., [20]). Another avenue for future studies would be to examine the ways in which the sustainability of elite athlete development can be secured. This aspect is critical to both the public (finance) perspective and the athletes' perspective, as supporting/pursuing elite winter sports is a risky endeavor for both parties.

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