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The Effects of Elite Sports Participation on Later Job Success

Ralf Dewenter* Leonie Giessing†

February 2015

Abstract

This paper analyses the income effect of the participation in elite sports using a unique dataset on former German top-level athletes. To quantify the average treatment effect we use covariate nearest-neighbour matching. While our treatment group consists of formerly top-level athletes the control group of non-athletes is drawn from the GSOEP database. On average, former athletes receive higher incomes than similar non-athletes. Moreover, team sports athletes as well as male athletes realise significantly higher incomes. Comparing the income of former female athletes with male non-athletes, we find that participating in elite sports closes the gender-wage gap.

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1 Introduction

Participation in sports is widely acknowledged to have positive effects on individual health and general well-being. Moreover, physical activities are also assumed to exert a positive impact on labour market success. While most studies focus on either leisure activities or college sports, little has been said about the impact of professional and elite sports on athletes' later job success, after their athletic career. In comparison to leisure activities and college sports, professional sports is much more time consuming and therefore assumed to be a closer substitute to education and vocational training. However, professional sports may also result in positive personal characteristics such as endurance, commitment and discipline.

When analysing job market outcome of athletes one can identify at least four different channels through which participation in elite sports may contribute to later job market success. The contribution can be either positive or negative, i.e. can be beneficial or detrimental to a professional career. First, while the theory of human capital is applicable, it does not allow an unambiguous assessment of professional sports and its impact on a later labour market outcome: Following Becker (1965) one might argue that the allocation of time to other activities than schooling and vocational training directly leads to a lower level of human capital and therefore to lower productivity. As participation in elite sports is extremely time consuming, this may result in a much less intensive education. The resulting diminished academic activity might then be detrimental to a business career. By this reasoning the participation in elite sports will result in limited careers and lower individual incomes.

However, considering human capital as a multidimensional object leads to different results. Apart from positive effects on health and individual well-being (see Lechner, 2009), elite athletes are often supposed to show certain skills and personal characteristics such as commitment, discipline,

self-confidence and a high stress tolerance, that may also be helpful for a professional business career. Particularly the combination of these characteristics may provide benefits for the former athletes that can facilitate their professional success (Schmidt & Saller, 2013). Put differently, athletes are supposed to develop or enhance certain positive character which can also be beneficial for a successful business career.

Steger (2002) shows that productive consumption, i.e. activities that cannot be classified as labour will indirectly contribute to the income, increases the stock of human capital as well as the efficiency of labour. Concerning elite sports one can talk about productive consumption if by the participation in top sports certain skills and personal properties are gained or enhanced and if these properties are also relevant and valuable in the later working life or in other non-sporting areas. These properties are named transferable skills or life skills (see Danish et al., 2007 & 1993 and McKnight et al., 2009). These skills include inter alia "learning to set and develop plans to reach goals" (Danish & d'Augelli, 1983), "high self-confidence and expectations of success", "focus on the present task", "viewing difficult situations as challenging and exciting" as well as "strong determination and commitment" (Krane & Williams, 2006). In addition, Danish et al. (1993) mention further skills such as the ability to perform under pressure, to communicate with others, to accept responsibilty for ones behaviour, to accept criticism and feedback in order to learn, to evaluate oneself, and to build self-control as well as self-motivation.

Second, there are also social networking effects: an extreme commitment into elite sports may lead to the development of character disorders and antisocial behaviour. Elite athletes may therefore, intentionally or not, invest less in education and social competences, which may result in a less successful professional career. Ogilvie and Tutko (1971), e.g., argue that the participation in elite sports leads to character disorders instead of building character. The promotion of competitive rivalry prohibits the development of pro-social

character traits. As a consequence, antisocial behaviour can have a negative impact on the professional career and thus, on income.

On the other hand, elite sports may well stimulate pro-social character traits. Especially in team sports, team work abilities or at least team compatibility is an important requirement for sporting success. By this means, pro-social behaviour can also be developed with respect to private or professional life. Furthermore, athletes may then benefit from elite sports participation. This may be the case if attributes such as, for example, team work abilities are decisive for the recruitment or promotion decision.

As a third channel, participation in elite sports may serve as a signalling device. Potential employers may assume that beside showing other positive characteristics, former athletes are also highly motivated (see Lechner, 2009). Furthermore, in connection with higher education, athletes also signal a high performance and assertiveness.

A fourth channel may simply be induced by former athletes' prominence. Given that an employer can choose between two otherwise identical candidates, he might opt for the prominent one.

The rest of the paper is organised as as follows. Next, we briefly discuss the findings of other studies on the impact of sports participation on the labour market success. In the third chapter, we describe the data and provide some descriptive statistics. We then use an unique data set to analyse if and to which extent former elite athletes which were formerly sponsored by the German Sports Aid Foundation (Deutsche Sporthilfe) are more successful in their later working lives than non-athletes. The occupational success is measured by the monthly income net of taxes. Put differently, we simply address the question if former athletes earn a higher average net monthly income than similar persons, that have not participated in elite sports. To deal with a possible selection problem, we employ covariate nearest-neighbour matching (CVM) and control for several factors influencing the size of the labour income. To the best of our knowledge, this study is the first analysis

on the effects of participation in elite sports on later job success.

2 Literature Review

A number of studies exist which analyse the impact of high school and college athletic participation as well as of physical activities on different measures such as grades, health, well-being and labour market success.

A qualitative analysis among 616 former successful German Olympic athletes, for example, shows that 65 % have a school degree that allows for studies at a university or polytechnic. This rate is 40 % above national average. More than 50 % of former athletes hold a university degree. With respect to their professions, the authors find that the former Olympic athletes are more often employed in jobs that have a high reputation than the national average. They typically work in management positions or academic professions and less often in the fields of trade and craft (Conzelmann & Nagel, 2003).

A study among twelve to sixteen year old students in the Netherlands by Jonker et al. (2011) compares the level and importance of self-regulatory skills among teenage top athletes and non-athletes in the pre-university and in the pre-vocational school system. In total, six self-regulatory skills are being tested, i.e. planning, self-monitoring, evaluation, reflection, effort and self-efficacy. The authors find that students in the pre-university system had higher scores in five of the self-regulatory skills than in the pre-vocational system. Comparing the youth athletes with the non-athletes within their respective school systems the athletes outscored the non-athletes on three skills.

Schmidt and Saller (2013) compare job-related personality features of top athletes supported by the German Sports Aid Foundation with students at the European Business School as well as qualified employees and managers. The top athletes obtained above average results in the categories commitment, discipline and steadiness. However, the athlete must be aware of the

skills she gained or enhanced by participating in elite sports in order to be able to transfer them to non-sporting settings. Additionally, it must be known that these competences are also valuable in other areas of life (Danish et al., 2007). Besides, having been an elite athlete may serve as a signalling device. It can benefit recruitment and promotions processes if potential employers value this as a signal that a person is highly ambitious, dedicated or loyal to the team (Long & Caudill, 1991).

Long and Caudill (1991) find that ten years after having been freshmen former male college athletes realise a four percent higher annual income than their fellow students. However, they do not find a positive income effect for former female college athletes. Ewing (1995) confirmed most of these results, analysing former high school athletes. Moreover, Ewing (1998) provides evidence that former high school athletes more often hold jobs with better labour market outcomes.

Barron et al. (2000) use longitudinal survey data to analyse the impact of high school athletic participation on labour market outcomes. Overall, they find evidence for positive effects on wages and educational attainment. Similarly, Ewing (2007) finds also higher wages for former high school athletes. Athletes are, moreover, also more likely to receive fringe benefits such as retirement, medical insurance, dental insurance and paid vacation.

Lechner (2009) analyses the impact of individual leisure sport activities on labour market variables as well as on health and subjective well-being. Using individual data from the German Socio-Economic Panel study (GSOEP) Lechner finds significant effects with respect to income. Active sports participation increases income by about 1200 Euro per year. The returns on sports activites are comparable to those from one additional year of schooling. As Lechner also uses matching techniques for identifcation matters, this paper is closest to our analysis.

3 Empirical Analysis

3.1 Identification

When analysing the effect of participation in elite sports on salary only realized income is observable. However, to measure the exact effect one has to compare the actual income with the income the same person would have earned if she had not executed any top sports. As such a counterfactual situation, of course, does not exist we use information on a control group to approximate respective incomes. For each former athlete, we identify up to four control group members of non-athletes by using covariate nearest-neighbour matching (CVM). We then compare the salaries of persons of the treatment group, i.e. former athletes, with those of the control group, i.e. non-athletes, that posses the same probability to be successful in the labour market. The difference in salaries of treatment and control group members across all matches yields the sample average treatment effect (SATT).

Job success is measured by the monthly income net of taxes. We distinguish between married and unmarried individuals to account for differences in income tax rates. Sex is included to account for a possible gender wage gap (see Antonczyk et al., 2010). A dummy variable East Germany (Old Lander) indicates whether a workplace is located in East (West) Germany and controls for possible differences in income (see Ragnitz, 2012). As a person who is still on job training typically receives a lower salary than a completely qualified person, we include a dummy variable stating whether someone is still in training. We also control for full-time and part-time employment.

To identify adequate matching partners, we use several personal characteristics which are supposed to have an impact on income, such as gender, marital status, labour market experience, workplace location (East or West Germany), level of training, job position, character traits and attitude towards life. Related to the Mincer wage equation, we include a measure for the job market experience, the number of years being employed as well as an

instrument for the educational attainment (Mincer, 1974 and 1958).[1]

The level of educational attainment may to some extent be endogenous when athletes expect elite sports to be more compatible with studies than it would be with a job. For this reason, we use the professions of the respondents‘ parents when the latter were teenagers, as a proxy variable for the respondents‘ highest level of education. This is supposed a valid approximation as there exists some kind of path dependence between parents‘ occupation and their kids‘ level of education (see Eccles & Davis-Kean, 2005). Children whose parents have university degrees show a higher probability to become university graduates themselves.[2]

Former athletes may earn higher incomes because of the possession of certain character traits that are also beneficial to a career on the job market. If they possess these qualities irrespective of their athletic background, they may have experienced the same job market career even without having been an elite athlete. To prevent a self-selection bias we assess measures of the respondents‘ character traits and attitudes towards life and future in the matching process.

3.2 Nearest neighbour matching

In order to compose the control group of non-athletes we calculate the vectors of covariates to find the shortest distance to an observation in the treatment group. The distance is formally denoted as $d_M(i) = \|z - x\|_V$, where x indicates the covariate values for an observation i from the treatment group of former athletes, while z are the covariate values for its potential match from the group of non-athletes. Depending on the number of matching partners M, the set of indices that are at least as close as the Mth match are subsumed

[1] Using the year of birth would be an insufficient measure for the job market experience. Former athletes may enter into working life later than non-athletes as due to the double burden of top sports (see Aquilina, 2013).

[2] The coding of the former athletes parents' occupation is done by the StaBua 1992 job classification which is in accordance with the GSOEP data.

under $\tau_M(i)$ (see Abadie et al., 2004).

As the SATT score will be biased if the matching is not exact we use the bias-corrected matching estimator for the average treatment effect of the treated by Abadie et al. (2004) and Abadie & Imbens (2002):

$$\tau^{sample,t} = \frac{1}{N_1} \sum_{i:W_i=1} \left\{ Y_i - \tilde{Y}(0) \right\}, \tag{1}$$

where Y_i represents the actual salary of a former elite athlete. The income of a former elite athlete if she had not been an elite athlete, indicated by $\tilde{Y}(0)$, is unobserved, and hence has to be predicted.

$$\tilde{Y}(0) = \frac{1}{\tau_M(i)} \sum_{l \in \tau_M(i)} \{ Y_l + \hat{\mu}_0(X_i) - \hat{\mu}_0(X_l) \}, \tag{2}$$

where l indicates an observation of the control group and X_i and X_l are the matrices of covariate values of an observation of the treatment and control group, respectively. The bias correction is made by an adjustment of the differences within the matches for the differences in its covariate values. It is based on the regression function for the controls approximated by a linear function, i.e. $\hat{\mu}_0(x) = \hat{\beta}_{00} + \hat{\beta}'_{01}x$. The observations are weighted by $K_M(i)$, denoting the number of times an observation of the control group is used as a match.

The bias correction is only implemented for covariates that do not possess a good matching quality. The matching quality is tested with the Wilcoxon matched-pairs signed-rank test (see Abadie & et al., 2004). One specification includes three estimations since we vary the number of matching partners, i.e one, two and four matching partners. The bias corrected variables will be indicated in the regression tables. The test statistics of the Wilcoxon matched-pairs signed-rank test are shown in the Appendix (see Tables 7 to 12).

In determining SATT scores, we estimate various specifications to evaluate the robustness of our results. While, in a first specification, we include

only the fathers' profession as a matching covariate and in a second specification, we also consider the profession of both parents. Furthermore, we vary the covariates to achieve exact or at least as exactly as possible matches. As a further robustness check, following Abadie and Imbens (2002), we vary the number of matching partners up to four different partners. Finally, we also determine the impact of team and individual sports as well as of gender on the avarage treatment effect.

3.3 Data

The data used in this study is extracted from two different sources. While information on the treatment group has been collected through a survey among former elite athletes, information on the control group is observed from the German Socio-Economic Panel (GSOEP). The GSOEP is a representative survey of 20,000 individuals in 11,000 households. Since 1984 the persons are surveyed yearly on income, work, education and health (Wagner et al., 2008). The database allows to construct the courses of education as well as the professional career paths of the individuals used for the control group.

Data on the treatment group has been collected via an online questionnaire among athletes who were formerly supported by the German Sports Aid foundation (Deutsche Sporthilfe).[3] The survey took place in January and February 2013. In total, 1,346 members of the alumni association *emadeus* as well as about 4,500 formerly supported athletes have been requested by email to fill in the questionnaire. Overall, 938 former athletes (460 *emadeus* members and 478 non-members) responded to the request. However, given that some of the individuals have either not responded questions on income or are not yet employed, we ended up with a treatment group of 259 former athletes. In total, the online survey consists of 41 questions. Seven questions are aimed at the athletic career. The remaining 34 questions cover the socio-

[3]To achieve comparability of both surveys, we adapted the wording from the GSOEP questionnaires for the survey among former athletes.

economic background of the respondents. These are in style of the GSOEP survey.

Asking for the exact income often has a deterrent effect and may thus result in a lower response rate. We therefore asked individuals to state their income by choosing a respective income category out of eleven income categories. While the lowest category covers monthly salaries in the range from zero to 500 €, the highest category contains salaries of at least 5,000 € and above. The increase in the income categories takes place in steps of 500 €. As the GSOEP questionnaire asks for the exact income we had to assign persons in the control group to their respective income category for matters of comparability.

Table 1 displays the distribution of the monthly income net of taxes within the two groups, i.e. the treatment and the control group. While the majority of non-athletes fall within the lower and middle income brackets, the former athletes realize salaries primarily in the middle and upper brackets. A comparison of the average income of the two groups shows a similar result. Former athletes earn on average 3,046 € net of taxes a month. The average income of the non-athletes is 812 € lower. Regarding the median of athletes, it falls in income category five, i.e. 2,000 up to 2,500 €, thereby being one category above those of the non-athletes.

The descriptive statistics of the variables used in the analysis are shown in Tables 2 to 4. The treatment group consists of 259 observations, while the pool of non-athletes from which the observations for the control group are drawn covers 4,292 individuals. The distributions within the two groups of athletes and non-athletes are approximately identical with respect to sex and the location of the workplace.

Differences in the distribution between the two groups can be observed with respect to the professional status. While the majority of non-athletes works as employees (57.06 %) and workers (22.16 %), the former athletes work mostly as employees (67.95 %) and civil servants (15.06 %). The share

Table 1: Distribution of the monthly income net of taxes

	Athletes		Non-athletes	
monthly income net of taxes in €	**#**	**%**	**#**	**%**
0 - < 500	4	1.54%	231	5.38%
500 - < 1000	10	3.86%	585	13.63%
1000 - < 1500	19	6.56%	897	20.90%
1500 - < 2000	54	20.85%	865	20.15%
2000 - < 2500	48	18.53%	586	13.65%
2500 - < 3000	28	10.81%	358	8.34%
3000 - < 3500	28	10.81%	280	6.52%
3500 - < 4000	19	7.34%	174	4.05%
4000 - < 4500	11	4.25%	109	2.54%
4500 - < 5000	8	3.09%	63	1.47%
≥ 5000	32	12.36%	144	3.36%
Total	*259*		*4292*	
Ø	*3046* €		*2234* €	
Stand. Dev.	*1323* €		*1176* €	
Median	*2000 - < 2500* €		*1500 - < 2000* €	

of workers among the athletes is only 8.11 % and, hence considerably below the one of the control group. The proportion of self-employed and interns does not vary between the two groups. The same holds for the share of people that are currently in training. Among the non-athletes about 66.08 % are married which is considerably higher than in the treatment group (49.03 %). Als, the average job market experience differs between the two groups (see Table 3).

The questionnaires contain also questions on the character traits as well as the attitudes towards life and the future of the respondents. Regarding the GSOEP survey, the questions concerning the character traits were last asked in 2009, while the questions on the attitudes towards life and future were asked the last time in 2005. Since these personal attributes are not likely to vary much over the time (particularly not for adults) we use this information in our analysis. We consider this important in order to control for the impact of characteristics such as commitment and self-motivation have on success, and therefore also on income. Matching former athletes and non-athletes with similar personal characteristics should diminish the self-selection problem.

Table 4 shows the statements according to which the respondents should assess themselves as well as the respective descriptive statistics. Regarding the character trait the respondents were asked to state on a scale from one to seven to what extend they agree to the given statements. Thereby, "1" indicates "does not apply at all" and "7" indicates "applies totally". In total, the respondents were inquired on five character traits. Concerning the attitudes towards life and future the respondents got two statements they are, again, asked to evaluate on a scale from one to seven according to its personal applicability. Similarly, "1" indicates "does not agree at all" and "7" indicates "agree totally". In both categories the extent to which the respondents agree to the statements is higher among former athletes than among non-athletes.

Table 2: Explanatory Variables I

	Athletes		Non-athletes	
	#	%	#	%
No. of observations	259		4292	
Team sports	85	32.82%	-	-
Individual sports	174	67.18%	-	-
Sex				
Men	146	56.37%	2291	53.38%
Women	113	43.63%	2001	46.62%
Fed. State of workplace				
West Germany	220	84.94%	3499	81.52%
East Germany	39	15.06%	793	18.48%
Job position				
Worker	21	8.11%	951	22.16%
Self-employed (0)[1]	12	4.63%	203	4.73%
Self-employed (9)[2]	9	3.47%	179	4.17%
Self-employed (9+)[3]	7	2.70%	37	0.86%
Intern	1	0.39%	33	0.77%
Employee	176	67.95%	2449	57.06%
Clerk	39	15.06%	434	10.11%
Marital status				
Married	127	49.03%	2836	66.08%
Single	132	50.97%	1456	33.92%
Currently in training				
Yes	16	6.18%	178	4.15%
No	243	93.82%	4114	95.85%
Type of employm. status				
Full-time	229	88.42%	3207	74.72%
Part-time	30	11.58%	1085	25.28%
Profession of Parents				
Profession of father	259	100.00%	4292	100.00%
Profession of mother	243	93.82%	2941	68.52%

1: 0 employees, 2: 1-9 employees, 3: more than 9 employees.

Table 3: Explanatory Variables II

Athletes					
Variable	Ø	Std. Dev.	Min	Max	Median
No. years in job	11,80	9,50	0	45	9
Non-athletes					
Variable	Ø	Std. Dev.	Min	Max	Median
No. years in job	27,09	11,13	2	55	28

Table 4: Explanatory Variables III

	Athletes					
Variable	Description	Ø	Stand. Dev.	Min.	Max.	Median
Character Traits; I am	... communicative, talkative (1)	5.69	1.19	1	7	6
(Scale: 1-7)	... inventive, contributing new ideas (2)	5.00	1.35	1	7	5
	... rather lazy (3)	2.13	1.46	1	7	2
	... easily getting nervous (4)	2.90	1.56	1	7	2
	... completing tasks efficiently & effectively (5)	6.04	1.00	1	7	6
Attitude in life	The way my life progresses depends on me. (1)	5.90	0.89	3	7	6
(Scale: 1-7)	Success has to be earned. (2)	6.04	1.02	2	7	6
	Non-athlete					
Variable	Description	Ø	Stand. Dev.	Min.	Max.	Median
Character Traits; I am ...	... communicative. talkative (1)	5.45	1.35	1	7	6
(Scale: 1-7)	... inventive. contributing new ideas (2)	4.66	1.34	1	7	5
	... rather lazy (3)	2.44	1.54	1	7	2
	... easily getting nervous (4)	3.46	1.63	1	7	3
	... completing tasks efficiently & effectively (5)	5.90	1.01	1	7	6
Attitude in life	The way my life progresses depends on me. (1)	5.56	1.24	1	7	6
(Scale: 1-7)	Success has to be earned. (2)	6.00	1.09	1	7	6

3.4 Results

3.4.1 Nearest-neighbour matching

To identify the effect of participation in elite sports on later job success we estimate the sample average treatment effect. Tables 5 and 6 summarize the results from our initial regressions. The first column displays the number of matching partners and the second column contains the SATT score, i.e. the amount a former athlete earns on average more or less than a non-athlete. As monthly income is stated in categories of 500 €, the SATT score has to be interpreted in the following way: a score of, say, 1.500 means that a former athlete has an on average 1.5 times one income category – or 750 € - higher monthly income net of taxes – than a non-athlete. The average treatment effect in Euros are given in column four. The size of the treatment group is shown in column five and the size of the control group after the matching has been taken place in column six.[4] The total number of observations of both groups that can be drawn from for the matching is stated in column seven. Column eight shows the percentage of exact matches.

For all of our regressions, we find a positive income effect for the participation in elite sports. While for Model I (a) matching is carried out by using each covariate given in Table 3 and additionally the father's profession, Model I (b) also includes the mother's profession. In both models the variable number of years in job is required to be matched as exactly as possible. Depending on the number of matching partners, former athletes receive a monthly income net of taxes that is on average 688 € to 750 € above that of comparable non-athletes for Model I (a). In Model I (b) the observed income effect is higher by about by 40 € . (see Table 5). The results are statistically significant at the 1 percent level of confidence. Given the small variation in the SATT scores as well as the high percentage of exact matches, the results

[4]The lower number of observations in the control group compared to the treatment group can be attributed to the fact that we match with replacement.

Table 5: Results Model I

	Model I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.38***	.176	688.00	259	199	4551	78.76
2	1.50***	.170	750.00	259	354	4551	76.06
4	1.45***	.167	724.50	259	607	4551	69.79
	Model I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.51***	.224	753.50	243	181	3184	74.89
2	1.56***	.203	777.50	243	311	3184	71.60
4	1.50***	.182	751.50	243	513	3184	66.05

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Model I (a): job position, fed. state workpl., character trait 1, character trait 3, character trait 4, profession father, no. of years in job, marital status
biasadj: Model I (b): job position, character trait 3, character trait 4, no. of years in job, marital status

seem to be quite robust.

Model II expands the analysis with respect to the number of variables on which an exactly as possible match is conducted. Not only the number of years in job, but also the types of profession and the marital status is used to find matches. Again, we find a positive and statistically significant income effect for the participation in elite sports. The measured SATT scores are persistently above those of Model I. On average, the determined income effect exceeds that of Model I by roughly 10 %. However, comparing the measures of the matching quality, Model I performs much better than Model II. Lower income effects therefore allow for a more conservative interpretation of the results.[5]

An analysis of box plot charts allows some inference about the influence of the single covariates on the measured income effect. Figure 1 summarizes plots for twelve of the variables used in Model I(a) with two matching part-

[5]As a kind of robustness check, we performed nearest-neighbour CVM, where we corrected all matching variables for possible biases. However, the results remain qualitatively as well as quantitatively unchanged.

Table 6: Results Model II

	Model II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.53***	.177	763.50	259	200	4551	67.18
2	1.56***	.165	781.50	259	360	4551	64.86
4	1.65***	.164	826.50	259	600	4551	56.66
	Model II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.69***	.194	844.50	243	172	3184	64.61
2	1.84***	.175	920.00	243	313	3184	59.67
4	1.52***	.172	761.50	243	508	3184	51.75

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Model II (a): job position, character trait 1, character trait 3, character trait 4, profession father, no. of years in job
biasadj: Model II (b): job position, character trait 3, character trait 4, profession mother, no. of years in job

ners. The x-axis indicates the income difference for each observation in the treatment group and its respective match and the y-axis gives the respective covariates. On average, the participation in elite sports leads to a positive income difference for more or less all variables. Nonetheless, some covariates show a considerably larger positive income spread than others.

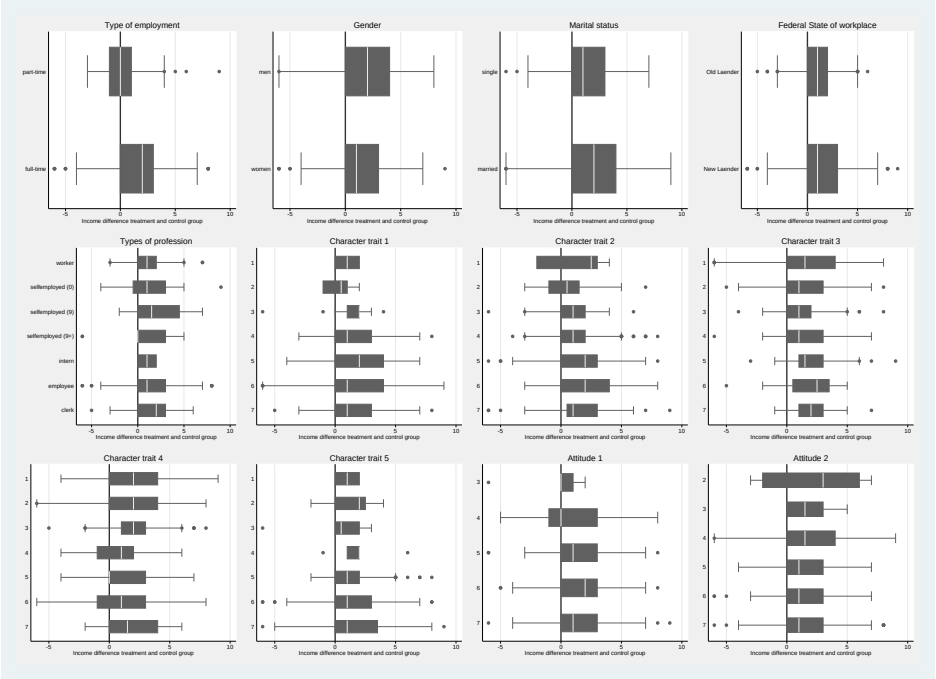
An inspection of the distributions of full-time and part-time employed former athletes reveals that the positive income effect is clearly driven by full-time employed. Turning to gender, the income effect is bigger for men than for women, yet nonetheless positive for both groups. The same can be observed with respect to marital status. While married former athletes realise incomes which are higher by about two income categories, on average, unmarried athletes ascend only one category. Whether the workplace is situated in West or East Germany has no (or at least no significant) impact on income premiums.

Among the types of profession, the largest positive income differences are observed for self-employed former athletes with up to nine employees as

well as for individuals that work in the civil service (*clerk*). About 20 % of all employees in the civil service are middle grade civil servants. While the majority of non-athletes (44.0 %) works in the higher intermediate civil service, the majority of former athletes (43.6 %) works in the higher civil service, which is surely an explanation for the premiums.

Regarding the distributions of the character trait measures, the results are somewhat ambiguous. Similar median income premiums can be achieved irrespective of either a strong agreement or a strong disagreement to some of the given character trait statements. This applies, for example, for character trait 2. The largest positive median income spread is realized for former athletes who ranked themselves either "1" or "5" or "6". A further surprising result can be observed for character trait 3. The biggest income premium is realized by individuals which assess themselves as rather lazy. Yet, the second largest median income spread is attained by respondents disagreeing with this statement. Similarly, respondents that rank themselves rather low to intermediate in completing tasks efficiently and effectively realise the highest median income premium. It is, of course, not clear whether these distributions result from distorted self-perceptions or just from some kind of superiority. Even lazy individuals can be successful at work when they are at the same time highly intelligent and creative. Turning to measures for attitudes, a general view that success has to be earned does not seem to be very important for a higher income premium. Respondents ranking themselves low to medium in this respect, realize the highest median income difference. However, personal responsibility ("The way my life progresses depends on me.") coincides with a high median difference in income. But, again, when interpreting the box plot charts for the character-trait and attitude-towards-life measures, one has to bear in mind that these values are based on a subjective self-assessment.

Figure 1: Box plot charts of the matching variables



3.4.2 Extensions and robustness checks

As we are aware of several characteristics of both, treatment group and the control group members, our data allows for a number of extensions and robustness checks.

Team sports vs. individual sports Analysing former athletes that participated in team sports and those that performed individual sports separately, one still finds a positive and statistically significant income effect for both groups (see Table 13 and Table 14 in the Appendix). While former athletes in team sports receive a labour income net of taxes that is on average about 745 € to up to almost 905 € higher than that of comparable non-athletes (Specification Team I(a) and I(b)), the income premium of athletes in individual events is lower (715 € to 782 €). Possible reasons for

this finding can be a greater capacity for teamwork or a greater willingness to work in a team on part of the former team athletes. These are properties that are often beneficial in a professional life. However, when interpreting the results one should notice that the number of observations in the group of former team athletes is quite low, i.e. 85 and 80. Yet, the results are statistically significant and the matching quality, measured by the percentage of exact matches, is high. Therefore, it can reasonably be concluded from these results that the participation in team sports generates a higher positive income effect, when compared to individual sports.

Gender-wage gap Splitting the analysis according to gender, we find a positive and statistically significant income effect for both, women and men, within their respective gender groups (see Tables 15 and 16 in the Appendix). The average income effect of women is a bit lower than that of men. On average, former female athletes earn 560 € to 635 € more a month than their peers, who have not participated in elite sports (Specifiication Women I(a) and I(b)). Performing the same analysis among the group of men, we estimate a positive average income effect of about 800 € to 928 €(Specification Men I(a) and I(b)).

Comparing the income of former female athletes with men, who did not participate in elite sports, there is no definite result observable (see Table 17 in the Appendix). The SATT scores are consistently positive, yet they are rather small in size and, except for one estimation, none is statistically significant. Former female athletes earn the same monthly income net of taxes than non-athlete males. This finding is in so far interesting as usually women receive on average a lower income than men for similar works (Antonczyk et al. 2010). It seems that the participation in elite sports helps in closing the gender-wage gap.

Propensity score matching Apart from CVM, we also used two types of propensity score matching to evaluate the effect of elite sports participation. In the PSM we use the same set of variables we also include in the CVM. At first, propensity scores are estimated using the variables on character traits, attitudes towards life, and parents' professions by means of probit and logit techniques. The remaining set of variables are used as covariates in the actual matching process. Overall, the estimates remain qualitatively and quantitatively unchanged in comparison to CVM. We interpret these results such that our estimates are robust to changes in the specification and in the method used.[6]

Overall, our findings indicate that the positive effects attributed to the participation in elite sports with respect to a later professional career prevail. The estimated SATT scores for the income effect of former athletes are consistently positive and statistically as well as economically significant. Besides, the results prove to be robust with regard to variations in the specification and estimation method. This seems to support the theory of productive consumption. Since we control for the existence of certain character traits, that are also beneficial to a professional career, the participation in elite sports appears to enhance these character traits. A further explanation for the findings may be a signalling effect. The very fact that one has participated in elite sports may induce employers to assign the former athlete with these characteristics (Long & Caudill 1991). Former athletes seem to benefit especially if they are not easily getting nervous and if they believe that personal responsibilty is important. Moreover, the positive income effect can in particular be observed for former athletes working in the civil service.

[6]Results are available upon request.

4 Conclusion

This paper analyses the effect of the participation in elite sports on the later success in professional careers using a unique dataset. We estimate SATT scores for former elite athletes by covariate nearest-neighbour matching. This allows to quantify the average difference in the monthly net income of formerly by the German Sports Aid Foundation supported athletes and non-athletes, that have the same probability to be professionally successful. As matching covariates we use socio-demographic as well as measures of personal qualities and attitudes. By varying the number of matching partners and covariates, we verified the robustness of the results. We also estimate the SATT scores for different groups and analyse the general tendencies of the influence of the covariates on the income effect with the help of box plot charts.

Our findings seem to support the theory of productive consumption and signalling. We find a positive and statistically as well as economically significant effect for the participation in elite sports on the later job success. On average, former athletes receive a monthly net income that exceeds the income of non-athletes by about 690 to 780 €. The effect is even larger for former athletes that have participated in team sports. The premium attributed to team sports can be rationalized by a possible greater capacity for teamwork or a greater willingness to work in a team. This suggests that a certain importance concerning the income, is actually attached to the ability to work in teams.

The separate study of men and women shows that both male and female former athletes receive an income premium when compared to non-athletes. Male athletes earn on average about 850 € more than male non-athletes. The income difference for female athletes when compared to non-athletes of the same gender is smaller, yet also positive and significant. Most interestingly, participation in elite sports results in a closing of the gender-wage gap. Thus,

female former athletes receive about the same monthly net income than male non-athletes.

To sum up, our estimates prove to be robust and significant. We identify relatively strong positive income effects, that can be attributed to the former participation in elite sports. Our findings suggest that the practice of top-level sports generates welfare beyond the mere positive effect on the society. In addition to the establishment of role models and the conveyance of character traits that are commonly regarded as positive, such as fair play, team spirit and commitment, it creates economic benefits on part of the former athletes itself. Further, when debating about the level and the scheme of elite sports funding, this long-term effect should also be taken into account.

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Appendix

Table 7: Matching Variables - Signranktest - Model I and Model II

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.0013	.0000	.0000	.0001	.0000	.0000	.	.	.	.	.	.
Full-time/Part-time	.4054	.3304	.5176	.6171	.5271	1.0000	.6698	.3452	.6467	.6831	.7576	.7833
Sex	.4233	.6117	.5879	1.0000	.7055	.4730	.2673	.5807	.3726	.8997	.3543	.7349
# years in job	.0013	.0003	.0000	.0003	.0009	.0000	.0073	.0000	.0000	.0003	.0000	.0000
Profession	.0747	.0046	.0000	.1717	.0070	.0000	.0253	.0016	.0000	.0253	.0016	.0000
Apprentice y/n	.	.3173	.0833	.3173	1.0000	1.0000	1.0000	.4669	.6473	.0956	.5316	.4533
Fed. state workpl.	.1336	.0222	.0233	.6698	.5716	.9251	.0116	.0039	.0084	.5637	.8137	.1250
Profession father	.0130	.0064	.0001	.2639	.3012	.3352	.0000	.0001	.0000	.1914	.1299	.0206
Profession mother	-	-	-	.3095	.1252	.0016	-	-	-	.0157	.0001	.0000
Character trait 1	.1440	.0187	.0127	.3546	.4682	.2682	.1221	.0310	.0220	.6326	.8977	.6277
Character trait 2	.1693	.0905	.0900	.0534	.1076	.0061	.5334	.1526	.0630	.1208	.2426	.0073
Character trait 3	.0371	.0001	.0000	.0008	.0000	.0000	.0011	.0000	.0000	.0000	.0000	.0000
Character trait 4	.1707	.0037	.0000	.2041	.0012	.0000	.1268	.0087	.0000	.0142	.0016	.0000
Character trait 5	.7659	.9729	.3111	.5415	.9330	.3049	.8769	.6735	.3683	.2547	.9120	.1921
Attitude 1	.7694	.9034	.4786	.1761	.4957	.1132	.8072	.2980	.0252	.2648	.2743	.1201
Attitude 2	.7592	.6026	.1930	.2639	.2149	.0027	.1620	.6735	.6626	.7367	.4845	.2225

Table 8: Matching Variables - Signranktest - Model I and Model II - Team sports

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.1025	.0032	.0000	.0164	.0004	.0000	.	.	.	.	.	.
Full-time/Part-time	.3173	1.0000	.4328	.1797	.6171	.4652	.7389	.3711	.0782	.7389	.5930	.6219
Sex	.4386	.3841	.1281	.4386	.2230	.0339	.1573	.1228	.0051	.2513	.2482	.0312
# years in job	.1628	.0031	.0002	.0103	.0021	.0006	.2646	.0131	.0000	.0842	.0034	.0000
Profession	.0254	.0827	.0285	.0455	.0960	.0254	.0833	.0143	.0005	.0833	.0143	.0005
Apprentice y/n	.	.	.	.	.	.	.3173	.3173	1.0000	.1573	.5637	.5637
Fed. state workpl.	.6547	.5637	.2568	.1573	.0707	.0236	.5637	.7815	.3841	.6547	.1083	.0094
Profession father	.0260	.0271	.0080	.1614	.2619	.3110	.0008	.0009	.0027	.2794	.1910	.4645
Profession mother	-	-	-	.1592	.0220	.0206	-	-	-	.0748	.0009	.0000
Character trait 1	.4824	.0739	.3624	.6971	.8580	.5277	.3570	.1229	.0993	.8241	.9637	.6217
Character trait 2	.3828	.4260	.2989	.2539	.3174	.1051	.8441	.6494	.5734	.7744	.7440	.1718
Character trait 3	.5416	.3010	.0025	.1084	.0158	.0346	.1027	.0373	.0024	.0229	.0078	.0090
Character trait 4	.7390	.4037	.0253	.2566	.0546	.0004	.6757	.1889	.0246	.3041	.0584	.0046
Character trait 5	.7692	.8443	.4225	.4795	.6959	.8521	.8295	.8816	.4244	.9426	.3169	.4212
Attitude 1	.3784	.0457	.2968	.4148	.0878	.3242	1.0000	.1433	.1517	.5987	.1580	.9266
Attitude 2	.1749	.3139	.1938	.6113	.9030	.0213	.5953	.7152	.3056	.8482	.6989	.0032

Table 9: Matching Variables - Signranktest - Model I and Model II - Individual Sports

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.0047	.0022	.0000	.0090	.0000	.0000	.	.	.	.	.	.
Fuul-time/Part-time	1.0000	.4328	.3096	1.0000	.6949	.5413	.5930	.5050	.8273	.4386	1.0000	.6662
Sex	.4328	.8997	.8033	.6310	.2159	.6971	.6121	.7290	.4634	.6547	.0294	.5467
# years in job	.0045	.0138	.0053	.0050	.0498	.0021	.0094	.0004	.0011	.0008	.0007	.0000
Profession	.5493	.0109	.000	.5535	.0326	.0001	.1573	.0455	.0047	.1573	.5127	.0047
Apprentice y/n	.	.3173	.0833	.	.5637	1.0000	.5637	.6171	.5164	.2568	.5127	.4838
Fed. state workpl.	.0348	.0010	.0007	.1967	.0956	.0997	.0124	.0004	.0002	.3938	.6858	.9287
Profession father	.1122	.0679	.0044	.5349	.5680	.7991	.0092	.0164	.0002	.4088	.3632	.0539
Profession father	-	-	-	.7341	.6507	.0690	-	-	-	.0897	.0128	.0002
Character trait 1	.1944	.1071	.0291	.3101	.6246	.4769	.2714	.1153	.1009	.7671	.8629	.9075
Character trait 2	.3254	.1675	.2134	.2195	.2556	.0277	.4249	.1745	.0702	.1586	.2992	.0137
Character trait 3	.0308	.0002	.0000	.0087	.0000	.0000	.0059	.0000	.0000	.0001	.0000	.0000
Character trait 4	.1114	.0048	.0000	.0172	.0104	.0000	.1199	.0157	.0001	.0312	.0104	.0001
Character trait 5	.8847	.7436	.4693	.2187	.7926	.2500	.7365	.5794	.5286	.1813	.7422	.3615
Attitude 1	.3432	.1570	.7686	.3010	.7661	.1474	.7683	.7486	.1273	.3205	.7030	.0617
Attitude 2	.9637	.8073	.3717	.1293	.2663	.0406	.1708	.1326	.2507	.6549	.1843	.6810

Table 10: Matching Variables - Signranktest - Model I and Model II - Women vs. Women

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.0495	.1655	.0043	.0330	.0094	.0065	.	.	.	.	.	.
Full-time/Part-time	.8273	.3763	.0348	.3938	.3865	.0359	.6949	.3270	.0656	1.0000	.7681	.0542
# years in job	.2244	.3212	.5132	.5485	.3806	.9383	.9280	.3679	.0013	.6684	.0206	.0001
Profession	.3417	.0022	.0000	.0147	.0004	.0000	.1573	.0455	.0047	.1573	.0455	.0047
Apprentice y/n	.	.3173	.0455	.	.3173	.1797	.4142	.4913	.6394	.2059	.4669	.4349
Fed. state workpl.	.6547	.1336	.2059	.5271	.8348	.6803	.1797	.2253	.6171	.0184	.1573	.0116
Profession father	.1201	.0089	.0001	.1235	.1007	.0709	.0113	.0001	.0000	.0247	.0365	.0041
Profession mother	-	-	-	.3578	.1196	.0934	-	-	-	.0318	.0497	.0005
Character trait 1	.8857	.7241	.4339	.8369	.3648	.1215	.8244	.7663	.2177	.9733	.5661	.1191
Character trait 2	.6113	.9096	.9284	.6697	.7712	.8212	.6892	.8641	.8309	.3985	.9393	.9307
Character trait 3	.0208	.0025	.0000	.0287	.0086	.0000	.0052	.0001	.0000	.0047	.0000	.0000
Character trait 4	.6832	.4853	.0155	.4527	.1557	.0002	.4960	.3059	.0003	.5003	.0260	.0000
Character trait 5	.0923	.0069	.0000	.1684	.0205	.0000	.0593	.0222	.0000	.0496	.0035	.0000
Attitude 1	.4223	.7408	.8205	.4230	.7695	.8552	.4657	.7575	.0815	.2230	.0255	.0020
Attitude 2	.4522	.5795	.2197	.0939	.0131	.0001	.3256	.1560	.9195	.7274	.7286	.1001

Table 11: Matching Variables - Signranktest - Model I and Model II - Men vs. Men

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.0012	.0000	.0000	.0001	.0000	.0000	.	.	.	.	.	.
Full-time/Part-time	.0455	.0143	.0002	.0455	.0339	.0290	.3173	.1573	.0116	.1797	.2059	.2752
# years in job	.0029	.0000	.0000	.0000	.0000	.0000	.0009	.0000	.0000	.0000	.0000	.0000
Profession	.5301	.0026	.0000	.7370	.2430	.0006	.0833	.0143	.0005	.0833	.0143	.0005
Apprentice y/n	.3173	.0833	.0047	.1573	.1797	.0124	.5637	.2059	.2382	.3173	.2850	.3841
Fed. state workpl.	.7389	.2568	.0801	.3458	.3763	.8292	.1088	.1824	.1730	.6698	.7773	.6188
Profession father	.0516	.0356	.0073	.5427	.8001	.7512	.0903	.2419	.0241	.7904	.6727	.7763
Profession mother	-	-	-	.0615	.0486	.0024	-	-	-	.0122	.0000	.0000
Character trait 1	.0135	.0264	.0005	.1625	.2493	.0428	.0640	.0648	.0171	.4625	.5186	.6735
Character trait 2	.4422	.1298	.0404	.2422	.0515	.0005	.4437	.1194	.0306	.1584	.1258	.0017
Character trait 3	.0856	.0009	.0000	.0003	.0000	.0000	.0006	.0000	.0000	.0000	.0000	.0000
Character trait 4	.0376	.0001	.0000	.0005	.0000	.0000	.0600	.0008	.0000	.0044	.0003	.0000
Character trait 5	.0797	.0791	.1382	.0423	.4334	.5995	.3607	.4618	.1668	.3974	.8374	.5644
Attitude 1	.7291	.8059	.5283	.3715	.3723	.1575	.7844	.3618	.7115	.8576	.7316	.9848
Attitude 2	.2644	.9425	.5409	.7861	.8508	.3801	.2635	.2993	.2734	.2722	.2637	.5831

Table 12: Matching Variables - Signranktest - Model I and Model II - Women vs. Men

	Model I (a)			Model I (b)			Model II (a)			Model II (b)		
Variable	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**	**M1**	**M2**	**M3**
Marital status	.0278	.0223	.0010	.1441	.1521	.0080	.	.	.	.	.	.
Full-time/Part-time	.0016	.0000	.0000	.0005	.0000	.0000	.0008	.0000	.0000	.0001	.0000	.0000
# years in job	.4194	.3914	.0769	.0648	.0199	.0162	.2369	.3357	.0147	.0344	.0002	.0000
Profession	.2040	.0135	.0000	.5370	.0194	.0000	.1573	.0455	.0047	.1573	.0455	.0047
Apprentice y/n	.	.3173	.0455	.3173	.1573	.0082	.0455	.0196	.3657	.0253	.6547	.3961
Fed. state workpl.	.2059	.3711	.4458	.7630	.5127	.8927	.1088	.2087	.4855	.4913	.8694	.6662
Profession father	.1929	.4588	.4913	.0763	.0978	.1481	.5882	.7791	.7850	.5994	.6509	.9699
Profession mother	-	-	-	.0027	.0002	.0149	-	-	-	.2209	.1741	.6224
Character trait 1	.0107	.0001	.0000	.0058	.0000	.0000	.0038	.0000	.0000	.0039	.0000	.0000
Character trait 2	.7895	.3173	.8215	.8387	.8652	.7533	.3255	.4611	.8310	.3275	.7079	.8420
Character trait 3	.0001	.0000	.0000	.0008	.0000	.0000	.0000	.0000	.0000	.0007	.0000	.0000
Character trait 4	.7208	.9638	.7099	.6345	.9187	.7389	.6048	.1178	.9117	.6134	.5848	.5530
Character trait 5	.0179	.0032	.0000	.0039	.0001	.0000	.0455	.0009	.0000	.0035	.0000	.0000
Attitude 1	.7203	.9641	.8628	.4769	.1488	.0339	.3227	.0681	.0910	.3063	.2728	.1516
Attitude 2	.4591	.1027	.0200	.0627	.0516	.0055	.4313	.5134	.4997	.9134	.6033	.4994

Table 13: Results Team Sports

	Team I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.52***	.280	759.50	85	80	4377	71.76
2	1.74***	.267	868.00	85	142	4377	72.35
4	1.49***	.270	744.00	85	257	4377	68.24
	Team I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treatment	# Control	N	% exact matches
1	1.67***	.319	835.00	80	73	3021	70.00
2	1.81***	.286	905.00	80	131	3021	73.12
4	1.58***	.288	792.00	80	228	3021	67.81
	Team II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treatment	# Control	N	% exact matches
1	1.78***	.294	891.50	85	76	4377	62.35
2	1.82***	.269	908.50	85	142	4377	61.76
4	1.73***	.255	865.50	85	250	4377	54.71
	Team II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treatment	# Control	N	% exact matches
1	1.96***	.321	982.00	80	68	3021	61.25
2	2.09***	.268	1048.50	80	125	3021	60.00
4	2.11***	.265	1054.00	80	218	3021	52.81

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$,Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Team I (a): job position, profession father, no. of years in job, marital status
biasadj: Team I (b): job position, character trait 3, profession mother, no. of years in job, marital status
biasadj: Team II (a): job position, character trait 3, profession father, no. of years in job
biasadj: Team II (b): job position, character trait 3, profession mother, no. of years in job

Table 14: Results Individual Sports

	Individual I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.43***	.217	715.00	174	148	4466	83.33
2	1.45***	.211	725.50	174	268	4466	78.74
4	1.56***	.195	782.00	174	473	4466	72.56
	Individual I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.52***	.243	761.00	163	130	3104	77.25
2	1.42***	.244	707.50	163	233	3104	69.76
4	1.49***	.211	745.00	163	403	3104	63.62
	Individual II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.67***	.219	832.50	174	146	4466	70.69
2	1.54***	.205	772.00	174	271	4466	66.95
4	1.63***	.204	812.50	174	474	4466	58.76
	Individual II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.87***	.237	932.50	163	127	3104	66.87
2	1.54***	.224	767.50	163	235	3104	61.66
4	1.50***	.217	750.50	163	404	3104	53.07

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Individual I (a): job position, fed. state workpl., character trait 3, character trait 4, no. of years in job, marital status
biasadj: Individual I (b): job position, character trait 3, character trait 4, no. of years in job, marital status
biasadj: Individual II (a): job position, fed. state workpl., character trait 3, character trait 4, profession of father, no. of years in job
biasadj: Individual II (b): job position, character trait 3, character trait 4, profession mother, no. of years in job

Table 15: Results Women

	Women I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.18***	.255	590.00	113	84	2114	76.11
2	1.17***	.234	587.00	113	146	2114	74.78
4	1.12***	.215	560.00	113	250	2114	67.92
	Women I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.27***	.246	635.00	111	76	1550	74.77
2	1.14***	.235	568.50	111	134	1550	69.82
4	1.15***	.223	572.50	111	216	1550	62.39
	Women II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.37***	.256	685.00	113	81	2114	63.72
2	1.44***	.252	718.00	113	147	2114	59.29
4	1.22***	.237	612.00	113	248	2114	49.56
	Women II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.42***	.278	707.50	111	71	1550	55.86
2	1.27***	.268	633.00	111	132	1550	51.80
4	1.31***	.244	652.50	111	220	1550	40.99

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Women I (a): job position, character trait 3, character trait 5, profession father, marital status
biasadj: Women I (b): job position, character trait 3, character trait 5, attitude in life 2, marital status
biasadj: Women II (a): job position, character trait 3, character trait 5, profession father
biasadj: Women II (b): job position, fed. state workpl., character trait 3, character trait 4, character trait 5, attitude in life 1, profession father, profession mother, no. years in job

Table 16: Results Men

	Men I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.60***	.223	800.50	146	117	2437	72.60
2	1.85***	.219	924.50	146	210	2437	72.95
4	1.67***	.213	834.00	146	357	2437	66.10
	Men I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.86***	.296	928.00	132	105	1634	72.73
2	1.81***	.256	905.50	132	188	1634	69.32
4	1.86***	.235	928.50	132	298	1634	63.64
	Men II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	1.84***	.208	919.50	146	116	2437	60.96
2	1.82***	.198	908.00	146	215	2437	57.88
4	1.74***	.198	872.00	146	357	2437	49.49
	Men II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	2.29***	.253	1146.00	132	97	1634	59.09
2	1.96***	.231	980.00	132	183	1634	53.79
4	2.07***	.240	1036.00	132	303	1634	44.51

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Men I (a): job position, character trait 1, character trait 3, character trait 4, profession father, no. of years in job, marital status, full-/part-time
biasadj: Men I (b): character trait 3, character trait 4, character trait 5, profession mother, no. of years in job, marital status, full-/part-time
biasadj: Men II (a): job position, character trait 3, character trait 4, no. of years in job
biasadj: Men II (b): job position, character trait 3, character trait 4, profession mother, no. of years in job

Table 17: Results Women vs. Men

	Women vs. Men I (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	.040	.345	20.00	113	79	2404	71.68
2	.283	.296	141.50	113	139	2404	66.37
4	.381	.261	190.50	113	249	2404	61.94
	Women vs. Men I (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	.164	.415	82.00	111	73	1613	71.17
2	.149	.359	74.50	111	131	1613	61.26
4	.544**	.265	272.00	111	215	1613	61.26
	Women vs. Men II (a)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	.696**	.278	348.00	113	80	2404	63.72
2	.467*	.272	233.50	113	137	2404	54.42
4	.275	.255	137.50	113	227	2404	46.24
	Women vs. Men II (b)						
# Matches	SATT	Std. Dev.	in Euro	# Treat.	# Control	N	% exact matches
1	.480*	.285	240.00	111	70	1613	59.46
2	.430	.293	215.00	111	121	1613	53.15
4	.605**	.274	302.50	111	194	1613	41.22

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$, Standard errors are robust to heteroskedasticity. Observations for the control group are drawn from the group of non-athletes with replacement.
biasadj: Women vs. Men I (a): job position, character trait 1, character trait 3, character trait 5, marital status, full-/part-time
biasadj: Women vs. Men I (b): job position, character trait 1, character trait 3, character trait 5, profession mother, no. of years in job, full-/part-time
biasadj: Women vs. Men II (a): job position, apprentice, character trait 1, character trait 3, character trait 5, full-/part-time
biasadj: Women vs. Men II (b): job position, character trait 1, character trait 3, character trait 5, no. of years in job, full-/part-time

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