Universität St.Gallen

Children's skill formation in less developed countries – The impact of sports participation

Tim Pawlowski, Ute Schüttoff, Paul Downward, Michael Lechner

May 2014 Discussion Paper no. 2014-12

School of Economics and Political Science,
Department of Economics

University of St. Gallen

Editor: Martina Flockerzi
University of St.Gallen
School of Economics and Political Science
Department of Economics
Bodanstrasse 8
CH-9000 St. Gallen
Phone +41 71 224 23 25
Fax +41 71 224 31 35
Email seps@unisg.ch

Publisher: School of Economics and Political Science
Department of Economics
University of St.Gallen
Bodanstrasse 8
CH-9000 St. Gallen
Phone +41 71 224 23 25

Electronic Publication: Fax +41 71 224 31 35
http://www.seps.unisg.ch

Children's skill formation in less developed countries – The impact of sports participation[1]

Tim Pawlowski, Ute Schüttoff, Paul Downward, Michael Lechner[2]

[1] This version: 20 May 2014. Comments are very welcome. Preliminary, please do not cite without the permission of one of the authors.

[2] Michael Lechner is also affiliated with CEPR and PSI, London, CESIfo, Munich, IAB, Nuremberg, and IZA, Bonn. A previous version of the paper was presented at the meeting of the German Society of Sport Science, Konstanz (September 2013) as well as during the Economics Research Seminar of the Department of Economics at the University of St. Gallen (November 2013). We thank participants for helpful comments and suggestions. The usual disclaimer applies.

Author's address:

Tim Pawlowski (corresponding author)
Faculty of Economics and Social Science, Institute of Sports Science
University of Tübingen
Wilhelmstraße 124
D-72074 Tübingen, Germany
Phone: +49(0)7071-29-76544
Email: tim.pawlowski@uni-tuebingen.de
Website: www.tim-pawlowski.de

Ute Schüttoff
Faculty of Economics and Social Science, Institute of Sports Science
University of Tübingen
Wilhelmstraße 124
D-72074 Tübingen, Germany
Phone: +49(0)7071-29-76545
Email: ute.schuettoff@uni-tuebingen.de

Paul Downward
School of Sport Exercise and Health Sciences, Sport Policy and Management Research Group
Loughborough University
Leicestershire, UK
LE11 3TU
Phone: +44-1509 226365
Email: p.downward@lboro.ac.uk

Prof. Dr. Michael Lechner
SEW-HSG
Varnbüelstrasse 14
CH-9000 St. Gallen
Phone +41 71 224 23 20
Fax +41 71 220 23 02
Email Michael.lechner@unisg.ch
Website www.michael-lechner.eu

Abstract

Previous research suggests that sports club participation of children in developed countries positively influences the children's well-being, health as well as human and social capital. We use panel data of a cohort of 1,579 children in Ethiopia and Peru to test these relationships in less developed countries where access to work might be only to manual labor, access to education is more limited and daily-survival activities demand high physical energy. By exploiting the panel structure of our data in a specific way, we suggest that the effects flexibly estimated by propensity score matching are close to having a causal interpretation. The findings suggest that the impact of programs, such as those provided in sport, can have positive developmental impacts for children, for example, on human and social capital, but that the results vary by context.[3]

Keywords

Social capital, Human capital, Well-being, Health, Group participation, Sports.

JEL Classification

C14, D12, I21, J24.

[3] The data used in this publication come from Young Lives, a 15-year study of the changing nature of childhood poverty in Ethiopia, India (Andhra Pradesh), Peru and Vietnam (www.younglives.org.uk). Young Lives is core-funded by UK aid from the Department for International Development (DFID) and co-funded from 2010 to 2014 by the Netherlands Ministry of Foreign Affairs. The views expressed here are those of the author(s). They are not necessarily those of Young Lives, the University of Oxford, DFID or other funders.

Children's skill formation in less developed countries
- The impact of sports participation

I. INTRODUCTION

Policy makers have sought to encourage greater sport and physical activity of children particularly because of the health benefits that might accrue (WHO, 2010). Sports club participation of children naturally has a role to play in this regard. However, it might also influence the children's cognitive and non-cognitive skill formation (Felfe et al., 2011) which is important for labor market outcomes and social behavior (see for example Heckman et al., 2006).

Most literature has focused on the outcomes of sports participation on adults or children in industrialized countries (see Section 2) where passive leisure activities such as watching TV are popular substitutes for physical activity, and employment as well as education possibilities to enhance human and social capital are widespread. This is different in poorer countries where access to work might be only to manual labor, access to education is more limited and daily-survival activities demand high physical energy and therefore physical *in*activity is not a major problem (Caballero, 2005). Significantly, too, studies analyzing the factors associated with children's skill formation in less developed countries have broadly neglected to test the influence of sports participation (a recent example is Helmers and Patnam, 2011). This is surprising given the numerous programs around the globe promoting children's sports participation with the explicit objective to foster their cognitive and non-cognitive skill formation.[4] Consequently, this paper contributes to the existing literature by testing the relationship between participation in a sports group and various outcome measures related to human capital, social capital, well-being, health as well as participation in other group activities in a setting of children in less developed countries. [5] The countries are Ethiopia and Peru.[6]

4. A prominent example is the UNICEF *Sport for Development* program (in cooperation with partners such as the Federation Internationale de Football Association, FIFA): http://www.unicef.org/sports/index_57597.html
5. The Development Policy and Analysis Division (DPAD) of the Department of Economic and Social Affairs of the United Nations Secretariat (UN / DESA) provide a classification of countries based on data of the World Economic Situation and Prospects (WESP). Overall, three broad categories are used, i.e. developed economies, economies in transition and developing countries. The two countries in focus of this paper are classified as developing countries. The categorization is based on meeting thresholds for criteria such as per

The data used covers a cohort of 1,579 children who had been surveyed in three periods (2002, 2006/07 and 2009) about all areas of their life. By exploiting the panel structure of our data, we suggest that the effects estimated by a semi-parametric matching estimator are close to having a causal interpretation. Our results suggest that the overall effects of sports group participation are a significant and positive effect on human capital through increased school enrolment in Ethiopia. Furthermore, there is a significant and positive impact of sports group participation on social capital through the perception of the individual child of a safe environment in Ethiopia. However, there are negative effects on subjective well-being and subjective health. In addition, a positive impact on social capital through respect by other children in the individual's class, as well as the individual's subjective well-being and health status could be detected in Peru. Finally, sports group participation reduces the probability of participating in after school clubs in Ethiopia, though it increases the probability of belonging to a religious group. It also reduces the probability of participating in "other groups" in Peru. This is evidence of the broadly bonding nature of social capital formation through sport rather than bridging capital, which makes links across more heterogeneous groups. Overall, findings suggest that the impact of programs, such as those provided in sport, can have positive developmental impacts for children, but the effects can be heterogeneous according to the context.

The reminder of the paper is as follows: we start with a discussion of the related literature in Section II. Information on the characteristics of the countries and their sport systems is presented in Section III. Section IV outlines the identification and estimation strategies employed, before discussing the results in Section V and drawing conclusions in Section VI.

II. LITERATURE REVIEW: THE OUTCOMES FROM SPORT FOR YOUNG PEOPLE

Unlike the large literature, based on large-scale survey data, that examines the factors associated with why people participate in sport (for a recent overview, see Breuer, Hallmann and Wicker, 2011), and the growing literature examining the outcomes associated with sports participation for adults (see for example Downward et al., 2012; Lechner and Downward,

capita GNI, a human assets index and an economic vulnerability index. The categorization of countries is available at http://www.un.org/en/development/desa/policy/wesp/wesp_current/2012country_class.pdf.

6. The reasons for the choice of these countries are given in Section III.

2013), there is relatively less research into the effects of sport on young peoples' lives. Nonetheless, it has focused on human capital, subjective well-being, health and social capital.[7]

The impact of sport on human capital is the most researched area which, as indicated in Gomez-Pinilla (2008), suggests that exercise has beneficial impacts on cognitive functions e.g. to enhance learning and memory. Several studies have specifically focused on analyzing the direct and indirect effect of curricular and extra-curricular formal sport participation either in education or in clubs on cognitive and non-cognitive skill formation.

Barron et al. (2000) make use of an instrumental variable approach to examine the effects of high school athletic participation on education and labor market outcomes in the US. Private school, school enrolment, measures of health, family income, and location (central city) as well as information on the individual's height and weight (for the National Longitudinal Survey of Youth) at the time the individual was a high school student are included as exogenous variables (instruments). They find evidence that there is a direct impact of athletic participation on wages and educational attainment and argue that this reflects differences across an individual's ability or preference for leisure. However, some instruments are likely to have direct effects on their outcomes, for example the reputational impacts of the school, or the neighbourhood in which a child grows up could affect employment opportunities and are thus hardly credible. Further results are provided by Eide and Ronan (2001), who use an instrumental variable (IV) approach as well. They also use height as an instrument for participation. They show that for white male students (school-sponsored extracurricular) sports participation has a negative effect on their educational attainment, but a positive effect for white female students.

A study using data from the Michigan Study of Adolescent Life Transitions (MSALT) examines extracurricular activities and adolescent development (Eccles et al., 2003). It is found that involvement in (school) team sports predicted better educational outcomes (in grade 10 and 12). Furthermore, sports participants like school more and would rather attend college full time than is the case with none sports participants. However, only gender, intellectual aptitude (test for verbal and mathematical abilities), and the mother's educational

7. A tabular overview is provided in Table A.1 in the Appendix.

level are entered as controls in the regression analysis. In contrast, a fixed effects strategy is used by Lipscomb (2007) to test whether sports activity provides an immediate return to student learning. Results show that, independent of individual ability, athletic and other club participation (in school) are both associated with an increase in math test scores and with Bachelor's degree attainment expectations. Athletic club participation was also associated positively with science test scores. Finally, Stevenson (2010) makes use of changes in US law providing for equal provision of sporting opportunities for both male and female students as a natural experiment to show that the post legislation increases in female sports participation increased female college attendance, employment and wages.[8] The interaction of the Title IX legislation with preexisting levels of boys' sports participation forms the instrument for the change in girls' athletic participation over the 1972–1978 period.

Besides these papers three studies exist with a focus on Europe (Germany) and also the wider impacts of sport than on just human capital: Pfeifer and Cornelißen (2010) analyze the impact of young Germans who participate in extra-curricular athletic activities on educational attainment (in the form of secondary school degrees and professional degrees). They use the 2000-2005 waves of the German Socio-Economic Panel with individuals having finished their education (aged 17-99) and where retrospective information on their adolescence is available. The sample includes 2,930 males and 3,071 females. Ordered probit models with generalized thresholds are applied to estimate the effect of participation in sport activities on the achievement of levels of secondary school degrees and professional degrees. Results show that participation in sport activities has a significant positive impact on educational attainment. The robustness of the results is tested by applying an IV-approach (using body height and city size as instruments).

Felfe et al. (2011) analyze the effect of sports club participation on skill development of children in Germany aged 3 to 10 years using data from the "German Health Interview and Examination Survey for Children and Adolescents" (KiGGS) as well as the "German Child Panel" (GCP). The effect of sports on children's cognitive (overall school grade) and non-cognitive skill measures (emotional problems, behavioral problems, hyperactivity, peer problems, and antisocial behavior) are estimated by employing matching methods. To avoid selection bias, a wide range of background characteristics are controlled for. The local

8. The legal change involved Title IX of the Educational Amendments to the 1964 Civil Rights Act. This banned gender discrimination in federally funded educational institutions.

availability of sports facilities is also included as an instrumental variable as a robustness check. Results show that there is a positive effect of participation in sports on children's cognitive and non-cognitive skills. In addition to these effects, Felfe et al. (2011) found that children participating in sports clubs score higher in different health and well-being measures.

Finally, Gerlach and Brettschneider (2013) is the only study to analyze the impact of sports club participation by children and adolescents on social capital, i.e. social acceptance and respect by peers. Based on a longitudinal study of 1,637 individuals in Germany, they detect a significant positive association using variance analyses. This study also indicates a positive relation on well-being (in line with Felfe et al., 2011) while there is no significant positive effect on obesity.

III. STUDY PROGRAM AND INSTITUTIONAL BACKGROUND

As the review of the existing literature suggests there is some evidence that sports participation in a variety of settings positively influences human capital, social capital, well-being and health for young people. However, previous studies analyzing these effects for children have focused only on industrialized countries. In poorer countries, children often grow up under more difficult conditions, like malnutrition and persistent hunger (Alderman and Christiaensen, 2001). Furthermore, manual labor and daily-survival activities demand high energy and physical *in*activity is not a major problem (Caballero, 2005). Therefore, the associated effects of sports participation might (at least) be different in these countries.

In general, malnutrition is associated with poor developmental outcomes. For instance, Victora et al. (2008) show for cohort studies from Brazil, Guatemala, India, the Philippines, and South Africa that poor fetal growth or stunting in the first two years of life result in irreversible damage, e.g. shorter adult height, lower attained schooling, and reduced adult income. Further, malnutrition in early childhood can cause vocabulary deficits (e.g. Grantham-McGregor, 2002) and other deficiencies in school performance and intelligence (Grantham-McGregor, 1995). Alderman (2010) argues that early childhood nutrition is a long-term investment in health, nutritional and cognitive development. However, Crookston et al. (2011) point out that poor nutritional status alone does not account for children’s

cognitive deficits. Their study confirms that other factors such as wealth, maternal education, area of residence and number of siblings are also important determinants of verbal and quantitative ability. Summing up, the condition for skill development of children in less developed countries are different and certainly worth comparing to children in developed countries. Therefore, it appears interesting and highly relevant to test, whether (formal or informal) sports *group* participation effects children's human capital, social capital, well-being and health. The effects on other group participation is also examined as sport may also encourage social capital in the form of other group activity as a bridging form, or reduce it as a bonding form of capital (Downward et al., 2014b).

The data used is taken from the Young Lives (YL) study program which is an international study of childhood poverty and was established to pursue the changing lives of 12,000 children in Ethiopia, India (in the state of Andhra Pradesh), Peru and Vietnam over 15 years (2001 – 2016) (Young Lives, 2013). The countries were selected to reflect a wide range of cultural, political, geographical and social contexts. The challenge of the sampling was to manage the inherent geographic and infrastructural characteristics of the four countries (Young Lives Method Guide, 2011). In each study country 20 sentinel sites were selected non-randomly, with rich areas excluded and poor areas purposively over-sampled. Children in the right age group were sampled randomly in the selected sites (Young Lives Method Guide, 2011). To create two age cohorts 2,000 infants (aged between 6 and 18 months) and 1,000 older children (aged 7 to 8 years) (only 700 in Peru) were selected. International experts developed the interview questionnaires (on child, household and community level) which were used in all four YL countries (Crookston et al., 2011).[9]

In this study questions from the child questionnaires (answered by the child) and household questionnaires (answered by the primary caregiver) were taken.[10] Only children from the older cohort from Ethiopia and Peru[11] who participated in all three rounds (2002, 2006/07 and 2009) of the YL survey were analyzed (n=1,635). Further, only those children who were

9. Some papers have already made use of the YL study program data (see Helmers and Patnam (2011) or Lordan and Frijters (2013) as an example).
10. The community questionnaire was not considered as it was not possible to find comparable variables of interest of this questionnaire for all countries.
11. The countries India (in the state of Andhra Pradesh) and Vietnam are not considered in this study as sports participation figures are too low in these samples to allow a meaningful econometric analysis.

enrolled in school in round 2 were included.[12] Hence, n=1,579 children are accessible for our analysis.

In the following, the institutional background, i.e. the country characteristics as well as the sport systems in the two countries, are discussed.[13]

1. Ethiopia

Ethiopia is located in the East of Africa and has a population of 93.8 million (in 2013). In 2011, 17% of the population lived in urban areas (USA in 2010[14]: 82%). It remains one of the world's poorest countries as 29.2% (in 2009/10) of the population lives below the poverty line (USA in 2010: 15.1%). 4.9% of GDP are taken for health expenditures (USA in 2011: 17.9%). Infant mortality rates (58 deaths per 1,000 live births) and death rates are lower in the city as they have better access to hospitals. Life expectancy is 58 years for men and 62 years for women (USA in 2013: 77 years for men; 81 years for women) (World Factbook, 2013). The school system includes elementary schools (grades 1 to 8), secondary schools (grades 9 and 10) and pre-universities (grades 11 and 12) (African Children's Educational Trust, 2013). However, education possibilities are rare, especially in rural areas where facilities are often thinly spread. This situation is reflected in the literacy rates (literacy rates include people at the age of 15 and over who can read and write): 39% of the population aged over 15 years can read and write, with 49% of males and 29% of females (USA: 99% can read and write) (World Factbook, 2013). The households in the YL sample are slightly better-off and have better access to basic services than the average household in Ethiopia (Outes-Leon and Sanchez, 2008).

The most popular sports in Ethiopia[15] are football, athletics (particularly middle and long distance running), volleyball and basketball. In general, sport for all is organized from the Federal Sport Commission to the district level, but there are almost no activities taking place. However, there are many sports clubs/groups, particularly in the sports mentioned before and also some clubs in taekwondo, tennis, table tennis, handball and other sports. These sports

12. 96% of all children are enrolled in school in round 2. Non-enrolled children (in r2) were excluded from the sample as it seems that their living conditions differ much from the rest of the sample.
13. A summary of this information is provided in the Appendix (Tables A.2 and A.3).
14. Available US figures are provided for a comparison.
15. All information on sports and sport systems in Ethiopia were provided by Zeru Bekele (Lecturer, Department of Sport Science, Addis Ababa University). We are grateful for his support.

groups are structured by sports and age and a typical sports group is made up of around 20-25 children. The overall objective of a sports group is practicing, preparing for competitions and playing sports in general. There are coaches in the sports groups but not all are well trained.

2. Peru

Peru is located in the west of South America and is populated by 29.8 million people with 77% living in urban regions (in 2010) (World Factbook, 2013). There is a poverty rate of 28%, however there is inequality between rural and urban children (Escobal et al., 2003). Life expectancy at birth is 71 years for male and 75 years for female, which is much higher compared to Ethiopia. The infant mortality rate is 21 deaths per 1,000 births and health expenditure was 5.1% of GDP in 2010 (World Factbook, 2013). Peru has, in comparison to other South American and YL countries, a quite high literacy rate. In 2004, the literacy rate for youth (15-24 years) was 97% and for adults almost 90% (World Factbook, 2013). Education in Peru through primary and secondary school is free for children from ages 7 to 16, although in practice it is inaccessible to many rural children. Children enter primary school at the age of six (grades 1 to 6). Secondary school consists of 5 grades (grades 7 to12). There are vocational education, private and public technical colleges and universities for higher education (Classbase, 2013). The households in the YL sample are better off than the average household in Peru and rather located in sites with better access to health, education and other services (Escobal and Flores, 2008).

The most popular sport in Peru[16] is football. Therefore, most of the sports clubs are football clubs. In general, there is a great demand for sports clubs from children, but clubs have to be paid (to be member), which exclude the majority of very low-income children. In addition, public parks with sports facilities are available but also require payment for getting access. Therefore, very poor children just play in the streets. The sports groups in the clubs are led by coaches.

16. All information on sports and sport systems in Peru were provided by Virginia Rey-Sánchez (Directora de comunicaciones; Estudio Niños del Milenio) as well as Mariluz Aparicio (Asistente de comunicaciones; Estudio Niños del Milenio). We are grateful for their support.

IV. EMPIRICAL STRATEGY

In line with some previous papers investigating the effects of sports (club) participation (Lechner, 2009; Lechner and Downward, 2013; Downward et al., 2014a) an average treatment effects analysis is conducted. The treatment variable is taken from round 3 of the YL survey in 2009 and measures whether a child generally participates in a sports group or not (as a dummy variable with a score of 1 for yes).[17]

In general, we are interested in the average effects of sports group participation on a randomly drawn child from the population (i.e. Average Treatment Effects: ATE), the average effects for those children who participated in sports groups (i.e. Average Treatment Effects on the Treated: ATET) and the average effects for those children who did not participate in sports groups (i.e. Average Treatment Effects on the Non-Treated: ATENT) (see Wooldridge, 2010, 905f.). The outcomes for which these effects are investigated are measured in the final round of the data (r3). The periodicity of the outcomes is important to recognize for identification. The reasons for this are now discussed.

To identify these effects, it is necessary that three central assumptions hold. The first is known as the no confounding or conditional independence assumption (CIA), the second is known as the stable unit treatment value assumption (STUVA)[18] and the third is known as common support or overlap assumption (OVERLAP)[19] (see Imbens, 2004). In the following, we discuss how we proceed with our empirical work to ensure that CIA holds and present further details on the estimation procedure employed. However, before discussing the plausibility of this assumption in our setting in more detail, we review the outcome variables (from r3) to be considered.

17. Note that participation in a sports group was not asked in round 1.
18. STUVA demands that potential outcomes are unaffected by the particular assignment of the treatment. This condition requires that there are no unrepresented treatments (everybody is either 0 or 1) and that there are no relevant interactions between treatments (the fact that child *i* participates does not change the potential outcome of child *j*). We think that this assumption holds in our context at least with regard to an individual's perception of *their* experience. However, some spillovers could be latently present.
19. By estimating treatment effects the probability of the treatment assignment (propensity score P) is important. The overlap (or common support) assumption forecloses the possibility that P is ever zero or one which means that the perfect predictability of treatment (w) given a set of confounding variables X is ruled out (Wooldridge, 2010). This ensures that for any given value of the confounding variables, a unit could potentially be observed with $w = 1$ or $w = 0$, $0 < (w = 1|X = x) < 1$. As indicated by our results (discussed in chapter 5) we generally deal with a set of observations with appropriate matches.

1. Outcome variables

Human capital is measured by the Peabody Picture Vocabulary Test (PPVT). This test analyses receptive vocabulary and provides a quick estimate of verbal ability and scholastic aptitude (Pearson, 2013). In the test, a word is spoken and the child must choose the correct one of four pictures. Furthermore, in line with Becker (1962), who states that investments in schooling, on-the job training or medical care enhance individual productivity and therefore employment prospects, school enrolment is included as indicator for human capital (as a dummy variable).

Social capital is defined by Putnam as "those features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993, 167) and thereby "enable participants to act together more effectively to pursue shared objectives" (Putnam, 1995, 664ff.). These networks can be broad and wide ranging (Downward et al., 2014b). Consequently, the feeling of safety can be included in the concept of social capital. Feeling safe can be established through social relationships. Having friends and being helpful as well as the presence of older pro-social role models contribute to a sense of safety (Gilgun, 1996; Caprara et al., 2000). Feeling safe is also influenced by public (neighborhood) safety. People do not feel safe when they are regularly surrounded by, or see, violence. Hence, feeling safe is strongly connected with the effectiveness of public safety in keeping violence in a community low (Overstreet and Braun, 2000). In line with this, social capital is measured by neighborhood trust, friends support and respect by other children and feeling safe outside the house (safe environment) which are assessed on a scale 1 (strongly disagree) to 5 (strongly agree). In addition to the original (categorical) variables, dummy variables are deployed for these outcome variables with disagreement (1 to 3) as reference category. Finally, with respect to social capital, as indicated above it is interesting to investigate if sports group participation is a substitute or complement to *other group participation*. For example, it may act to bond similar individuals together, thus reducing links to others, or bridge differences between individuals. The latter is often cited as important for producing social cohesion, but bonding capital can be also important. For instance, Seefeldt and Erwing (1997) argue that sport participation is a substitute to gang behavior as adolescents join gangs because they provide an identity for its member and serve many

functions that a family might do. Here other group participation is measured by dummy variables of memberships in after school, religious, school, youth, and other groups.[20]

Subjective well-being can be measured as the emotional response and global judgment of life satisfaction (Diener et al., 1999), or happiness which "involves acceptance and peace with oneself as well as with the conditions of one's existence" (Höhler, 1996, cited after Hornung, 2006); or eudaemonia, or good psychological functioning. Although there are differences in the definitions of these terms, life-satisfaction and happiness are often used as synonyms. In this study, subjective well-being is measured as satisfaction with life where children should state their current position on a ladder (step 1 to 9). High steps denote high satisfaction with life. The ladder, as a representation of well-being, was first developed by Cantril (1965). It is known as the Cantril scale or Cantril ladder.

Health capital is measured as subjective health status and Body Mass Index (BMI). The question on the health status has to be answered by the children on a 5-point scale (1=very poor to 5=very good). The BMI is calculated by dividing weight by squared height.

2. Identification

Just comparing the outcomes of children participating with those not participating in a sports group might yield biased results if those two groups differ with respect to other characteristics that also influence the outcome variables (Imbens, 2004). CIA implies that potential outcomes are conditionally independent of the treatment (*here*: sports group participation) for given values of any confounding variables *X* that might influence both. As noted in Section II, since previous studies confirm that selection into sports is not random, it is likely that a selection bias also exists in the context of our study. Therefore, we need to control for variables jointly determining sports group participation and the outcome variables. These confounding variables are used to estimate the conditional choice probabilities of being a sports group member, i.e. the propensity score (see Rosenbaum and Rubin, 1983), before matching similar individuals that just differ with respect to the treatment who can thus form the basis of a causal analysis.

20. An overview is provided in table A.4 in the Appendix.

In general, finding relevant and exogenous confounders is not straightforward.[21] Therefore, our choice of confounding variables is based on theoretical considerations and previous empirical findings related to sports (club) participation in developed countries since there is no study available, which is focused on sports group participation in less developed countries. It is important to stress that to deal with the issue of possible endogeneity we use variables primarily from the period prior to the treatment and the outcomes, i.e. from round 1 (r1) or round 2 (r2) (see table A.5 in the Appendix).

The first block of variables are socio-demographic and child environmental characteristics with gender, site (urban/rural), as well as dummy variables for the country. While the importance to control for gender is well documented in the literature (e.g. Lechner, 2009), the variable 'site' is included here since it appears plausible that urban areas in less developed countries have a better provision of sports facilities than rural areas, which might influence sports activity in general (cf. for example Limstrand, 2008; Pawlowski et al., 2009; Wicker et al., 2009, for developed countries). To describe the background and environment of the children, variables characterizing household and parents are taken into consideration. The household is represented by its size. Studies have found that adult sports participation is reduced by having children in a family especially for females (Farrell and Shields, 2002; Downward and Riordan, 2007). Further results show that there is a relationship between the sports participation of the children and their parents and siblings (Scheerder et al., 2007; Downward et al., 2014a). In addition, the household situation in terms of wealth compared to other households (measured as a dummy variable, with 'richer or average' as the reference category) and the wealth index are considered. The latter measures the socioeconomic status of a household and incorporates housing quality (e.g. rooms per person), consumer durables and services (e.g. electricity or water) (Kumra, 2008). Previous studies showed that higher socio-economic status and higher incomes raise sports activity (e.g. Downward and Rasciute, 2010). Furthermore, the relationship of primary caregiver and child, as well as the educational level of the primary caregiver are included in the list of variables (completed secondary education and completed university degree). Finally, time-use variables (leisure, chore, work, study, sleep) are included measuring the hours spent for a certain activity per day.

21. For instance, while sports group participation might positively affect health status, children are in general more likely to be physically active (and organized in sports groups) if they do not suffer from health problems.

In addition to these variables, available lagged variables of all five outcome categories are used as they might capture time constant confounders ('fixed effects') that are otherwise unobservable. Unfortunately, some of these variables are either measured differently compared to the outcome variables from round 3 (r3) or not available in round 2.

Human capital is measured by school enrolment (r1), work (r2), reading and writing (r1, r2), numeracy skills (r1) and 'scoremath' (r2). Reading, writing and numeracy are included as dummy variable whereas the reference categories are the ability to read/write/calculate. 'Scoremath' is measured by a test where children have to solve ten arithmetic problems (scores between 0 and 10 can be achieved). Furthermore, neighbourhood trust, respect by children and safe environment are included as lagged *social capital* measures. The variable 'friends support' is not available in round 2. Subjective health status was measured as 'compared to other children' and a dummy for long-term illness was included with the reference category no long-term illness to measure *health capital*. Further, body mass index from round 1 is included as well as height which is taken from round 3 (at the age of 15) as it is assumed, as with the literature in Section 2, that height is not affected by sports activity of children, at least in the short run. However, height can have an effect on the physical activity of children. Finally, dummy variables for *group* memberships (after school-, religious-, informal child-, and work related group) are also used as confounding variables.

Finally, interaction terms based on selected confounding variables and the variable "sports group" (r2) are included in the model to capture interaction effects of sports group participation prior to the treatment (interaction terms are also displayed in table A.7 in the Appendix). The idea is that some variables (e.g. male, site or household size) might have a different effect for children who were in a sport group in the past.

In summary, the aim of using this rich set of variables is to try and to control for some of the most important confounding effects. It is acknowledged, however, that there may well be further confounding factors that cannot be controlled for but which might jointly influence sports participation and outcomes, such as health and well-being. These might include genetics, psychological, cognitive, and other emotional factors or behavioral attributes associated with factors such as diet that unfortunately cannot be taken into account. Therefore, the degree to which the estimated effects have a causal interpretation can be said to have limits. Nevertheless, in as such that these factors already influenced past outcomes, and have

an effect that is stable over time, similar to a fixed effects, their effect will be accounted for by the inclusion of lagged outcome variables.

3. Estimation

Average treatment effects are estimated by radius matching based on the propensity score. This method enables comparison of the different outcomes of children being a member of a sports group (treated) with the outcomes of children who are not a member of a sports group (in round 3). To avoid selection bias, the two groups are adjusted in their covariate composition (as described in the section before) based on the propensity to be member of a sports group, which is estimated using a probit model.[22]

Specifically, we apply an estimator that takes into account the methodological considerations of Lechner et al. (2011). Compared to standard nearest-neighbor matching this procedure is more precise because it incorporates the idea of radius matching (e.g. Dehejia and Wahba, 2002). Furthermore, the algorithm uses the initial matching weights in a second step of (weighted) regression adjustment, which has two advantages. Firstly, the estimator satisfies a so-called double robustness property: the estimator remains consistent if either the matching step is based on a correctly specified selection model, or the regression model is correctly specified (e.g., Rubin, 1979; Joffe et al., 2004). Secondly, the regression adjustment should reduce small sample as well as asymptotic biases of matching (see Abadie and Imbens, 2008). Huber, Lechner, and Wunsch (2013) investigate the finite sample properties of this radius matching with bias adjustment algorithm along with many other matching type estimators and find it to be most highly ranked.

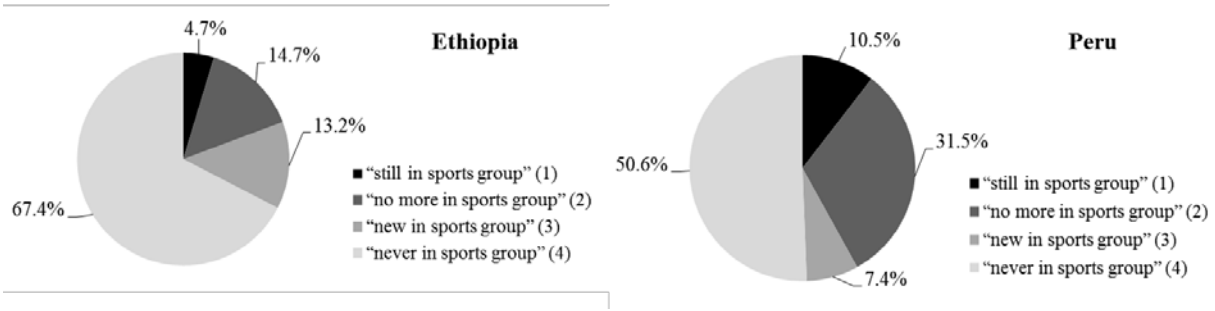
Concerning inferences, Abadie and Imbens (2008) show that for standard matching (i.e. based on a fixed number of comparison observations) bootstrap-based inference may be invalid. However, the matching algorithm used in our analysis is smoother than the one studied by Abadie and Imbens (2008) because it is based on a variable number of comparisons and uses the regression adjustment. For this reason, the bootstrap is likely to be a valid inference pro-

22. For estimation, Bin_Match_4.0.1 is used, which is the Gauss version of the radius match command in STATA (see Huber, Lechner, and Steinmayr, 2014, for an investigation on the sensitivity of the estimator with respect to different values of various tuning parameters). It is used on Gauss Version 13. The Gauss programme can be downloaded from www.michael-lechner.eu/software, while Stata and R versions are available from the respective repositories.

cedure in our context. To take account of the panel nature of the data, a block bootstrap is used in which all observations from the same individual over time are forming the block. To be more precise, inference is based on (i) bootstrapping programs 4,999 times; (ii) computing the bootstrap t-statistics of the respective average effects in each of the samples (normalized by the estimated effect); and (iii) estimating the p-value as the share of absolute bootstrap t-statistics that are larger than the absolute t-statistic in the original sample (see for instance MacKinnon (2006) for a discussion on bootstrapping symmetric statistics). This statistic is smoothed as suggested by Racine and MacKinnon (2007). Since the theoretical results by Abadie and Imbens (2008) and the simulation based results in Huber et al. (2013) suggest that the estimator is asymptotically normally distributed, bootstrapping the potentially pivotal t-statistic (computed under the assumption that the weights obtained to compute the control group are non-stochastic; see Lechner, 2002) has the advantage of potentially providing so-called asymptotic refinements and thus improving inference. In addition, we also checked the bootstrap distribution of the estimated effects directly (quantile method). The results are very similar (available on request).

Finally, in contrast to other studies mentioned before, our focus is upon two countries, which differ significantly with regard to their sports group participation behavior (Figure 1) as well as to their outcome variables (see Table A.6 in the Appendix). In addition, the meaning of 'sports group' might vary somewhat by country. To consider this kind of heterogeneity we primarily focus on single-country models. However, we analyze a pooled sample that includes a country dummy variable as an additional control variable.

Figure 1 *Country specific shares of sports group participation*



Note: Group definition: group 1 = "still in sports group" (sport in r2 and r3), group 2 = "no more in sports group" (sport in r2, but no sport in r3), group 3 = "new in sports group" (no sport in r2, but sport in r3) and group 4 = "never in sports group" (no sport in r2 and r3).

Summing up, overall three different specifications are estimated based on the single-country sample of Ethiopia (model 1) and Peru (model 2), as well as the pooled samples (model 3). We argue that these different specifications as well as the use of the confounding variables described before are sufficient to reveal some evidence towards a *causal* link between sports group participation and the outcome measures of interest.

V. RESULTS

For the models estimated for Ethiopia and Peru, two sets of results are presented. The first are sample means and probit estimates (used to calculate the conditional choice probabilities of being a sports group member in round 3). The second are the matching results.

For ease of exposition, Table 1 provides an (abbreviated) overview of the mean values by treatment state and the probit estimates of the single country models. The complete versions as well as the corresponding values for the pooled sample, which composes 58% Ethiopian and 42% Peruvian children, are displayed in Table A.7 in the Appendix. There are considerably more males than females in the sports group sample (75%) compared to the non-sports group sample (45%) in Ethiopia. This suggests some male orientation for sports in this country. In contrast, in Peru the share of males in the sports group sample (49%) is smaller than in the non-sports group sample (54%). In line with this, being male is positively associated with the probability to participate in a sports group in Ethiopia while there is no significant association in Peru. The percentage of households, which assess themselves as poorer compared to other households, is slightly higher in the samples of non-sports group members in both countries. In Peru, (a poor) household situation is significant and negatively associated with the probability to participate in a sports group. The objective measure of wealth (by the wealth index) shows no significance. In Ethiopia, being in a sports group in round 2 is positively associated with being in a sports group in round 3. However, in Peru there is a negative impact of being in a sports group in round 2 on the possibility of being in a sports group in round 3. With regard to time allocation; leisure time is the highest for sports group members in Ethiopia (2.82 h) and chore time is highest for sports group members in Peru (4.71 h). However, only chore time and study time in round 2 is positively associated with the probability to participate in a sports group in Peru. The latter is negatively associated with the probability to participate in a sports group in Ethiopia when being interacted with

sports group participation in round 2. Over 85% of the Ethiopian children trust in their neighborhood, which is in turn positively associated with participating in a sports group. In general, children in Peru assess their health worse than children in Ethiopia.

Table 1: *Descriptive statistics and average marginal effects of the probit models for covariates of the selection process into sports group participation in Ethiopia and Peru (this is a reduced version, the complete table is available in Appendix A.7).*

	Ethiopian sample			**Peruvian sample**		
	Mean in subsamples		**Probit**	**Mean in subsamples**		**Probit**
Variables	SG member in r3	not SG member in r3	dependent variable: SG member	SG member in r3	not SG member in r3	dependent variable: SG member
Socio-demographics and child environmental characteristics						
Male	0.75	0.45	**0.179*** **	0.49	0.54	-0.037
Household size	6.42	6.54	-0.008	5.61	5.53	-0.002
Household situation (r1)	0.27	0.31	-0.02	0.24	0.27	**-0.07***
Wealth index (r2)	0.32	0.30	0.118	0.45	0.54	-0.296
Caregiver higher edu	0.16	0.14	0.008	0.47	0.55	0.053
Time allocation						
Sports group	0.26	0.18	**0.544***	0.58	0.38	**-0.365****
Leisure time	2.82	2.67	0.007	2.42	2.57	0.040
Chore time	4.09	4.07	0.007	4.71	4.33	**0.050***
Study time	7.35	7.54	0.0003	7.62	7.84	**0.055***
Study time x SG	1.85	1.35	**-0.045****	4.36	2.88	-0.006
Human capital						
School enrolment (r1)	0.67	0.73	0.009	-	-	-
Work	0.09	0.06	0.053	0.34	0.26	0.072
Reading (r1)	0.46	0.54	0.016	0.09	0.09	-0.046
Writing (r1)	0.47	0.57	-0.036	0.15	0.12	0.042
Numeracy	0.44	0.43	0.017	0.20	0.18	0.033
Social capital						
Neighbourhood trust	0.88	0.86	**0.064***	0.56	0.56	-0.049
Respect by children	0.87	0.90	-0.044	0.91	0.91	0.001
Safe environment	0.84	0.78	0.014	0.65	0.57	0.048
Subjective well-being						
Satisfaction with life	4.21	4.31	-0.002	5.99	6.00	-0.012
Health capital						
Health status	0.55	0.56	-0.006	0.62	0.63	-0.015
BMI	13.57	13.85	-0.009	16.61	16.83	-0.001
Height	157.78	154.40	**0.004*** **	153.52	154.70	0.001
Other group participation						
Religious group	0.14	0.11	0.056	0.34	0.21	**0.087***
Observations / Efron's R^2	165	756	11.6	118	540	10.2

Note: Significance levels are indicated as *** ≡ p<0.01; ** ≡ p<0.05; * ≡ p<0.1; Significant effects are displayed in bold letters; Bootstrapped p-values. Number of bootstrap replications: 4999, "x SG" ≡ interaction term with "being in a sports group in round 2". If not mentioned otherwise, all covariates are measured in r2.

Finally, BMI at the age of 8 is 13.57 for sports group members in Ethiopia (control group: 13.85) and 16.61 in Peru (control group: 16.83). According to the World Health Organization (WHO) the "normal" BMI for children at the age of 7.5-8.5 years (like in round 1) should be

15.6-15.8 for boys and 15.5-15.8 for girls (WHO, 2007). Hence, children from Ethiopia are underweight. Finally, height is positively associated with the probability to participate in a sports group in Ethiopia, being in a religious group is positively associated with the probability to participate in a sports group in Peru.

Table 2: *Average treatment effects of sports group participation in Ethiopia and Peru (this is a reduced version, the full set of results is available in Appendix A.8).*

Sample	Ethiopian sample	Peruvian sample
Human capital		
Vocabulary test	4.904 (0.184)	-0.67 (0.725)
School enrolment	**0.093*** (0.000)**	0.009 (0.74)
Social capital		
Neighborhood trust	-0.067 (0.613)	-0.078 (0.498)
Friends support	0.097 (0.322)	0.138 (0.307)
Respect by children	0.068 (0.362)	**0.137* (0.071)**
Safe environment	**0.198** (0.044)**	0.095 (0.465)
Subjective well-being		
Satisfaction with life	**-0.298* (0.072)**	0.323 (0.160)
Health capital		
Health status	**-0.164* (0.063)**	**0.152* (0.092)**
Body Mass Index	0.117 (0.553)	0.259 (0.539)
Other group participation		
After school club	**-0.052** (0.05)**	-0.041 (0.125)
Religious group	**0.054* (0.099)**	-0.042 (0.246)
School club	0.018 (0.670)	0.032 (0.199)
Youth group	-0.013 (0.144)	0.019 (0.474)
Another group	-0.026 (0.266)	**-0.006*** (0.01)**
	No. of observations: 921 No. of treated: 165 (17.91% of observations) Common support: 913 (Share in common support: 99.13%)	No. of observations: 658 No. of treated: 118 (17.93% of observations) Common support: 623 (Share in common support: 94.68%)

Note: Significance levels are indicated as *** p≤0.01; ** p≤0.05; * p≤0.1. Significant effects are displayed in bold letters. p-values (in brackets) obtained from 4.999 bootstrap replications. The results are based on a version, which uses weighted logits instead of weighted OLS for the binary outcomes (weights used for inference take bias adjustment not into account).

Table 2 provides the matching results of ATE for the single countries. These results indicate the average difference in the effects of sports group participation across all of the children.[23] Looking at human capital, sports group participation has a significant and positive effect on school enrolment in Ethiopia while there is no influence in the Peruvian sample. With regard to social capital, there is a significant and positive impact of sports group participation on the perception of a safe environment in Ethiopia. In Peru, a positive impact on respect by other children could be detected but at a 10 percent level. Furthermore, while sports club

23. The complete version as well as the corresponding values for the pooled sample are displayed in Table A.8 in the Appendix. Since common support is given for more than 99% of the observations in Ethiopia and 95% in Peru (the remaining 1% and 5% of observations have been removed), the overlap assumption is not of concern.

participation reduces the probability to participate in after school clubs in Ethiopia, it raises it for Religious groups (but at a 10 percent level only) and it reduces the probability to participate in "other groups" in Peru. On balance, the results suggest that the impact of participation in a sports group is to generally raise social capital, but that this is more likely to be of a bonding nature, as it appears to substitute participation in other groups. The ATE of sports group participation shows variable impacts on subjective well-being (it is negative and significant at a 10 percent level for Ethiopia, and positive but insignificant for Peru) and health status (it is negative for Ethiopia and positive for Peru – both significant at a 10 percent level only). These results are also echoed in examining the ATET and ATENT, which focus on the mean effects for the two distinct subgroups of individuals participating and the individuals not participating in sport groups, respectively.

In disaggregating these effects, as illustrated in Table A.8 in the Appendix, it is also shown that the ATENT for subjective well-being and health status are negative if only significant at a 10% level in Ethiopia while the corresponding ATET are not significant at all (indicating a lack of relevance there). These results suggest that the outcomes from the sports behaviors of the current participating group and non-participating groups in Ethiopia are not 'transferable' even if the individuals were to change their behaviors, which suggests some strong sense of self-selection in behaviors. As the results are broadly negative for Ethiopia, then it might appear that some disutility is associated with the activity. This could indicate some social expectation on behaviors that is not accounted for in the analysis. Likewise, results similar to the ATE for Peru are identified. The ATET for friends support reaffirms the impact on social capital of sport participation. The effects on subjective well-being and health status are also positive and significant. These results indicate that the benefits from sports participation here are potentially not relevant for those currently not participating.

VI. DISCUSSION AND CONCLUSIONS

The literature that explores the outcomes of sports participation on adults or children upon health, well-being, social and human capital has focused on industrialized countries. This paper contributes to the literature by focusing on children in the less developed countries of Ethiopia and Peru and exploiting panel data and a semi-parametric matching estimator to

move towards a causal interpretation of the effects. Whereas the literature addressing the US or European countries finds a broadly positive impact of sport across all of these outcomes, more limited and variable results are discovered in this research. This suggests that the level of economic and social development matters in thinking about how, for example, policies seeking to improve outcomes are implemented.

Our results suggest that sports group participation has a significant and positive effect on human capital through formal school enrolment in Ethiopia while there is no significant effect in Peru. Furthermore, there is evidence for a positive impact of sports group participation on social capital through the perception of the individual child of a safe environment in Ethiopia as well as the support of friends and respect by other children in the individual's class in Peru. One feature of that impact is that bonding social capital seems to be primarily developed since sports group participation is shown to reduce participation in after school clubs (Ethiopia) and other groups (Peru), though it does increase religious group membership in Ethiopia. Finally, positive impacts upon the individual's subjective well-being and health status are identified in Peru only, but not in Ethiopia, where evidence of negative effects is found.

One possibility for these differences could be that the quality and format of the sports organization in the different countries could have an effect. For example, in the case of social capital, in Ethiopia there are almost no 'sport for all' activities developed from the Federal Sport Commission and the coaches of the sports groups are not well trained. Nonetheless sport provides a basis for encouragement to go to school and to provide some structure and safety to the child's environment. Religious group membership might also offer this. There is also, therefore, perhaps less emphasis on perceptions by children as to the subjective health and well-being impacts from sports activity either from lack of communication to them, or expectations of their experience. In contrast, there seems to be a better-developed system of sports clubs in Peru, with trained coaches that organize the sports groups and care for the children. The greater congruence of results from Peru (i.e. positive impacts on health, well-being and social capital through the support of friends and respect by other children in the individual's class) with those from more developed countries thus might be expected.

Summing up, this paper contributes to the literature as it is the first to generally explore the relationship between children's participation in sports groups and their skill formation in less developed countries. Furthermore, – and in contrast to most of the existing studies analyzing

the factors associated with sports participation – the panel data available and the identification strategy employed suggest that the estimated effects are (at least) close to having a causal interpretation. Overall, the findings suggest that the impact of programs, such as those provided in sport, can have positive developmental impacts for children, but the effects can be heterogeneous according to the context, which in this case is the sports organization of the country, and which points to an issue for future research.

REFERENCES

Abadie, A. and G.W. Imbens (2008). On the Failure of the Bootstrap for Matching Estimators, *Econometrica.* 76(6): 1537–1557.

African Children's Educational Trust (2013). Schools – Ethiopian Educational System, http://www.a-cet.org/schools.php?id=110560.

Alderman, H. and L. Christiaensen (2001). Child Malnutrition in Ethiopia: Can Maternal Knowledge Augment the Role of Income? *Africa Region Working Paper* Series 22.

Alderman, H. (2010). The economic cost of a poor start to life, *Journal of Developmental Origins of Health and Disease.* 1(1): 19–25.

Barron, J.M., B.T. Ewing and G.R. Wadell (2000). The effects of high school athletic participation on education and labor market outcomes, *Review of Economics and Statistics.* 82: 409–421.

Becker, G.S. (1962). Investment in Human Capital: A Theoretical Analysis, *Journal of Political Economy.* 70(5): 9-49.

Breuer, C., K. Hallmann and P. Wicker (2011). Determinants of sport participation in different sports, *Managing Leisure.* 16(4): 269-286

Caballero, B. (2005). A nutrition paradox - underweight and obesity in developing countries, *The New England journal of medicine.* 352(15): 1514-1516.

Cantril, H. (1965). *The pattern of human concerns*. New Brunswick: Rutgers University Press.

Caprara, G., C. Barbanell, C. Pastorelli, A. Bandura and P. Zimbardo (2000). Prosocial foundations of children's academic achievement, *Psychological Science.* 11(4): 302-306.

Classbase (2013). Education System in Peru, http://www.classbase.com/Countries/Peru/Education-System.

Crookston, B.T., K.A. Dearden, S.C. Alder, C.A. Porucznik, J.B. Stanford, R.M. Merrill, T.T. Dickerson and M.E. Penny (2011). Impact of early and concurrent stunting on cognition, *Maternal and Child Nutrition.* 7(4): 397–409.

Dehejia, R.H., and S. Wahba (2002). Propensity-score-matching methods for nonexperimental causal studies, *The Review of Economics and Statistics*. 84(1): 151–161.

Diener, E., E.M. Suh, R.E. Lucas and H.L. Smith (1999). Subjective Well-Being: Three Decades of Progress, *Psychological Bulletin.* 125(2): 276-302.

Downward, P., and S. Rasciute (2010). The Relative Demands for Sports and Leisure in England. *European Sport Management Quarterly.* 10(2): 189–214.

Downward, P., and J. Riordan (2007). Social Interactions and the Demand for Sport: an Econoic Analysis, *Contemporary Economic Policy.* 25(4): 518–537.

Downward, P., F. Lera-Lopez and S. Rasciute (2012). The economic analysis of sport participation, in L. Robinson, P. Chelladurai, G. Bodet and P. Downward (eds.), *Routledge Handbook of Sport Management.* London: Routledge.

Downward, P., K. Hallmann and T. Pawlowski (2014a). Assessing parental impact on the sports participation of children: A socio-economic analysis of the UK, *European Journal of Sport Science.* 14(1): 84–90.

Downward, P., T. Pawlowski and S. Rasciute (2014b). Does associational behaviour raise social capital? A cross-country analysis of trust, *Eastern Economic Journal*. 40: 150–165.

Eccles, J.S., B.L. Barber, M. Stone and J. Hunt (2003). Extracurricular Activities and Adolescent Development, *Journal of Social Issues.* 59: 865–889.

Eide, E.R., and N. Ronan (2001). Is participation in high school athletics an investment or a consumption good? Evidence from high school and beyond, *Economics of Education Review*. 20(5): 431–442.

Escobal, J., and E. Flores (2008). An Assessment of the Young Lives Sampling Approach in Peru. Young Lives Technical Note No. 3.

Escobal, J., C. Lanata, S. Madrid, M. Penny, J. Saavedra, P. Suarez, H. Verastegui, E. Villar, and S. Huttly (2003). Young Lives Preliminary Country Report: Peru, http://r4d.dfid.gov.uk/PDF/Outputs/YoungLives/PeruPreliminaryreport.pdf.

Farrell, L., and M.A. Shields (2002). Investigating the economic and demographic determinants of sporting participation in England, *Journal of the Royal Statistical Society: Series A (Statistics in Society).* 165(2): 335–348.

Felfe, C., M. Lechner and A. Steinmayr (2011). Sports and child development. Discussion Paper series (Forschungsinstitut zur Zukunft der Arbeit, No.6105).

Gerlach, E., and W.-D. Brettschneider (2013). *Aufwachsen im Sport. Befunde einer 10-jährigen Längsschnittstudie zwischen Kindheit und Adoleszenz* (Sportentwicklungen in Deutschland Band 23). Aachen: Meyer & Meyer.

Gilgun, J. (1996). Human development and adversity in ecological perspective, part 2: Three patterns, *Families in society.* 77(8): 459-476.

Gomez-Pinilla, F. (2008). The influences of diet and exercise on mental health through hormensis, *Aging Research Review*. 7(1): 49–62.

Grantham-McGregor, S. (1995). A review of studies of the effect of severe malnutrition on mental development, *The Journal of Nutrition.* 125(8 Suppl.): 2233S–2238S.

Grantham-McGregor, S. (2002). Linear growth retardation and cognition, *Lancet*. 359(9306): 542.

Joffe, M.M., T.R. Ten Have, H. Feldman, and S.E. Kimmel (2004). Model Selection, Confounder Control, and Marginal Structural Models: Review and New Applications, *The American Statistician*. 58(4): 272–279.

Heckman, J., J. Stixrud and E. Urzua (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior, *Journal of Labor Economics.* 24(3): 411–482.

Helmers, C., and M. Patnam (2011). The formation and evolution of childhood skill acquisition: Evidence from India, *Journal of Development Economics.* 95(2): 252-266.

Höhler, G. (1996). *Das Glück, Analyse einer Sehnsucht*. Düsseldorf: Econ Verlag.

Hornung, B.R. (2006). Happiness and the pursuit of happiness: A sociocybernetic approach, *Kybernetes.* 35(3/4): 323–346.

Huber, M., M. Lechner and A. Steinmayr (2014). Radius matching on the propensity score with bias adjustment: finite sample behaviour, tuning parameters and software implementation. Forthcoming in *Empirical Economics*.

Huber, M., M. Lechner and C. Wunsch (2013): The performance of estimators based on the propensity score, *Journal of Econometrics*. 175(1): 1–21.

Imbens, G.W. (2004). Nonparametric Estimation of Average Treatment Effects under Exogeneity: A Review, *The Review of Economics and Statistics*. 86(1): 4–29.

Kumra, N. (2008). An Assessment of the Young Lives Sampling Approach in Andhra Pradesh, India (Technical Note No. 2).

Lechner, M. (2009). Long-run labour market and health effects of individual sports activities, *The Journal of Health Economics.* 28(4): 839–854.

Lechner, M., and P. Downward (2013) Heterogeneous Sports Participation and Labour Market Outcomes in England, *IZA Discussion Paper* No. 7690, October.

Lechner, M. (2002). Some Practical Issues in the Evaluation of Heterogeneous Labour Market Programmes by Matching Methods, *Journal of the Royal Statistical Society, Series A*, 165:59–82.

Lechner, M., R. Miquel and C. Wunsch (2011). Long-Run Effects of Public Sector Sponsored Training in West Germany, *Journal of the European Economic Association*. 9(4): 742–784.

Limstrand, T. (2008). Environmental Characteristics Relevant to Young People's use of Sports Facilities: a Review, *Scandinavian Journal of Medicine & Science.* 18(3): 275–287.

Lipscomb, S. (2007). Secondary school extracurricular involvement and academic achievement: a fixed effects approach, *Economics of Education Review*. 26(4): 463–472.

Lordan, G., and P. Frijters (2013). Unplanned pregnancy and the impact on sibling health outcomes, *Health Economics.* 22: 903–914.

Outes-Leon, I., and A. Sanchez (2008). An Assessment of the Young Lives Sampling Approach in Ethiopia (Technical Note No. 1).

Overstreet, S., and S. Braun (2000). Exposure to community violence and post-traumatic stress symptoms: Mediating factors, *American Journal of Orthopsychiatry*. 70(2): 263–271.

Pawlowski, T., C. Breuer, P. Wicker and S. Poupaux (2009). Travel Time Spending Behaviour in Recreational Sports: An Econometric Approach with Management Implication, *European Sport Management Quarterly*. 9(3): 215–242.

Pearson (2013). Peabody Picture Vocabulary Test, Fourth Edition, http://psychcorp.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm? Pid=PAa30700.

Pfeifer, C., and T. Cornelißen (2010). The impact of participation in sports on educational attainment—New evidence from Germany, *Economics of Education Review*. 29(1): 94–103.

Putnam, R. (1993). *Making democracy work: Civic traditions in modern Italy*. Princeton, NJ: Princeton University Press.

Putnam, R. (1995). Tuning in, tuning out: The strange disappearance of social capital in America, *Political Science and Politics.* 28(4): 664-683.

MacKinnon, J.G. (2006). Bootstrap Methods in Econometrics. *The Economic Record*, 82, S2–S18.

Racine, J.S., and J.G. MacKinnon (2007). Inference via kernel smoothing of bootstrap P values, *Computational Statistics & Data Analysis*. 51(12): 5949–5957.

Rosenbaum, P., and D. Rubin (1983). The central role of the propensity score in observational studies for causal effects, *Biometrika.* 70(1): 41–55.

Rubin, D.B. (1979). Using Multivariate Matched Sampling and Regression Adjustment to Control Bias in Observational Studies, *Journal of the American Statistical Association.* 74(366): 318–328.

Scheerder, J., M. Taks, and W. Lagae (2007). Teenage girls' participation in sports. An integrational analysis of socio-cultural predictor variables, *European Journal for Sport and Society.* 4(2): 133–150.

Seefeldt, V.D., and M.E. Ewing (1997). Youth Sports in America: An Overview, *President's Council on Fitness and Sport: Research Digest.* 2(11): 1–14.

Stevenson, B. (2010). Beyond the Classroom: Using Title IX to measure the return to High School sport, *The Review of Economics and Statistics.* 92(2): 284–301

Victora, C.G., L. Adair, C. Fall, P.C. Hallal, R. Martorell, L. Ritcher *et al*. (2008). Maternal and child undernutrition: consequences for adult health and human capital, *Lancet.* 371(9609): 340–357.

Wicker, P., C. Breuer and T. Pawlowski (2009). Promoting Sport for All to Age-specific Target Groups: the Impact of Sport Infrastructure, *European Sport Management Quarterly*. 9(2): 103–118.

Wooldridge, J.M. (2010). *Econometric analysis of cross section and panel data* (2nd Ed.). Cambridge, MA: MIT Press.

World Factbook (2013). https://www.cia.gov/library/publications/the-world-factbook/ .

World Health Organization (WHO) (2007). Growth reference 5-19 years, http://www.who.int/growthref/who2007_bmi_for_age/en/ .

World Health Organization (WHO) (2010). Global recommendations on physical activity for health, http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf.
Young Lives (2013). *What we do*, http://www.younglives.org.uk/what-we-do.
Young Lives Method Guide (2011). *Sampling*, http://www.younglives.org.uk/files/methods-guide/methods-guide-sampling.

APPENDIX

Table A.1: *Large-scale empirical studies exploring possible effects of child and youth sports participation on their human capital, social capital, subjective well-being and health*

Study: Young	Country & Data	Estimation strategy	Results
Barron, Ewing and Wadell (2000)	USA, National Longitudinal Survey of Youth (NLSY; n=1,047) and of High School Class (NLS-72; n=3,014)	Two-period model of time allocation (probit model)	**Human capital:** Athletic participation directly affects wages and educational attainment (EA). But effects appear to reflect differences across individuals in ability or value of leisure.
Eide and Ronan (2001)	USA, High School and Beyond data set (HSB) (n=11,577)	Ordinary least squares and instrumental variable	**Human capital:** Sports participation has a neg. effect on the EA of white male student athletes, a pos. effect on the EA and earnings of black male student athletes, and a pos. effect on the EA of white female student athletes.
Eccles, Barber, Stone and Hunt (2003)	Michigan, USA MSALT (n=1,259)	Longitudinal regression analysis	**Human capital:** Participation in most extracurricular activities leads to better educational outcomes by controlling for social class, gender and intellectual aptitude. Participation on school sports teams increased educational outcomes, but higher drinking rates, too.
Lipscomb (2007)	USA, National Education Longitudinal Study (NELS) (n=16,305)	Fixed effects strategy	**Human capital:** Athletic and club participation are associated with an increase in math test scores and an increase in Bachelor's degree attainment expectations.
Stevenson (2010)	National Center for Education Statistics (NCES) and Public Use Micro Sample (PUMS) of the 1990 Census of Population (n varies per data set)	Instrumental variables	**Human capital:** Analysis across states in changes between pre- and post-legislation reveals that a rise in state sports participation for females generates an increase in female college attendance and in labour force.
Pfeifer and Cornelißen (2010)	GSOEP (n=6,050)	Generalized ordered probit models	**Human capital:** After controlling for important variables, a significant and positive effect of sport on educational attainment could be found.
Felfe, Lechner and Steinmayr (2011)	KiGGS, GCP and information on the available sports facilities (n=5,632)	Matching estimation strategy and instrumental variable (IV)	**Human capital, subjective well-being and health:** Sports club participation of children in Germany aged 3 to 10 years has a positive effect on skill development (cognitive and non-cognitive), general well-being and health.
Gerlach and Brettschneider (2013)	Germany, Longitudinal Study of children in a region in Germany (Paderborn) (n=1,637)	Variance analysis	**Social capital, subjective well-being and health:** Sports club participation of children and adolescents has a significant positive effect on social acceptance and respect by peers and well-being. However, there is no significant positive effect on obesity.

Table A.2: *General information on Ethiopia and Peru*

Characteristics	Ethiopia	Peru
Location	East of Africa	West of South America
Population (urban/rural)	93.8 million 17% in urban areas	29.8 million 77% in urban areas
Poverty (% of pop. living below poverty line)	29.2%	27.8%
Health a) Life expectancy (in years) b) Infant mortality rate (per 1,000 live births) c) Health expenditure	a) men: 58, women: 62 b) 58 deaths c) 4.9% of GDP (GDP: $ 91.29 billion in 2010)	a) men: 71, women: 75 b) 21 deaths c) 5.1% of GDP (GDP: $ 292.2 billion in 2010)
Education a) Age of school enrolment b) Grades (1st and 2nd education) c) Literacy rate	a) 7 years b) 10 grades (+ 2 pre-university) c) 39%	a) 6 years b) 12 grades c) 90% and 97% for youth (15-24 years)
Representativeness (differences to nationally representative samples)	YL households • are slightly better-off • have better access to basic services[1]	YL households • are better-off • are located in sites with better access to health, education and other services[2]

Notes: If not marked numbers are taken from the World Factbook (2013); [1]Outes-Leon and Sanchez (2008) [2]Escobal and Flores (2008).

Table A.3: *Information on sports and sport systems in Ethiopia and Peru*

Characteristics	Ethiopia	Peru
Popular sports (order mentioned by experts)	• football • athletics (particularly middle and long distance running) • volleyball • basketball	• football
General organization of "Sport for all"	Sport for all is organized from the Federal Sport Commission to the district level, but there are almost no activities.	
General organization of sports groups	• many clubs particularly in soccer, athletics, basketball and volleyball • few clubs in taekwondo, tennis, table tennis, handball etc. • sport and age specific groups • around 20-25 children per sports group	• mainly football clubs • great demand for sports clubs from children, but clubs have to be paid (to be member), which exclude the majority of low-income children • public parks with sports facilities (pay for access) • poor children play in the streets
Aim of sports groups	• practicing • preparing for competitions • playing sports in general	
Degree of organization in sports groups	There are coaches but not all are well trained.	There are coaches in the sports groups organized in clubs.
Contact Person (source)	**Zeru Bekele** Lecturer, Department of Sport Science Addis Ababa University	**Virginia Rey- Sánchez** (Directora de comunicaciones) **Mariluz Aparicio** (Asistente de comunicaciones) Estudio Niños del Milenio

Table A.4: *Description of outcome variables (taken from round 3)*

Variable	Label	Scale
Human capital		
Vocabulary test	Peabody Picture Vocabulary Test (PPVT)	Metric: achieved points in the test
School enrolment	Is child currently in school?	*dummy:* 0 – no, 1 – yes
Social capital		
Neighbourhood trust	Most people in my neighbourhood can be trusted.	1 – strongly disagree; 2 – disagree; 3 – more or less; 4 – agree; 5 – strongly agree
Neighbourhood trust (d)	Most people in my neighbourhood can be trusted.	*dummy:* 0 – strongly disagree – more or less, 1 – agree & strongly agree
Respect by children	Other children in my class treat me with respect.	1 – strongly disagree; 2 – disagree; 3 – more or less; 4 – agree; 5 – strongly agree
Respect by children (d)	Other children in my class treat me with respect.	*dummy:* 0 – strongly disagree – more or less, 1 – agree & strongly agree
Safe environment	I feel save when I go out of the house on my own.	1 – strongly disagree; 2 – disagree; 3 – more or less; 4 – agree; 5 – strongly agree
Safe environment (d)	I feel save when I go out of the house on my own.	*dummy:* 0 – strongly disagree – more or less, 1 – agree & strongly agree
Friends support	My friends will stand by me during difficult times.	1 – strongly disagree; 2 – disagree; 3 – more or less; 4 – agree; 5 – strongly agree
Friends support (d)	My friends will stand by me during difficult times.	*dummy:* 0 – strongly disagree – more or less, 1 – agree & strongly agree
Subjective well-being		
Satisfaction with life	Current position on ladder	Cantril ladder: 1=dissatisfied to 9=satisfied
Health capital		
Health status	In general is your health good or poor?	1=very poor, 2=poor, 3=average, 4=good, 5=very good
Body mass index (BMI)	Calculated BMI=weight / squared(height)	Value of the BMI
Other group participation		
After school club	Member of an after school club	*dummy:* 0 – no, 1 – yes
Religious group	Member of a religious group	*dummy:* 0 – no, 1 – yes
School club	Member of a school club	*dummy:* 0 – no, 1 – yes
Youth group	Member of a youth group	*dummy:* 0 – no, 1 – yes
Another group	Member of another group	*dummy:* 0 – no, 1 – yes

Table A.5: *Description of confounding variables (taken from round 1 and 2; only "height" taken from round 3)*

Variables	Label	Scale
Socio-demographics and child environmental characteristics		
Male*	Gender of the child.	*dummy:* 0 – female, 1 - male
Site*	Site where the child lives. (r2)	*dummy:* 0 – rural, 1 – urban
Peruvian*	Country	*dummy:* 0 – Ethiopian, 1 – Peruvian
Household size*	Number of household members. (r2)	*metric*
Household situation	Household situation (wealth) compared to others. (r1)	*dummy:* 0 – richer or average, 1 – poorer
Wealth index (wi)*	Measures the socioeconomic status of households. (Higher wi indicates higher socioecon. status.) (r1, r2)	*metric* (value between 0 and 1)
Relationship caregiver	Relationship of caregiver and child. (r1)	*dummy:* 0 – mother is primary caregiver, 1 – other is primary caregiver
Caregiver higher edu*	Caregiver completed secondary or post-secondary school or university. (r2)	*dummy:* 0 – did not complete, 1 – completed
Caregiver university	Caregiver completed university. (r2)	*dummy:* 0 – did not complete, 1 – completed
Time allocation		
Sports group	Sports group membership in r2.	*dummy:* 0 – no, 1 – yes
Leisure time*	Time spent for general leisure on a typical day. (r2)	*metric*
Chore time	Time spent for caring for others, domestic tasks, and family farm or business on a typical day. (r2)	*metric*
Study time*	Time spent at school and for studying outside school on a typical day. (r2)	*metric*
Work time	Time spent on paid activities on a typical day. (r2)	*metric*
Sleeping time*	Time spent for sleeping on a typical night. (r2)	*metric*
Human capital		
School enrolment	Child is currently enrolled in school. (r1)	*dummy:* 0 – no, 1 – yes
Work	Has child done paid work in last 12 months? (r2)	*dummy:* 0 – no, 1 – yes
Reading	Child can't read letters, words or sentences. (r1, r2)	*dummy:* 0 – can read, 1 – can't read
Writing	Child can't write sentences. (r1, r2)	*dummy:* 0 – can write, 1 – can't write
Numeracy	Answer to the calculation 2 times 4. (r1)	*dummy:* 0 – can calculate; 1 – can't calculate
Scoremath*	Mathematic achievement test. (r2)	*metric* (scores between 0 and 10)
Social capital		
Neighbourhood trust*	Most people in my neighbourhood can be trusted. (r2)	*dummy:* 0 – strongly disagree – more or less, 1 – agree & strongly agree
Respect by children*	Other children in my class treat me with respect. (r2)	
Safe environment	I feel safe when I go out of the house on my own. (r2)	
Subjective well-being		
Satisfaction with life*	Current position on ladder. (r2)	Cantril ladder: 1 - dissatisfied to 9 - satisfied
Health capital		
Health status*	Health compared to other children. (r2)	*dummy:* 0 – similar or better, 1 – worse
Long-term illness*	Child has long time health problems. (r2)	*dummy:* 0 – no, 1 – yes
BMI (Body Mass Index)	Weight / squared height (r1)	*metric*
Height	Height of the child (r3)	
Other group participation		
After school club*	Member of an after school club (r2)	*dummy:* 0 – no, 1 – yes
Religious group	Member of a religious group (r2)	*dummy:* 0 – no, 1 – yes
Informal child group	Member of an informal child group (r2)	*dummy:* 0 – no, 1 – yes
Work related group	Member of an work related group (r2)	*dummy:* 0 – no, 1 – yes

Note: * An interaction term with the variable "sports group" is also included.

Table A.6: *Country specific mean values for the outcome variables and t-test significances*

	Overall sample	Ethiopian sample	Peruvian sample	t-test
Human capital				
Vocabulary test (Peabody Picture Vocabulary Test score: 0-200)	130.6	152.8	97.6	35.995***
School enrolment (share of enrolled)	91.9%	91.1%	93.0%	-1.373
Social capital				
Neighbourhood trust (share of "agree" and "strongly agree")	48.5%	60.8%	31.3%	12.078***
Friends support (share of "agree" and "strongly agree")	70.3%	77.6%	60.0%	7.682***
Respect by children (share of "agree" and "strongly agree")	78.5%	76.7%	81.2%	-2.148**
Safe environment (share of "agree" and "strongly agree")	61.3%	73%	45%	11.727***
Subjective well-being				
Satisfaction with life (Cantril ladder: 1=dissatisfied to 9=satisfied)	5.4	4.8	6.1	-15.200***
Health capital				
Health status (mean of 1-very poor...5-very good)	3.9	4.0	3.8	7.111***
Body Mass Index (weight / squared height)	18.6	16.8	21.1	-32.719***
Other group participation				
After school club (share of members)	10.3%	13.7%	5.6%	5.23***
Religious group (share of members)	5.4%	3.3%	8.4%	-4.453***
School club (share of members)	11.5%	18.2%	2.0%	10.329***
Youth group (share of members)	3.2%	3.0%	3.5%	-0.504
Another group (share of members)	4.2%	6.9%	0.3%	6.59***
Observations	1,579	921	658	

Note: Significance levels are indicated as *** ≡ p<0.01; ** ≡ p<0.05

Table A.7: *Descriptive statistics and average marginal effects of the probit models for covariates of the selection process into sports group participation (model 1-3)*

	Model 1			**Model 2**			**Model 3**		
	Ethiopian sample			**Peruvian sample**			**Pooled sample**		
	Mean in subsamples		**Probit**	**Mean in subsamples**		**Probit**	**Mean in subsamples**		**Probit**
Variables	SG member in r3	not SG member in r3	dependent variable: SG member	SG member in r3	not SG member in r3	dependent variable: SG member	SG member in r3	not SG member in r3	dependent variable: SG member
Socio-demographics and child environmental characteristics									
Male	0.75	0.45	**0.179*****	0.49	0.54	-0.037	0.64	0.49	**0.107*****
Male x SG	0.21	0.11	-0.037	0.32	0.23	0.002	0.25	0.16	**-0.084****
Site	0.45	0.41	0.013	0.42	0.64	-0.105	0.44	0.50	-0.050
Site x SG	0.14	0.07	0.122	0.25	0.21	0.061	0.18	0.13	0.044
Peruvian	-	-	-	-	-	-	0.42	0.42	-0.0004
Peruvian x SG	-	-	-	-	-	-	0.24	0.16	-0.006
Household size	6.42	6.54	-0.008	5.61	5.53	-0.002	6.08	6.12	-0.007
Household size x SG	1.68	1.18	-0.0004	3.33	2.14	0.009	2.37	1.58	0.007
Household situation (r1)	0.27	0.31	-0.02	0.24	0.27	**-0.07***	0.26	0.29	**-0.036***
Wealth index (r1)	0.22	0.23	-0.159	0.42	0.47	0.111	0.31	0.32	0.029
Wealth index (r2)	0.32	0.30	0.118	0.45	0.54	-0.296	0.38	0.40	-0.104
Wealth index x SG	0.09	0.06	0.026	0.27	0.19	0.214	0.17	0.11	0.056
Relationship caregiver	0.08	0.12	-0.034	0.07	0.07	-0.018	0.08	0.10	-0.018
Caregiver higher edu	0.16	0.14	0.008	0.47	0.55	0.053	0.29	0.31	-0.017
Caregiver higher edu x SG	-	-	-	0.26	0.20	-0.079	0.16	0.10	0.040
Caregiver university	-	-	-	-	-	-	0.01	0.02	-0.024
Time allocation									
Sports group	0.26	0.18	**0.544***	0.58	0.38	**-0.365****	0.40	0.26	0.019
Leisure time	2.82	2.67	0.007	2.42	2.57	0.040	2.66	2.63	0.004
Leisure time x SG	0.76	0.51	-0.027	1.45	0.98	0.003	1.05	0.71	-0.011
Chore time	4.09	4.07	0.007	4.71	4.33	**0.050***	4.35	4.18	0.001
Study time	7.35	7.54	0.0003	7.62	7.84	**0.055***	7.46	7.66	0.001
Study time x SG	1.85	1.35	**-0.045****	4.36	2.88	-0.006	2.89	1.99	-0.016
Work time	0.12	0.13	-0.01	-	-	-	0.17	0.18	-0.028
Sleeping time	9.01	9.03	0.012	9.35	9.33	-0.026	9.15	9.16	0.002
Sleeping time x SG	2.32	1.59	-0.02	5.53	3.58	0.04	3.65	2.42	0.008
Human capital									
School enrolment	0.67	0.73	0.009	-	-		0.84	0.81	0.021
Work	0.09	0.06	0.053	0.34	0.26	0.072	0.19	0.14	**0.064***
Reading (r1)	0.46	0.54	0.016	0.09	0.09	-0.046	0.31	0.35	-0.013
Reading (r2)	-	-	-	-	-		0.04	0.05	-0.004
Writing (r1)	0.47	0.57	-0.036	0.15	0.12	0.042	0.34	0.38	-0.024
Writing (r2)	0.08	0.09	0.002	-	-		0.05	0.06	0.002
Numeracy	0.44	0.43	0.017	0.20	0.18	0.033	0.34	0.33	0.015
Scoremath	5.17	4.97	-0.004	5.45	5.86	-0.006	5.29	5.34	-0.003
Scoremath x SG	1.48	0.94	0.019	3.21	2.20	0.001	2.20	1.47	0.005
Social capital									
Neighbourhood trust	0.88	0.86	**0.064***	0.56	0.56	-0.049	0.75	0.73	-0.005
Neighbourhood trust x SG	0.21	0.15	-0.037	0.36	0.21	0.067	0.27	0.18	0.018
Respect by children	0.87	0.90	-0.044	0.91	0.91	0.001	0.89	0.91	-0.013
Respect by children x SG	0.23	0.15	0.060	-	-	-0.001	0.35	0.24	-0.031
Safe environment	0.84	0.78	0.014	0.65	0.57	0.048	0.76	0.69	**0.042***
Subjective well-being									
Satisfaction with life	4.21	4.31	-0.002	5.99	6.00	-0.012	4.95	5.01	-0.005
Satisfaction with life x SG	1.16	0.80	-0.0001	3.69	2.35	0.018	2.22	1.45	0.011
Health capital									
Health status	0.55	0.56	-0.006	0.62	0.63	-0.015	0.58	0.59	-0.008
Health status x SG	0.14	0.09	0.027	0.34	0.22	0.006	0.22	0.14	0.018
Long-term illness	-	-	-	0.13	0.11	-0.047	0.07	0.07	**-0.080***
Long-term illness x SG	-	-	-	0.10	0.04	0.124	0.05	0.02	**0.216***
BMI	13.57	13.85	-0.009	16.61	16.83	-0.001	14.83	15.09	-0.008
Height	157.78	154.40	**0.004*****	153.52	154.70	0.001	156.00	154.52	0.002
Other group participation									
After school club	0.18	0.17	0.028	0.13	0.08	-0.046	0.16	0.13	0.014
After school club x SG	-	-	-	0.26	0.04	0.079	0.07	0.04	0.014
Religious group	0.14	0.11	0.056	0.34	0.21	**0.087***	0.22	0.15	**0.086*****
Informal child group	0.12	0.12	-0.038	0.18	0.12	0.055	0.14	0.12	-0.007
Work related group	-	-	-	-	-	-	0.03	0.04	-0.043
Observations / Efron's R^2	165	756	11.6	118	540	10.2	283	1,296	6.3

Note: Significance levels are indicated as *** ≡ p<0.01; ** ≡ p<0.05; * ≡ p<0.1; Significant effects are displayed in bold letters; Bootstrapped p-values. Number of bootstrap replications: 4999, "x SG" ≡ interaction term with "being in a sports group in round 2". If not mentioned otherwise, all covariates are measured in r2.

Table A.8 *Radius matching results*

	Model 1			Model 2			Model 3		
Sample	**Ethiopian sample**			**Peruvian sample**			**Pooled sample**		
Outcomes	**ATE**	**ATET**	**ATENT**	**ATE**	**ATET**	**ATENT**	**ATE**	**ATET**	**ATENT**
Human capital									
Vocabulary test	4.904 (0.184)	5.516 (0.173)	4.775 (0.277)	-0.67 (0.725)	2.310 (0.373)	-1.347 (0.552)	3.843 (0.199)	2.168 (0.547)	4.207 (0.237)
School enrolment	**0.093*** (0.000)**	**0.083*** (0.009)**	**0.095*** (0.000)**	0.009 (0.74)	0.024 (0.528)	0.006 (0.860)	**0.064*** (0.000)**	**0.067*** (0.002)**	**0.064*** (0.000)**
Social capital									
Neighbourhood trust	-0.067 (0.613)	-0.106 (0.444)	-0.059 (0.711)	-0.078 (0.498)	-0.14 (0.269)	-0.064 (0.645)	-0.122 (0.140)	-0.024 (0.794)	-0.143 (0.146)
Neighbourhood trust (d)	-0.02 (0.707)	-0.051 (0.377)	-0.013 (0.834)	-0.014 (0.819)	-0.066 (0.317)	-0.002 (0.977)	-0.037 (0.351)	-0.012 (0.784)	-0.042 (0.371)
Friends support	0.097 (0.322)	0.01 (0.928)	0.116 (0.321)	0.138 (0.307)	**0.221* (0.094)**	0.12 (0.466)	**0.168** (0.026)**	**0.220*** (0.007)**	0.156 (0.084)
Friends support (d)	0.007 (0.891)	-0.008 (0.865)	0.01 (0.866)	0.097 (0.120)	**0.132** (0.045)**	0.089 (0.237)	**0.07** (0.048)**	**0.082** (0.034)**	0.067 (0.112)
Respect by children	0.068 (0.362)	0.053 (0.607)	0.072 (0.418)	**0.137* (0.071)**	0.135 (0.12)	0.138 (0.131)	0.073 (0.171)	0.100 (0.108)	0.067 (0.291)
Respect by children (d)	0.014 (0.771)	0.019 (0.713)	0.013 (0.821)	0.025 (0.582)	-0.032 (0.542)	0.038 (0.489)	-0.036 (0.287)	-0.007 (0.848)	-0.042 (0.294)
Safe environment	**0.198** (0.044)**	0.139 (0.288)	0.211 (0.069)	0.095 (0.465)	0.004 (0.978)	0.116 (0.458)	0.085 (0.357)	0.083 (0.382)	0.086 (0.44)
Safe environment (d)	0.035 (0.428)	0.039 (0.445)	0.034 (0.514)	0.038 (0.552)	-0.026 (0.709)	0.053 (0.494)	0.034 (0.375)	0.036 (0.372)	0.034 (0.465)
Subjective well-being									
Satisfaction with life	**-0.298* (0.072)**	-0.135 (0.509)	**-0.332* (0.09)**	0.323 (0.160)	**0.505** (0.023)**	0.281 (0.312)	-0.0004 (0.998)	0.548 (0.417)	-0.029 (0.871)
Health capital									
Health status	**-0.164* (0.063)**	-0.097 (0.348)	**-0.178* (0.089)**	**0.152* (0.092)**	**0.260*** (0.004)**	0.127 (0.243)	0.008 (0.867)	0.047 (0.476)	-0.001 (0.992)
Body Mass Index	0.117 (0.553)	0.127 (0.578)	0.115 (0.623)	0.259 (0.539)	0.361 (0.32)	0.235 (0.645)	0.129 (0.651)	0.152 (0.581)	0.124 (0.717)
Other group participation									
After school club	**-0.052** (0.05)**	-0.013 (0.744)	**-0.060* (0.052)**	-0.041 (0.125)	**-0.075** (0.029)**	-0.034 (0.297)	**-0.053*** (0.000)**	-0.025 (0.320)	**-0.06*** (0.000)**
Religious group	**0.054* (0.099)**	0.029 (0.249)	0.06 (0.131)	-0.042 (0.246)	-0.038 (0.312)	-0.043 (0.326)	0.002 (0.88)	0.009 (0.629)	0.001 (0.959)
School club	0.018 (0.670)	-0.055 (0.205)	0.034 (0.509)	0.032 (0.199)	0.002 (0.841)	0.039 (0.203)	-0.013 (0.538)	-0.033 (0.271)	-0.008 (0.733)
Youth group	-0.013 (0.144)	-0.007 (0.775)	-0.014 (0.129)	0.019 (0.474)	0.0004 (0.988)	0.023 (0.469)	**-0.014** (0.039)**	0.005 (0.767)	**-0.018** (0.015)**
Another group	-0.026 (0.266)	-0.016 (0.526)	-0.028 (0.314)	**-0.006*** (0.01)**	**-0.014*** (0.000)**	-0.004 (0.157)	-0.01 (0.629)	-0.011 (0.485)	-0.009 (0.699)
	No. of observations: 921 No. of treated: 165 (17.91% of observations) Common support: 913 (Share in common support: 99.13%)			No. of observations: 658 No. of treated: 118 (17.93% of observations) Common support: 623 (Share in common support: 94.68%)			No. of observations: 1,579 No. of treated: 283 (17.92% of observations) Common support: 1,567 (Share in common support: 99.24%)		

Note: Significance levels are indicated as *** p≤0.01; ** p≤0.05; * p≤0.1; Significant effects are displayed in bold letters. p-values (in brackets) obtained from 4.999 bootstrap replications. The results are based on a version, which uses weighted logits instead of weighted OLS for the binary outcomes (weights used for inference take bias adjustment not into account).