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Do high school sports build or reveal character? Bounding causal estimates of sports participation ☆

Michael R Ransom[a], Tyler Ransom*,[b]

[a] Department of Economics, Brigham Young University, 143 FOB, Provo, UT 84604, United States
[b] Department of Economics, University of Oklahoma, 322 CCD1, 308 Cate Center Drive, Norman, OK 73072, United States

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ABSTRACT

We examine the extent to which participation in high school athletics in the United States has beneficial effects on future education, labor market, and health outcomes. Due to the absence of plausible instruments in observational data, we use recently developed methods that relate selection on observables with selection on unobservables to estimate bounds on the causal effect of athletics participation. We do not find consistent evidence of individual education or labor market benefits. However, we do find that male (but not female) athletes are more likely to exercise regularly as adults, but are no less likely to be obese.

1. Introduction

Participating in sports is a cultural rite of passage for adolescents in many countries, including the United States. According to the National Federation of State High School Associations (NFHS), in the US, 7.9 million high school students (56%), play some kind of sport. Sports participation has also trended upward over time, and participation in sports organized by high schools has increased steadily over the past 25 years (National Federation of State High School Associations, 2017).

Given widespread participation in sports, it is natural to ask if the benefits outweigh the costs, both to individual athletes and to schools. While potential benefits of sports participation on long-term individual outcomes have been widely publicized (Dick's Sporting Goods, 2017), participating in athletics may be costly for individual students by taking time away from academic pursuits (Coleman, 1961) or increasing injury risk (Fair & Champa, 2017). Moreover, maintaining athletic programs is a non-trivial cost for schools—so much so that athletic programs are being dropped from an increasing number of school districts. It is estimated that 27% of public high schools will have no athletic programs by the year 2020 (Dick's Sporting Goods, 2017; Up 2 Us Sports, 2017). This is a particularly surprising trend in light of the continued growth in the number of students participating.

The primary question amid the debate of whether to maintain funding for high school athletics is whether or not athletic participation benefits students in line with the purposes of schools. That is, does participation enhance human capital of students in ways that will improve their lives, as opposed to simply providing an enjoyable recreational activity? We add our analysis to a large number of previous studies that have used observational data to also investigate this question. The primary empirical approach in existing studies has been to either assume that athletes are randomly assigned, or to use instrumental variables or quasi-experimental policy changes to estimate a plausibly causal effect. We take a different approach by instead asserting that, outside of one-time large-scale policy changes, no plausibly exogenous instruments exist. Instead, we make use of recently developed econometric methods that relate selection on observables with selection on unobservables to bound the causal effects of participation in high school sports (see also Altonji, Elder, & Taber, 2005b; Krauth, 2016; Millimet & Tchernis, 2013; Millimet, Tchernis, & Husain, 2010; Oster, 2017).

The econometric method we utilize in our analysis is developed by Krauth (2016) and allows researchers to empirically test the extent of

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* Corresponding author.
E-mail addresses: ransom@byu.edu (M.R. Ransom), ransom@ou.edu (T. Ransom).

Main estimating equation:

$$y = \alpha \mathit{HSathlete} + X\beta + \varepsilon$$

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where y is a bunch of outcomes:

- Educational (graduated high school, attended college, graduated college)
- Labor market (log wages, employed full-time)
- Health & risky behaviors (overweight/obese, exercise regularly, heavy drinker)

Table 4
Effect of sports on educational outcomes for men.

	Graduate HS		Attend college			Graduate college		
	NLSY79	Add Health	NLSY79	NELS:88	Add Health	NLSY79	NELS:88	Add Health
OLS, no controls	0.163***	0.055***	0.275***	0.090***	0.149***	0.161***	0.158***	0.096***
	(0.010)	(0.007)	(0.014)	(0.014)	(0.018)	(0.011)	(.016)	(.022)
OLS, full controls	0.062***	0.028**	0.120***	0.067***	0.078***	0.056***	0.095***	0.079***
	(0.010)	(0.008)	(0.013)	(0.013)	(0.016)	(0.010)	(0.013)	(0.022)
Bounds, $\lambda \in [0, 1]$	[−0.183, 0.062]	[−0.414, 0.028]	[− 0.182, 0.120]	[0.005, 0.067]	[−0.511, 0.078]	[−0.153, 0.056]	[−0.012, 0.095]	[−0.481, 0.079]
	(−0.217, 0.080)	(−0.529, 0.045)	(− 0.227, 0.147)	(−0.034,0.093)	(− 0.701, 0.110)	(−0.189,0.076)	(−0.055, 0.120)	(−0.893, 0.122)
$\hat{\lambda}^{\infty}$	2.75	1.51	2.75	4.53	1.51	2.75	4.51	1.49
$\hat{\lambda}(0)$	0.27	0.18	0.43	1.07	0.29	0.29	0.89	0.55
$\hat{\lambda}^{*}$	0.18	0.07	0.31	0.78	0.17	0.17	0.49	0.21
N	4296	5043	4296	4227	5044	4296	4196	3427

Notes: Additional controls include those listed in Tables 1 and 2, as well as birth year dummies. $\hat{\lambda}^{\infty}$ corresponds to the value of λ at which identification breaks down, i.e. $\lambda > \hat{\lambda}^{\infty}$ yields bounds on $\hat{\alpha} \in (-\infty, \infty)$. $\hat{\lambda}(0)$ is the value of λ at which the bounds of $\hat{\alpha}$ include 0. $\hat{\lambda}^{*}$ is the value of λ such that the 95% confidence interval on the bounds of $\hat{\alpha}$ include 0. Standard errors below OLS coefficients in parentheses. 95% confidence interval below each set of bounds in parentheses. ** indicates significance at the 5% level; *** at the 1% level.