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DISCUSSION PAPER SERIES

IZA DP No. 14584

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ABSTRACT

Athletes Greatly Benefit from Participation in Sports at the College and Secondary Level*

The recent Supreme Court decision NCAA vs Alston (June 2021) has heightened interest in the benefits and costs of participation in sports for student athletes. Anecdotes about the exploitation of student athletes were cited in the opinion. This paper uses panel data for two different cohorts that follow students from high school through college and into their post-school pursuits to examine the generality of these anecdotes. On average, student athletes' benefit- often substantially so—in terms of graduation, post-collegiate employment, and earnings. Benefits in terms of social mobility for disadvantaged and minority students are substantial, contrary to the anecdotes in play in the media and in the courts.

JEL Classification: Z2, I320, I260

Keywords: sport economics, social mobility, returns to education

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I. Introduction

In an era of social media determination of facts, the myth of the exploitation of college athletes is flourishing. Associate Justice of the Supreme Court, Brett Kavanaugh, repeated this myth among many others stating, "But the student athletes who generate the revenues, many of whom are African American and from lower-income backgrounds, end up with little or nothing."[1] This paper confronts the anecdotes that drive the myth with data and find it to be false. On average, student athletes including disadvantaged and minority students benefit from participation in sports at both the collegiate and secondary school levels.

This study examines the effect of participation in intercollegiate athletics on the human capital and economic outcomes for student-athletes attending post-secondary institutions relative to comparable students who did not participate in intercollegiate athletics. In addition, we examine outcomes for students participating in intercollegiate football and basketball at Division I and Football Bowl Subdivision ("FBS") schools, as well as outcomes for all athletes participating in high school varsity sports and intercollegiate athletics at other types of post-secondary institutions, compared to those who are otherwise similar but do not participate in athletics.[2]

Because participation in athletics may provide benefits (or detriments) throughout several stages of adolescent and adult life including high school, college, and post college life, it is important to examine the effects of athletics at various stages of the life cycle. The longitudinal nature of the data used here allows us to focus on the effects of participation in athletics at different life stages, as

[1] Supreme Court decision in Re: National Collegiate Athletic Association v. Shawne Alston, et al. American Athletic Conference, et al. v. Shawne Alston, et al., Decided June 21, 2021.
[2] See Appendix A for descriptions of the precise construction of the athletics variables and other variables used in the analyses.

well as to assess the cumulative effects of athletics participation, since success at each stage can beget success, or at least help provide the opportunity for future success.

We use the standard conceptual framework and empirical methodologies used for analyzing the returns to investment in education and the effect of cognitive and non-cognitive factors on educational, labor market and social outcomes. Using this framework, we examine the role of high school and intercollegiate athletics in contributing to the outcomes experienced by student-athletes.

One key area that we explore is how the existence of intercollegiate athletics provides incentives for students to graduate from high school and to get admitted to and attend college. Research has shown that attending college provides lifelong benefits. Therefore, if intercollegiate athletics provides incentives to finish high school and improves student-athletes' opportunities to get admitted to and attend college programs, then this benefit would need to be considered in evaluating the benefits to student-athletes from the current NCAA structure. In examining whether participation in high school varsity athletics improves students' probability of finishing high school and attending college, we also evaluate the extent to which participating in high school varsity athletics may compensate for disadvantaged backgrounds, which otherwise may hinder college attendance or college graduation. Along these lines, this analysis provides a basis for assessing the extent to which athletics is a vehicle for social mobility for disadvantaged individuals.

Consistent with the literature on the returns to schooling, we also estimate the value of participating in intercollegiate athletics in terms of the effects on student-athletes' future wages. Part of this analysis involves assessing whether, as some have claimed, student-athletes who participate in intercollegiate athletics achieve inferior academic and labor market outcomes compared to comparable non-athlete students. Specifically, we examine the questions of whether those who play varsity intercollegiate sports at four-year institutions, and Division I institutions in particular,

graduate at lower rates or earn lower wages than comparable non- athletes.[3]

Based on these analyses, our primary conclusions are that there are substantial benefits to participation in athletics in general, and in intercollegiate athletics in particular, especially for members of some disadvantaged groups. Further, we find little or no evidence of adverse effects of athletics participation on academic or labor market outcomes. Specifically, based on our analysis of two different extensive nationally representative datasets, the National Educational Longitudinal Survey ("NELS") and the Education Longitudinal Survey ("ELS"), controlling appropriately for cognitive and non-cognitive factors and other socioeconomic and family background variables that may affect the outcomes, and which provide a basis for examining the comparability of various cohorts, our main findings are as follows:

a. *Probability of Graduating from High School*
   Participation in athletics increases the probability of graduating from high school.[4] Graduating is a step in a path to further achievements, and therefore implies improved future outcomes for student-athletes.

b. *Probability of Attending College*
   Participation in athletics significantly improves the probability of attending college.[5] This finding is consistent with what would be expected if high school students, in the hope of receiving a scholarship, invested more in their academic and athletic capital to meet the eligibility and admissions standards imposed by the NCAA and the colleges. In other words, just the anticipation of potentially receiving an athletic scholarship can motivate student human capital investments in high school that provide future rewards.

c. *Graduation Rates (Obtaining a Bachelor's Degree)*
   We find that intercollegiate varsity athletes are as likely or more likely to earn at least a Bachelor's degree relative to comparable non-athletes.[6]

[3] The survey data we use follows students through their mid-20's, thus it provides information on early life-cycle wages.
[4] See Appendix Tables N1.1A, N1.2A, E1.1A, and E1.2A.
[5] See Appendix Tables N2.1A, N2.2A, E2.1A, and E2.2A.
[6] See Appendix Tables N3.3C, N3.4C, E3.3C, and E3.4C.

d. Returns to Intercollegiate Athletics (Earnings)
We find positive effects of athletics on initial (mid-20's) wages and no adverse effects on these wages due to participation in intercollegiate athletics.[7]

These results demonstrate, based on the available data, substantial benefits to athletic participation. In the rest of the paper, we explain the basis for this conclusion. Part 2 provides an overview of the conceptual framework employed here and the academic literature underpinning this approach. Part 3 describes the data and methodology employed to generate the analyses of the effect of athletic participation on various outcomes. Part 4 presents and discusses the empirical results from this analysis. Part 5 summarizes our conclusions. Appendix A provides details on the variables from the NELS and ELS datasets that were used or derived in the specifications presented in this report. Appendix B provides background on the non-cognitive and cognitive measures used in the report and in the academic literature on this topic. Appendices B.1 and B.2 provide further detail on the construction of the non-cognitive and cognitive measures, respectively. The full set of results is presented in Appendix A.

II. THE ECONOMICS OF HUMAN CAPITAL INVESTMENT PROVIDES A FRAMEWORK FOR ANALYZING THE IMPACT OF ATHLETICS ON VARIOUS OUTCOMES

As we outline below, the economics literature on human capital investment finds that returns from human capital investments reach beyond immediate financial benefits. Indeed, this literature provides clear support for the contention that, to reliably evaluate the net benefit that student-athletes receive from attending college and participating in intercollegiate athletics, one must look beyond athletic scholarships and other financial benefits and activities occurring solely during one's time at school. While in school, student-athletes likely receive benefits from various aspects of

[7] See Appendix Tables N4.1C, N4.2C, E4.1C, and E4.2C.

their college experiences, including access to top academic programs, sports training, team participation experiences, and social benefits from playing for a high-profile program, such as a Division I school.

Furthermore, the benefits that student-athletes receive from participating in a Division I athletics program likely extend well beyond returns realized while students are enrolled in school. For example, the benefits of improved knowledge on exercise, eating habits, and general physical care can last well beyond school years and provide value later in life. Leadership and teamwork skills that were acquired or enhanced through participation on a sports team potentially provide increased value in the job market following the student's time in college.[8] Economists refer to skills and knowledge that improve an individual's future productivity at work (or at other activities such as personal care) as forms of human capital.

The broad range of documented, long-run benefits in the economics literature resulting from human capital investments means that reliable measures of welfare effects from such investments should consider effects beyond immediate financial benefits. It supports a long-horizon perspective of returns to early human capital investments.

A. The Economics Literature on Human Capital Investments

Human capital investments have the characteristic that individuals forgo short term returns in order to acquire personal skills that provide greater benefits long term. Essentially, this involves planting seeds today for harvest in the future. Determining the optimal level and types of human capital investments to make is a complex decision. These decisions have long-lasting implications for

[8] For example, see (Shulman and Bowen 2001). Specifically, in discussing the post-schooling careers of student- athletes, the authors report that athletes tend to have better teamwork skills and they attribute positive labor market outcomes to these types of skills.

individuals' (post-college or otherwise) labor market careers. Such decisions also influence individuals' productivity in non-market areas, such as health maintenance and interpersonal relationships.

The broad range of effects resulting from human capital investments, along with the complexity of these decisions, has been well-documented. There has been extensive research on human capital investment in the academic literature. Many economists have spent significant efforts on researching optimal investments and tracking how these investments affect future outcomes in a variety of dimensions.[9] For example, Heckman, Humphries, and Veramendi (2018) have found that educational investments made early in life positively influence many different outcomes later in life, including labor market performance, individual health, and a variety of social outcomes.[10]

Beyond the longevity and complexity of returns emanating from human capital investments, the economics literature has also well documented the benefits to post-secondary educations. From the time of Jacob Mincer's 1974 book, "Schooling, Experience, and Earnings," many researchers have performed extensive empirical research on the relationship between the various factors discussed in this report and labor market outcomes.[11] Positive and significant benefits are widely acknowledged in this literature.

Some examples in the economics literature, empirically linking post-secondary investments

[9] Examples of our research in this area include: Cunha and Heckman (2007b), Cunha, Heckman, and Schennach (2010), Heckman, Lochner, and Todd (2006). For additional discussion, see Ashenfelter and Heckman (1976), (Cunha and Heckman 2007a), Cunha and Heckman (2008), Heckman (1975, 1976), Heckman, Lochner, and Cossa (2003), Heckman, Lochner, and Taber (1998, 1999).

[10] Heckman, Humphries, and Veramendi (2018), Heckman, Stixrud, and Urzúa (2006).

[11] Mincer (1974) Mincer, Jacob A., "Schooling, Experience, and Earnings," National Bureau of Economic Research. (1974).

to positive future outcomes, include Heckman and Vytlacil (2001), Hoekstra (2009), Andrews, Li, and Lovenheim (2016), Molitor and Leigh (2005), Averett and Dalessandro (2001), and Monk-Turner (1994). These studies all show considerable benefits resulting from college investments, with these returns measured years after the investment decisions are implemented. This literature highlights the large potential benefits likely to flow to student-athletes from participation in sports programs if college attendance or preparation are facilitated (or incentivized) by these athletic programs.

Given that the returns to education come from improving outcomes in many different areas and can occur over extended periods of time, optimally choosing human capital investments involves far more than merely assessing monetary costs associated with different schooling options. Understanding and incorporating this insight into our analysis leads to identifying the many benefits that can be derived from participating in intercollegiate basketball and football at Division I and FBS schools.

Student-athletes participating in intercollegiate basketball and football at Division I and FBS schools potentially receive numerous benefits, including: coaching inputs to improve a student's performance in the sport, access to high quality training facilities, reputational capital acquired through playing the sport, admittance to an academic program that might otherwise be unavailable (even by paying tuition),[12] human capital acquired through academic work, human capital that enhances productivity as leader or team member, access to employment networks with improved job opportunities, ability to live in desirable geographic locations, and human capital that enhances overall health (e.g., knowledge related to healthy diets and exercise

[12] For example, many individuals from a disadvantaged background may not have had the opportunity to attend a high-quality collegiate academic program, or even college at all, without the benefit of athletic grants-in-aid programs. This benefit has been explicitly recognized in the economics literature. See, e.g., Haskell (2012).

programs).

Indeed, in recent years, there have been a growing number of studies in the economics literature examining the public (social) and non-monetary returns to education. For example, Milligan, Moretti, and Oreopoulos (2004) find positive effects of education on civic participation and involvement.[13] As discussed in Moretti (2004), increased human capital also provides positive externalities that others may find attractive and affect the growth of cities and employers' locational decisions.[14]

Oreopoulos and Salvanes (2011) survey several non-monetary outcomes that are positively affected by education.[15] For example, more educated individuals tend, on average, to have higher levels of job satisfaction and jobs with higher levels of prestige. Controlling for income, higher levels of education are associated with lower separation/divorce rates, and better self- reported health. Schooling may also lead to improved parenting skills, which provides benefits to the next generation.

This research puts into context the well-recognized benefits of attending college, and the human capital literature more broadly provides the context for evaluating the benefits of athletics for various academic and economic outcomes. Indeed, evaluating the outcomes from participation in intercollegiate sports is only one aspect of the broader incentives that intercollegiate sports and scholarships may provide for necessary precursor accomplishments --

[13] Milligan, Moretti, and Oreopoulos (2004).
[14] Moretti (2004).
[15] Oreopoulos and Salvanes (2011).

including graduating from high school and achieving sufficient grades to be accepted into college. In the following empirical analyses, we evaluate some of these benefits that flow from participation in sports programs by student athletes.

III. DATA AND METHODOLOGY

A. Overview

The basic question we explore empirically is whether there are measurable benefits experienced by students who participate in intercollegiate athletics relative to other individuals in their cohorts who do not participate in intercollegiate athletics. However, the opportunity to participate in intercollegiate sports depends on student-athletes graduating from high school and earning sufficient grades to qualify for admission to college.[16]

Thus, the possibility of playing intercollegiate athletics and receiving an athletic scholarship to college may provide incentives for high school students to invest more intensively in their human capital by participating in high school athletics, studying to earn better grades, and graduating from high school. There may also be benefits in terms of learning about cooperation and teamwork and experiencing the satisfaction of completing a goal.

Our analysis seeks to measure the effects of participation in athletics at various stages along the path to participation in intercollegiate athletics. The four stages are graduation from high school, attending a post-secondary educational institution, obtaining a Bachelor's degree and earning initial wages. The details of our data, method and findings are delineated below.

B. Data

For this analysis, differences in relative educational and labor market outcomes (between

[16] For example, in the NELS data, we find that 90% of all college varsity athletes participated in high school varsity athletics.

student-athletes and non-athletes) are investigated with data from the National Education Longitudinal Study of 1988 ("NELS:88") and the Education Longitudinal Survey of 2002 ("ELS:2002"). We have gained access to both the public-use data (downloaded from the public website) and the restricted-use data obtained under contract with the U.S. Department of Education, Institute of Education Sciences. The restricted-use data provide more detailed information on individual survey respondents, including information on which post-secondary institutions they attended, which is needed to identify attendance at FBS and other Division I schools.

The NELS data are a nationally representative sample of students who were initially surveyed as eighth-graders in 1988. A sample of these initial respondents was surveyed again in 1990, 1992, 1994 and 2000.[17] Overall, 10,827 individuals responded in every survey wave, and our analysis of the NELS data is focused on this set of survey respondents. Student questionnaires across these survey years covered school experiences, activities, school and labor market outcomes, and family background characteristics.[18]

The base year (1988) seeks to capture the characteristics and activities of students as they are about to leave middle or junior high school, the first follow-up (1990) examines these students, many of whom are sophomores in high school, and the second follow-up occurs in 1992, when many of these individuals are seniors in high school. The third follow-up surveys these individuals in 1994, when many sample members were enrolled at a post-secondary institution. The final NELS survey wave occurs in 2000, at which point many of the survey respondents had completed their postsecondary education and had already started their careers.

[17] Additional students were added in the first two follow-up periods to maintain the representativeness of the sample.
[18] See http://nces.ed.gov/surveys/nels88/index.asp.

The ELS data are a representative sample of students surveyed in 2002, 2004, 2006, and 2012. There were 10,895 individuals who responded across every survey wave, and we focus our analysis of the ELS data on this set of respondents. Unlike the NELS survey, the ELS survey begins surveying individuals when many of them are sophomores in high school (2002). The first follow-up occurs in 2004, when many of these respondents are in the 12th grade. The second follow-up (2006) occurs at a point when many of the individuals are enrolled at a post- secondary institution, and the last survey occurs in 2012, when most students are in their mid-20's. The ELS survey covers many of the same or similar questions covered by NELS, including educational and income outcomes, measures of cognitive and non-cognitive ability, socio- economic status (including parents' education and income), personal aspirations and attitudes towards school, work, and home, educational resources and support, and extracurricular activities.[19]

For several reasons, we analyze the NELS and ELS datasets separately rather than combining them into one dataset. While the NELS and ELS surveys ask many similar questions, there were differences in some key questions and the construction of important variables between the two surveys, which could introduce imprecision in the measurement of the various effects of interest if the data were "pooled" together. For example, several of the variables which record characteristics of the respondent's background, the respondent's activities, and various non-cognitive measures, were constructed differently in ELS and NELS.

While the specific questions are different, the resulting measures capture comparable characteristics and activities. Some of these differences may be due to the introduction of new research and developments in construction of sample questions. In addition, running each of the regressions separately for ELS and NELS data allows for the regression coefficients to vary across

[19] See https://nces.ed.gov/surveys/els2002/.

time, rather than assuming they have a fixed relationship across cohorts. The specific variables used in our analyses are discussed in detail in Appendix A.

While both the NELS and ELS surveys ask respondents about high school athletics participation and college athletics participation, specific sports are only identified in the data at the high school level. Therefore, for males we use the term "college football players and college basketball players" to refer to intercollegiate athletes who participated in either varsity high school football, varsity high school basketball, or both.[20] For females, we use the term "college basketball players" to refer to intercollegiate athletes who participated in high school basketball.[21]

C. Methodology

As discussed in the introduction, participation in athletics may provide benefits throughout several stages of one's formative years during high school, college, and post-college graduation. The longitudinal nature of the NELS and ELS data allows us to focus on the importance of athletics participation for a given life stage as well as to assess the cumulative effects of participation in athletics across life stages.

For example, consider the effect of participation in high school varsity athletics. As discussed below, we find that participation in high school athletics increases the likelihood of high

[20] In the NELS and ELS data that we examine, a majority of male college athletes either a) only played football in high school, b) only played basketball in high school, c) only played football and basketball in high school, or d) did not play football or basketball in high school. For the above four groups of college athletes, there exists an unambiguous high school sports classification for purposes of our analysis (college basketball/football athletes and non-basketball/football college athletes). Likewise, a majority of female college athletes either a) only played high school basketball or b) did not play high school basketball.

[21] We also provide definitions for college football players and college basketball players in NELS and ELS in Appendix C.

school graduation.[22] High school graduation, in turn, increases the likelihood of college attendance, and college attendance is a necessary requirement for earning a Bachelor's degree. Furthermore, as discussed previously, it is well documented that college graduates earn, on average, higher wages than those who do not have a college degree. As such, participation in high school athletics may lead to higher wages in one's mid-20's via the channel of post-secondary education.

Similarly, the option to participate in intercollegiate athletics may provide benefits through two channels. First, as we detail below, all else equal, we observe that participation in intercollegiate athletics increases the likelihood of obtaining at least a Bachelor's degree. Second, the benefits of intercollegiate athletics provide an additional incentive for high school students to both participate in high school athletics as well as graduate from high school in order to take advantage of the opportunities afforded by intercollegiate athletics.

Participation in intercollegiate athletics also provides benefits beyond the increased likelihood of obtaining a Bachelor's degree. As documented below, we observe higher mid-20's earnings outcomes for wage earners who participated in intercollegiate athletics.

We use econometric methods to examine various educational and labor market outcomes while carefully controlling for a host of individual characteristics, including cognitive abilities, non-cognitive abilities, socio-economic background, and family history – the omission of which might lead to spurious relationships between participation in athletics and the outcomes we study.[23] These methods enable us to isolate the effect of athletic participation on these outcomes and evaluate

[22] See Appendix Tables N1.1A, N1.2A, E1.1A, and E1.2A.
[23] This is commonly referred to as omitted variable bias in the econometrics literature.

whether the results are statistically significant.[24]

Examining outcomes individually allows us to focus on the effect of athletics participation on a given outcome. As previously noted, we primarily focus on four types of outcomes, or what we will refer to as stages, throughout an individual's early adulthood:[25]

- Graduation from high school
- Attendance at a four-year post-secondary institution
- Obtaining a Bachelor's degree
- Wages during one's mid-20's

For each of these outcomes/stages, we econometrically control for individual and family background characteristics that have been shown to be important in the literature, thereby allowing us to examine and isolate the role of participating in high school and intercollegiate athletics. Controls include cognitive ability measures (scores on achievement tests), non- cognitive ability (e.g., locus of control, general effort and persistence), race, family income, parents' education, etc. The full set of results, including a list of controls used for each outcome, is presented in Appendix C.

To understand the importance of properly controlling for individual and family characteristics, consider a hypothetical example in which one is interested in comparing the college graduation rates of athletes with the college graduation rates of non-athletes. In particular, assume (as is actually observed in the data) that in the population students below the poverty line graduate at lower rates than all other students, and assume that students below the poverty line are represented at a higher rate in athletics than their rate of representation in the population. It would then follow that failing to control for the income level of the student's family when examining the

[24] Throughout our report, we test for statistical significance at a 5% significance level.
[25] We also examine similar additional outcomes. For example, attendance at a NCAA Division I school, highest level of educational attainment (to include some post-secondary education, two-year college), etc.

effect of athletics on the likelihood of college graduation would erroneously lead one to attribute the effects of family income on the likelihood of graduating to the effect of participation in college athletics on graduating.

We also control for cognitive and non-cognitive factors and other demographic and family background variables. These factors have been shown to be important in predicting transitions to different levels of schooling and for predicting outcomes.[26] This provides a means of comparing like-for-like background for athletes versus non-athletes to better isolate the effect of participation in athletics on the outcomes of interest. Studies such as those by Harper *et al.* (2013) that do not control for student background characteristics when examining differences

> in college graduation rates between African American student athletes and other college students, may lead to substantially biased conclusions regarding the differences in graduation rates across groups of students. It is important to control for factors known to explain the outcomes of interest. This is standard practice in economics. To omit such factors may create omitted variable bias and non-scientific, unreliable inferences.

For every outcome of interest, we econometrically control for the aforementioned factors using regression analysis. For example, when analyzing the probability that an individual graduates from high school,[27] We estimate a model that contains the following variables plus additional right-hand-side variables not explicitly listed here.[28]

$$Graduation_i = b_0 + b_1(High\ School\ Athletic\ Participation)_i + b_2(African\ American)_i + \ldots + \varepsilon_i$$

[26] Heckman, Humphries, and Veramendi (2018).
[27] Throughout this report, we will refer to graduation from high school on time or receipt of a GED on time as graduation from high school.
[28] Other variables include controls for other races, family background information (such as family income), non-cognitive and cognitive measures, etc. As noted previously, a full list of variables is provided in Appendix A.

where Graduation is a binary variable equal to one if an individual *i* graduates from high school and zero otherwise, High School Athletic Participation is a binary variable equal to one if individual *i* participates in high school athletics and zero otherwise, and African American is a binary variable equal to one if individual *i* is African American and zero otherwise. The coefficient b_1 has the interpretation of the causal effect on the probability of graduating from high school due to the participation in high school athletics.[29]

We find that participation in athletics generates benefits at various stages of life. As described in the previous section, these benefits are measured by isolating the effect of athletics on a particular academic or labor-market outcome while controlling for a variety of individual characteristics, including cognitive abilities, non-cognitive abilities, socio-economic background, and family history. Our findings are detailed below.

IV. EMPIRICAL RESULTS

A. The Effects of Participation in High School Athletics - Summary

First, we summarize our findings related to high school athletics from the NELS and ELS datasets below:

- All else equal, on average high school athletes are statistically significantly **more likely to graduate** from high school than comparable non-athletes. Moreover, those who participate in football or basketball are statistically significantly more likely to graduate from high school than comparable non-athletes.[30]

[29] In this example, multiplying the coefficient b_1 by 100 would yield the percentage point increase in the probability of graduating from high school due to participation in high school athletics.
[30] See Appendix Tables N1.1A, N1.2A, E1.1A, and E1.2A.

- All else equal, conditional on graduating from high school, on average the likelihood of **attending a post-secondary education institution is statistically significantly higher** both for high school athletes relative to comparable non-athletes and for high school football and basketball players relative to comparable non-athletes.[31,32] Further, on average, all else equal, even conditional on attending a post-secondary institution, high- school student athletes continue to outperform, as both athletes in general and football and basketball players in particular graduate at statistically significantly higher rates than non-athletes. we also find that high school athletes earn statistically significantly higher wages in their mid-20's.[33]

- All else equal, high school athletics participation confers considerable benefits at various stages of one's life when analyzing various subsamples of individuals in the data.

B. The Effects of High School Athletics: High School Graduation

ELS

On average, high school athletics participation increases the likelihood that both males and females graduate high school. Among females, all else equal, on average high school athletes are 1.8 percentage points more likely to graduate than comparable non-athletes and basketball players are

[31] See Appendix Tables N2.1A, N2.2A, E2.1A, and E2.2A.

[32] In the NELS balanced sample, approximately 10% of high school athletes continued to participate in college athletics. In the ELS balanced sample, approximately 14% of high school athletes continued to participate in college athletics. Also, note that some football players and some basketball players also participate in other sports as well. These individuals are included as students who are considered to have played football or basketball.

[33] Specifically, we find that among college students, all else equal, high school athletes are, on average, as likely or statistically significantly more likely to earn at least a Bachelor's degree than comparable non-athletes. Some of these high school athletes also participated in intercollegiate athletics. See Appendix Tables N3.3A, N3.4A, E3.3A, and E3.4A for further details on our estimates. Additionally, we also find that future wages are also higher for athletes. Namely, examining individuals in their mid-20's, all else equal, on average we find that those who participated in high school athletics in general as well as those who participated in high school football or basketball in particular earn wages that are statistically significantly higher than comparable individuals who did not participate in high school athletics. See Appendix Tables N4.1A, N4.2A, E4.1A, and E4.2A for further details on our estimates.

3.0 percentage points more likely to graduate than comparable non- athletes. Among males, all else equal, on average athletes are 4.6 percentage points more likely to graduate than comparable non-athletes, and those who play either football or basketball are 5.0 percentage points more likely to graduate than comparable non-athletes (see Table 1). These results are statistically significant.

NELS

In NELS, all else equal, on average female high school basketball players are statistically significantly more likely to graduate from high school than comparable females who did not participate in high school athletics. Similarly, all else equal, on average male football and basketball players are statistically significantly more likely to graduate high school than comparable males who did not participate in high school athletics. Likewise, all else equal, on average male and female athletes in general are statistically significantly more likely to graduate from high school than comparable non-athletes (see Table 1).

Table 1: High School Graduation
Dependent Variable: Received High School Diploma or GED Linear Probability Model

	NELS	ELS
Males		
HS Sophomore Varsity Athlete (% points)	**7.8*** **	**4.6*** **
Coefficient Estimate	0.078***	0.046***
(Standard Error)	(0.009)	(0.009)
[95% Confidence Interval]	[0.060 , 0.097]	[0.028 , 0.064]
High School Sophomore BB/FB Varsity Athlete (% points)	**8.4*** **	**5.0*** **
Coefficient Estimate	0.084***	0.050***
(Standard Error)	(0.010)	(0.010)
[95% Confidence Interval]	[0.064 , 0.105]	[0.030 , 0.071]
Females		
HS Sophomore Varsity Athlete (% points)	**4.3*** **	**1.8** **
Coefficient Estimate	0.043***	0.018**
(Standard Error)	(0.007)	(0.007)
[95% Confidence Interval]	[0.029 , 0.057]	[0.005 , 0.030]
High School Sophomore BB/FB Varsity Athlete (% points)	**3.9*** **	**3.0*** **
Coefficient Estimate	0.039***	0.030***
(Standard Error)	(0.011)	(0.008)
[95% Confidence Interval]	[0.018 , 0.060]	[0.013 , 0.046]

Notes: Summary of results of Tables N1.1A, N1.2A, E1.1A, E1.2A. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. *** and ** denote statistical significance of the coefficient estimate at the 0.1 and 1 percent level, respectively.

C. The Effects of High School Athletics – Attending a Post-Secondary Institution

ELS

Among high school graduates, all else equal, on average those who participated in high school athletics are statistically significantly more likely to attend a post-secondary institution. In particular, male athletes are 4.3 percentage points more likely to attend a post-secondary institution than comparable males who did not participate in sports, and female athletes are 5.8 percentage points more likely to attend a post-secondary institution than comparable females who did not participate in sports. This also holds true when examining the specific sports of football and basketball. Among males, those who played football or basketball are 4.6 percentage points more likely to attend a post-secondary institution than comparable non- athletes. Furthermore, female high school basketball players are 6 percentage points more likely to attend a post-secondary institution than comparable females who did not participate in high school athletics (see Table 2).

NELS

Conditional on graduating from high school, all else equal, on average female high school basketball players are statistically significantly more likely to attend a post-secondary institution than comparable females who did not participate in high school athletics. Likewise, among males, all else equal, on average those who participated in either high school football or high school basketball are statistically significantly more likely to attend a post-secondary institution than comparable non-athletes. Similarly, all else equal, on average male and female high school athletes are statistically significantly more likely to attend a post-secondary institution than comparable non-athletes (see Table 2).

Table 2: Attending Any PSE Institution
Dependent Variable: Attended Any PSE Institution Within Two Years of High School Graduation, Conditional on Graduation from High School; Linear Probability Model

	NEL	ELS
Males		
HS Sophomore Varsity Athlete (% points)	**9.3*** **	**4.3** **
Coefficient Estimate	0.093***	0.043**
(Standard Error)	(0.015)	(0.013)
[95% Confidence Interval]	[0.063 , 0.123]	[0.017 , 0.069]
High School Soph. BB/FB Varsity Athlete (% points)	**10.3*** **	**4.6** **
Coefficient Estimate	0.103***	0.046**
(Standard Error)	(0.017)	(0.015)
[95% Confidence Interval]	[0.070 , 0.137]	[0.016, 0.076]
Females		
HS Sophomore Varsity Athlete (% points)	**8.2*** **	**5.8*** **
Coefficient Estimate	0.082***	0.058***
(Standard Error)	(0.013)	(0.010)
[95% Confidence Interval]	[0.056 , 0.108]	[0.039 , 0.078]
High School Soph. BB Varsity Athlete (% points)	**9.8*** **	**6.0*** **
Coefficient Estimate	0.098***	0.060***
(Standard Error)	(0.019)	(0.015)
[95% Confidence Interval]	[0.060 , 0.136]	[0.031 , 0.090]

Notes: Summary of results of Tables N2.1A, N2.2A, E2.1A, E2.2A. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. *** and ** denote statistical significance of the coefficient estimate at the 0.1 and 1 percent level, respectively.

D. The Effects of High School Athletics – Specific Findings by Socioeconomic Background and Race

The beneficial effects of athletics at various stages of one's life are also found when examining students from backgrounds that could be considered as disadvantaged.

Poverty[35]

ELS

- For example, among males below the poverty line, all else equal, on average we find that those who participate in high school athletics are 15% more likely to graduate high school than comparable non-athletes. This result is statistically significant (Appendix Table E1.1B).

- Moreover, conditional on graduating from high school, all else equal, on average the effect of participation in high school athletics on the likelihood of attending a post-secondary institution is not different for students below the poverty line relative to other comparable students (Appendix Tables E2.1B, E2.2B).

NELS

- We find that males below the poverty line surveyed in NELS benefit from high school athletics to a similar extent to those we observe in ELS. In NELS, among males below the poverty line, all else equal, on average high school athletes are 11.6 percentage points more likely to graduate from high school than comparable non-athletes (Appendix Table N1.1B). Similarly, among males below the poverty line, all else equal, on average those playing high school football or basketball are 10.7 percentage points more likely to graduate high school than comparable non-athletes (Appendix Table N1.1B). These results are statistically significant.

- Among males below the poverty line who graduate from high school, all else equal, on average we find that those who play high school football or basketball are 17.2 percentage points more likely to attend a post-secondary institution (see Table 3). This result is statistically significant.

Single-parent households

ELS

- Among males from single-parent households, all else equal, on average high school athletes are 7.4 percentage points more likely to graduate from high school than comparable non-athletes (Appendix Table E1.1B). Similarly, when examining the same subset of males from single-parent households, all else equal, on average those who are high school football or basketball players are 6.8 percentage points more likely to graduate from high school than comparable non-athletes (Appendix Table E1.1B). These results are statistically significant.

[35] When analyzing ELS data, we use 2001 U.S. poverty thresholds (adjusted for household size and number of children). When analyzing NELS data, we use 1987 U.S. poverty thresholds (adjusted for household size and number of children). Poverty thresholds for both years are available at https://www.census.gov/data/tables/time- series/demo/income-poverty/historical-poverty-thresholds.html.

- Females from single-parent households also benefit from playing high school basketball. Among females, all else equal, on average we find that female high school basketball players are 5.2 percentage points more likely to graduate from high school than comparable non-athletes (Appendix Table E1.2B). Furthermore, among females from single-parent households who graduate from high school, all else equal, on average high school basketball players are 7.9 percentage points more likely to attend a post- secondary institution (see Table 3). These results are statistically significant.

NELS

- Among students from single-parent homes, all else equal, on average high school football and basketball players are statistically significantly more likely to graduate from high school than comparable non-athletes (Appendix Tables N1.1B, N1.2B). Conditional on graduating from high school, all else equal, on average they are also statistically significantly more likely to attend a post-secondary institution than comparable non- athletes (see Table 3).

African-American

Students ELS

- Among African-American females, all else equal, on average those who participate in high school athletics are 6.7 percentage points more likely to graduate from high school than comparable non-athletes (Appendix Table E1.2B). This result is statistically significant.

NELS

- We also find that high school athletics provides benefits to African-American males at various stages. In particular, among African-American males, all else equal, on average high school athletes are 11 percentage points more likely to graduate from high school (Appendix Table N1.1B) and 17.2 percentage points more likely to attend a post-secondary institution (see Table 3). These results are statistically significant.

Table 3: Attending Any PSE Institution
Dependent Variable: Attended Any PSE Institution Within Two Years of High School Graduation
Conditional on Graduation from High School; Linear Probability Model

Subpopulation:	Below the Poverty Line		Single-Parent Household		African Americans	
	NELS	**ELS**	**NELS**	**ELS**	**NELS**	**ELS**
Males						
HS Sophomore Varsity Athlete (% points)	**13.1***	**7.8**	**7.7***	**3.8**	**17.2****	**2.4**
Coefficient Estimate	0.131*	0.078	0.077*	0.038	0.172**	0.024
(Standard Error)	(0.056)	(0.062)	(0.034)	(0.027)	(0.065)	(0.049)
[95% Confidence Interval]	[0.021 , 0.241]	[-0.042 , 0.199]	[0.011 , 0.143]	[-0.015 , 0.092]	[0.044 , 0.300]	[-0.072 , 0.119]
HS Soph. BB/FB Varsity Athlete (% points)	**17.2****	**11.1**	**8.6***	**0.9**	**18.8****	**2.1**
Coefficient Estimate	0.172**	0.111	0.086*	0.009	0.188**	0.021
(Standard Error)	(0.060)	(0.068)	(0.038)	(0.032)	(0.067)	(0.052)
[95% Confidence Interval]	[0.053 , 0.290]	[-0.023 , 0.245]	[0.013 , 0.160]	[-0.054 , 0.072]	[0.057 , 0.319]	[-0.080 , 0.123]
Females						
HS Sophomore Varsity Athlete (% points)	**10.5***	**5.0**	**10.7*****	**7.4*****	**-3.3**	**3.5**
Coefficient Estimate	0.105*	0.050	0.107***	0.074***	-0.033	0.035
(Standard Error)	(0.049)	(0.040)	(0.028)	(0.020)	(0.049)	(0.035)
[95% Confidence Interval]	[0.009 , 0.201]	[-0.028 , 0.129]	[0.053 , 0.161]	[0.035 , 0.113]	[-0.129 , 0.063]	[-0.035 , 0.104]
HS Soph. BB Varsity Athlete (% points)	**7.3**	**4.8**	**11.9****	**7.9***	**7.3**	**1.4**
Coefficient Estimate	0.073	0.048	0.119**	0.079*	0.073	0.014
(Standard Error)	(0.069)	(0.074)	(0.043)	(0.032)	(0.066)	(0.053)
[95% Confidence Interval]	[-0.063 , 0.208]	[-0.096 , 0.193]	[0.036 , 0.203]	[0.017 , 0.141]	[-0.057 , 0.203]	[-0.090 , 0.119]

Notes: Summary of results of Tables N2.1B, N2.2B, E2.1B, E2.2B. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets.
***, **, and * denote statistical significance of the coefficient estimate at the 0.1, 1, and 5 percent level, respectively.

E. The Effects of Intercollegiate Athletics: Earning a Bachelor's Degree

The findings just discussed provide strong evidence of the benefits of participation in high school athletics in general and in high school football and high school basketball in particular, at various stages of students' progression through high school and college. Similarly, below we find a **higher probability of obtaining at least a Bachelor's degree and higher**

earnings for college athletes relative to comparable college students who did not participate in intercollegiate athletics. In particular:

ELS

- All else equal, on average college athletes are as likely or statistically significantly more likely to earn at least a Bachelor's degree relative to comparable college students who did not participate in intercollegiate athletics (see Table 4).

- Among males in college, all else equal, on average college football and college basketball players are statistically significantly more likely to earn at least a Bachelor's degree than comparable individuals who did not participate in intercollegiate athletics (see Table 4).

NELS

- The benefits attributable to intercollegiate athletics participation found in ELS are generally found in the NELS dataset as well. In particular, all else equal, college athletes are on average more likely to earn at least a Bachelor's degree relative to other comparable college students who did not participate in intercollegiate athletics.

- For example, among male college students, all else equal, we find that those who participate in intercollegiate athletics on average are 6.1 percentage points more likely to earn at least a Bachelor's degree. Among female college students, all else equal, on average those who participate in intercollegiate athletics are 10.9 percentage points more likely to earn at least a Bachelor's degree (see Table 4).[36]

[36] Similarly, using Multinomial Logit to examine the categorical outcome of highest level of educational attainment of those who attended a post-secondary education institution, all else equal, on average we find that intercollegiate athletes are statistically significantly more likely to earn a Bachelor degree than non-athletes. In particular, all else equal, on average male intercollegiate athletes in ELS are 13.1 percentage points more likely to attain a Bachelor degree than non-athletes and female athletes are 11.4 percentage points more likely to attain a Bachelor degree than non-athletes (based on results of Appendix Tables E3.1D and E3.2D). In NELS, all else equal, on average male intercollegiate athletes are 15.5 percentage points more likely to attain a Bachelor degree than non-athletes and female athletes are 22.3 percentage points more likely to attain a Bachelor degree than non-athletes (based on results of Appendix Tables N3.1D and N3.2D).

Table 4: Earning a Bachelor's Degree or Higher
Dependent Variable: Post-Secondary Education Attained – Bachelor's Degree or Higher; Linear Probability Model

	NEL	ELS
Males		
College Athlete (% points)	**6.1***	**6.7****
Coefficient Estimate	0.061*	0.067**
(Standard Error)	(0.028)	(0.026)
[95% Confidence Interval]	[0.006 , 0.115]	[0.017 , 0.118]
College FB/BB Athlete (% points)	**4.9**	**6.9***
Coefficient Estimate	0.049	0.069*
(Standard Error)	(0.037)	(0.035)
[95% Confidence Interval]	[-0.023 , 0.121]	[0.001 , 0.138]
Females		
College Athlete (% points)	**10.9*****	**1.9**
Coefficient Estimate	0.109***	0.019
(Standard Error)	(0.028)	(0.027)
[95% Confidence Interval]	[0.053 , 0.164]	[-0.033 , 0.071]
College BB Athlete (% points)	**16.7*****	**-0.8**
Coefficient Estimate	0.167***	-0.008
(Standard Error)	(0.039)	(0.053)
[95% Confidence Interval]	[0.090 , 0.244]	[-0.111 , 0.095]

Notes: Summary of results of Tables N3.3C, N3.4C, E3.3C, E3.4C. Conditional on attending a non-profit 4-year PSE institution. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. ***, **, and * denote statistical significance of the coefficient estimate at the 0.1, 1, and 5 percent level, respectively.

F. The Effects of Intercollegiate Athletics: Wages

ELS

The beneficial effects of intercollegiate athletics participation continue after entering the workforce. In particular, all else equal, individuals who were college athletes on average earn statistically significantly higher wages in their mid-20's than other comparable individuals.[37]

All else equal, on average we find that males who were college athletes earn wages in their mid-20's that are approximately 12% higher than those of other comparable males, and we find that females who were college athletes earn wages in their mid-20's that are approximately 18% higher than those of other comparable females (see Table 5).[38] These results are statistically significant.

NELS

Among males who earn wages in their mid-20's, we find that males who were college athletes earn statistically significantly higher wages than all other males. In particular, among males, all else equal, males who were college athletes earn wages that are on average approximately 15% higher than all others. Among females who earn wages in their mid-20's, we do not find a difference in wages when comparing those who were college athletes relative to all

[37] Throughout our analysis of the effects of athletics on mid-20's wages, we examine survey respondents who reported earning positive wages from employment.

[38] Note that the effect of athletics on mid-20's wage is calculated by exponentiating the relevant estimate displayed in Table 5 and subtracting one. For example, the 12.0% figure cited in Table 5 is calculated according to $(e^{0.113})- 1$. Results are similar when employing an alternative transformation of the coefficient estimate to percentage effects.

others (see Table 5).

The finding that males who were college athletes earn wages in their mid-20's that are on average statistically significantly higher relative to all other males also holds when only examining mid-20's wages of males who played college football and college basketball relative to the mid-20's wages of males who did not participate in intercollegiate athletics (see Table 5).

G. The Effects of Intercollegiate Athletics - Division I and FBS Students

We also examine the extent to which the beneficial effects of athletics extend to those who specifically attend FBS and other Division I institutions. Within FBS and Division I generally, on average we find no adverse effects of participation in intercollegiate athletics on various outcomes when examining both the NELS and ELS datasets. On average, we also find no difference in the effect of intercollegiate athletics on various outcomes when comparing Division I students with comparable non-Division I students.[39]

[39] See Appendix Tables N3.3C, N3.4C, E3.3C, E3.4C, N4.1C, N4.2C, E4.1C, and E4.2C.

Table 5: Mid-20's Wages
Dependent Variable: Logarithmic Annual Income in Mid-20's Conditional on Earning Employment Income

	NELS	ELS
Males		
College Athlete[&]	***15.3%***	***12.0%***
Coefficient Estimate	0.142***	0.113*
(Standard Error)	(0.036)	(0.051)
[95% Confidence Interval]	[0.071, 0.213]	[0.013, 0.213]
College FB/BB Athlete[&]	***16.9%***	***12.8%***
Coefficient Estimate	0.156***	0.121
(Standard Error)	(0.043)	(0.068)
[95% Confidence Interval]	[0.073 , 0.240]	[-0.013 , 0.255]
Females		
College Athlete[&]	***8.7%***	***18.5%***
Coefficient Estimate	0.083	0.170**
(Standard Error)	(0.045)	(0.056)
[95% Confidence Interval]	[-0.006 , 0.172]	[0.059 , 0.280]
College BB Athlete[&]	***1.5%***	***28.2%***
Coefficient Estimate	0.014	0.249**
(Standard Error)	(0.070)	(0.096)
[95% Confidence Interval]	[-0.123 , 0.152]	[0.061 , 0.436]

Notes: Summary of results of Tables N4.1C, N4.2C, E4.1C, E4.2C. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. ***, **, and * denote statistical significance of the coefficient estimate at the 0.1, 1, and 5 percent level, respectively. [&] denotes percent computed according to $e^{(\text{Coefficient Estimate})}$ -1.

Probability of Attending a Division I

Institution ELS

Among high school graduates, all else equal, we find that on average those who participated in high school athletics are statistically significantly more likely to attend a Division I school than comparable non-athletes. This also holds true when examining high school football and basketball players relative to non-athletes (Appendix Tables E2.5A, E2.6A).

NELS

In NELS, we also find that all else equal, high school athletes are on average statistically significantly more likely to attend a Division I school than comparable non-athletes (Appendix Tables N2.5A, N2.6A).

Comparisons Within Division I Cohorts

Earning a Bachelor's Degree or

Higher[40] ELS

Males and females

- Among comparable Division I male students, all else equal, on average the incremental effect of intercollegiate athletics on the likelihood that an individual will earn a Bachelor's degree or higher is **positive and significant** (Appendix Table E3.3C). Among comparable Division I female students, all else equal, on average there are no adverse effects of intercollegiate athletics on the likelihood that an individual will earn a Bachelor's degree or higher (Appendix Table E3.4C).
- Among comparable FBS students, all else equal, on average there are no adverse effects of intercollegiate athletics on the likelihood that an individual will earn a Bachelor's degree or higher (Appendix Tables E3.3C, E3.4C).
- Among comparable Division I students, all else equal, we find that on average college football players and college basketball players earn a Bachelor's degree or higher at the same rate as non-athletes (Appendix Tables E3.3C, E3.4C).
- Among comparable FBS students, all else equal, on average we find that college football

[40] See Table 6 for a summary of the results in this section.

players and college basketball players earn a Bachelor's degree or higher at the same rate as non-athletes (Appendix Tables E3.3C, E3.4C).

NELS

Males and females

- Among comparable Division I students, all else equal, on average there are no adverse effects of intercollegiate athletics on the likelihood that an individual will earn a Bachelor's degree or higher (Appendix Tables N3.3C, N3.4C).
- Among comparable FBS students, all else equal, on average there are no adverse effects of intercollegiate athletics on the likelihood that an individual will earn a Bachelor's degree or higher (Appendix Tables N3.3C, N3.4C).
- Among comparable Division I students, all else equal, we find that college football players and college basketball players are on average more likely to earn a Bachelor's degree or higher than comparable non-athletes (Appendix Tables N3.3C, N3.4C).
- Among comparable FBS students, all else equal, on average we find that college football players and college basketball players earn a Bachelor's degree or higher at the same rate as non-athletes (Appendix Tables N3.3C, N3.4C).

Table 6: Earning a Bachelor's Degree or Higher
Dependent Variable: Post-Secondary Education Attained – Bachelor's Degree or Higher; Linear Probability Model

Subpopulation:	Division I		FBS	
	NELS	**ELS**	**NELS**	**ELS**
Males				
College Athlete (% points)	**6.1**	**8.5***	**4.1**	**2.1**
Coefficient Estimate	0.061	0.085*	0.041	0.021
(Standard Error)	(0.038)	(0.036)	(0.057)	(0.052)
[95% Confidence Interval]	[-0.014 , 0.135]	[0.015 , 0.155]	[-0.071 , 0.153]	[-0.081 , 0.122]
College FB/BB Athlete (% points)	**9.6***	**8.5**	**6.3**	**-2.5**
Coefficient Estimate	0.096*	0.085	0.063	-0.025
(Standard Error)	(0.047)	(0.053)	(0.069)	(0.081)
[95% Confidence Interval]	[0.005 , 0.188]	[-0.019 , 0.189]	[-0.071 , 0.198]	[-0.184 , 0.134]
Females				
College Athlete (% points)	**5.5**	**0.6**	**4.8**	**1.2**
Coefficient Estimate	0.055	0.006	0.048	0.012
(Standard Error)	(0.041)	(0.038)	(0.058)	(0.049)
[95% Confidence Interval]	[-0.025 , 0.136]	[-0.069 , 0.081]	[-0.066 , 0.162]	[-0.083 , 0.107]
College BB Athlete (% points)	**14.4****	**-3.7**	**14.8**	**-3.8**
Coefficient Estimate	0.144**	-0.037	0.148	-0.038
(Standard Error)	(0.048)	(0.107)	(0.083)	(0.154)
[95% Confidence Interval]	[0.050 , 0.238]	[-0.248 , 0.173]	[-0.014 , 0.310]	[-0.339 , 0.263]

Notes: Summary of results of Tables N3.3C, N3.4C, E3.3C, E3.4C. Conditional on attending a non-profit 4-year PSE institution. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. ** and * denote statistical significance of the coefficient estimate at the 1 and 5 percent level, respectively.

Wage Earners[41]

ELS

Males and females

- Among Division I students, all else equal, on average there are no adverse effects of intercollegiate athletics on mid-20's wages (Appendix Tables E4.1C, E4.2C).
- Among FBS students, all else equal, on average there are no adverse effects of intercollegiate athletics on mid-20's wages (Appendix Tables E4.1C, E4.2C).
- Among Division I students, all else equal, on average we find that college football players and college basketball players earn the same wages in their mid-20's as non-athletes (Appendix Tables E4.1C, E4.2C).
- Among FBS students, all else equal, on average we find that college football players and college basketball players earn the same wages in their mid-20's as non-athletes (Appendix Tables E4.1C, E4.2C).

NELS

Males

- Among Division I male students, all else equal, on average the incremental effect of intercollegiate athletics on mid-20's wages are **positive and significant**. (Appendix Table N4.1C).
- Among FBS male students, all else equal, on average there are no adverse effects of intercollegiate athletics on mid-20's wages (Appendix Table N4.1C).
- Among Division I male students, all else equal, on average we find that college football players and college basketball players earn statistically significantly higher wages in their mid-20's than non-athletes (Appendix Table N4.1C).
- Among FBS male students, all else equal, on average we find that college football players and college basketball players earn statistically significantly higher wages in their mid- 20's than non-athletes (Appendix Table N4.1C).

Females

- Among Division I female students, all else equal, on average there are no adverse effects of intercollegiate athletics on mid-20's wages. (Appendix Table N4.2C).
- Among FBS female students, all else equal, on average there are no adverse effects of intercollegiate athletics on mid-20's wages (Appendix Table N4.2C).
- Among Division I female students, all else equal, on average we find that college basketball players earn the same wages in their mid-20's as non-athletes (Appendix Table N4.2C).

[41] See Table 7 for a summary of the results in this section.

- Among FBS female students, all else equal, on average we find that college basketball players earn the same wages in their mid-20's as non-athletes (Appendix Table N4.2C).

Division I Compared to Non-Division I

Obtaining a Bachelor's Degree or Higher

In both NELS and ELS, all else equal, on average we find that the effect of participating in intercollegiate athletics on the likelihood of earning a Bachelor's degree or higher among Division I students is not statistically different than the effect of intercollegiate athletics participation on the likelihood of obtaining a Bachelor's degree or higher among comparable non-Division I students.[42] Likewise, all else equal, on average, we find no difference in the effect of intercollegiate athletics on the likelihood of earning a Bachelor's degree or higher when comparing students at FBS institutions with comparable students at non-FBS institutions.[43]

[42] See Appendix Tables N3.3C, N3.4C, E3.3C, and E3.4C.
[43] See Appendix Tables N3.3C, N3.4C, E3.3C, and E3.4C.

Table 7: Mid-20's Wages
Dependent Variable: Logarithmic Annual Income in Mid-20's
Conditional on Earning Employment Income

Subpopulation:	Division I		FBS	
	NELS	**ELS**	**NELS**	**ELS**
Males				
College Athlete[&]	***22.0%***	***13.3%***	***13.8%***	***7.9%***
Coefficient Estimate	0.199**	0.125	0.129	0.076
(Standard Error)	(0.065)	(0.066)	(0.090)	(0.099)
[95% Confidence Interval]	[0.072 , 0.325]	[-0.004 , 0.254]	[-0.047 , 0.305]	[-0.117 , 0.269]
College FB/BB Athlete[&]	***27.6%***	***19.3%***	***24.0%***	***13.1%***
Coefficient Estimate	0.243***	0.176	0.215**	0.123
(Standard Error)	(0.069)	(0.091)	(0.079)	(0.130)
[95% Confidence Interval]	[0.108 , 0.379]	[-0.002 , 0.354]	[0.060 , 0.370]	[-0.131 , 0.377]
Females				
College Athlete[&]	***2.6%***	***11.4%***	***8.6%***	***4.5%***
Coefficient Estimate	0.026	0.108	0.082	0.044
(Standard Error)	(0.067)	(0.093)	(0.104)	(0.143)
[95% Confidence Interval]	[-0.105 , 0.157]	[-0.074 , 0.290]	[-0.122 , 0.287]	[-0.237 , 0.324]
College BB Athlete[&]	***-7.5%***	***22.7%***	***-12.2%***	***-7.1%***
Coefficient Estimate	-0.078	0.204	-0.130	-0.073
(Standard Error)	(0.095)	(0.194)	(0.134)	(0.304)
[95% Confidence Interval]	[-0.264 , 0.108]	[-0.176 , 0.584]	[-0.393 , 0.133]	[-0.670 , 0.523]

Notes: Summary of results of Tables N4.1C, N4.2C, E4.1C, E4.2C. Each cell corresponds to the athletic effect of interest from a particular regression specification. Robust standard errors in parentheses. 95-percent confidence intervals in square brackets. *** and ** denote statistical significance of the coefficient estimate at the 0.1 and 1 percent level, respectively. [&] denotes percent computed according to $e^{(\text{Coefficient Estimate})}$ -1.

Wages

Similarly, in both NELS and ELS, all else equal, on average we find that the effect of intercollegiate athletics participation at a Division I institution on mid-20's wages is not statistically different than the effect of intercollegiate athletics participation at a non-Division I institution.[44] Moreover, all else equal, on average we find that the effect of participating in intercollegiate athletics at an FBS institution on mid-20's wages is not statistically different than the effect of participating in intercollegiate athletics at a non-FBS institution.[45]

As part of these analyses, we performed numerous robustness checks, which we, and others, commonly use in academic research. These robustness checks include examining results on various demographic groups, using different functional forms, controlling for cognitive and non- cognitive ability in various ways, using various definitions of high school athlete and college athlete, and including or excluding explanatory variables.

V. CONCLUSION

The economics literature on human capital investment and returns to education and our own analysis of NELS and ELS data support the contention that participation in athletics provides substantial benefits to various groups, including to students from disadvantaged backgrounds. Based on these analyses, our primary conclusions are that there are substantial benefits to participation in athletics in general, and in intercollegiate athletics in particular, especially for members of some disadvantaged groups. Further, all else equal, on average we find no adverse effects of participation in intercollegiate athletics on academic or labor market outcomes for students participating in intercollegiate basketball and football in Division I or FBS schools. To the extent that intercollegiate

[44] See Appendix Tables N4.1C, N4.2C, E4.1C, and E4.2C.
[45] See Appendix Tables N4.1C, N4.2C, E4.1C, and E4.2C.

athletic scholarships provide incentives and paths to educational and athletics opportunities otherwise limited or unavailable for such students, athletics provide a vehicle for social mobility. Indeed, consistent with the literature on human capital development, the benefits of investments in human capital from the various stages we studied should provide life-long benefits. The colorful anecdotes promoted by the media fail to capture the factual reality of the benefits of participation in sports. The courts that act on the media anecdotes about a few athletes run the risk of compromising or possibly destroying a proven avenue of benefit to the many.

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