Location-based Barriers to Mobility:
Evidence from Elite High School Football Players

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ABSTRACT: A growing body of literature explores how neighborhoods influence the success of those who are raised in them. In this study, we contribute to that literature by examining the relationship between neighborhood characteristics and the success of elite high school football players. Elite high school players are a compelling group to study because, as individuals, they are i) well-aware that they possess very valuable human capital, ii) recognize that exploiting that capital requires attending college, and iii) invariably offered football scholarships, vastly reducing financial barriers to attending college. And yet some of these players fail to make it to a college campus. What explains such costly failures – what we term "derailments"? We explore the relationship between derailment and several measures of neighborhood characteristics. Included in our measures are Chetty and Hendron's (2018b) causal county mobility measures. We find that "derailed" high school athletes attended lower-quality schools and grew up in disadvantaged neighborhoods than players who transitioned successfully to college, that counties with the lowest mobility according to the Chetty and Hendron measures were substantially more likely to host a derailed player than were higher mobility counties, and that the lowest mobility counties produced a higher proportion of derailed players as a proportion of total elite players than did higher mobility counties.

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I. INTRODUCTION

A growing literature provides evidence that the neighborhood in which a child is raised has a substantial effect on the child's chances of achieving upward mobility (Chetty, Hendren, and Katz 2016; Chetty and Hendren 2018a; Chyn 2018; Deutscher 2020; Nakamura, Sigurdsson, and Steinsson 2022). Indeed, researchers have even developed quantitative measures of income mobility for specific geographic areas (Chetty and Hendren 2018b; Chetty, Friedman, Hendren, Jones, and Porter 2026). In this paper, we draw on this literature and employ such measures to explore whether the effects of neighborhoods are apparent in a population with very valuable human capital and a very clear path to upward mobility that is ostensibly independent of neighborhood characteristics: elite high school football players.

Over one million students participate in organized high school football annually, and about 250,000 of them graduate each year, many going on to seek a place with a college football program. The "recruiting" process that matches players and colleges can be frenetic, with players competing for spots on programs and programs competing for commitments from players. The very best high school players are signified by high ratings from major news services (ESPN, 247Sports, Rivals.com), which are summarized as a number of stars.[1] What we will refer to as "elite" high school players receive a rating of 3-star, 4-star, or 5-star.[2] Only about one percent of high school football players receive a rating of 3-star or above, practically guaranteeing the player a scholarship and a spot on the roster of a major college football

[1] We describe the rating systems in detail in Section II.

[2] In a typical year, the services grant one-to-two thousand 3-star ratings, three-to-four hundred 4-star ratings, and thirty-two 5-star ratings (the latter being awarded only to the best of the best).

program, which is the first step on a path than may lead to a shot at the NFL, and professional football riches.[3]

These elite (3-star and above) high school seniors will invariably have received signals of their potential market value (probably many over a period of years) from coaches, friends, and family; from multiple media outlets; and eventually through scholarship offers. They are therefore more likely to be aware of the life-changing economic consequences of their next steps than comparably high IQ high school students, who may lack full awareness of their cognitive edge or its long-term value. The path to a college football program is laid out clearly, and all the elite high school player has to do is take the first step – decide where to enroll, accept a scholarship, and join a program.

Yet a small but persistent number of the elite fail on that first step, typically because they cannot meet college football's required academic and disciplinary standards. All of them would have been informed of the standards well in advance, by recruiters if not by their own coaches. Nonetheless, they fail to pass muster. We term such players "derailed." Even then, there are remedies – derailment requires a period in the desert, such as enrolling in a junior college for a year or two to fulfill the eligibility requirements. Many derailed players indeed enroll, but most drop out short of meeting the requirements, and as a result, never play a down of major college football.[4]

The presence of derailed players poses a puzzle: How is it possible for individuals with recognized talent, significant money at stake, and a clear path before them to fail to make it even

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[3] The data we analyze in this paper precede the now common practice of paying players, encompassing a period when even minor forms of compensation (for signing autographs, for example) could be punished by prohibition from future college football competition.

[4] The Netflix documentary *Last Chance U* follows elite high school players who play football at "JUCO's" while attempting to pass their courses. Much of the program follows guidance counselors' efforts to prevent students from flunking out, with a common reason for failure being missing class.

as far as a college campus?[5] We seek an explanation in the nature of the neighborhoods from which the players are drawn. We do not engage in causal analysis, but rather explore the covariates associated with this failure to advance despite a level of talent that would have produced many scholarship offers. What we find is consistent with the idea that even when offered a clear path out of a disadvantaged neighborhood, the long-term effects of the neighborhood are sufficiently strong to pull the player back in.

We begin by providing an overview of college football, the recruiting process, and the link between high school player star ratings and NFL success. We then follow by describing our data. Our main data set consists of every high school player rated 3, 4, or 5-star from 2005 through 2022, 33,850 elite high school football players in total. We use a separate data set to match each of the elite high school players with the rosters of major college football programs and identify 2170 unmatched players. We dig deeply into the backgrounds of these unmatched players and find that academic or disciplinary problems prevented 932 of them from ever enrolling in a major college program. These players were "derailed."

We then match our data set of 33,850 elite players, including the 932 derailed players, with socio-demographic and economic measures drawn from the zip codes and counties in which they attended high school. We focus on six measures: high school quality, high school racial composition, participation in high school free lunch programs, neighborhood median household income, neighborhood racial mix, and neighborhood share of single-parent households. We find that derailed players attended significantly (economic and statistically) worse high schools, characterized by lower academic scores, higher levels of segregation, and greater participation in

[5] Our sample period ends in 2022, just as paying college players was becoming the norm. Nonetheless, ranked players not only had the chance to develop human capital through attending college, but (as we will discuss) a non-negligible probability of accessing the riches available to professional football players.

free lunch programs. These high schools were located in neighborhoods with lower household income, higher rates of single parenthood, and greater segregation. In short, derailed players came from less-desirable neighborhoods than the average elite player.

We follow by matching the players in our sample to the counties for which Chetty and Hendren (2018b) have calculated mobility measures. In order to give our analysis structure, we posit two effects. The first is what we call an "investment effect", whereby as income mobility in a location falls, the gains from investing heavily in an activity like athletics, which provides a clear path to improved circumstances, rise. Second, we posit a "resource effect", whereby low mobility levels are associated with more profoundly negative neighborhood effects. We transform Chetty and Hendren's cardinal measures into ordinal measures, and find evidence consistent with both effects. First, the complete set of elite high school players, both successful and derailed, is drawn mainly from lower mobility counties, consistent with the investment effect. Second, derailed players come predominantly from the very *lowest* mobility counties, consistent with the resource effect. The relationships are very apparent in figures and simple tables. However, we also estimate a two-stage hurdle model on county level data organized into mobility deciles. The results show that the probability that a county hosts any elite players falls as the county mobility deciles rise (that is to say, as county mobility rises), as does the number of elite players in a county; the same results hold even more strongly for derailed players. We also run a simple OLS regression of derailed players as a proportion of the total number of elite players in a given county on the county mobility deciles and find that the *proportion* (not just the number) of derailed players falls as county mobility rises.

We finish our analysis of elite high school football players by briefly reviewing the efforts by derailed players to remedy their situations by returning to school. Nearly 90 percent of derailed players enrolled in a junior college or equivalent in order to achieve the academic standards that would allow them to play major college football. Less than one-third succeeded. And the damage did not stop there: Members of the one-third that did make it to a major college program achieved NFL success at half the rate of comparably rated players who were not derailed.

By documenting the relationship between neighborhood characteristics and upward mobility for a set of young men with a well-defined path to success that is ostensibly independent of neighborhood circumstances, this paper contributes to a growing body of empirical research showing how local environments influence mobility. Chetty, Hendren, and Katz (2016) conduct a randomized housing voucher experiment and show that children who move from high-poverty to low-poverty neighborhoods are more likely to attend college and raise their earnings in adulthood. Chetty and Hendren (2018a) develop a credible causal strategy to measure the effect of neighborhoods by examining time spent by children in new neighborhoods, finding that children who were younger when the move took place (age 6 rather than age 12, for example) did better as adults. Employing Chetty and Hendren's empirical approach, Deutscher (2020) finds similar evidence of causal neighborhood effects when investigating neighborhoods in Australia. Focusing on exogenous shocks that force families to move, Chyn (2018) investigates the effect of the demolition of public housing projects in Chicago and finds that children who were moved to better neighborhoods were more likely to be employed and earn higher incomes as adults, and less likely to be arrested, while Nakamura, Sigurdsson, and Steinsson (2022) find similar improvements when investigating the effect of a volcanic eruption in Iceland.

Although we do not estimate causal effects, by documenting strong associations between neighborhoods and the success of elite high school football players, we shed light on how much neighborhoods may affect outcomes even when the stakes are easily apparent and the rewards unmistakable.[6] Furthermore, in employing the county level mobility measures created by Chetty and Hendren (2018b), we join other researchers who have demonstrated their usefulness.[7] Donnelly et al. (2017) link children's cognitive and behavioral outcomes to Chetty and Hendren's county mobility estimates and find that growing up in a high-mobility county is associated with fewer child behavioral problems and meaningful gains in early cognitive skills. Mann, Edin, and Shaefer (2024) shows that counties with lower upward mobility according to the Chetty and Hendren measures experience higher rates of violent crime and homicide—often explaining more variation than traditional measures such as poverty or unemployment. These papers and ours suggest that the county-level causal effects estimated by Chetty and Hendren capture broader place-based forces that extend beyond earnings alone.

Finally, our findings contribute to a multi-field debate on whether emphasizing youth sports such as football is "good" or "bad" for disadvantaged youths (e.g., Beamon and Bell 2002). Much of the debate implicitly assumes that the opportunity cost of athletic competition is learning in the classroom. Our analysis suggests that areas that produce elite athletes are not well-stocked with good schools promoting upward mobility, and that neighborhood effects are sufficiently deleterious that even very talented athletes may find it difficult to take advantage of the clearly defined opportunities their skills provide them. In other words, a single-minded focus

[6] For other related literature, see, e.g., McLanahan and Sandefur (1994); Heckman and Masterov (2007); Deming (2009); Bertrand and Pan (2013); Hoxby and Avery (2013); Chetty et al. (2014); Jackson, Johnson, and Persico (2016); Autor et al. (2019); Danieli, Devi, and Fryer (2021).

[7] Chetty and Hendren aggregate child exposure effects at the county level, estimating how much each year in the destination county changes adult incomes, and report causal effects at different points along the county's distribution.

on athletics may in fact be a rational response to the poor circumstances in which the children find themselves.[8]

II. BACKGROUND

A. College Football and the Recruitment of High School Athletes

College football is hugely popular and an important source of revenue for many colleges and universities, either directly through dollars generated by football games or indirectly by attracting alumni donations and future applicants (e.g., Humphries and Mondello 2007; Pope and Pope 2009, 2014). The NCAA, the sport's governing body, divides college football into three divisions – Divisions I, II, and III – which vary in terms of scholarships granted, time demanded of student-athletes, and the proportion of the student body that participates in collegiate sports. NCAA Division I football is further split into two subdivisions: the high-profile Football Bowl Subdivision (FBS), with 134 universities, and the somewhat lower-profile Football Championship Subdivision (FCS), with 129 universities.

The FBS is where "big-time" college football is played; the much-watched College Football National Championship follows a playoff among the most highly ranked FBS teams. The vast majority of players who sign a contract with a high-paying National Football League team attended an FBS school, and the most talented high school seniors compete avidly for spots on FBS rosters.[9] The top FBS programs compete equally fiercely for the best high school players.

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[8] For recent studies that investigate the socio-economic backgrounds of elite high-school football players, see Allison, Davis, and Barranco (2018), who analyze a sample of 929 recruits, and White et al. (2021) who analyze a sample of NFL players.

[9] https://www.collegetransitions.com/blog/colleges-with-the-most-nfl-players/

The "recruiting" process culminates when a given player accepts a football scholarship from a particular school.[10] The top players receive many scholarship offers.

That said, for a player to actually join an FBS program, he must meet the NCAA's academic standards and the disciplinary standards set by his future school, as we will discuss in more detail. These standards have posed a barrier for some outstanding high school players.

B. Ranking the Recruits

For fans, tracking the off-season recruiting process is nearly as popular as following the in-season games, as colleges scramble to attract the best high school seniors to their football programs. In recent years, the paying of college players and the easing of rules regarding transferring from one school to another have altered college football in important ways. Yet the imperative to identify the best high school football players and convince them to enroll at State U has not changed.[11]

Several websites have emerged to rate high school football players, generally during the player's senior year. The three leading ranking services are: 247Sports, ESPN, and Rivals.com, each of which provides a numeric rating for graduating high school seniors.[12] ESPN and 247Sports use a rating scale that runs from a high of 100 to a potential low of 0, while 247Sports uses a scale that runs from 1.00 to a possible low of 0 – although as a practical matter, the services generally do not bother to rate players who are likely to score below 70 (or 0.70).[13]

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[10] Agreements are not binding until the player signs a formal commitment letter. For more detailed explorations of the recruiting process, see, e.g., DuMond, Lynch, Platania (2008); Harris (2018).

[11] Our analysis focuses on the years 2005-2022, just prior to the U.S. Supreme Court's 2021 decision in *NCAA v. Alston* that led to fundamental changes in the rules regarding paying and keeping players (see, e.g., Noll XXX, for detail).

[12] The services may differ in their player rankings, but not by much. For example, in 2025, ESPN and 247Sports listed the same top three candidates in the same order, while Rivals.com listed two of the same three, with the third from the other two services appearing fourth.

[13] The rivals.com scale runs from 6.1 (5-star) to 5.2 (2-star).

247Sports provides a composite ranking that aggregates ESPN, Rivals.com, and its own rankings. In the analysis that follows, we employ the 247Sports Composite ranking.

All three services also express their ratings more concisely, as a number of "stars," with the top players receiving ratings running from 3-stars to 5-stars, and players below the 3-star level seldom rated.[14] A "5-star player" is the elite of the elite, the very best of the best, and the rating services generally grant no more than thirty-two 5-star designations annually (to match the number of first-round picks in the NFL draft).[15] Not quite as rare, but nearly so, are the several hundred 4-star designations granted annually, and the one-to-two thousand annual 3-star designations. To put these numbers in context, roughly 250,000 high school football players graduate each year, so that less than one percent of all graduating high school football players receive a rating of 3-star or higher.[16]

The potential value of the human capital reflected in these ratings is enormous. College football is the only path to professional football, and the chances of an elite player making it to the NFL and collecting an enormous salary for at least a short period of time (the minimum NFL rookie salary in 2024 was $840,000) are substantial.[17] Table 1 shows several measures of the likelihood of NFL success by star rating. Not surprisingly, high school seniors with 5-star ratings fare best: More than one-third are on an NFL roster for at least one season, and more than 15 percent are in the league for five years or more. The NFL prospects for 4-star athletes are not quite as bright, but a 4-star player still has a greater than 13 percent chance of playing in the NFL

[14] Our data set contains a smattering of 2-star rating, but such players compete almost entirely at Division II or Division III schools and will not be part of our analysis.
[15] Each Spring, NFL teams choose college athletes for their professional rosters, generally picking in reverse order to the previous season's winning record.
[16] The National Federation of High School Associations estimates that, on average, more than one million high school athletes competed on football teams annually from 2005 through 2022. See www.nfhs.org.
[17] As we mentioned above, our data set covers the period right before colleges began paying college football players (legally, at least).

for at least one season. The 3-star athletes are greater longshots still, but have a better than 6 percent chance of making it to the NFL, which is over 60 times the NFL odds for an unranked player.[18] In short, a 3-star rating or higher signifies the possession of very valuable human capital. And yet, certain elite (3-to-5 star) high school athletes never make it to a college football program. We will term these players "derailed."

III. THE DATA

A. Elite High School Football Players

Our primary data set will consist of the universe of 33,850 high school seniors who graduated with a 247Sports Composite rating of 3-stars or higher from 2005 through 2022.[19] In addition to providing ratings, the 247Sports platform lists the high schools from which players graduated and the college football programs to which they committed. However, 247Sports provides no information as to whether the player actually enrolled in the college to which he committed. To determine this, we match the 33,850 high school athletes from the 247Sports data set to CFBStats, a proprietary data set from SportsSource Analytics that tracks all Division I football players.[20] Our objective is to identify and compare ranked high school football players who successfully transitioned to a Division I roster after their senior season with those who did not. As noted, we refer to the latter players as "derailed." To identify derailed players, we proceed in two steps. First, we determine which of the 33,850 elite high school seniors in our data set

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[18] Note that unranked players can also enjoy NFL success, but very rarely do so, as shown by the "Other" category in Table 1.

[19] The starting year is 2005, since that is the first available year for collegiate roster data. The ending year is 2022 to allow for the player two years after high school to make it to a NCAA Division I roster.

[20] The matching process was long and tedious, requiring many iterations. Particular difficulties arose because many players shared names (9 named Jalen Williams, 8 named Chris Jones, and 8 named Chris Smith), and player names were not always spelled the same way (e.g., "DJ" versus "D.J."). In hundreds of cases, either 247Sports or CFBStats provided an incorrect spelling of the player's name.

cannot be matched with a Division I football program the following year. Second, for any unmatched players, we conduct Google searches to determine why they did not transition successfully to a college football program. Determining what happened to these players was relatively straightforward (although extremely time-consuming), because most of them had been prominent high school football stars.[21]

Our search revealed the existence of 932 players who were ranked 3-star or higher, were recruited by college football programs, and often even accepted offers (presumably made before a player's final high school grades were available) but were unable to attend because of academic or disciplinary problems.[22] The NCAA enforces strict admission rules for student-athletes, who must complete 16 NCAA-approved core courses in high school, graduate with a minimum core-course GPA of at least 2.30, and achieve a qualifying score on either the SAT or ACT.[23] Via Google searches, we determined that of the 932 derailed players, 772 failed to enroll in college due to academic issues, 118 experienced disciplinary problems, and 42 had a combination of the two. In the "disciplinary problems" category, we include both players who committed an untoward act (e.g., a crime for which they were arrested and convicted) before

[21] We searched using several combinations of the player's name, high school, hometown, committed university, and universities with scholarship offers, as well as various search terms such as "academics," "academic issues," "grades," "arrests," "football," and "recruiting," etc. The primary news sources include local newspapers, players' social media pages (primarily X or Hudl), and college fan websites and forums.
[22] There were an additional 1238 elite players who appear to have met college eligibility standards, but chose not to play college football, often playing another sport instead. We include them in our main data set, but their inclusion has no effect on our results.
[23] Student-athletes who met the GPA requirement but fell short on the test score could still qualify as "academic redshirts," allowing them to receive athletic scholarships and practice with the team during their first year. However, they were ineligible to compete until they met the academic progress standards. Since these players were immediately placed on a Division I college roster after high school graduation and appeared in the CFBStats data files, we excluded them from the sample of 932 players with academic and disciplinary issues.

enrolling in college, as well as a small number of players dismissed from their college team before the start of their first football season.

Table 2 groups our entire data set of 33,850 elite high-school players by star rating and by whether they "transitioned seamlessly" to college or were instead "derailed." Column 1 presents the full data set, showing the relative abundance of 3-star athletes versus 4-stars or 5-star players. Column 2 presents the set of players who transitioned seamlessly to Division I college football, which, not surprisingly, strongly resembles column 1, because it contains most of the players in our data set.[24] Column 3 presents the derailed players, who are slightly different. First, they are more heavily weighted toward 3-star players and less heavily weighted towards 5-star players, although not by a substantial amount.[25] Yet there are a small number of 5-star players among them – players possessing nearly a more than one-in-three chance of at least a year in the NFL, *if* they can achieve the standards necessary to gain entrance to one of the college programs eager to have them. The proportion of 4-star players is nearly as high as in the full data set, and even the 3-stars among the derailed have an average rating in the "mid" category, making them probable starters for an FBS program.[26] All of these 932 derailed players had received offers from FBS programs, conditional on their academic record, and many had actually committed to particular programs before being ruled ineligible. Such "derailment" was presumably *very* costly.

[24] Note that we include the 1238 "voluntary withdrawals" in the Column 2 grouping, as none of these represent "derailed" players per our online searches. We do so for conservatism, and the subsequent empirical tests are slightly sharper in distinguishing between "derailed" players and "seamless transition" players when we exclude "voluntary withdrawals" from the larger sample.
[25] The average numerical rating of the "derailed" players is 0.854 versus 0.857 for the "non-derailed" players.
[26] 247Sports divides its 3-star rankings into low (80-83), mid (84-86), and high (87-89). While a mid-3-star is projected as a starter for a top college football program, a low 3-star is likely a substitute or a starter for a lesser FBS program.

Failing to meet NCAA academic standards was not necessarily the end of the line for derailed players. High school football players who do not initially meet NCAA Division I eligibility requirements may turn to junior colleges (JUCOs) or military colleges as an alternative route. If they perform successfully academically as well as on the football field, they may find that they again receive college scholarship offers. But the path is not easy; successfully transferring from a JUCO to a Division I program usually requires multiple semesters of full-time coursework that leads to either an associate degree or roughly 48 transferable credit hours. They are required to maintain a minimum GPA of about 2.50 and to take classes in English, math, and science. In short, the challenge is substantial and as we will discuss later in this paper, the vast majority of derailed players fail to surmount it.

B. Attributes of High Schools and Neighborhoods

Our goal is to determine the relationship between school and neighborhood characteristics and the likelihood that a high school football star is derailed. Our primary data source (247Sports) provides the names and locations of the high schools attended. We draw high school attributes from *U.S. News Academic Insights*, which collects detailed statistics on high schools. We use the high school zip code to draw U.S. Census data for the defined zone.

U.S. News Academic Insights data

As of 2024, *U.S. News Academic Insights* tracked nearly 25,000 public high schools across the United States, assigning rankings to 17,760 of them. *U.S. News Academic Insights* has collected annual data on public high schools since 2007 but greatly expanded its coverage in 2019. *U.S. News Academic Insights* significantly changed its rating standards in 2019 to be more inclusive by decreasing the focus on standardized test scores. As a result, *U.S. News Academic Insights* no longer provides data from before 2019. Furthermore, it does not report comparable statistics for private high schools, such as prep or religious schools. Therefore, any players attending private or religious high schools will be excluded from analyses that use the high school measures (though from not from analyses using only the census measures), which affects a little more than 10 percent of the players in our data set.

U.S. News Academic Insights does not collect data directly from high schools; instead, it compiles information from sources such as state departments of education. Due to delays in how states release and verify standardized assessment results, the *U.S. News Academic Insights* high school rankings typically reflect data from two academic years earlier. This lag arises because most states publish official testing results several months after the school year ends—often in late fall—and the process of aggregating and validating data across all 50 states can extend into the following calendar year. Since the rankings are prepared for spring publication, the most recent dataset available as of early 2024 was from the 2021-2022 assessment cycle. Therefore, we will utilize the 2024 ranking (corresponding to the 2021-2022 assessment cycle) for our 2022 high school cohort, the 2023 ranking for our 2021 high school cohort, and so forth. Given that 2019 is the earliest year for which rankings are available, we use the 2019 rankings for our cohorts from 2005 to 2016 (i.e., all earlier years), as well as for the 2017 cohort.

Of the roughly 18,000 U.S. high schools for which the *U.S. News Academic Insights* provides a rating, about 6000 hosted an elite player between 2005 and 2022. A little more than 30,000 of the roughly 34,000 players in our data set attended a public high school. The mean public high school hosted 5.3 elite players (standard deviation of 8.4); the median hosted 2 elite players. Nearly 700 of these schools hosted 855 derailed players, which amounts to 2.8 percent of the total public-school players. Prep and religious schools not covered by *U.S. News*

Academic Insights account for the remaining 3500 elite players (4.5 per school, standard deviation of 8.6), about 2.2 percent of whom were derailed.

We will employ the following three *U.S. News Academic Insights* measures: i) high school ranking score between zero and 100, ii) the percentage of the high school's enrollment eligible for a reduced price or free lunch program, and iii) the percentage of students in each high school who are black (across all grades).[27] To gauge the stability of the three measures across the years, we compute the respective correlation coefficients for the 2019 and 2024 cohorts. The correlation coefficients are: 0.82 for School Ranking (15,226 observations), 0.98 for Percentage Black (17,873 observations), and 0.86 for Free Lunch Program (14,992 observations). Overall, these correlation coefficients are relatively high. Once we extend the analysis back to 2005 using data from the 2016-17 academic year, the correlation is likely lower, potentially creating measurement error that could bias regression coefficients towards 0.

U.S. Census data

Our second source of neighborhood measures is the U.S. Census, using a data set from IPUMS National Historical Geographic Information Systems (NHGIS). We use annual census data from 2005 to 2022 for the following three variables corresponding to the zip code of the player's high school: i) household median income (measured in 2022 dollars); ii) the percentage of households with a single head, and iii) the proportion of the neighborhood's population that is black.

[27] The high school score is based on weighting six school quality indicators: college readiness (30 percent), college curriculum breadth (10 percent), state assessment proficiency (20 percent), state assessment performance (20 percent), underserved student performance (10 percent), and graduation rate (10 percent).

C. Chetty and Hendren (2018b) counties

We will also employ the county-level mobility estimates developed by Chetty and Hendren (2018b), in order to explore whether derailed players are more likely to be found in low mobility counties. Our sample and theirs do not match perfectly: The Chetty and Hendren cohorts are children born 1980–1986 observed at age 26 from 2006 to 2012, while ours are high school students who graduated from 2005 through 2022. A high school graduate of 2005 might indeed have turned 26 in 2012, but most would have reached that age a decade or more later. If mobility changes dramatically over short periods, the use of Chetty and Hendren's data would be difficult to justify. Of course, neighborhood mobility that changes rapidly would be of less social concern. Therefore, if we can document economically and statistically significant differences among our players consistent with Chetty and Hendren's county measures, it speaks to both the underlying causal mechanisms of the associations we present using the neighborhood measures, and the broader usefulness of the Chetty and Hendren measures.

As discussed, our dataset consists of 33,850 elite football players, of whom 932 experienced academic-disciplinary issues that derailed their transition from high school to college. We match the player-level zip code data to counties and use Chetty and Hendren's online Table 2 to determine the county mobility measures.[28] We attach a county FIPS code to each recruit's high-school location to merge the Chetty–Hendren county place-effect series, and are able to link over 99 percent of both the elite players and the derailed elite players to a Chetty and Hendren county. Our 33,850 players are drawn from 1571 of the 2873 unique counties in the Chetty and Hendren data set. Interestingly, this means that 1302 counties do not contain any

[28] The source for the county causal effects is online_table2-2.xlsx available on Chetty's Opportunity Insights website in the Data Library section, labeled as "Preferred Estimates of Causal Place Effects by County." https://opportunityinsights.org/data.

elite players over the sample period, a fact that influences our subsequent empirical research methodology, as we will discuss.

Figure 1 provides a map of counties with at least one elite player (top) and at least one derailed player (bottom). Elite players appear to be least common in the more sparsely populated Great Plains. Derailed players seem to be most common in southern and eastern coastal areas, as well as in southern California. The patterns may hint at systematic differences in the environments that produce elite athletes, and their effect on derailment which we will explore.[29]

IV. SCHOOL AND NEIGHBORHOOD CHARACTERISTICS

We will begin our empirical analysis by estimating the association between high school and neighborhood measures and the likelihood of elite high school football players being derailed.

A. Descriptive Statistics

Table 3a presents descriptive statistics for the school and neighborhood variables, for the full data set (top panel) and for the set of derailed players (bottom panel). As compared to the full data set, derailed players went to high schools with average ratings 9.5 points lower (16 percent less), had 10 percentage points higher proportion of the student body eligible for free lunches (24 percent more), and in which black students made up an additional 10 percentage points of the student body (37 percent more). In neighborhoods that hosted derailed athletes, the average black proportion of the population was 8 percentage points higher (40 percent), the single-parent percentage was three percentage points higher (20 percent more), and the average median income was $10,000 lower (15 percent less). Finally, black players make up 69 percent of the full sample but account for 94 percent of the derailed sample.

[29] The clustering of elite and derailed elite players in Southern California, Arizona, and Nevada shown in the map partly reflects the large size of counties in the western United States.

A comparison of the mean values suggests substantial differences between the underlying environments of derailed players versus those of the full sample of elite football players. In all cases, the differences in means are highly statistically significant, with p-values less than 0.01. Because these high school and neighborhood variables are highly correlated, we will estimate their joint association with derailment.

B. Empirical Analysis

To examine the effect of the school and neighborhood variables on the likelihood that an elite high school athlete is derailed – fails to transition smoothly to college – we will estimate a probit model

$$(1) \qquad y_i = X_i\beta + \varepsilon$$

where *i* denotes a player. The variable y_i equals 1 if the player was derailed and 0 otherwise. We will estimate three versions of this equation: the first with the matrix X containing only the high school variables, the second with matrix X containing only the census variables, and the third with the matrix containing both sets of variables.[30] Before presenting the estimates, we should again point out that derailed players account for only about three percent of the observations in our sample (932 players in total), so we are asking a lot of our data. Our goal is simply to examine whether school and neighborhood quality are nonetheless significantly associated with the likelihood that a player falls into this unfortunate category.

[30] We estimate three versions of Equation (1) because the underlying data sources differ in coverage. *U.S. News Academic Insights* reports high-school characteristics only for public schools. In contrast, our Census variables are available for all ZIP codes, including those corresponding to private schools. Estimating separate models allows us to use the full sample of players when possible (Census-only specification), while also examining the school-level variables in the subsample for which they are available.

Table 4 displays the marginal effects and standard errors from the probit estimations; we report the full probit estimations including the coefficient estimates and confidence intervals in the Online Appendix. The first column shows the results of an estimation that includes only the high school measures. All three estimated marginal effects are statistically significant at the five percent level or better. Each of the three estimates is small in magnitude and the same is true for the marginal effects in the second two columns. For example, a 1-point increase in the U.S. News rating (which ranges from 0 to 100) is associated with a 0.01 percentage point decrease in the derailment likelihood. But while these estimates may seem "small", one should keep in mind that the overall probability of a player being derailed is only 2.75 percent.

A sensible way to calculate the magnitudes is to scale the marginal effects in Table 4 by the standard deviations shown in Table 3a. Beginning with the marginal effects of the high school variables shown in columns 1, a one-standard deviation increase in the U.S. News high school score implies a 0.35 percentage point decrease in the likelihood of being derailed, equal to nearly 13 percent of the mean derailed proportion of 2.75 percent. Similarly, a one standard deviation increase in the percent of students eligible for free lunch implies a 0.56 percentage point increase in the probability of being derailed, while a one standard deviation increase in the proportion of the student body that is black implies a 0.45 percentage point increase in the probability of derailment. Column 2 shows the marginal effects of the census variables. A one standard deviation increase in the proportion of the neighborhood that is black and in median income leads, respectively, to a 0.63 percentage point increase and a 0.66 percentage point decrease in the likelihood of a player being derailed. The proportion of single-parent households does not contribute in a statistically significant way to the likelihood of derailment, although it is highly correlated with the other two variables.[31] Column 3 combines the high school and census measures in a single probit estimation. The largest and most significant change in the marginal effects of the various variables is with the neighborhood proportion of black residents. The sign of this variable actually switches and the statistical significance disappears, which is not surprising considering that its correlation with the proportion of high school students who are black is 0.81.

In short, there is a strong, statistically significant association in the expected direction between school and neighborhood characteristics and the likelihood that an elite high school player will be derailed. As discussed earlier, we make no claims of causality but note that the less desirable the school and neighborhood characteristics, the more likely it is to produce a derailed player. These patterns hold whether we rely solely on school measures (available only for public schools), solely on neighborhood measures (available for all players), or the combined specification in Column 3.

V. CHETTY AND HENDERN MOBILITY MEASURES

We now turn to the county causal mobility estimates developed by Chetty and Hendren (2018a, 2018b), in order to examine their implications for the emergence and derailment of elite high school football players. If we are indeed picking up the influence of the neighborhood on the likelihood that an elite high school football player advances to college (and as noted, all of the derailed players had offers from major college football programs), one might expect the level

[31] See the Online Appendix for the correlation matrix. In a univariate regression, the coefficient on single-parent households is highly statistically significant. Moreover, the economic significance is also high as a one standard deviation increase in the percentage of single-parent households implies a 0.84 increase in the derailment probability, over 30 percent of the baseline derailment rate. The sign change for the single-parent household variable and the loss of its statistical significance is likely due to its high multicollinearity with the other two Census variables in Column 2.

of economic mobility in the neighborhood to influence that likelihood in at least two ways. First, the lower the level of economic mobility, the fewer alternatives an athlete has to improve his lot, and the greater the incentive to develop his football skills. This logic suggests that a player from a low mobility area will invest more intensively in developing his sporting skills than a player with a similar endowment of athletic talent in a higher mobility area. We will call this the "investment effect." However, there is also the direct effect of the factors that create a low mobility environment: poor-quality schools, high rates of single parenthood, and low levels of human capital accumulation. All else equal, a high school student growing up in a resource-poor environment will be less likely to develop the skills necessary to advance to college, even if he has more than adequate athletic talent. We will call this the "resource effect." We posit that due to the investment effect, we will find more highly rated athletes emerging from lower mobility areas than from higher mobility areas.[32] But due to the resource effect, we expect the very lowest mobility neighborhoods to be home to the high school football stars who have the most difficulty advancing to college despite elite ability.

A. Descriptive Statistics

Table 3b presents the descriptive statistics for the sample based on Chetty and Hendren's (2018b) county mobility data, with each observation now a county rather than a player. As our principal measure, we will employ the percentage gain (or loss) in annual household income for all children based on 25th percentile parent income.[33] The larger the measure, the greater the mobility.

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[32] Indeed, stories about athletes from poor communities overcoming tremendous obstacles to become sports stars are legion.

[33] We test the robustness of our results by also investigating the "boys only" version of the same measure. The apparent advantage of the latter is that our sample consists entirely of boys; however, use of the "boys only" measure reduces the number of counties in our sample by about 140. We will present results using the "all children" measure but note that those using the "boys only" measure are qualitatively

The top panel of Table 3b includes the full set of 2873 counties from the Chetty and Hendren (2018b) data set. The average county hosted nearly 12 elite players and one-third of a derailed player. The mean causal effect value for "all children" at the 25^{th} percentile is 0.23, with a standard deviation of 0.53. Thus, spending one more year in the average county increases the child's annual income at age 26 by 0.23 percent relative to the national mean.[34]

The sample described in the middle panel of the table includes only the 1571 counties that produced at least one elite player from 2005 through 2022. The mean number of elite players per county jumps to 21, while the number of derailed players roughly doubles to 0.6. The mean value for the county mobility measure drops substantially from 0.23 to 0.06, indicating that elite players come from lower-than-average mobility counties.

Lastly, the sample described at the bottom panel of Table 3b includes only the 363 counties that hosted at least one derailed player. The number of elite players is substantially higher still, at nearly 70 per county. And so is the number of derailed players, which jumps to 2.56 per county. In these counties, mobility is even lower – the mean values of the mobility measures is -0.18, implying that each year spent in the county by children *reduces* expected income as adults by 0.18 percent.

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similar. Chetty and Hendren (2018b) also provide several other measures of county causal effects. They focus on the relation between the family's household income when the child is living at home and the child's subsequent income at age 26. They document a linear relation between the parent's and the child's household income and therefore focus on children growing up with parents at the 25th and 75th percentiles of the household income distribution. Based on the linear relation, they conclude that their estimates correspond to the average outcomes of children in below-median ($p < 50$) and in above-median ($p > 50$) families.

[34] Note that Chetty and Hendren (2018b) estimate the causal effects based on the percentile ranks (for both parent household income and for subsequent child household income) as opposed to using the respective incomes. Also, it might seem odd that the average county mobility estimate is positive relative to the national mean, but this is because the national mean is a value-weighted estimate across all 2873 counties.

B. Empirical Analysis

We will begin by transforming Chetty and Hendren's cardinal "25th percentile, all youths" mobility measure into an ordinal measure, by ranking counties from lowest to highest mobility level; the higher the mobility in a county, the higher the rank. Chetty and Hendron provide mobility estimates for 2873 counties, over 90 percent of all US counties, and we rank those counties from 1 (lowest mobility) to 2873 (highest mobility). We calculate the total number of ranked players and the total number of derailed players produced by each county and match them to the rankings. A notable feature of the county-level data set is that 45 percent of all the Chetty and Hendren counties produced *no* elite football players (3-star or higher) between 2005 and 2022 (the span of our data set). We will therefore compare three sets of counties for the 2005-2022 period: i) counties with at least one derailed player; ii) counties with at least one elite player; and iii) counties with *no* ranked players.

We begin with the histograms shown in Figure 2. In each case, counties are ranked from lowest mobility to highest mobility. The top histogram includes only counties that produced at least one derailed player. As can be seen, the distribution of players is skewed the left, with the mass of the players in the lowest mobility decile counties. The middle histogram includes only counties that produced at least one elite football player. The distribution is again skewed to the left – that is, weighted the lower mobility counties – although not nearly as pronouncedly as counties that produced derailed players.[35] Finally, the bottom histogram includes only that set of counties that produce no elite high school football players. These counties are skewed to the

[35] There is overlap between the two, because not only must a player be "elite" (3-star or above) to be counted as derailed, but any county that produced a derailed player also produced non-derailed elite players.

right – with the mass in the highest mobility counties. The patterns displayed are consistent with both the posited investment and resource effects.

The histograms in Figure 2 highlight clear differences in the mobility distribution across county types, particularly the heavy concentration of derailed-player counties in the lowest-mobility ranges. To quantify these patterns more precisely, we first divide counties into mobility deciles, and then examine how counties and players alike are distributed within the deciles. The deciles run from 1 (lowest mobility) to 10 (highest mobility). We group the mobility estimates by deciles for two primary reasons: (a) by averaging across groups, we reduce the influence of estimation error in the noisy mobility estimates and (b) to allow for a non-linear relation between our player (elite and derailed) counts and the mobility distribution.

Table 5a shows the number of counties in each mobility decile by three categories: at least one elite player, at least one derailed player, and no elite players (which means no derailed players, either). As one moves from the lowest mobility decile 1 to the highest mobility decile 10, the number of counties producing at least one elite player declines monotonically, with a huge difference in county numbers at the extreme deciles (there are 230 counties in Decile 1 versus 65 in Decile 10). The number of counties with at least one derailed player also declines monotonically and falls to 0 in the highest mobility decile. As for counties that host *no* elite high school football players, the pattern reverses itself nearly exactly from what we see in column 1: the number of counties producing no elite players rises from 57 in Decile 1 to 225 in Decile 10.

Table 5b presents the data by number of players instead of by number of counties. The number of elite players per decile declines nearly monotonically as mobility rises, and with 7788 elite players in Decile 1 versus 121 in Decile 10 – that is to say, a decline by a factor of more than 60. The same pattern holds for the derailed players, with 253 in the lowest mobility decile and no players at all in the highest mobility decile. The third column in the table shows the derailment rate, which declines fairly steadily as the decile mobility levels increase.

While the patterns in Figure 2 and Tables 5a and 5b are compelling, the underlying county-level data reveals significant variation. To address this, we employ a hurdle model—a two-part framework comprising a binary response model and a truncated-at-zero count model (Mullahy 1986). Estimating a hurdle model allows the zeroes and the positive counts to be generated by separate processes, with positive count values being those that surmount the zero-threshold "hurdle."[36] The hurdle model can be expressed as

$$(2) \qquad P(\mathrm{y}) = 0 = f_1(0) = p$$

$$P(\mathrm{y}=i>0) = (1-p)\, f_2(i) \,/\, [1-f_2(0)] = (1-\mathrm{p})\, f'_2(i)$$

where f_1 and f_2 are probability density functions. Density function f_1 represents the probability of clearing the hurdle while f'_2 represents the truncated normalization of f_2. Consequently, f_1 dictates the initial hurdle process while f'_2 regulates the resulting count process for all values that surpass the threshold.

We will employ a logit model in our first stage and a zero-inflated negative binomial model in our second stage.[37] In each case, our covariates will be the county mobility deciles. The logit model will estimate how the probability that a county produces at least one player of the relevant type (elite or derailed) changes as we move up the mobility deciles. The zero-truncated negative binomial model (ZTNB) measures how the *number* of players changes as we climb the mobility deciles, given that at least one player was produced in the given county.

[36] The threshold can in fact be any value, but it is often set at zero.
[37] Our data is over-dispersed (the variance is greater than the mean, as Table 3b shows), making the negative binomial model preferable to a Poisson model, the principal alternative.

Table 6 presents the results from our county-level hurdle model estimations. Columns 1 and 2 report results for the total elite players and Columns 3 and 4 report results for derailed players. All specifications adjust for county populations to account for differences in scale across counties (all else equal, larger populations may be expected to produce more elite players). The elite-player specifications use the full sample of counties and are estimated relative to the highest mobility decile (Decile 10). The derailed player specifications restrict the sample to counties that produced at least one elite player (derailment can only occur if there is at least one elite player in a county). Because no counties in the highest mobility decile produced a derailed player (as shown in Table 5), deciles 9 and 10 are combined as the baseline category to achieve model convergence.

We begin with the elite player estimations. The logit estimates are in column 1. Counties in the lowest mobility decile are 27 percentage points more likely to produce at least one elite player than counties in the highest mobility decile. The probability falls to 19 percent and 13 percent for deciles 2 and 3 (i.e., as mobility rises), and then settles at roughly 0 thereafter. Evidently, the probability of producing an elite player does not change substantially once we are above the third mobility decile (which, looking at Figure 1, is not entirely surprising). Nonetheless, the logit results indicate that, as shown in Figure 2 and Table 5, elite player production tends to be focused in low-mobility counties.

Column 2 lists the Zero-Truncated Negative Binomial (ZTNB) marginal effect estimates for elite players. Counties in Deciles 1 through 8 produce significantly more elite players than counties in the highest mobility decile, with a difference not statistically significantly different from 0 for Decile 9. The magnitudes can be large – the average county in the lowest mobility decile produces nearly 24 more elite players than the average county in the highest mobility decile, conditional on producing at least one elite player – but decline steadily as mobility rises, a pattern consistent with the proposed investment effect. When economic mobility is low, alternative paths to advancement are limited, increasing incentives to invest in football-specific human capital.

We then conduct the analysis for derailed players, now restricting the estimation to counties that produced at least one elite player. It should be noted that the magnitudes of the marginal effects cannot be compared to those of the elite players, because the derailed players estimates are relative to the 9th and 10th deciles combined, while the elite player estimates are relative to the 10th decile only. The logit results in Column 3 show that the probability of producing at least one derailed player is sharply higher in low-mobility counties. A county in the lowest mobility decile is 32 percentage points more likely to produce a derailed player than counties in the combined two highest mobility deciles. The likelihood of derailment declines fairly steadily as mobility rises. The fact that *no* counties in the highest mobility decile produced a derailed player underscores the strength of the underlying gradient.

Column 4 reports the ZTNB results for derailed players, estimated on the 363 counties that produced at least one derailed athlete. Counties in the lowest mobility decile produce an average of 1.8 more derailed players than high-mobility counties, conditional on producing at least one derailment, and the estimate is highly statistically significant. Deciles 1 through 6 exhibit positive and economically meaningful effects, while estimates for Deciles 7 and 8 are smaller and not statistically distinguishable from zero relative to the baseline of deciles 9 and 10. These results again indicate that low-mobility counties are not only more likely to produce a derailed player, but also produce them in greater numbers per county.

While Table 6 establishes that derailment is substantially more common in low-mobility counties, it does not directly address whether derailment changes relative to the number of elite players produced in a county. In particular, the patterns documented above could reflect either a higher absolute number of derailed players or simply greater elite-player production overall. In order to explore the proposed resource effect, we examine derailment as a *proportion* of elite players.

Table 7 reports results from an OLS regression of the percentage of elite players in a county who are derailed on the county mobility deciles. The estimated coefficients decline sharply as mobility increases. The derailment rate falls by roughly half between the lowest mobility decile and the middle of the distribution, and continues to decline thereafter. Although statistical significance is concentrated in the lowest deciles, the loss of significance reflects shrinking point estimates rather than rising uncertainty, as standard errors are similar across deciles. These results suggest that structural disadvantages in low-mobility environments impede academic progression even after accounting for the greater production of elite athletes via the investment effect.

VI. THE PATH FOLLOWING DERAILMENT

Our paper has documented that elite football players who failed to transition successfully from high school to an FBS program came disproportionately from disadvantaged neighborhoods and low mobility counties. This section examines their paths afterwards. First, we explore the subset of derailed players who attempted to meet university requirements (and thereby make it to an FBS program), either via a junior college (JUCO), a post-graduate school, or some other academic route. Second, we investigate the NFL success rates of derailed players who did eventually make FBS rosters.

Not surprisingly given their status as 3-5 star players, the majority of the 932 derailed players attempted to remedy their academic shortcomings. Nearly three-quarters of the derailed players enrolled in a JUCO, while a little more than 10 percent opted to attend a post-graduate school, often a military academy. Given that 247Sports tracks elite football players who are in JUCO or at a post graduate school, it was relatively straightforward to identify these 781 players.[38] Of the residual 151 players who chose not to attend either JUCO or post-graduate school, a handful took remedial courses at their intended university and were able to join a FBS team the following season, or the season afterwards. As for the rest, we were able to find little information, other than that they never managed to play for an FBS program.

Derailed athletes who went to a military academy or other type of post graduate school fared best, with 68 percent (65 of 96 players) eventually transitioning to an FBS program. Of those who attended JUCO, only 36 percent made it to an FBS roster. The difference is not entirely surprising: Those enrolled in post-graduate programs may have had relatively better academic preparation, or simply have been more disciplined (or more willing to be disciplined). In all, 351 of the 932 derailed players, eventually landed on a FBS team. Thus, the derailment was permanent for a supra-majority of derailed players.

The damage went further: Even those derailed players who eventually succeeded in making an FBS roster reached the NFL at lower rates than similarly rated players who transitioned to college immediately after high school. As shown in Table 1 earlier in this paper,

[38] Several of the derailed players who started at a post-graduate school for a year, switched to a JUCO for their second season after high school. Also, for many of the players who started at JUCO, it took two years, instead of one, to successfully transition to a FBS program.

6.4 percent of elite (3-to-5-star) players managed at least one season in the NFL, with the highest rates among the 5-star players and the lowest among the 3-stars. Table 2 showed that the set of derailed players (as compared to players who went straight to college) was slightly lighter in 5-star and 4-star players and slightly heavier in 3-star players.[39] Adjusting for those differences, we calculate that if the derailed players had reached the NFL at the same rates as non-derailed players, 55 of them (5.9 percent) would have enjoyed at least one NFL season, presumably at an annual salary of close to one million dollars. Restricting the sample to the 351 derailed players who eventually reached an FBS roster, and applying the same assumption, we predict that roughly 22 of these players spent at least one year in the NFL. In practice, outcomes fall well short of that benchmark: across the full sample of 932 derailed players, only 13 ultimately appeared on an NFL roster. This gap underscores the substantial cost of derailment. Even when athletic ability provides a credible second chance, background disadvantages appear to continue shaping outcomes in ways that limit access to the highest levels of collegiate and professional football.

VII. CONCLUSION

This analysis began with a straightforward question: Why do some of the most talented high school football players fail to transition to major college football programs despite extensive interest from college teams and evident ability?[40] Such players are acutely aware both of the

[39] In addition to providing the star rating, the 247 Sports Composite provides a numerical rating for each elite athlete. The average numerical rating of the derailed sample of 932 players was 0.854 versus 0.857 for all elite athletes, thus a very small difference and hence not explanatory regarding the eventual success in the NFL.

[40] Our original objective was not to study derailed football players. Rather, as part of a large database effort to track all FBS football players, we were having difficulty matching a sample of FBS football players to a separate sample of elite high school football players, and we quickly realized that derailment was too often the culprit. We then set out to understand why.

value of their human capital and of what they need to do to cash in on it – something that is patently untrue of their non-athlete peers. Yet failures occur, and are correlated with factors specific to the neighborhoods the players grow up in, such as bad schools, low income levels, and high levels of segregation, all of which may be expected to contribute to low levels of mobility.

We posit two mechanisms that link low-mobility areas to the production of elite football players, and (for some of them) their subsequent derailment. First, we document an "investment effect": where few alternative channels to upward mobility are apparent, children invest more heavily in athletics, which provides a clear path to improved fortunes. As a result, low-mobility counties produce a disproportionate number of elite football players. Second, we document a resource effect: low-mobility counties are plagued by bad schools and bad neighborhoods, which hinder the development of the skills needed to make it to college. As a result, as mobility falls, the proportion of elite players who end up derailed increases.

Note that we should not overstate the phenomenon; only about 3 percent of the 33,350 players in our sample experienced derailment. Nonetheless, that it occurs even as frequently as that, given the rewards for success are so clear and so bountiful, illustrates the size of the barriers faced. How much more must such barriers influence those for whom the stakes are smaller or less clear, as is more usually the case? And how many talented children are held back as a result?

Some commentators have argued that children in disadvantaged neighborhoods overinvest in sports at the expense of academics. That indeed may be true, but our evidence points to an alternative possibility; rather than being a "mistake", an intense emphasis on athletics may be a rational response to a situation that presents few other paths to success. In other words, the problem is not so much the focus on sports as the absence of alternative means upwards in low-mobility communities.

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Table 1: Star Ratings and NFL Success (2005-2024)

	% >=1 Year Played	% >=3 Years Played	% >=5 Years Played
5-star	33.9	24.2	15.7
4-star	13.2	9.1	5.1
3-star	4.5	2.8	1.6
3-5 star	6.4	4.2	2.4
Other	0.10	0.06	0.04

Notes: Star ratings from 247Sports, 2005-2022 for 33,850 high school seniors. NFL data source is Pro Football Reference (Sport Reference, LLC) which tracks all NFL players. We focus on players who played at least part of one year in the NFL between 2008 and 2024. A total of 6667 NFL players met the requirements. We match these 6667 NFL players to the 33,850 football players in our 247Sports dataset with a three, four, or five-star rating during 2005 through 2022. The table displays the proportion of players who made it to the NFL level by each star rating. For example, there were a total of 587 five-star players: 33.9% played at least one season in the NFL, 24.2% played at least three seasons, and 15.7% played at least five seasons. The "Other" category consists of high school football players who made it to the NFL without a three, four, or five-star rating.

Table 2: Star Ratings by Enrollment in College Football Programs

	Total Elite Players	Transitioned Seamlessly	Derailed: Academic / Disciplinary Problems
5-star	587 (2%)	583 (2%)	4 (0.4%)
4-star	5,703 (17%)	5,561 (17%)	142 (15%)
3-star	27,560 (81%)	26,774 (81%)	786 (85%)
Total	33,850 (100%)	32,918 (100%)	932 100%

Notes: This table displays the distribution of 33,850 elite football players by star rating and by college enrollment outcome. The first column displays the full sample of 33,850 players by their rating status. The second column displays the players who “transitioned seamlessly” to a Division I roster immediately after high school. We include the 1238 “voluntary withdrawals” in this column; omitting these players has no impact on the overall conclusions reached. The third column displays the “derailed” players by star rating status.

Table 3a: Descriptive Statistics (School and Neighborhood Measures)

Full Data Set					
Variable	*Mean*	*Stdev*	*Min*	*Max*	*#Obs*
U.S. News					
High school score	60.91	27.12	0.26	99.92	28,063
Proportion free lunch	0.42	0.25	0	1	26,753
Percent black	0.27	0.28	0	1	28,549
Census tract (zip code)					
Percent black	0.20	0.23	0	1	33,603
Percent HH single parent	0.15	0.08	0	0.96	32,837
Median income (‘000s)	67.2	31.2	9.0	250.0	33,586
247Sports					
Percent players black	0.69	0.46	0	1	33,850
Derailed players only					
Variable	*Mean*	*Stdev*	*Min*	*Max*	*#obs*
U.S. News					
High school score	51.44	28.20	1.56	99.10	812
Percent free lunch	0.52	0.26	0	1	773
Percent black	0.37	0.30	0	1	821
Census tract (zip code)					
Percent black	0.28	0.25	0	1	932
Percent HH single parent	0.18	0.09	0	0.96	927
Median income (‘000s)	57.1	25.3	9.0	189.3	931
247Sports					
Percent players black	0.94	0.24	0	1	932

Notes: Table 3a reports descriptive statistics for high school and neighborhood variables for the full sample of 33,850 elite high-school football players and for the subset of 932 players who were derailed due to academic or disciplinary issues. All variables labeled as “Proportion” are measured on a 0–1 scale. High-school characteristics are drawn from *U.S. News Academic Insights* and include the school ranking score, the proportion of students eligible for free lunch, and the proportion of Black students. Neighborhood characteristics correspond to the ZIP code of the player’s high school and include the proportion Black, the proportion with single-parent household, and the median income (in real dollars). The final row in each panel reports the racial composition of players in the 247Sports dataset. Our comparisons between the full sample and the derailed subset show that derailed players attended significantly lower-rated schools, with higher proportions of low-income and Black students, and came from neighborhoods with lower median incomes and higher proportions of Black and single-parent households.

Table 3b: Descriptive Statistics (County-level Measures)

Variable	*Mean*	*Stdev*	*Min*	*Max*	*#Obs*
Full Set of Counties					
Number of elite players	11.6	49.3	0	1001	2873
Number of derailed players	0.32	1.49	0	39	2873
P25 income – all youths	0.23	0.53	-1.86	2.03	2873
Counties with at Least One Ranked Player					
Number of elite players	21.3	65.2	0	1001	1571
Number of derailed players	0.59	1.98	0	39	1571
P25 income – all youths	0.06	0.47	-1.10	1.84	1571
Counties with at Least One Derailed Player					
Number of elite players	69.6	122	1	1001	363
Number of derailed players	2.56	3.46	1	39	363
P25 income – all youths	-0.18	0.37	-1.10	0.80	363

Notes: Table 3b reports descriptive statistics for county-level variables from Chetty and Hendren's (2018b) causal place effects dataset. The first panel includes all 2,873 counties for which Chetty and Hendren report mobility measures; the second restricts the sample to the 1,571 counties that produced at least one 3- to 5-star high school football player between 2005 and 2022; and the third restricts to the 363 counties that produced at least one derailed player. "P25 income" denotes the estimated causal effect of spending an additional year in the county on a child's expected income at age 26, expressed as a percentage difference relative to the national population-weighted mean. The panel shows that counties producing elite players, and especially those producing derailed players, have substantially lower average mobility levels than the full set of U.S. counties

Table 4: Probability of Being Derailed (Probit Analysis)

Dependent variable = 1 if Player is Derailed and 0 Otherwise			
Variables		Marginal Effects	
	(1)	(2)	(3)
High school score	-0.0001**		-0.0001**
	(.00005)		(.00005)
Percent free school lunch	0.0221***		0.0143**
	(.005)		(.006)
Percent students black	0.0167***		0.0200***
	(.004)		(.006)
Percent neighborhood black		0.0227***	-0.0054
		(.005)	(.008)
Percent single parent HH		-0.0079	-0.0065
		(.016)	(.018)
Median income (‘000s		-0.0027***	-0.0002***
		(.00004)	(.00005)
Psuedo-R2	.022	.018	.026
# obs	26,298	32,830	25,577

Notes: Table 4 reports the marginal effects from probit estimations of Equation (1), where the dependent variable equals 1 if an elite player was derailed and 0 otherwise. Column (1) includes only school-level variables from *U.S. News Academic Insights*; Column (2) includes only Census variables at the ZIP-code level; and Column (3) combines both sets of measures. All “proportion” variables are scaled from 0 to 1. Standard errors are reported in parentheses.

Table 5a: Number of Counties by Decile, Lowest (1) to Highest (10) Mobility

	Total counties with one or more elite players	Total counties with one or more derailed players	Total counties with no elite players
Decile 1	230	91	57
Decile 2	228	84	59
Decile 3	209	59	78
Decile 4	181	45	106
Decile 5	157	29	130
Decile 6	146	21	141
Decile 7	135	14	152
Decile 8	110	13	177
Decile 9	110	7	177
Decile 10	65	0	225
Total	1571	363	1302

Notes: This panel reports the number of counties falling into each mobility decile, where decile 1 represents the lowest-mobility counties and decile 10 the highest, based on the ordinalized Chetty–Hendren (2018b) P25 mobility measure. The panel distinguishes among counties that produced at least one derailed player, at least one elite (3–5 star) player, and no elite players. Consistent with the histogram patterns in Figure 2, counties hosting derailed players are heavily concentrated in the lowest mobility deciles, while counties with no elite players are disproportionately found in the highest mobility deciles. Counties producing elite players are distributed between these two extremes, with a noticeable tilt toward the lower-mobility end of the distribution.

Table 5b: Number of Players by County Deciles, Lowest (1) to Highest (10) Mobility

	Total elite players	Total derailed players	Derailment rate
Decile 1	7788	253	3.25%
Decile 2	6990	239	3.42%
Decile 3	4948	160	3.23%
Decile 4	4670	127	2.72%
Decile 5	2626	53	2.02%
Decile 6	2839	49	1.73%
Decile 7	1225	19	1.55%
Decile 8	1330	20	1.50%
Decile 9	900	8	0.89%
Decile 10	121	0	0.00%
Total	33,437	928	2.78%

Notes: Panel b reports the number of elite players and derailed players in each mobility decile, where Decile 1 represents the lowest-mobility counties and Decile 10 the highest, using the ordinalized Chetty–Hendren (2018b) P25 mobility measure. The table shows that both elite and derailed players are disproportionately drawn from low-mobility counties, but the concentration is much stronger for derailed players.

Table 6 Total Elite and Derailed Players by Decile (Marginal Effects)

	Elite Players		Derailed Players	
Dep Variable	Logit	ZTNB	Logit	ZTNB
Decile 1	0.271***	23.56***	0.321***	1.78***
(*lowest mobility*)	(0.035)	(2.75)	(0.035)	(0.34)
Decile 2	0.186***	16.58**	0.259***	1.65***
	(0.038)	(2.19)	(0.38)	(0.31)
Decile 3	0.127***	14.93***	0.201***	1.82***
	(0.038)	(2.18)	(0.37)	(0.40)
Decile 4	0.021	9.57***	0.153***	1.25***
	(0.037)	(1.90)	(0.37)	(0.33)
Decile 5	-0.044	5.32**	0.088**	0.62**
	(0.036)	(1.70)	(0.36)	(0.28)
Decile 6	-0.042	6.98***	0.064*	1.12***
	(0.036)	(1.84)	(0.36)	(0.42)
Decile 7	-0.038	5.80***	0.050	0.23
	(0.036)	(1.82)	(0.37)	(0.25)
Decile 8	-0.090	5.66***	0.043	0.33
	(0.035)	(1.88)	(0.038)	(0.28)
Decile 9	-0.001	1.59		
	(0.036)	(1.64)_		
# obs	2873	1571	1571	363

Notes: Table 6 reports the marginal effects from logits and zero-truncated negative binomial (ZTNB) regressions estimating the association between county-level mobility deciles and the number of elite players and derailed players produced in each county, adjusted for population (log population in both the logit and ZTNB model). The first (second) two columns report the marginal effects from the logit and ZTNB estimations for the elite (derailed) players. The first logit estimation includes the full set of counties, and the second logit estimation includes only counties that produced at least one elite player (because derailed players are a subset of elite players). When the logit is estimated on derailed players, deciles 9 and 10 are combined, because decile 10 did not produce a single derailed player (see Table 5). The ZTNB regressions are estimated on the set of counties that hosted at least one elite or one derailed player, respectively. Because the highest mobility decile(s) serve as the omitted category, the marginal effects reflect the estimated difference in the expected count of players relative to the highest-mobility counties. Standard errors are in parentheses. *** = statistically significantly different than 0 at 1 percent; ** = at 5 percent, and * = at 10 percent.

TABLE 7: Proportion of Elite Players Derailed by Decile

(Counties that produced at least one elite player)

Dep var: percentage of total elite players derailed by county

Decile 1	0.050***
(*lowest mobility*)	(.014)
Decile 2	0.043***
	(.014)
Decile 3	0.035***
	(.014)
Decile 4	0.022
	(.014)
Decile 5	0.022
	(.014)
Decile 6	0.019
	(.015)
Decile 7	0.017
	(.015)
Decile 8	0.015
	(.015)
Decile 9	0.013
	(.015)
R2	.021
# obs	1571

Notes: Table 7 reports the coefficient estimates from an ordinary least squares regression examining the relation between county-level mobility deciles and the proportion of derailed players within the sample of elite players in each county, using the subsample of 1571 counties that produced at least one elite player between 2005 and 2022. The explanatory variables are the mobility deciles 1 through 9, with the highest mobility decile (Decile 10) omitted. Standard errors are in parentheses. *** = statistically significantly different than 0 at 1 percent; ** = at 5 percent, and * = at 10 percent.

Figure 1: Counties with Elite and Derailed Players (Mainland U.S.)

Top panel: counties with at least one elite player. Bottom panel: counties with at least one derailed player.

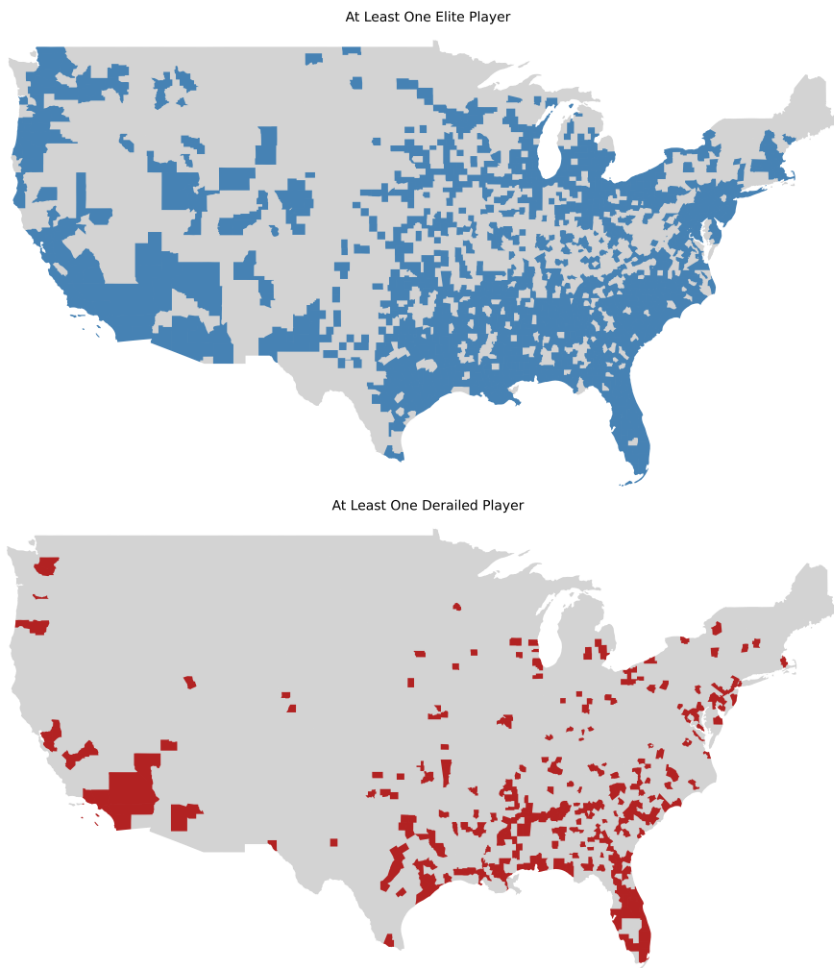

Figure 2: Mobility Rank Histograms

Histograms of county mobility rank for: (i) counties with ≥1 derailed player, (ii) counties with ≥1 elite player, and (iii) counties with no elite players.