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The Effects of College Education on Career Earnings in the NBA

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ABSTRACT. The purpose of our research is to investigate whether the high school basketball player is better off attending or forgoing his college career to enter the NBA directly out of high school. We measure "better off" by total salary earned in the first ten years of a player's NBA career. Using both OLS and a Heckit model, to control for possible sample selection bias, our results suggest that although college is an investment period for athletes, rational athletes do understand the opportunity cost of each year spent in college, with the most talented players forgoing their college education altogether. (J30, J44, J50).

I. Introduction

In 1995 the Minnesota Timberwolves drafted Kevin Garnett out of Farragut Academy (high school). The selection of Garnett changed the nature of the NBA draft, creating a dilemma for both players and NBA teams.[1] This new dilemma was whether potential NBA players should forgo their college education and immediately start their professional careers with the possible payoff of a lucrative contract, or continue to play college ball for free, investing in valuable human capital in the process.[2] On behalf of the NBA teams, this draft development created a new dimension of decision-making and increased risk. By drafting a player directly out of high school, teams were betting on highly uncertain potential talent.

Young men experience some of the greatest changes in their athletic development during their college years. A percentage of athletes reach their potential during college years, while many potential superstars never reach expectations for a plethora of reasons including injuries, burnout, personal and family problems, academic difficulties, and substance abuse.

Compounding this problem is the reality that with only two rounds

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in the NBA draft, in order to draft a player out of high school, teams must forgo a talented player who has reached his athletic potential in college and could immediately contribute at the NBA level. Developmentally, the high school athlete may be years away from being competitive at the NBA level. But on the flip-side, if a team decides to draft talent that has been developed over the course of a college career instead of potential high school talent, they risk losing the top talent available, as evidenced by the Minnesota Timberwolves drafting Kevin Garnett and Charlotte drafting Kobe Bryant.

Li and Rosen (1998) explain that for firms facing asymmetric information about potential employee performance, if an unraveling mechanism becomes part of employment contracts, firms become less risk adverse and have an opportunity to hire potentially riskier employees. Grossthuis, Hill, and Perri (2007) apply the theory of contract unraveling to NBA firm behavior. They demonstrate that with the change in league policy to lengthen rookie contracts from 2 years to a 4th year option, with the accompanying league-controlled pay scale, individual teams have an incentive to engage in riskier behavior regarding their rookie draft picks. They demonstrate empirically that teams have engaged in drafting potentially risker prospects since the change in the league contracts. While previous studies have focused on incentives for the management of NBA teams, by contrast, our study instead focuses on the behavior of the athlete, particularly, high school prospects facing an optimization decision of when to declare oneself eligible for the NBA draft.

For the potential athlete, the decision to forgo college basketball and declare eligibility for the NBA draft has personal implications. During a player's college career, he is under the tutelage of some of the greatest development coaches in the country; is able to hone his fundamental skills such as shooting, ball handling, rebounding and defense by playing against much higher caliber competition than experienced in high school; and has the opportunity to develop his intuition and understanding of game dynamics.

The college years are when student athletes have an opportunity to develop their human capital and acquire social capital. Most importantly, for most college basketball players, their athletic scholarship provides them the opportunity to earn a college degree, which will aid their career development outside of basketball – a likely necessity for most college athletes.[3]

But each year of development in college is not free. The opportunity cost for the student athlete is potentially enormous. Instead of playing in college for no salary, each year the potential star could be making millions of dollars in the NBA. Also, each season the student athlete plays college hoops, the athlete is exposed to potential career-ending injuries.

The purpose of our research is to ask whether the high school basketball player is better off going to college and developing his professional skills, including human and social capital, or forgoing his college career to enter the NBA directly out of high school. We employ a narrow definition of "better off" as a higher total salary in the first ten years of a player's NBA career. A ten year cutoff was required for data reasons, and will be explained later. We include only those players who actually entered the NBA, as opposed to high school and college athletes who were not successful in their attempts to play NBA basketball. Ten years of earnings in the NBA are used to compare the success of players drafted out of high school to those drafted out of college.

II. Background

Pay in any profession is determined by three primary variables: the skill set the employee brings to the job, including human and social capital; employee performance or merit on the job; and the market structure of the profession. The degree to which each of these variables contributes to employee pay may vary significantly across occupations, but together these three determinants explain employee compensation in virtually every profession.

Human capital represents the natural ability, skill set, experiences, and "know how" the worker brings to the job.[4] Economists model human capital as people making investments that will better themselves in their careers. These investments include formal education, vocational training, on-the-job training, and experiences that make the employees more productive at their job. Social capital is the employee's ability to effectively communicate, get along with one's colleagues, and work efficiently with others. In the NBA, social capital is required for teamwork, leadership, and the always important "public relations."

Employee performance, or merit pay, is the economic notion of marginal revenue product. That is, employees are paid according to their

productivity, as measured by the amount of additional revenue they bring into the firm. Assuming qualified and productive labor is relatively scarce and performance varies across individual workers, employers have an incentive to give pay increases to their workers based on individual performance.

The market structure of the profession is the economic market structure of the industry. Market structure may range from monopoly to perfect competition, each with associated market power and ability to capture economic rents. Internal market structure also affects worker pay. Job characteristics, including job hazards and qualifications that determine the available labor pool, industry and firm location, local and internal job markets, product maturity, union presence, and firm size and organization all contribute to employee wages.

III. The NBA Labor Market

Michael Wallace (1988) presents an overview of the three pay determinants for professional basketball players in the NBA. The human capital basketball players bring to the NBA is the set of basketball skills, such as shooting, ball handling, rebounding and defense. Human capital is developed throughout a player's high school and college years as well as his career in the NBA. A player's draft position in the NBA draft and number of years experience in the league are two indicators of human capital.

Merit is measured by the performance of the athlete. David Berri (1999) models the contribution of player statistics (both offensive and defensive) to team wins. Faced with free agency in the NBA, teams are forced to pay their more productive players a competitive wage or lose them to another team after they become eligible for free agency, usually in their third or fourth year in the league. Thus, players in the NBA are compensated according to their performance on the court.

The market structure of the NBA could be modeled as either a monopoly or oligopoly (competing with other sports, such as the NFL and NHL for attendance and television ratings). Market structure variables internal to the NBA include union presence and labor negotiations, discrimination, individual team markets, labor segmentation, and the salary cap. Labor negotiations over salary contracts occur between the National Basketball Players Association

(NBPA), formed in 1954, and the league owners.

Discrimination in the NBA is a topic studied at length by economists. Kahn and Sherer (1988) used eleven player productivity variables to estimate the racial wage gap during the 1985-86 season. After controlling for productivity differences, they found a twenty-five percent wage gap between black and white players. Likewise, Koch and VanderHill (1988) used college and NBA statistics and market characteristics to determine player salaries. They also found a pay advantage for white athletes in the NBA. But a more recent study, Dey (1997), found that after controlling for player performance statistics from 1987 to 1993, while a significant salary gap for black players was present in 1987, by 1992 it had disappeared. Dey attributes this closing of the salary gap to free agency, an increase in the productivity of black athletes, and a change in customer preferences. Hill (2004) does not find evidence of any pay discrimination when investigating the NBA in the 1990s. He adds height to the performance, draft, and experience variables used by others, and measures these variables over the previous three years, instead of just one.

We are not so much interested in the discrimination literature as the models used to measure the determinants of salary. In one of the earliest articles on NBA labor markets, Robert Mogull (1977) found evidence that blacks and whites were rewarded differently for performance criteria. He regresses salary on several performance variables.[5] These performance variables, sometimes weighted by games played, remain common throughout the NBA labor literature. In various combinations these same independent variables have been used by Hamilton (1997), Gius and Johnson (1998), Hoang and Rascher (1999), Leonard and Prinzinger (1999), Eschker, Perez, and Siegler (2004), Groothuis and Hill (2004), Kahn and Shah (2005), Stroh (2007), and Yang and Lin (2010). Jenkins (1996) adds a position dummy and indexes production variables for both career and season. Hoang and Rascher added draft position and frequency of a player being traded. Eschker, Perez, and Siegler added a superstar effect and player age. Groothuis and Hill (2004) used a hazard function with the typical performance variables, adding draft position, height, weight, and race in an attempt to determine impacts on the duration of player careers.

Team markets are divided primarily between large market teams and small market teams. Large market teams, with greater gate and television revenues, have larger budgets for their team payrolls. Thus, teams in

larger markets are better able to compete for talent by offering higher player salaries.[6]

The labor market in the NBA is divided by player position: forwards, centers, and guards, with salaries for each position determined by supply and demand. Likewise, salaries in the labor market can be divided between starters and players that fill the bench on each team. Finally, player mobility plays a role in the labor market. The basketball lockout of 1998-99, and the subsequent negotiations that followed, led to an agreement that drafted rookies would sign three-year contracts. After the third year teams could extend the player's contract for a fourth year. In the fifth year the player would become a free agent, with the club having the right of first refusal. The right of first refusal gives the player's team the opportunity to match salary offers made by any other team in order to retain the services of the athlete.

Following the labor negations of the 1998-99 lockout, the "salary cap" was revised for NBA teams. During the first three years, new player salaries were set by the league. After the third year, a player's salary could rise by a maximum of 12% annually. Total player salaries for each team are not to exceed 57% of each team's revenues. Each year 10% of player salaries are put into an escrow account. If player salaries exceed 57% of team revenues, money is taken out of the escrow account and given back to the team owner to make up the difference.

IV. High School Players in the NBA

Moses Malone was the first basketball player to play American professional basketball without first having played in college. He joined the now defunct American Basketball Association (ABA) in 1974. The ABA eventually merged with the NBA in 1976. At the time, the NBA did not allow players to enter its league without having first attended college. That restriction no longer exists, though the NBA did recently institute a minimum age requirement to join the league.[7]

Since 1995, when our data set begins, 40 players have been drafted directly out of high school by NBA teams. Since Kevin Garnett was drafted in 1995, through 2005, at least one high school player was drafted each year. In fact, except for 1997 and 2002, at least two high school players were drafted each year, with an astonishing ten high school players selected in 2005 (Figure 1). This is even more impressive

considering that the NBA draft has only two rounds, consisting of 60 total picks.

In 2006 the NBA changed its policy, establishing a minimum age of 19 for draft eligibility. Since 2006, the NBA has instead drafted more talented players from European leagues and from across the developing world. Thus, the years 1995 -2005 provide a unique time period to study the decision making behavior of high school basketball stars as they face the choice between college or the NBA.
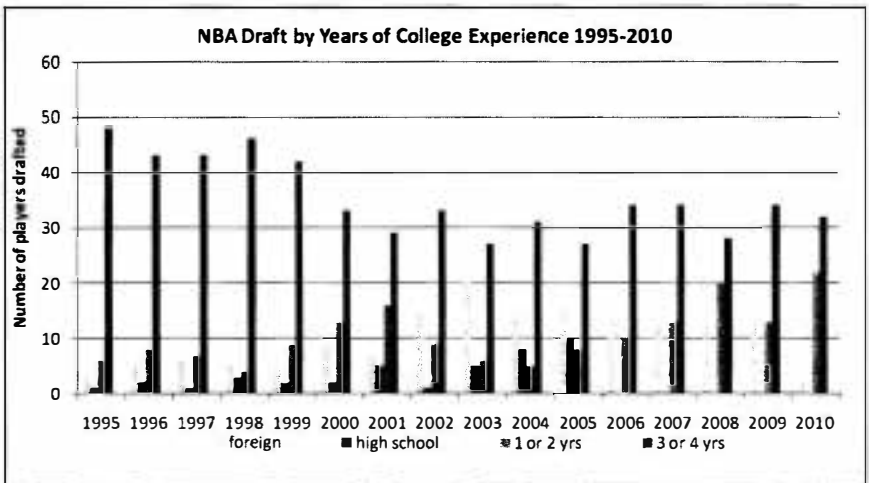

Figure 1. NBA Draft by Cohort

V. Methodology

College education will be modeled as an investment by athletes in human and social capital. For the athlete, the college years are a period of time when players develop their athletic talent (human capital). The NBA draft is modeled as the League's assessment of the stock of human capital (i.e. proficiency at the game of basketball) each player has acquired at the start of his career in the NBA.

There are numerous variables that affect the length and quality of a player's career, including work ethic, injuries, and luck. Since we know of no way to measure these, we will instead use the *ceteris paribus* assumption to model player careers in the NBA. For purposes of

studying the effects of human capital formation during the college years on each player's career, NBA careers will be modeled as dependent on the stock of human capital each player brings into the NBA.[8] Thus, the NBA draft will be modeled as the league's assessment of each player's potential stock of human capital at time period = 0. We want to test the hypothesis that college education has a positive and significant contribution to the career earnings of an NBA player.

The difficulty with any assessment of potential is that in a competitive industry potential ability (human capital developed in college) does not always correlate positively with actual performance. Thus, the first three years, which is the length of the standard rookie contract, tend to be a probationary period when teams evaluate the actual performance of each new player. During this probationary period athletes will either fail to be competitive at the NBA level, and have a career of less than three years; or excel in performance, and have a long career. Therefore, we model a player's first three years in the NBA as a probationary period, where teams are assessing whether each athlete can be competitive at the NBA level of competition.

There are numerous difficulties in trying to compare careers in the NBA based on player performance variables, including variable weights, disaggregation of player versus team effects, and annual versus career statistics. We simplify this problem by using career earnings in the league to measure each player's career. Assuming players are paid their marginal revenue product, career earnings become a good measure of each player's performance during his NBA career. Thus, the basic model utilized in this paper is:

Player's NBA Career Earning= f (*Player's stock of human*   (1)
capital, Social capital, On the job performance)

Our study uses data from 1995, the year Kevin Garnett started his career in the NBA, through 2010, the latest year for which data are available. Career earnings in the NBA are discounted back to 1995 to produce a present value of earnings. To make the salary data linear, the natural log of the present value of career earnings is used. Six years of draft data were used in our study, starting with the 1995 draft and ending with 2000. For the year 2000 draft, ten years of player career data is available. Thus, to create a consistent comparison of player careers across draft

years, for each year's draft, the first ten years of player data were used to proxy player performance.

Thus, the salary variable becomes:

$$Career\ Earnings = \ln \left(\sum_{t=1995+j}^{n=10} \frac{\dfrac{salary_t}{CPI_t}}{CPI1995} \right) \tag{2}$$

Where $j = 0, 1, 2, 3, 4, 5$, depending on the year of the draft.

Two primary variables are used to model the right hand side of equation (1). First, each player's draft position is used to measure the league's *ex-ante* assessment of each athlete's stock of human capital. Second, each player's education is used to measure his investment in human capital. Years of college experience is used to measure the effects of a college education, with values ranging from zero to four. Players drafted out of high school are given a value of zero.[9]

Two variables that affect each athlete's stock of human capital are player position and race. Also, two dummy variables are used to control for player position: one for forwards and another for centers. Since a player's race has been shown to impact salaries and has the potential to affect the league's judgment of the athlete's marketability for employment, we include it as a dummy variable.[10]

Finally, three control variables are added to the model. First, a dummy variable for the division of the college is used to proxy the quality of the capital formation experience during an athlete's time in college. Division-1 college basketball schools are given a value of 1. All other colleges were given a value of 0. The assumption is that playing a higher level of competition at a Division-1 school will positively affect the athlete's human capital formation experience. Second, to control for player performance during the probationary period in the NBA, two additional variables are included. Average-minutes-per-game and number-of-games-played are included to proxy player performance during his first three years in the league. These two control variables assume that regardless of position, athletes who are performing well in the NBA will play both more games, and more minutes during each game.

The basic empirical model used to test the effects of human capital formation during college becomes:

Career earnings = a_1 +a_2 *Draft* +a_3 *College* +a_4 *Division 1*   (3)
+a_5 *Forward* +a_6 *Center* +a_7 *Race* +a_8 *Games* +a_9 *Minutes* + e_1

Where *Draft* is the player's draft position; *College* is the number of years of college education; *Division 1* is a college-tier dummy; *Forward* and *Center* are player position dummies; *Race* is a dummy variable; *Games* is the number of games played during the first three years; and *Minutes* are the average number of minutes played per game during the first three years in the NBA.

Given that 15 years of data are available, and this study investigates career earnings over a ten year period, our dataset consists of all players drafted from 1995 to 2000.[11] With 58 players drafted each year for six years, the sample includes 347 players.[12] In order to avoid biasing the educational attainment variable, 28 foreign players were removed from the sample. Likewise, 66 additional players were removed from the sample because they never played a single game in the NBA. Including these players would cause censorial problems with both the games-played and the minutes played variables.[13] Thus, our resulting sample size has 253 observations.

VI. Heckman's 2-Stage Model (Heckit)

Not surprisingly, there is a noteworthy gap in career earnings between players who survived the first three-year trial period and those who did not. This characteristic suggests a potential problem of sample selection bias caused by many other factors determined before these players reached the NBA draft. For example, human capital theory commonly is applied to explain such performance differences, and focuses on the resulting "endowment" differences in players' skills and talent before they were drafted. Thus, one may argue that players who had already accumulated enough skills to excel in their NBA career out of high school tend to forgo college. We expect that a significant portion of the differences in NBA performance during the probationary period is a product of these unobservable variables that are beyond the scope of this study.

However, if the selection bias exists as the wage gap data suggest, the conventional OLS method becomes questionable when we attempted to estimate equation (3). Besides, for those players who did not make it

through the first three years, their annual income from years 4 to 10 was obviously zero. We wanted to emphasize that this zero income is an indicator to show the performance of each player also affects the magnitude of career earnings. Therefore, the application of the Tobit model becomes conceptually unsuitable since the data is not really "censored."[14] Instead, we apply Heckman's two-stage model to correct for the problem of sample selection bias as suggested by Heckman (1979); Maddala (1992) and Greene (2000). Moreover, the first three years in the NBA appear to be a probationary period when teams are evaluating the performance of recently drafted athletes. The majority of athletes in the NBA play either for three or fewer years or more than ten years (see Figure 2).[15]

Figure 2.

Therefore, without making any unnecessary assumptions, we created a dummy variable called passing-grade (PG) to estimate the probably of surviving the first three years of an NBA career after the draft. We assume:

Passing Grade = f (Player performance during first   (4)
                     three years in NBA).

Players with a 1-3 year career were coded "0" for PG, and players with a 4+ year career were coded "1" for PG. In the first stage we estimate PG using the binomial probit model. That is,

$$PG=1 \text{ if } PG^* >0 \text{ and} \tag{5}$$
$$PG=0 \text{ if } PG^* <= 0$$

Sequentially, "average-minutes-per-game" and "number-of-games-played" during an athlete's first three years in the NBA become the instrumental variables used to estimate Passing Grade (PG) in the first stage.

First Stage Estimation:

$$\text{Passing Grade}= b_1 +b_2 \, Draft +b_3 \, College +b_4 \, Division \, 1 + \tag{6}$$
$$b_5 \, Forward +b_6 \, Center +b_7 \, Race +b_8 \, Games +b_9 \, Minutes + e_1$$

After estimating the binomial probit in the first stage, the resulting inverse Mills ratio (λ) will be stored and injected as an independent variable in the second stage of the Heckit Model to estimate career earnings:

$$\text{Career earnings} = c_1+c_2 \, Draft +c_3 \, College +c_4 \, Division \, 1 + \tag{7}$$
$$c_5 \, Forward +c_6 \, Center +c_7 \, Race +c_8 \, (\lambda) + e_1$$

Equation (7) estimates the effects of a college education on career earnings after controlling for the NBA's pre-career assessment (draft position) and sample selection bias problem. We hypothesize that the coefficient for the college education variable should be positive and significant. On the other hand, if we cannot reject the null hypothesis of zero for the coefficient of the inverse Mills ratio λ (i.e., c_8), we should instead use OLS to estimate equation (3). For the purpose of comparison, we applied both a Heckit and OLS model in this study.

Finally, we applied both the White's general test and the Breusch-Pagan Lagrange multiplier test (Greene 2000; p. 508-511) to investigate the potential problem of heteroscedasticity. The robust covariance matrix for the OLS model (equation (3)) generated the Chi-Squared statistic of 24.61 (0.0018), which indicated that the hypothesis of homoscedasticity is rejected. The LM statistics from the Breusch-Pagan tests suggested that

Draft, College, Games, and Minutes contained heteroscedasticity when regressed on Career earnings separately. However, we only found minor variations on the standard errors of the heteroscedasticity corrected (White) coefficients, compared to the original OLS results. Moreover, as suggested by Johnson and DiNardo (1997), while appending a White noise error causes no problem of bias in the liner model, the process may cause unknown bias in the nonlinear models such as probit for our Heckit model. The lack of standard method in hypothesis testing also makes the Probit model with heteroscedasticity difficult to interpret and analyze (Greene 2000). Therefore, in this study we report the original estimate results both for the OLS and Heckit models. But we would like to acknowledge the existence of heteroscedasticity in our results.

VII. Results

Table 1 lists career earnings (before the natural log is calculated) broken down according to the explanatory variables in equation (3). Foreign players are included in this table only for comparison purposes. The results indicate that the mean career earnings vary greatly across groups. Players drafted out of high school earned an average of $43.5 million, while the mean for college seniors is $15.9 million, and for foreign players is $17.4 million. By position, on average, forwards have the highest career earnings, and centers have the lowest. For the race variable, players of color now earn $6 million more than their white counterparts, a gap in the opposite direction of that found in research focusing on an earlier time period.

Table 2 summarizes the results from Heckit and OLS. The regressions for equations (6) and (7) were run using the Heckit 2-stage regression model, and results obtained show that the coefficient associated with the inverse Mill's ratio (i.e., -1.86) is significant at the 0.01 % level, which indicates that the correlation between the error terms of passing the first three years and career earnings are different than zero. This result suggests the existence of sample selection bias and offers a rationale to apply the Heckit model in our analysis.

In the first stage, a binomial probit model is run to estimate an athlete's probability of surviving the probationary period and going on to continue his career in the league as shown by equation (6). Five variables significantly affect an athlete's passing grade. First by position, forwards

and centers are more likely to survive than guards. Referring back to Table 1, the fact that there are only one half as many centers in the NBA, as opposed to either guards or forwards, may explain why being a center significantly affects one's passing grade at the 1% statistical level.

TABLE 1–Descriptive Data of NBA Players 1995-2010

| | N | Career Earnings real 1995 dollars | | | Years Pro | |
		Min	Mean	Max	Mean	Standard Deviation
White	76	$200,289	$19,607,328	$85,573,004	6.62	3.89
Color	205	$111,871	$25,855,578	$141,950,420	7.21	4.43
Forward	124	$111,871	$26,063,285	$141,950,420	7.08	4.30
Center	52	$200,289	$19,416,245	$81,479,000	6.98	4.00
Guard	105	$175,289	$23,163,888	$97,035,346	7.06	4.48
High School	11	$163,821	$43,486,348	$141,950,420	6.70	4.20
1 year college	10	$3,443,079	$46,325,601	$93,075,320	9.80	3.52
2 yrs college	31	$200,000	$38,941,901	$95,299,820	8.90	4.56
3 yrs college	34	$320,000	$37,696,602	$97,029,704	9.06	3.70
4 yrs college	167	$111,871	$15,992,605	$101,721,269	6.19	4.03
Foreign	28	$320,000	$17,411,686	$81,479,000	4.43	4.47

Minutes played per game and games played during a player's first three seasons in the NBA significantly affect a player's passing grade after the third year in the NBA. For this reason, these two variables are used as sequential instrumental variables. Finally, early draft picks are more likely to survive the probationary period.

In the second stage, career earnings in the NBA are estimated using Equation (7). Including an estimated passing grade for each athlete, after three years of performance in the NBA, only the variable *Draft* statistically significantly affects a player's career earnings in the NBA. Variables such as position, level of school, and most importantly, years of college education are all statistically insignificant. The results in Table

2 indicate that while position and performance affect the survival rate of any NBA players, career earnings are solely affected by the draft position for those players who survived the trial period. We failed to reject the null hypothesis that c_3 in Equation (7) is significantly different than zero, which suggests that college education is not a crucial variable in determining career earnings.

TABLE 2–Heckit 2-Stage and OLS Results

	Heckit Model		OLS
	Stage 1 (Eq 6)	Stage 2 (Eq 7)	(Eq 3)
Dependent Variable	Passing First Three Year	Natural Log of Career Earnings in NBA	Natural Log of Career Earnings in NBA
Constant	-3.61 (0.830)***	18.44 (0.329)8**	13.49 (0.303)***
Draft	-.03 (0.011)***	-.04 (0.006)***	-0.01 (0.004)**
Years of College	-.10 (0.156)	-.06 (0.088)	-0.09 (0.059)*
Division 1 School	.03 (0.357)	.27 (.276)	-0.12 (0.167)
Forward	.77 (0.297)***	-.13 (0.187)	0.11 (0.119)
Center	1.41 (.406)***	-.31 (0.250)	0.55 (0.163)**
Race	-.54 (0.315)	.04 (0.216)	-.01 (0.132)
Minutes Played per Game	.08 (0.015)***		0.03 (0.003)***
Games Played first three years	.004 (0.002)**		0.01 (0.001)***
λ (Inverse Mills Ratio)		-1.86 (0.244)***	
R-squared	.61 (Pseudo R-Squared)	.62	.78
McFadden ρ	0.60		
A.I.C.	0.54	.38	-.21
Prob>Chi-Square	0.0002		

Standard errors in parenthesis; *Significant at the .1% level; **Significant at the .05% level; ***Significant at the .01% level.

The results from the Heckit model suggest that the career earnings of NBA players depend on the survival of the probationary period. But the determining factors of surviving are playing position, minutes, and games played. This finding is consistent with the results suggested by the OLS method: the variables that significantly affect a player's career earnings in the NBA are his position in the NBA draft, minutes played per game, number of games played in the first three years, and playing center. The signs on these statistically significant variables are also consistent with the results from Heckit. Players drafted earlier have a lower number (draft picks are assigned a number in the regression equal to their position in the draft) and on average play longer and have greater career earnings in the NBA. This suggests either that NBA general managers are good at projecting future NBA potential, or that they are afflicted with sunk cost bias, and will give players drafted early a longer trial period, lasting beyond the initial three year period.[16] The negative sign on years of college suggests each additional year of college ball lowers career earnings. Likewise, the positive coefficient on minutes played per game during the first three years suggests that players who were starters and played most of each game enjoy high career earnings in the NBA. Finally, the insignificant race variable suggests that salary discrimination in the NBA may no longer be an issue, though we do not directly test for this. Overall, the results presented in Table 2 suggest that the stocks of human and social capital endowed by each player before they entered the NBA are more important than education, including human capital formation in college, if maximizing career earnings in the NBA is a player's goal.

VIII. Conclusions

The argument against high school players in the NBA is usually some form of the argument that "high school players can't make it in the NBA. They should stay in college and hone their skills". Another version of the argument frequently made in favor of staying college is that a player who leaves college early will never have developed the necessary skills to survive in the NBA in the long run. In other words, college coaches argue that the skills players develop in college will create higher career earnings than the extra salary earned in the short run.

The results present in Tables 1 and 2 provide mixed results for this argument that players go to college to build human capital for their NBA careers. Table 1 shows that on average, players directly out of high school have longer careers and higher career earnings than their college and foreign counterparts. This result seems to suggest that the exceptional basketball players make a rational decision to forego college to start their careers in the NBA. Based on career length, earnings, and draft position, players who go to college for one or two years to build human capital before starting their NBA careers do better than players who graduate from college. Players who have NBA potential, but are a step below their high school and underclassman counterparts in terms of basketball proficiency, spend up to four years in college to develop their human capital as NBA athletes. Table 2 shows that career earnings are not dependent on college attendance, but rather on draft position and performance during the first three years in the NBA.

The results of this study suggest that although college is an investment period for athletes toward their careers in the NBA, rational athletes do understand the opportunity cost of each year spent in college, with the best players forgoing their college education altogether. Thus, it is unlikely that athletes who possess the required stock of human capital to compete at the NBA level make an economically irrational decision to forego college for the NBA. The criticism leveled by sportswriters and coaches that high school seniors, such as Kevin Garnett, Kobe Bryant and LeBron James would benefit by at least some college experience, does not hold up. The beneficiaries of such talented players working for free in the college ranks are the colleges, the NCAA, and the highly paid college coaches.

In 2005, ten of 58 players chosen were drafted directly out of high school. These high school athletes understood the financial opportunity cost of playing in college, and made the rational choice to become draft eligible. The 2006 draft rule was the NBA's attempt to stem the ever-increasing tide of high school students entering each year's draft.

Sports writers now say that in retrospect the 2006 change in draft age was a misguided decision by the NBA.[17] The NBA desires future athletes to first get some formal college education, and thus, high school athletes are now attending college. Unfortunately players who already possess the athletic ability to compete in the NBA are now forced to attend college for a year until they reach the NBA mandated minimum age. This is a misallocation of resources and a transfer of economic rents from

players to colleges.   It appears the rationale for keeping high school athletes out of the draft is more for the benefit of the NCAA and NBA owners than out of any real concern for the players.

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Endnotes

1. In 1974 Moses Malone entered the old ABA without ever going to college. But Kevin Garnett was the first player drafted out of high school. Our paper focuses on high school players drafted since 1995, the first year of our comprehensive salary and draft data set.

2. The NBA recently ruled that players must be 19 years old or wait one year after graduating from high school to enter the draft. This ruling may be challenged in

court, but even if it stands, it merely pushes the choice between college and a potential professional career off by one year.

3.   There are approximately 900 colleges and universities in the United States that play basketball. Assuming that each roster is composed only of the NCAA limit of 13 scholarship players, there are 11,700 men playing college basketball each year, 60 of whom will be drafted. Since any college player is allowed to declare his eligibility for the draft, that means 0.5% of college basketball players are drafted each year. If only the (approximately) 350 division one schools are considered, then the percentage of players drafted increases to 1.3%.

4.   Becker 1964.

5.   The performance variables were field goals per minute, field goal percentage, free throws per minute, free throw percentage, rebounds per minute, assists per minute, points per minute, points per game, minutes per game and experience.

6.   The "soft" salary cap of 1999 partially offsets this market size advantage.

7.   Kegler, 2010.

8.   Although human capital formation continues throughout each athlete's career in the NBA, the human capital formation itself depends on the career of the athlete. Players who are relegated to careers as bench warmers or have their tenure terminated before or during their first year, have little opportunity to develop human capital, and thus their careers in the NBA are determined by the stock of human capital they possess as they enter the NBA.

9.   From 1995 to 2000, 28 of the 347 players drafted by the NBA were foreign. Although some foreign players may have some college education, the educational records of many foreign players are difficult to assess. Because of the unclear educational records of foreign players, and the relatively small sample, foreign players drafted by the NBA were removed from the sample in order to focus our study on the effects of a college education.

10. See Dey (1997) and Hill (2004).

11. Draft position data were obtained from the Sporting News NBA Guides 1995-2000. Player race, position, and education are from www.NBA.com and www.databasebasketball.com. Annual salary data are from Rodney Fort's website at http://users.pullman.com/rodfort/SportsBusiness/BizFrame.htm and www.usatoday.com website.

12. Washington forfeited its 1997 first-round pick in connection with its signing of Juwan Howard. Washington would have had the 17th pick overall.

13. Running the regression both with and without the 49 observations of draftees who never played a game in the NBA did not change either the sign or the level of significance of the coefficient on the education-level variable. Thus, the results from our basic regression model were not affected, based on this reduction in sample size.

14. Sigelman & Zeng, 1999; Maddala, 1992.

15. In our dataset of players drafted from 1995-2000, 74% of the players had careers of either 3 or fewer years or 10 or more years. 41% had careers of 3 or fewer years and 33% had careers of ten or more years.

16. See Staw and Hoang (1995). They test whether the amount of time played and career length are affected by draft order and find that NBA teams give more playing time to higher draft picks after adjusting for performance.

17. Phil Kegler (2010)