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Precocity and labor market outcomes: Evidence from professional basketball

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Abstract

We show that precocity, as measured by the age of entry into the elite-level professional basketball labor pool, often leads to better career outcomes. Our findings cast doubt on the on-court efficacy of the National Basketball Association's contentious age eligibility rule.

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1. Introduction

In 2005, the National Basketball Association (NBA) entered into a collective bargaining agreement (CBA) with the governmental recognized National Basketball Players Association (NBPA) union. The 2005 CBA included, for the first time, a minimum age rule requiring all American-born players to be at least 19 years of age by December 31 of the draft year and be at least one year removed from high school in order to be draft eligible.[1] Beck (2009) reported that the NBPA will seek to eliminate the age rule when the CBA expires in 2011, while Gregory (2008) quoted NBA Commissioner David Stern as saying that the league will move to increase the minimum age from 19 to 20.[2]

The purpose of this research is to clear the fog of any negotiation-related posturing and shed light on the interaction between age and career success. Specifically, we analyze the role of precocity on labor market outcomes of elite-level NBA players and, indirectly, test the on-court efficacy of the NBA's age rule. Our research generally relates to the literature on using sports industry data to test economic hypotheses (Kahn, 2000; Rosen and Sanderson, 2001). Sowell and Mounts (2005) investigated the overlap between age and ability, concluding that the interaction is "one of the most basic in all of economics…[i]t is at the foundation of all acts of production or utility creation." In other studies, NBA labor market outcomes have specifically been investigated as a function of college production (Coates and Oguntimein, 2010), opportunity costs (McCann, 2004) and the problem of choosing talent in a hyper-competitive workplace (Groothuis et al., 2009). This paper adds to the literature by focusing on age of entry into the labor market as the variable of interest.

2. Data and Model

Data were culled from publicly available sources, including the official websites of NBA.com and Basketball-Reference.com. The resulting data set includes all first round NBA draft picks from 1989 to 2000.[3] For player-level independent variables, the empirical specifications include age of NBA entry (*AGE*), NBA career years (*CRYR*),[4] height (*HT*)[5] and ordinal data pertaining to draft pick slot (*DRFT*), which takes the form of a relative ranking and is a reasonable proxy for talent. Dummy variables for college experience (*EDUC*),[6] playing position (*PSTN*),[7] nationality (*NATL*)[8] and race (*RACE*)[9] are also included.

[1] Non-American players are not required to be at least one year removed from high school.
[2] The NBA age rule is contentious. US Secretary of Education Arne Duncan described the rule as a "farce" and "intellectually dishonest" (Jackson, 2010). US Representative Steve Cohen called it "a vestige of slavery" (Thamel, 2009).
[3] The NBA conducts a multi-round reverse-order draft annually. There are currently two rounds, with each NBA team being allocated one draft pick each round. In previous years, the NBA draft included up to seven rounds. Our exclusive focus on the first round is for practical reasons – career and biographical data for obscure players drafted in later rounds were not available.
[4] *CRYR* denotes the number of seasons a player competed in the NBA.
[5] Height is measured in meters.
[6] Some college (1-4 years) or no college.
[7] Guard or nonguard.
[8] American or non-American.
[9] Black or nonblack.

Our dependent variables include average minutes played per game (*MNT*), a metric called player efficiency rating (*PER*), and number of all-star game appearances (*A-S*). Average minutes played per game over the course of a player's career is an imperfect measure of value to the team, as coaches seeking to maximize their squad's chances of success will rationally opt to have the relatively better players play more often than their less talented teammates. *PER* is a composite rating of a player's per-minute productivity that takes into account positive accomplishments (field goals, free throws, rebounds, assists, etc.) and negative accomplishments (turnovers, personal fouls, etc.).[10] All-star game appearances is a subjective measure of macro-level career outcomes that result from league, coach, media, peer and fan input.

We adopt multiple dependent variables, as there is no consensus in the literature for the best measure of career success. Taken together, however, such variables capture the breadth of measures that gauge labor market outcomes among NBA players.[11] In estimating the regressions using a number of dependent variables and adopting several sample restrictions,[12] we aim to show that the main results are robust to model specification variation. Summary statistics are set forth in Table 1.

Table 1. Summary Statistics

Variable	N	Mean	SD	Min	Max
AGE	332	22.03	1.27	18	26
CRYR	332	8.91	4.22	1	19
DRFT	332	14.40	8.07	1	29
EDUC	332	0.94	0.24	0	1
PSTN	332	0.40	0.49	0	1
HT	332	2.02	0.09	1.78	2.28
NATL	332	0.89	0.32	0	1
RACE	332	0.79	0.41	0	1
MNT	332	21.98	8.85	3.10	41.10
PER	332	13.56	3.63	-0.90	26.50
A-S	332	0.80	2.25	0	15

[10] Hollinger (2011) provides a detailed discussion of how *PER* is calculated.

[11] For the avoidance of doubt, we purposefully ignored salary levels. Our rationale was two-fold. First, the CBA artificially constrains salary levels via rookie wage scales and salary caps, skewing any results derived therefrom. Second, free agent players often opt to sign with certain teams for a number of nonmonetary reasons (McCann, 2006).

[12] We bifurcated our full sample in two distinct ways to: (i) account for censored data (56 of the 332 players in our full sample were active during the 2010-2011 NBA season) and (ii) highlight any year effects in the spirit of a regression discontinuity design. Most importantly, in 1995, for the first time in 20 years, an American player was drafted straight out of high school. An increasing number of high school players were drafted directly into the NBA with no college experience in subsequent years prior to the minimum age rule's enactment in 2005. Accordingly, we halved our full sample – 1989-1994 and 1995-2000. Regression results for each sub-sample are not reported, as such results are consistent with our primary findings.

Our general form estimating equation is as follows:

$$P = \beta_0 + \beta_1 AGE + \beta_2 CRYR + \beta_3 DRFT + \beta_4 CLLGE + B_5 PSTN + \beta_6 HT + \beta_7 NATL + \beta_8 RACE + \varepsilon \quad (1)$$

with P denoting our career outcome dependent variables (*MNT*, *PER*, and *A-S*). Along with our variable of interest (AGE), our control variables are consistent with many of those used in the general economics literature pertaining to human capital accumulation (Rosen, 1983; Acemoglu, 1996)[13] and the relevant sports economic literature (Staw and Hoang, 1995; Eschker et al., 2004; Groothuis et al., 2009; Coates and Oguntimein, 2010; Berri et al., 2011).

3. Results and Discussion

Across each of the three dependent variables (*MNT*, *PER* and *A-S*), we find evidence that players who enter the NBA at a relatively younger age have more successful on-court careers. Likewise, players with no experience in American college basketball also have more successful careers.[14] A player's tenure in the NBA was statistically significant in each of the three specifications, evidencing a human capital accumulation effect. Unsurprisingly, a player's draft position is a good proxy for talent and, in turn, a statistically significant predictor of career success. Height was a statistically significant predictor for *MNT* and *PER*, but not *A-S*. We find some evidence that black players' level of career success is greater as measured by *MNT*. There is weak and conflicting evidence pertaining to the predictive value of a player's position. There is no evidence that nationality predicts career success.

Regression results specific to the sub-sample of players drafted during the six year period from 1995 to 2000 are similar. Such results were largely expected, as an anecdotal review of the "best" NBA players over the course of the past decade reveals a disproportionate share entered the NBA labor market at a relatively young age with no college experience and as high draft picks vis-à-vis peers drafted in the same year. Taken together, our results point to NBA teams making prudent draft-day decisions, even among relatively young players who may not have been evaluated as extensively prior to being drafted and/or may have competed against inferior talent in high school, making such an evaluation more difficult.[15] More generally, our results indicate that NBA-caliber talent manifests itself early (at or around the age of 18) and NBA team executives have, as a whole, accurately selected talented precocious players via the annual draft. Our regression results are set forth in Table 2.

[13] For example, *CRYR* is specifically included to tease out the impact of any human capital accumulation.
[14] Players in this category include both Americans who were drafted by an NBA team straight out of high school and non-Americans who never availed themselves of the college basketball system unique to the US, opting instead to play "minor league" professional in Europe or otherwise during their mid-teens prior to playing in the NBA.
[15] Staw and Hoang (1995) cite sunk costs as an alternative/additional explanation of how draft pick status affects future performance.

Table 2. Regression Results

Variable	MNT	PER	A-S
AGE	-0.677***	-0.265**	-0.192*
	(0.250)	(0.133)	(0.106)
CRYR	1.236***	0.485***	0.163***
	(0.072)	(0.039)	(0.031)
DRFT	-0.313***	-0.068***	-0.051***
	(0.039)	(0.021)	(0.016)
EDUC	-2.612**	-2.065***	-1.718***
	(1.324)	(0.707)	(0.560)
PSTN	1.063	-0.933**	0.199
	(0.857)	(0.458)	(0.363)
HT	-11.390**	-7.782**	-0.001
	(4.774)	(2.550)	(2.02)
NATL	-0.523	-0.530	-0.457
	(0.984)	(0.526)	(0.417)
RACE	1.521**	0.147	0.259
	(0.724)	(0.387)	(0.306)
Constant	54.599***	34.382***	6.061
	(11.728)	(6.264)	(4.962)
R^2	0.71	0.51	0.26

Note: Robust standard errors in parentheses. *, **, and *** denote significance at 10, 5 and 1% levels, respectively.

4. Conclusion

Precocity and basketball are intertwined. If the current NBA age rule was in place prior to 2005, some of the best players in the league (Kevin Garnett, Kobe Bryant, LeBron James and Dwight Howard) during the past 15 years would have been initially ineligible. We find evidence that the younger a player is when he first enters the NBA labor pool the more successful he is likely to be. There is no systematic evidence of any success among "late bloomers." Our conclusion is tempered, however, by an identification problem. Namely, given that there is no perfect proxy for (at least partially) unobserved variables such as intrinsic talent and human capital accumulation, we acknowledge the inability to pinpoint the dominant driver of our results. Our findings cast doubt on the long-term on-court efficacy of the NBA's age rule, although the recent imposition of the league's age policy, coupled with certain off-court considerations that may be relevant, caution against any conclusive determination regarding the rule's effectiveness (and necessity). Likewise, limitations stemming from the censored data argue against a more definitive position on such issue.

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