Does the NBA Encourage Early Entry?

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Introduction

Over the last two decades, the number of underclassmen selected in the NBA Draft has dramatically increased. Chart 2 should help to visually confirm this fact. Even when controlling for performance in college, underclassmen are now paid significantly more than seniors. What is going on here? Isn't experience a good thing? Groothuis, Hill, and Perri (2007) argue that the rookie pay scale introduced in 1995 is responsible for the shift in behavior. They use Lazear's (1998) option value theory as a means of explaining this action. His theory is the result of applying the financial principle of option value to labor economics. He postulates that as the estimate of a worker's future production becomes more volatile, his option value increases. In the NBA Draft, early entrants have more option value than college seniors because less information is available about them, and they are less developed. The rookie pay scale sets compensation limits which lower the relative price of rookies. This encourages teams to take more risks. This study seeks to extend previous work, empirically test if option value is significant in determining draft order after 1995, and the extent to which it matters.

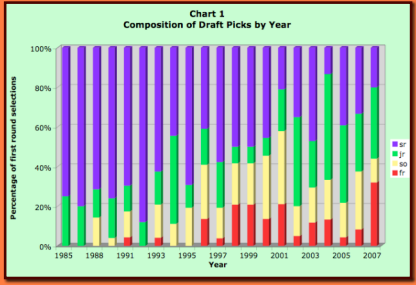

Chart 1 The graph above shows that seniors now comprise a smaller percentage of first-round draft choices than underclassmen.

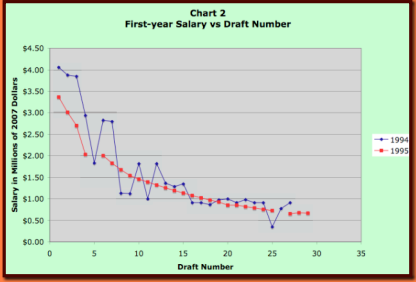

Chart 2 Compensation has not only been lowered (relative to total salaries paid), but also now moves in lockstep with draft number because of the rookie pay scale.

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Method

Goal: Test if option value is significant in determining first year salary after the change to the pay scale in 1995

Develop a model that can accurately predict draft position (ideally the model would include and quantify everything teams consider when drafting a player)

Teams choose players based on the expected value and variance of their future production. Finding available, normalized, and quantitative data that influence player evaluations was difficult. Over the length of this study, the NBA has received players from many different leagues (i.e. high-school, college, international). However, I chose to only include players who attended at least one year of college. This allowed me to include performance measures. This focus also provides a good proxy for option value: college experience. The more time a player spends in college, the less doubt there is about his future production. He becomes a known quantity.

- College Statistics
- Measure of Athleticism, Other
- Years of College Experience

Other Data Considerations

- I use per minute statistics to more accurately measure a player's impact on a game.
- I prefer Salary over Draft Number because it measures the dollar value teams are paying for option value

Table 1

Variable	Descriptions
Draft Number	Equal to what number pick the player is drafted with
Natural Log of Salary	Natural Log of the player's first-year salary in the NBA adjusted for inflation to 2007 dollars
FR	Equal to one if Freshman
SO	Equal to one if Sophomore
JR	Equal to one if Junior
CONF	Equal to one if Mid-Major*
BMI	[lbs/inches^2] * 703
GP	Games played during final year in college
FG%	Field Goal Percentage = (Field goals made / Field goals attmepted)
PTS	Points per minute during final year in college
TRB	Rebounds per minute during final year in college
AST	Assists per minute during final year in college
STL	Steals per minute during final year in college
BLK	Blocks per minute during final year in college
TOV	Turnovers per minute during final year in college
PF	Personal Fouls per minute during final year in college
AFTER	Equal to one if drafted after 1994
BEFORE	Equal to one if drafted before 1995

* - Major Conferences: ACC, Big East, Big 10, Big 12, Conference USA, Pac-10, SEC

Results

Table 2

Dependent Variable: Natural Log of Salary (adjusted to 2007 dollars)

Data:	*1985-1994 (185 observations)* "Before Group"		*1995-2007 (289 observations)* "After Group"	
	Coefficient	Std. Error	Coefficient	Std. Error
FR	0.0517857	0.3998784	0.5903639***	0.082973
SO	0.2894282*	0.1537129	0.4231729***	0.0651817
JR	0.0813069	0.1002749	0.197522***	0.0626619
CONF	-0.1536984	0.1024596	-0.0690355	0.0709869
BMI	-0.0415725	0.0265422	-0.0002584	0.0142415
GP	0.0248265**	0.0105744	0.0180305***	0.0058431
FG%	-0.9491242	0.9091218	1.751257***	0.5574728
PTS	2.142154***	0.4080998	1.986551***	0.2951601
TRB	2.251347***	0.8550629	0.6644912	0.4538961
AST	4.45335***	1.38098	4.241565***	0.8654368
STL	-4.204958	2.76244	-1.374874	1.592945
BLK	6.411258***	1.537461	3.76922***	0.9968451
TOV	-2.679727	2.886419	-4.990613***	1.592525
PF	-3.233793	2.760492	-4.186356***	1.454502
constant	13.14656	0.7478481	11.66367	0.46332
R^2	0.5128		0.4446	
Adj R^2	0.4500		0.3895	

----Year Dummy Variables Included in both regressions----

*** - *significant at the 1% level*
** - *significant at the 5% level*
* - *significant at the 10% level*

Table 3

Pooled Regression (Variance restricted to equal 1)

Dependent Variable	*Natural Log of Salary (Adjusted to 2007 dollars)* Coefficient	Std. Error
BEFORE	23.88812***	1.4561340
AFTER	30.13947***	1.1972410
FRX1	0.0517853	0.3998784
FRX2	0.5903642***	0.0829730
SOX1	0.290015*	0.1540245
SOX2	0.4238369***	0.0652840
JRX1	0.0813071	0.1002749
JRX2	0.1975221***	0.0626619
R^2	0.9992	
Adj R^2	0.9991	

----Year dummy variables and performance measures included----

Table 4

Restrictions	F - statistic	P - value
FRX1 - FRX2 = 0	F (1, 425) = 1.74	Prob > F = 0.1880
SOX1 - SOX2 = 0	F (1, 425) = 0.64	Prob > F = 0.4242
JRX1 - JRX2 = 0	F (1, 425) = 0.97	Prob > F = 0.3262
(all three)	F (3, 425) = 0.96	Prob > F = 0.4128

Before 1995

1. The coefficient on SO implies sophomores made 29% more money relative to seniors. It is also statistically significant at the 10% level.
2. FR, SO, and JR are jointly insignificant (F=1.38)

After 1995

1. FR, SO, and JR are individually significant at the 1% level.
2. FR, SO, and JR are also significantly different from one another (F=11.11)

Pooled Regression

1. The separate regressions were pooled to test whether underclassmen have more option value after than before the change.
2. Chart 2 explicitly shows that the variance of salaries before 1995 is much higher than after the change to the labor market. For this reason, before pooling the data I multiplied all the variables by (1/Root Mean Square Error), which equals (1/Standard Error) for an unbiased estimator. These corrected variables are detonated with an "X" (i.e. FRX instead of FR).
3. Dummy variables were included for the "before" and "after" group. These dummies are then interacted with every corrected variable (i.e. creating FRX1 and FRX2).
4. The chow tests performed in Table 4 present the key findings. Option value has not significantly changed for underclassmen individually, or all three jointly.
5. If option value has not significantly increased, this means that freshmen today are no different than before 1995. The exogenous change in the labor market is responsible for the increase in early entry into the NBA Draft.

The "Curse of the College Senior"

After his junior year, Tyler Hansbrough was projected by ESPN to be drafted between 18th and 28th if he left college. Just one year later, he is now projected to be drafted between 25th and 35th. With no real difference in his personal statistics (he even led his team to a national championship this year), many fans wonder why his stock has fallen. Chad Ford, a draft analyst for ESPN, calls it the "Curse of the College Senior." According to Ford, "the longer you stay, the more your draft position begins to slip, because people draft in part on upside. Right now, the thing about Tyler is they don't see any upside to him. He is what he is."

Conclusion

The rookie pay scale introduced in 1995 was not intended to encourage early entry. It was created to increase veteran salaries, relative to rookies. The unintended side effect of decreasing first-year salaries was the incentive it created for teams during the NBA Draft. Rookies are now a smaller investment; in fact their price is fixed. Taking a risk on an unproven player is more popular because of the huge gains that can be realized if the option value materializes into real value. College seniors are known quantities. Four years is a long time to evaluate a player, and by the end of their senior year, there remain few unknowns. The pooled regression really helps to strengthen the argument that there is an exogenous force at work. If underclassmen after the change are not being rewarded more to underclassmen before the change, they must have the same option value. Thus, it is not the players that have changed, but the structure of the market. With a lower investment, the same inherent option value has a more significant effect.

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