The One and Done Rule and Salary: Empirical Analysis

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A Paper Submitted in Partial Fulfillment for the Requirements of

Introduction to Econometrics (Econ 2123)

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Abstract: The One and Done policy was implemented in the National Basketball Association (NBA) in 2006 to prevent inexperienced players from starting their professional careers immediately after high school. One and Done players are those who attend only one year of college under this new policy before starting a professional career. Some celebrated One and Done players such as Greg Oden fizzle out while players such as Kevin Durant go on to be all stars. The current highest paid NBA players, such as Stephen Curry and Blake Griffin, attended multiple years of college before being drafted. This paper tests whether or not being a One and Done player has a real impact on average annual salary, and finds that while this variable is not statistically significant over the course of a player's career it still has some economically significant implications.

I. Introduction

The question is whether players who only play one year in college have significantly higher salaries. The importance of this question is seeing how someone who goes through this process has the ability to earn more. Most observers have the preconceived notion that the one-and-done players who have a high draft stock usually earn more in average salary than usual. The importance of this question really comes into play when comparing the long-term average earnings of One and Done players compared to players who are not One and Done. Do these players earn more in the long run compared to other players? Do other variables have more of an impact on our dependent variable compared to other variables? How do these terms interact to give us the best interpretation of the result at hand.

II. Literature Review

Beaulieu, Daniel. 2012. Framing the NBA's "one-and-done" rule.

This academic paper examines the “one-and-done” rule that restricted high school graduates to enter directly into the NBA draft following high school. In turn, a high school prospect would essentially now have the option of playing professionally elsewhere(most likely overseas), enter the NBA’s Developmental League, or play NCAA basketball. This rule has had great effects on both the NCAA and NBA. This article looked to analyze the many men who have played NBA basketball and have been successful and what year they went to the league and if they went from high school, they stayed one year in college and then went to the league. Or stayed 3-4 years and then went to the league. This study later does statistical analysis on how positive and negative impacts of this rule have been. The study later than offers counterarguments to abolishing the one-and-done rule. Most of the studies that were picked involved the results that one-and-done

players have produced after they have got out of college and further. In Daniel Beaulieu's study, he looked at how the one and done rule restricted the progress of a player but also has given the player more options than just playing in the NBA. Many of the same variables are analyzed in this study and our own independent study.

Hall, Karen. 2018. Factors that influence NCAA Division I basketball teams to sustain high performing championship levels.

NCAA Division I basketball teams high performances are able to get players coming out of the draft a higher draft stock. When the whole team is doing well the player with the potential to be one and done and get drafted are able to usually look good off of the whole teams success. Just by a player doing well for one season, they might have more potential to get drafted off of a few months from stellar play. A higher salary is able to be garnered as a higher draft number achieved is able to garner more money to your salary. Many of the same factors that lead Division I basketball teams to do well are many of the same factors that lead NBA teams to do well that enable a player to perform well. This includes leadership of coach, the longevity of coaches, recruiting of student-athletes, culture,donors, and financial resources are all the same factors that make a championship-winning team.

One of the next studies done in our Literature Review contains information about what motivates NCAA Division I basketball programs to keep high performing championship levels. Much of our study has a correlation with the different motivations a player may have in order to be one-and-done. Going to an amazing program has a lot to do with draft stock for NBA Players.

Fanney, S. Brandon. "The Effect of One-and-Done Players on Division I Men's College Basketball Programs."

This paper examines the impact of a 2006 NBA rule that prohibits the direct recruitment of high school players into the NBA by raising the minimum NBA age requirement and requiring players to be removed from high school for one year. This rule triggered the phenomenon of "one and done" players; players who attend one year of college and played only one year for their college's team before being professionally drafted. This study utilizes ANOVA output to determine if there was a difference between Division 1 teams that had a "one and done" player on their roster and those that did not. Data is gathered directly from the university's websites for the study. This difference was measured through five variables; winning percentage, NCAA tournament games, attendance, merchandise sales, and roster turnover. One and done players had a statistically significant impact only in increasing the teams' appearances in NCAA tournaments, but the author argues that the popularity of this factor means it should be weighted more heavily than the other non-significant factors. This examines much of the motivation players have in regards to trying to spend the least amount of years in college in order to maximize their earnings by being able to be in the NBA for longer so they have the opportunity to get higher salaries before those who stay in the NBA longer. This obviously has an effect on the level of competition in the NCAA and the NBA over a sustained period. Our performance variables are also significantly affected by this behavior.

III. Data Description

There is a perception that One and Done players, those who decide to start their professional career as soon as possible, are the best of the best. To test whether or not starting a professional career at the earliest possible time is a predictor for the salary over the course of a career, we constructed our own dataset from publicly available NBA statistics. The dataset has 134 observations, 67 One and Done players and 67 players who completed two or more years of college before entering the NBA. All players were drafted between 2007 (the year after the one and done rule was implemented) and 2018 (so they have all played at least one full season).To determine if the player was a "one and done" player, information on players was gathered from online articles and then used the official NBA website to verify that the player only played one year of college basketball before entering the NBA draft. The "other" players were selected randomly from a list of players who were also in the NBA draft during the same time period who had completed two or more years of college. Since One and Done players are more likely to be highly skilled, and therefore measure the benefits of starting their professional career as early as possible outweigh any benefits from remaining college. Due to this there is a potential risk of bias in our data, as these players are more likely to have larger salaries. To correct this, the "other players" were all also first round draft picks, and therefore would have similar or the same perceived skill level at the beginning of their career.

Data on salaries and player and NBA statistics (draft, PPG, etc.) were gathered from Basketball Reference.com. This data source was chosen because it has the most comprehensive data on salaries and sources official NBA data from SportRadar, an international data collection and analysis firm that is an official partner of the NBA. Average annual salary was manually calculated based on the total career salary of the player and divided by the years played in the

NBA. Total career salary was calculated by summing the players' yearly salary from the first year they were drafted until the 2018-2019 season, or the last season they played if their career ended before last year. If salary or other data was available for the 2019-2020 season, it was ignored as data for this year is not readily available for all players and we are currently in the middle of the 2019-2020 season so statistics for this year are incomplete. Data on other factors that could impact salary, such as statistics that measure skill were included. The statistics for Points Per Game (PPG), rebounds, and assists are averages across the players' careers. The All NBA Team is an annual award for the best players in the league that season. 126 members of the media vote on the fifteen best players in the league, so this variable measures players' perceived skill and the perception of each player outside of game statistics. The variable counts the amount of times the player has been voted as a member of an All-NBA team over the course of their career. Table 1 below displays summary statistics:

Table 1 -Summary Statistics

Variable	**Mean**	**Standard Deviation**
Average Annual Salary	5,973,406	3,893,097
One and Done	.5	.501
Age (during last season played in NBA as of 2018-2019 season)	25.798	3.195
Duration of NBA Career (as of 2018-2019 season)	6.291	3.06
Draft pick	11.097	9.462
All NBA Team	.425	1.426
Points Per Game (PPG) career average as of 2018-2019 season	11.251	5.593
Assist, career average as of 2018-2019 season	2.276	1.853
Rebounds, career average as of	4.762	2.466

2018-2019 season		

IV. Model

Final specification: $Y=B_0+B_1X_{\text{one and done}}+B_2X_{PPG}+B_3X_{Playoff}+B_4X_{\text{NBA All Team}}+B_5X_{Rebounds}+B_6X_{Assists}+\varepsilon$

To create our final model, we combined our regressor of interest with variables that control for factors that impact salary such as the player's actual and perceived skill level as well as the team's skill level. The regressor of interest is a dummy variable that equals 1 if the player only attended one year of college before joining the NBA and 0 if the player attended 2 or more years of college. Other variables included in the model are Points Per Game which is an important metric that controls for the individual's skill level. Rebounds and assists are important personal statistics to include in additional to points scored per game as not all players are "scoring" players, and have other roles on the team to support the team that add to their value. The All-NBA team appearances controls for perception of the player's skill as this award is decided by media groups. External perception of skill would positively impact salary as publicly popular players could improve a team's finances by increasing ticket or merchandise sales. The team would then be more determined to keep this player on the roster and could offer benefits such as a higher salary. The exclusion of any of these variables leads to positive omitted variable bias as these factors would cause an increase in salary. The variable for NBA playoff appearances controls for factors that impact the team's skill. The individual teams' finances and position impacts salary of players so this is important to control for. Wealthy NBA franchises such as the LA Lakers for example may have more resources. On the other hand, teams that perform poorly may be more determined to draft players with star potential. Since many players

play for multiple teams during the course of their career this effect was difficult to capture. The number of appearances in the NBA playoffs should do a good job of capturing the overall skill of the team the player was on that season. The variables of age last played in the NBA and years in the NBA were excluded as they were not significant in the model and are already captured during the calculation of our dependant variable when total salary is divided by tenure in the NBA. Finally our model utilizes clustered standard errors around the draft year as the players drafted the same year are related. The overall amount NBA teams are able to pay their players now compared to 10 years ago has changed. For example the NBA salary cap for the 2012-2013 season was $58.044 million and the salary cap for the 2019-2020 season is $109.14 millions so the best players today are being paid a lot more than the best players in 2012. Players within the same draft year have similar tenures, as well as similar skill levels since all selections are first round draft picks. Therefore there may be variance in the error term correlated with the draft year, so we clustered standard errors around year drafted.

V. Results

Table 2 displays the results of our model:

Table 2 - Regression Output – Impact of Being a One and Done Player on Average Salary			
Variables	Coefficient	Standard Error	95% Confidence Interval
One and Done	763,043	541,751	(-417330, 1943417)
NBA Playoff Appearances	581,073*	52,736	(466171, 695976)
PPG Average	256,447*	70,093	(103727, 409167)
All NBA Team Appearances	198,070	240,157	(-325187, 721328)
Rebounds Average	350,033*	91,681	(150277, 549790)

Assists Average	116,449	171,598	(-257432, 490331)
Constant	-866,240	499,334	(-1954197, 221716)
* p<0.05			**R-squared= .681**

The lack of statistical significance in the long term may be due to the length of a player's career. Although the hype surrounding the skill of a One and Done player at the beginning of one's career could be an initial benefit, over the course of an entire career this initial benefit does not hold. Metrics of the player and team's skill has become the most important determinants of average salary. The coefficient on the player's PPG average, Rebound average, and NBA playoff appearances are statistically significant, which makes sense. As the player demonstrates his skill as point earner or game winner, his salary likewise increases. The variable that controls for team also has the largest coefficient reinforcing the importance of factors external to the player, their team's standing, as an important determinant.

Although our model shows no statistical significance, the coefficient on the One and Done variable estimates that One and Done players earn $763,043 more one average per year during the course of their career. In terms of economic significance, which should be expanded on in a following section, an additional $763,043 earned per year seems like an economically significant amount of money so even though the results are not statistically significant there is still some economic significance.

VI. Additional Hypothesis Testing

As a preliminary hypothesis test first we tested the difference in the means between average annual salaries for One and Done players and non One and Done players. Using a two sample T test to test the difference in mean salary between these two groups. Using this method, the means were statistically different, and the average annual salary for One and Done players is larger on average.[1] However, in the more complete regression model that controls for additional factors such as those related to skill level the difference this difference is not statistically significant over the course of a player's career.

After examining the results from our model it is clear that being a One and Done player has no statistically significant impact on salary in the long term. As a sort of robustness check on our analysis, I put forth an additional hypothesis to examine this relationship; being a One and Done player may have a positive impact on initial salary, but over the course of a player's career other factors are more important determinants of salary. To test this hypothesis we ran our same regression model for players who only had a tenure of 4 years or less, 3 years or less, and 2 years or less. Table 3 displays these results. Unfortunately, given the constraints of the data set and the group members bandwidth to collect additional data, there are not enough observations about but it would be an interesting place for further research to pick up or to verify the results of this paper.While these results are not robust enough to draw real conclusions from due to the small sample sizes, the coefficient on One and Done consistently grows larger as tenure grows shorter. Given this consistent trend, there is an argument for further research.

Table 3 - Regression Output- Short Term Impact of Being a One and Done Player	* $p<0.05$

[1] The mean for average annual salary for One and Done players is $6,702,252 while the average salary for non One and Done players is $5,244,560.

Variable[2]	Players with a Tenure of <=2 Years	Players with a Tenure of <=3 Years	Players with a Tenure of <=4 Years
One and Done	4,728,248* (492,884)	1,805,818 (1,120,652)	1,204,666 (560,005)
NBA Playoff Appearances	801,838 (577,309)	121,412 (232,990)	-161,870 (170,875)
PPG Average	-1,336 (18,656)	16,297 (71,460)	-30,102 (77,034)
Rebounds Average	171,392 (112,724)	498,692 (227,230)	580,636* (153311)
Assist Average	37,381 (112,871)	266,016 (183,800)	346,596* (127,597)
Constant	1,069,914 (548,378)	96932 (804,890)	183,594 (421,007)
R-Squared	.9635	.7942	.7198
Observations	14	25	46

VII. Interpretation of Results and Omitted Variable Bias

All of our variables had a significant effect on our analysis and we can see the differences in effect between them. We see that our one and done variable has the highest coefficient out of all of our x or independent variables. This was a dummy variable that we were measuring with all of our other variables with essentially and was the main part of our analysis. There is a 763,043 difference in average salary with being one a one-and-done player compared with not being a one-and-done player. NBA playoff appearances came next with the second highest coefficient. This makes sense as teams who do well in the regular season regularly and go to the playoffs are there usually because of their star one and done player who will generate a higher

[2] The variable for All NBA Team Appearances was omitted for these regressions as there were not enough observations for this variable in these samples.

average salary because they are more valuable to the team. Our PPG, Rebounds, and Assist per game variable helps to measure performance and its effect on average salary. Unusually it seems that rebounds garners the highest coefficient for the performance variables. This could be as many of the players who become one and done players are usually bigger, taller men who generate much of their value on the amount of rebounds a game. All NBA team appearances isn't as pivotal because NBA team appearances depends greatly on how much a specific player inspires a specific team to win. Many players do not have as good of teammates as other people so there is a discrepancy and a bias. From our R-Squared our regression tells us that the model explains 68.1% of the variation in average salary.

All of our results were for the most part economically significant from what we calculated from the standard devation.We see that with the variable of one and done there is a 6.4% SD of average salary amongst all of our players. There is 3.3% of SD for the variable of age in relation to our salary. There is a 1.4% of SD for the variable of all NBA appearances. The variable ppg is 24% of the standard deviation in relation to average salary. The variable assist constitutes 10.9% of the SD in relation to average salary. The variable of rebounds constitutes 4.8% of the SD in relation to average salary. From the results we see that One and Done players obviously earn more than players who are not One and Done specifically. There is more than a million dollar per average difference between the two categories. Our Draft Pick variable seemed to not be significant in our model. This really turned no to not be as important as we thought it was going to be. The two most significant variables came out to be One and Done and playoff appearances in the NBA. These were the two highest coefficients in our regression line.

There are many omitted variables with this kind of study. One of them includes motivation and how much the player is willing to put in the time to get better and have the chance at superstar status. This will have a positive effect on our study because a player with motivation will more than train harder which will then potentially give him a higher draft number because of improvements in his quality. This will then result in an increase in salary for the specific player. Because there is a positive effect in our variable there will be an upward bias for our variable resulting in an estimate that is too small.

The omitted variable of injury and wear and tear will have a significant factor in how the player performs. The player will more than likely not be able to play as he or she should in order to receive the number one NBA draft pick and the player may not perform as well as he should in the NBA which will lead to a negative effect. With these Negatives, we will get a positive effect which will also ensure that we get an estimate with an upward bias that is too large.

The omitted variable of team performance will have an impact on the salary of our one and done player as being a star player on a worse team will bring more dollars to your paychecks because you are the most valuable player to the team. Much of the salary cap will go to the star player and a one and done player is usually the star player on the team. A positive effect happens in this situation and an upward bias is created. This will create an estimate again that will potentially be too large. Mostly all of the omitted variables measured will make estimates too large. They all have positive effects on our line. Most of our omitted variables would largely inflate our line but potentially would be statistically significant. Again

External: Applying any conclusions of this study may be difficult as the research question is very specific. Other American sports, such as baseball, allow players to play professionally right out of high school and the rules, funding, and culture around basketball could be seen as significantly different from other sports. Basketball leagues in other countries would also have significantly different rules, and culture around sports. In particular, the rules and culture around college sports is very different.

Internal:

What is the causal effect of being a “one and done” player in the NBA? Our target population, which is the NBA, benefits positively from the “one and done” rule compared to a player staying for 3 to 4 years but also benefits negatively compared to a player just not being able to go straight to the league. It seems that adding more variables to our specification than normal would exponentially improve the fitness of our model. Many of our omitted variables that are not included in our regression are actually statistically significant. What will threaten the internal validity of this model is not including as many “other variables” as possible because all of our variables will gives us statistically significant estimates that will not lead to Imperfect

multicollinearity. We see with virtually all of our omitted variables there will be an upward bias because all of their effects are positive.

There may be some measurement error in the independent variable that could affect the size of our standard errors. Since salaries are collected and averaged over a +10 year period, ideally (given more time) we would want to control for inflation on the salaries collected from the earlier years in the data set.

There could also be some bias as “one and done” players are presumably the players who see the most value in starting their professional career early over an additional year of education, and are therefore probably the most skilled athletes. We attempt to control for some of this bias by making the majority of our player selection from players who were first-round draft picks, or those who have the same(similar) perceived skill level at the beginning of their careers

VIII. Conclusion

Economic models based on factors garnering higher salaries generate a rich variety of predictions on outcomes of player salary for One and Done Players. We have found a number of variables or factors that have a great impact on average salary going up or going down. From our conclusion we can see that players who are One and Done have a higher average salary than players who are not One and Done by 1,457,602 on average. From our variables we can see how statistically significant our variable is and the causal effect that they have on our data. In general we can conclude that a player who goes One and Done compared to a player that does not go One and Done based on our analysis is more likely to go to generate a higher average salary.

This is based on the factors of only spending a year in college basketball, NBA Playoff appearances, NBA Team appearances, and individual player performance based on PPG, Assist, and Rebounds.

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