The Statistical Value of NBA Draft Picks

Analyzing the value of an NBA draft pick since 1987

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Abstract

In this project I seek to determine the average statistical value of an NBA draft pick using data from every NBA draft since 1987. Then take this data and perform regression models on these averaged NBA draft pick stat lines for picks 1-60 in advanced stats Value Over Replacement Player (VORP), Box Plus/Minus (BPM), and Per Game Win Shares. Finally, I operationalize these average statistical values by combing them with NBA player data from all players who played in 2018 to create an NBA trade machine/value comparison tool.

Throughout the history of the NBA, almost every trade between teams has involved the exchange of a draft pick or multiple draft picks. On the surface, there is nothing unique about this exchange; it is simply one group of commodities in exchange for another group of commodities that both sides have deemed equal in value. But how did they come to those valuations? One can generate a pretty good picture of what the value of a player is, as one can examine their stats and watch them physically play basketball. But what about draft picks. They are inherently unknown commodities with an unknown value, because no name is attached to them. One cannot go watch film of a future 1st round, 17th overall pick. One can't go talk to scouts about the value of the 24th pick in the 2nd round of the draft, or examine the stat line of the 2023 1st round 5th overall pick. But what one can do is look into the past to determine the value of these picks. History and common sense tells us that first round picks are worth more than second round picks. But by how much? What is the individual statistical value of each individual pick? These are the research questions that would guide my work in this project.

To begin to answer these questions, I first had to get my data. I knew I would need the stat lines of every single NBA draft pick for all the drafts I would choose to analyze in my project. But how far back should I go? I examined numerous potential years such as fivethirtyeight.com's data generated year of 1969, the breakup of the Bulls in 1998, the defensive rule changes of 2004, or even the NBA ABA merger in 1976. Ultimately though, I went with 1987, the final year Larry Bird played Magic Johnson in the NBA Finals. As one sports writer said, the rivalry between Magic Johnson and Larry Bird "dragged the sport out of its coked-up, tape-delayed purgatory."[1] Their rivalry reshaped the format of playoff series in order to make them more media friendly. NBA games and the NBA playoffs became regular television on the national networks, while each time soon had their own local broadcast. With Magic and Bird, the NBA became the modern spectacle it is today. Moreover, the made-for-TV nature of this rivalry forced the NBA to completely change free agency rules and institute the Bird exception, where NBA teams could go over the salary cap to sign players whose rights they retain. 1987 and the Bird-Magic rivalry was the catalyst for the modern NBA, and so 1987 became my year.

From this point, I went to basketball-reference.com and downloaded the statistical data from every draft from 1987 to 2018. This data came in formatted in Excel sheets, and these data frames included both basic and advanced stats. I combined the sheets and then uploaded them into R. The next piece of data acquisition was getting the stats of all the NBA players who played in the 2018 season, so that they could be included in the trade machine. After doing some research, I found an experimental R package called ballr. Within ballr, there was a function that would allow me to access the stat line of any player from the 2018 NBA season. However, this command only allowed me access to the basic stats. Thankfully, the ballr package also came equipped with another function that allowed me to access a players advanced stats from any particular season. After setting the year to 2018 for that function and doing some R coding to join them, I had access to NBA player stat lines that would match up with those of the NBA draft picks data set.

To answer my initial question of how much is a draft pick worth, I grouped each pick by round # and pick 3, and then proceeded to summarize their statistics. This gave me access to tables of picks 1-60 displaying the average stat lines, both basic and advanced stats, of each

[1] https://www.theringer.com/nba/2017/10/26/16550508/how-lebron-james-shaped-the-nba

individual pick averaged since 1987. These tables are displayed on the "Individual Pick Values" page.

Now that I knew the statistical value of each draft pick on average, I wanted to compare these value to each other to see what I could determine about the value of each pick. To do this, I created regression models for each of the three advanced stats I was including in the draft pick's stat lines: Value Over Replacement Player (VORP), Box Plus/Minus (BPM), and Per Game Win Shares. These models can be found on the next page. Figure 1 shows us that all NBA draft picks on average are statistically worthy of being NBA players, as they are above the -2 value that separates professional NBA players from minor league G-league players. However, after around pick 15, it becomes clear that the remaining draft picks are worth about the same in terms of VORP. While perhaps the decline is not as linear as one may have guessed nor do late first round picks show as much promise as one would think, this model generally fits with the assumption that the higher up in the draft on is, the more they are generally worth. But moving to Figure 2, the data starts to tell a different story. Modeling the average BPM of draft picks, the line is moving decreasing from left to right as expected, until it gets to about the 35th pick, or 5th pick in the 2nd round. At this point, the line begins to slope up, showing increased value for late 2nd round picks. While the line in Figure 3 does not do this, Figure 3 does display numerous high value outliers late in the 2nd round. What does this mean? I believe it is illustrating the trend in NBA drafts for teams to take chances late in the second round. These are players that may have externalities, such as attitude, injury, or international status, pushing down their draft stock in spite of their basketball talent. Under the common assumption that first picks are more valuable, teams don't want to spend a pick on these riskier players. But late in the second round, when a draft pick is supposed to be the least valuable, teams are more comfortable taking chances on these players, who may pan out into better players than their late first round and early second round counterparts.[2]

Finally, I used the average values of these draft picks combined with the stat lines of current NBA players to create my NBA Trade Machine/value comparison tool. The user fills in each slot, and then the R programs under the hood of the shiny app will, after a little bit of team, tell the user which side is statistically more valuable. The machine generally works well, but its biggest shortcoming is that it cannot account for the needs of the teams on each side nor the time frame of each pick. Therefore, when some trades are put in, such as one resembling the Anthony Davis trade this past summer, the machine will say Anthony Davis is less valuable than the other side, composed of 1st round picks and other players. If one was to glance at the NBA season, they would see this is not true; the Lakers clearly got the better side of the deal with Anthony Davis. However, this is because my trade machine is looking at the statistical long term rather than the immediate short term. Moreover, sometimes draft picks in trades are for future drafts, which my machine cannot account for in its current form. Overall though, it is a fun tool to play with and see what combinations of picks and players are more statistically valuable than others.

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[2] For example: Manu Ginobli, drafted 57th overall because teams were concerned about drafting an Argentinian basketball player. He went on to become a star for the San Antonio Spurs, winning multiple championships.

Figure 1

Average VORP of Draft Picks 1-60 Since 1987

The red line represents the VORP of a replacement level player i.e. one right between the minors (G-League) and professional (NBA)
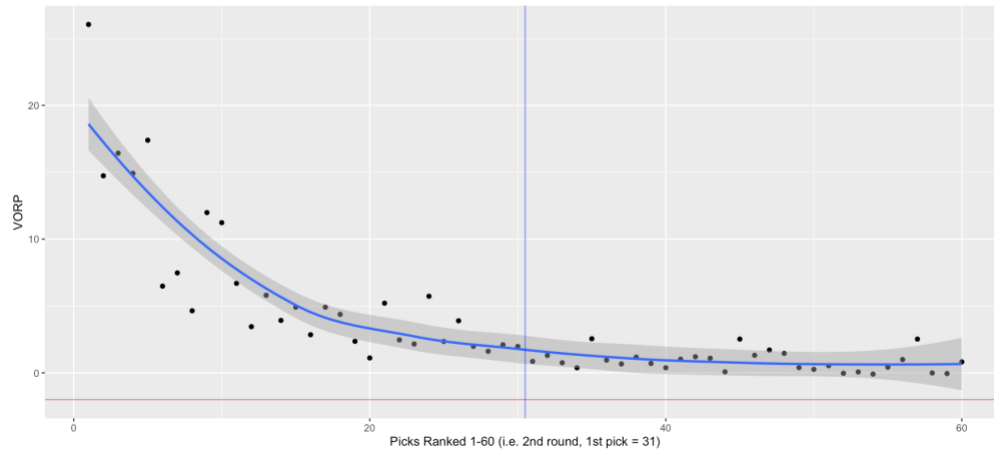

Figure 2

Average BPM of Draft Picks 1-60 Since 1987

The red line represents the NBA league average BPM

Figure 3

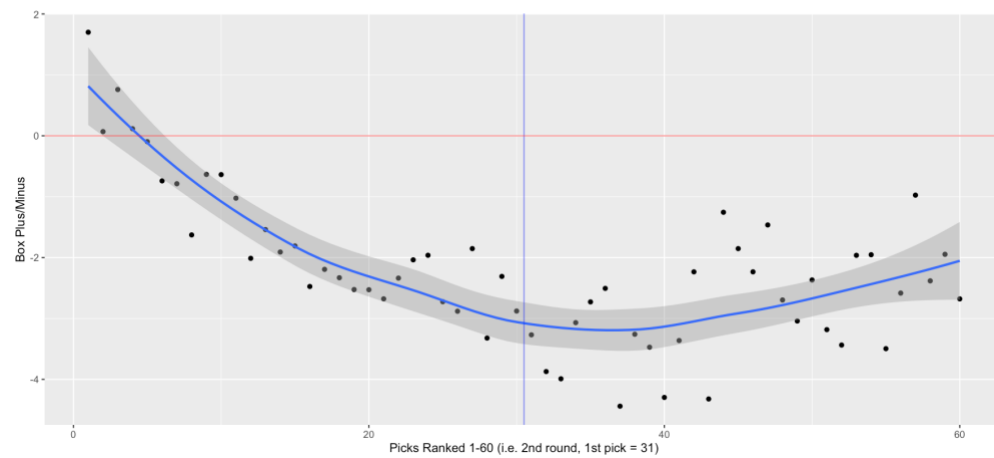### Average Win Shares Per Game of Draft Picks 1-60 Since 1987

The red line represents the NBA league average win shares per game