Investigating the Success of Top NBA Draft Picks

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Preliminary Information

Introduction

In a 2013 study on youth in competitive sports published by ESPN, it is stated that in the United States of America, "40 percent of adolescent boys and 25 percent of girls play competitive [basketball]."[1] This makes basketball, by percentage of youth involvement, the largest youth sport in the U.S. Although not all of these boys and girls carry with them their passion for the game of basketball as they transcend beyond adolescence, and certainly not all of them go on to pursue a professional career in the sport, many of them remain fans, and the sport itself remains central to American culture. It is no surprise, then, that when the National Basketball Association (NBA) Draft rolls around in late June, approximately 5 million Americans will be glued to their televisions watching the childhood dreams of 60 future NBA players materialize as their names are called by the NBA commissioner and they are welcomed into the NBA.[2]

The NBA Draft is an event during which NBA teams are allowed to select, in a predetermined order of prioritization based on the previous year's standings, players that will hopefully one-day play for and contribute to their team. The players eligible for selection are collegiate players from around the U.S., as well as the top international prospects aged 19 and up. It is important to note, however, that during the period on

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[1] "Hey data data – Swing!", ESPN Go, http://espn.go.com/espn/story/_/id/9469252/hidden-demographics-youth-sports-espn-magazine

[2] 2015 NBA Draft Ratings Buoyed by Huge Audience, AL.com, http://www.al.com/sports/index.ssf/2015/06/post_704.html

which this study was conducted, the NBA was allowing players to be drafted out of American high schools as well, with a minimum age requirement of 18.

This study will investigate in detail the careers of the top 5 NBA Draft picks from the 1985 NBA Draft through to the 1994 NBA Draft. The study of this sample of top 5 draft picks, analyzing their career success, both from an individual and a team standpoint, will look to answer the following sub-questions: Is "tanking", a process that will be explained later in this report involving the intentional losing of games in an attempt to attain the first overall pick in the draft, worth it?; How do top 5 draft picks affect their team's success immediately, in the short term, and in the long term?; How much individual success do top 5 draft picks find throughout their careers?; And finally, is there a large discrepancy between career accolades of first overall picks when compared to second, third, fourth, and fifth overall picks? In answering these sub-questions, this study is attempting to determine if a discrepancy between the success of first overall picks when compared to second, third, fourth, and fifth overall picks exists, and thus, if first overall picks are overvalued in relation to their slightly less valued, but potentially equally valuable counterparts.

Purpose

In August of 2014, a long-rumored blockbuster trade was finally completed, as NBA star Kevin Love was dealt from his Minnesota Timberwolves to the Cleveland Cavaliers in return for the first overall pick in the previous draft, Andrew Wiggins, before he had even played a single NBA game. The hope for Minnesota was to receive a player in Wiggins that could turn around their franchise and lead them to success down the road, while dumping Kevin Love, a player whom, they thought, had potentially reached his ceiling. Less than one year after this deal, Cleveland had made the jump

from the bottom of the standings to the top of their division, and Minnesota had fallen to dead last place in the league. The year after that bred the exact same result. In hindsight, it appears as though Minnesota saw more value than was warranted in the first overall pick that year. Interestingly enough, Minnesota is not the only team that glorifies first overall picks. Every year, a number of teams make a strong push to acquire the first overall pick in the draft despite history showing it may be overvalued. Some teams even go to measures as far as losing games intentionally and risking the support of their fan base in order to attain the first overall pick, one that may not hold any more value than the slightly later picks that can be attained by genuine, fan-base-retaining mediocrity. This study will attempt to illustrate that first overall picks are overvalued and, in fact, relatively equal in value to second, third, fourth, and fifth overall picks. If this hypothesis proves to be true, it could change the way NBA teams view the draft, valuing integrity over draft position. It could also change the way fans view the NBA Draft, making it less devastating to discover your team has only attained the fourth overall pick instead of the first overall pick, for example.

Method

Sample Selection

As mentioned earlier, this study will investigate the careers of the top 5 picks from the 1985 NBA Draft through to the 1994 NBA Draft. This sample will represent the entire population of top 5 NBA Draft picks since the first NBA Draft in 1947. Due to restraints resulting from a lack of time and man-power, the study was limited to the investigation of only the top 5 picks from each of the Drafts indicated above. These NBA

Drafts were selected in particular because the 1994 Draft is the first Draft, going back in history, from which, as of the 2015-16 NBA season, not a single one of the players selected remains an active player on an NBA roster. The other endpoint of the sample, the 1985 NBA Draft, was selected as it allows for a total of 10 consecutive NBA Drafts to be analyzed. This sample allows for analysis of the careers of a total of 49 players, as the second pick in the 1986 Draft, Len Bias, passed away suddenly the day after he was selected, never having the opportunity to play in the NBA.

When you consider the case of Len Bias, it becomes apparent that there is most certainly a level of sampling bias associated with the sampling method. It is likely that the sample selected will result in sampling bias, a phenomenon occurring when a sample that does not accurately represent the whole population, in this case the population of all top 5 draft picks in NBA history. Len acts as an outlier and his unusual circumstance shows that this sample, like any sample attempting to mimic a population, does not perfectly represent the population as a whole.

Data Collection

All of the data used in this investigation is secondary data. The data, including the names, draft position, statistics, and salaries among other things, on all of the 49 players analyzed was collected from two sources: Basketball Reference, and NBA.com Stats. Both of these sources can be classified as reliable. NBA.com Stats is the official source used by the media for professional basketball statistics, and every statistic published on the site is published by the NBA itself. Powered by SAP, an industry leader in statistical databases, the statistics published on NBA.com Stats are reviewed and verified regularly by NBA officials. The other source of my data, Basketball Reference, a division of Sports Reference, is widely recognized as one of the world's most reliable sports statistics

databases. It is a registered partner of several professional sports leagues across the world, including the NBA itself. The data was collected by these sources throughout the careers of the 49 players investigated in this study, from countless NBA box scores and statistical publications. For the purpose of this study, numerical data from these sources relating to the players of interest was entered by hand into a Microsoft Excel spreadsheet, a fact that stands as a significant flaw in the data collection process. Not only was the collection of data incredibly time consuming, but it also introduces the possibility that errors may have been made in the replication of data. Perhaps if the data points involved in the study weren't so deeply buried in a sea of data irrelevant to the study at hand, then it may have been possible to simply export the large amounts of data to a spreadsheet automatically, saving time and eliminating possible error. This also may have allowed the study to cover a larger sample, working to minimize the effects of the sampling bias.

All of the data collected and used in this investigation can be found in a table in the Appendix (Fig. 1).

Variable Analysis

In answering the sub-questions outlined in the introduction, this study will analyze a series of two-variable data points, looking for trends and correlations. The only independent variable that will be used in this study is categorical, and comes in the form of ordinal data. Categorical variables are those that are limited to a certain set of values, and these values help to group the data into categories. Ordinal variables are categorical variables that can be placed in a logical order. This study uses one ordinal variable: the player of interest's draft position (first overall, second, third, etc.). The dependent variables involved in this study are quite numerous, and while they are all

classified as numerical variables, they can be divided into two categories, discrete and continuous variables. Discrete variables are numerical, but can only take on a limited number of values resulting from a count. Discrete variables used in this study include the amount of points, rebounds, and assists a player amassed throughout his career, the amount of games a player played in his career, the amount of games and championships a player won in his career, and also the number of times a player was selected to an all-star or all-NBA team in his career. The other type of numerical variable is a continuous variable. Continuous variables can take on an infinite number of values, because instead of resulting from a count, they are the result of a measurement. The only continuous variables used in this study are two advanced statistics known as Value Over Replacement Player (VORP) and Player Efficiency Rating (PER). These variables are continuous because they involve measurements of on-court activity such as the distance a player covers on the floor every game among other things.

With a firm understanding of the method used to collect and analyze the data associated with the completion of this study, we are ready to analyze and interpret the findings of the investigation.

Sub Question Analysis

In attempt to answer the question of whether or not a discrepancy between the success of first overall picks when compared to second, third, fourth, and fifth overall picks exists, and thus, if first overall picks are overvalued in today's NBA, this study investigates the following sub-questions: Is the intentional losing of games in attempt to attain the first overall pick, a process known today as "tanking", worth it?; How do top 5

draft picks affect their team's success?; How do top 5 draft picks fare in terms of individual success throughout their careers?; And finally, is there a large discrepancy between the statistics and career accolades of first overall picks when compared to second, third, fourth, and fifth overall picks? Each of these questions will be accompanied by relevant data, statistics, and graphs, as well as an analytical commentary.

Note that for all of the graphs shown in the following section, the following formulae are used for calculations:

$$Coefficient\ of\ Determination = R^2$$

$$Correlation\ Coefficient = R = \sqrt{R^2}$$

$$Standard\ Deviation = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n}}$$

The coefficient of determination is a measure of the percentage of change in the dependent variable that is a result of a change in the independent variable. The correlation coefficient, the square root of the coefficient of determination, measures how strong of a correlation there is between the two variables. Finally, standard deviation is a measure of the spread of data, or the average deviation of data points from the mean. A larger standard deviation, in the case of the statistics analyzed in this study, indicates a lower predictability or greater uncertainty in how a player may do in that specific statistical category, as the data points are more spread out. A smaller spread in the data illustrates the fact that when this study is comparing statistics, even though it may

uncover trends, the effects of these trends are rather small, and, in fact, many of the players investigated have quite similar statistics, regardless of discrepancies in their draft position.

Also note that the independent variable in every graph in the upcoming section is the pick number with which a player was selected. This variable is categorical and ordinal by nature. A brief description of the dependent variable will be included before each graph, indicating not only what the variable is, but also what type of variable it is. For all the data used to create the following scatterplots, see Appendix Fig. 1.[3]

Sub-Questions 1 & 2: Is "Tanking" Worth It? How Do First Overall Draft Picks Affect Their Team's Success?

Background Information

Before the 2015-16 season began, two NBA teams completely renovated their respective rosters. These two teams were the Philadelphia 76ers and the Los Angeles Lakers. Throughout the season, Philadelphia had a total of 20 different players play at least 1 game for the team; Los Angeles, 17. To put this in perspective, a typical NBA team only dresses 10-12 players per game, and has an average of 14 players play for their team all season. With 20 players dressing, the 76ers could potentially play C(20, 5) or 15504 different lineups of player; the Lakers, 6188. A very large number of combinations when compared to the league average of C(14, 5) or 2002 possible combinations. On the surface, management appeared to be struggling to keep a consistent group of high

[3] The data was collected from Basketball Reference and NBA.com Stats and then entered into a Microsoft Excel spreadsheet for easier analysis

performing players together for either of these teams, but that may not have been the real issue.

Many basketball analysts accuse these teams of doing what is called “tanking”. Tanking is when a team’s upper management intentionally puts together a team of mediocre players, pairing them with a mediocre coach, essentially building a team to lose, with the hopes of losing as many games as possible and landing the first overall pick in the upcoming draft. The 2015-16 season saw the Philadelphia 76ers finish with a record of 10 wins and 72 losses, while the Los Angeles Lakers finished with 17 wins and 65 losses, two of the worst records in NBA history. This process is frustrating and demoralizing to players and fans, and can cause serious damage to a team’s reputation and fan base, begging us to ask the question, “is tanking really worth it?”

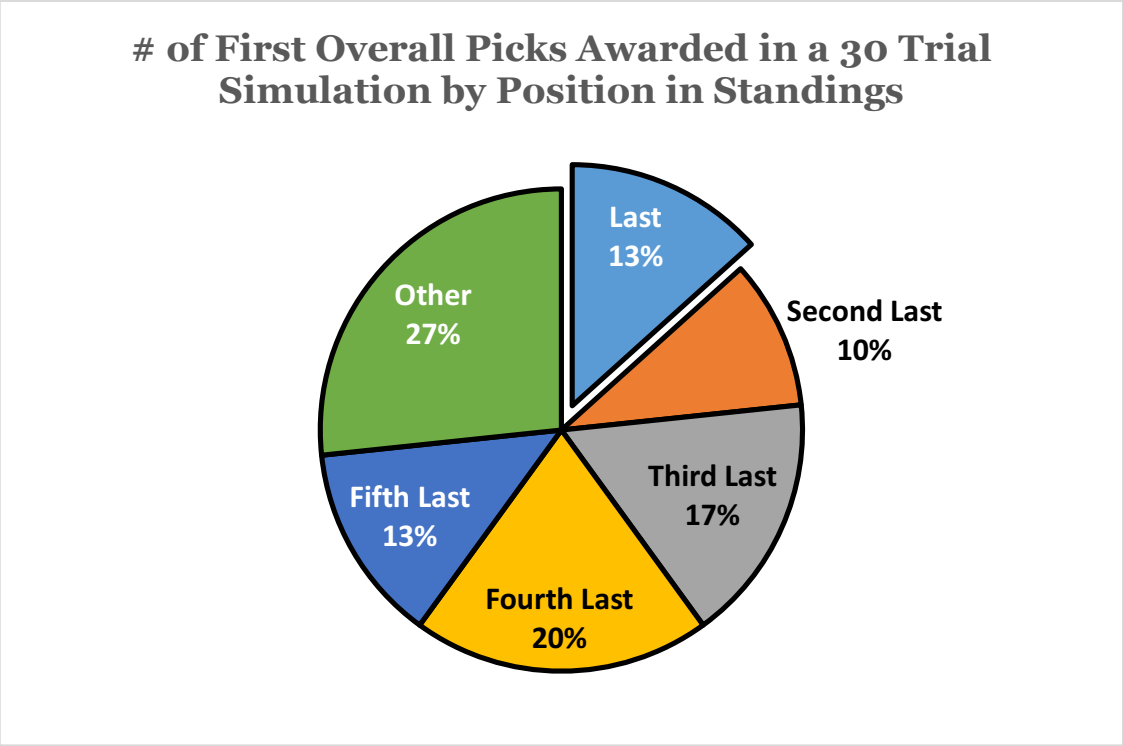
Before beginning the investigation, it is important that we understand a few basic details about the NBA Draft itself. When the collegiate and international seasons are wrapping up, scouts have had enough time to evaluate these players, and they have ultimately compiled a complete report on each and every player, detailing their strengths, weaknesses, and abilities. Of course, after scouts convene and their evaluations have been made public, certain players are more sought after than others, and thus teams must be assigned drafting priority to decide who gets first choice, second choice, third choice, etc. This assignment of priority is done through what’s called a draft lottery.

In the lottery, fourteen ping pong balls are placed in a traditional lottery machine and a combination of four is selected. This gives a total of 1001 combinations (see calculation below).

$$C(14,4) = \frac{14!}{(4)!\,(14-4)!} = 1001$$

Of these 1001 combinations, 1 is disregarded, giving the lottery a total of 1000 combinations. These 1000 combinations are assigned to teams with a higher percentages of the total being given to teams in reverse order of their placement in the standings. For example, the team finishing dead last in the previous year's standings is assigned 250 of the 1000 combinations, for a 25% chance at the first overall pick. The second last team; 199 out of 1000 for a 19.9% chance. The third last team; 156 out of 1000 for a 15.6% chance. The fourth last team; 119 out of 1000 for an 11.9% chance. And the fifth last team; 88 out of 1000 for an 8.8% chance at the first overall pick.

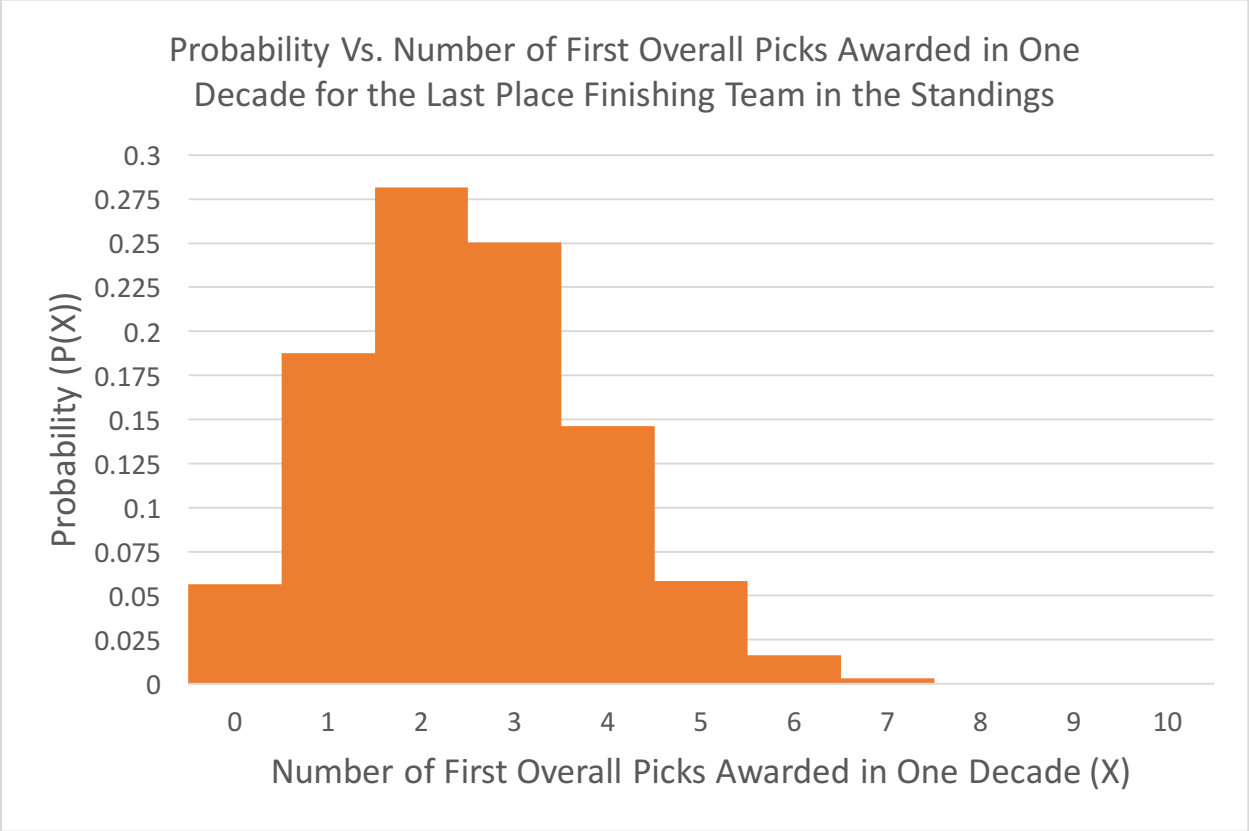
In a simulation of 30 draft lottery trials based on the 2016 draft lottery odds, the following results were observed: The first overall selection was only awarded to the team finishing in last place 13% of the time. This simulation was included in an attempt to illustrate the fact that, in such a small number of trials, for example the NBA Draft Lottery results over the course of a decade, the law of large numbers fails to come into play and the outcomes often do not begin to strongly tend towards the expected value.



Treating the NBA Draft lottery as a binomial experiment in which a success is considered to be a trial in which the last place team wins the first overall pick, and a failure is any other outcome, we can determine the probability of the last place team earning any of the possible values between zero and all ten first overall picks in a 10-year period. If we let "X" represent a discrete random variable taking on a value between zero and ten inclusive, "n" represent the number of trials (10), "p" represent the probability of a success (0.25), and "q" represent the probability of a failure (0.75), then we may calculate the probability associated with each possible value of the random variable using the following formula:

$$P(X) = C(10, X) \cdot (0.25)^{X} \cdot (0.75)^{10-X}$$

The following histogram illustrates the probabilities associated with every possible value of the discrete random variable, X.



The expected value for the discrete random variable, X, is 2.5, calculated by multiplying the probability of a successful trial by the total number of trials. The histogram has a right-skewed shape, placing the bulk of the probability distribution between values of 1 and 4. This means that if a team were to finish in dead last place for 10 consecutive years, they would likely only receive the first overall pick in between 1 and 4 of those years.

Now, with a basic understanding of the NBA Draft, the draft lottery, and the associated probabilities, we are prepared to begin to investigate the first sub-question itself: is tanking worth it?

Many teams resort to tanking, and it is becoming somewhat of an epidemic in recent years in the NBA. Countless sports columnists have identified the growing problem and offered opinions on how tanking could be controlled. One such article, written by Bleacher Report, is titled "5 Reasons Tanking MUST be Eliminated in the NBA".[4] It is a consensus understanding that there is no place for tanking in the game that America holds so near and dear to heart, however it continues to be a problem. There must, then, be a legitimate reason that leads so many franchises towards tanking. All of this tanking would be understandable if first overall picks had the ability to turn their respective franchises around, and bring them back from the NBA's graveyard of mediocrity in a significantly more efficient manner than a second, third, fourth, or fifth overall pick. So to answer the sub-question of whether or not the process of tanking is worth it, this study will answer the second sub-question, investigating the contributions made to their teams by first overall picks when compared to second, third, fourth, and fifth overall picks.

Investigating Top 5 NBA Draft Picks' Career Lengths

When a team is going to risk their fan base and their dignity by tanking in hopes of landing a first overall pick, they are likely hoping to get a player in the draft whose career will last longer than the average player, a player who will contribute more seasons and thus more games played to a franchise.

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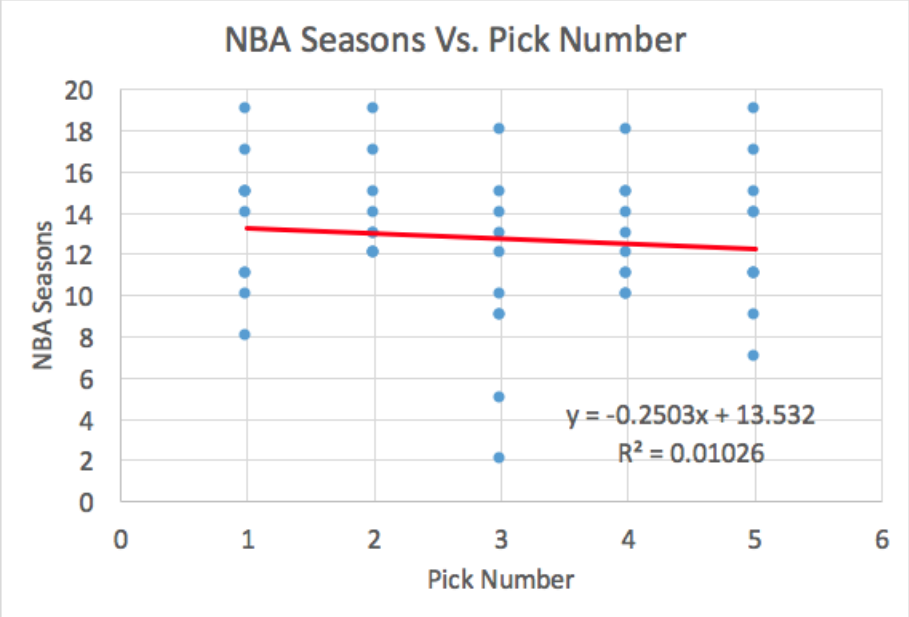
[4] "5 Reasons Tanking MUST be Eliminated in the NBA, Bleacher Report, http://bleacherreport.com/articles/1160643-5-reasons-tanking-must-be-eliminated-in-the-nba

The following is a scatterplot displaying the total number of seasons played by a player vs. the pick number at which they were selected. Below the scatterplot will be a sample calculation calculating the standard deviation and correlation coefficients for the data. After the sample calculation for this plot, calculations will be omitted in the interest of time and length. The dependent variable for the following graph is the number of seasons a player has played in the NBA. This variable is numerical and discrete, as it is the result of a count:



Sample Calculations

$$Correlation\ Coefficient = R = \sqrt{R^2} = \sqrt{0.01026} = -0.10129$$

$$Standard\ Deviation = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n}}$$

Where “x” is the value of the dependent variable, “$\bar{x}$” is the mean value of the dependent variable, and “n” is the number of data points.

For the excel table used to calculate standard deviation, see Appendix Fig. 2.[5]

$$Standard\ Deviation = \sqrt{\frac{604.530612}{49}}$$

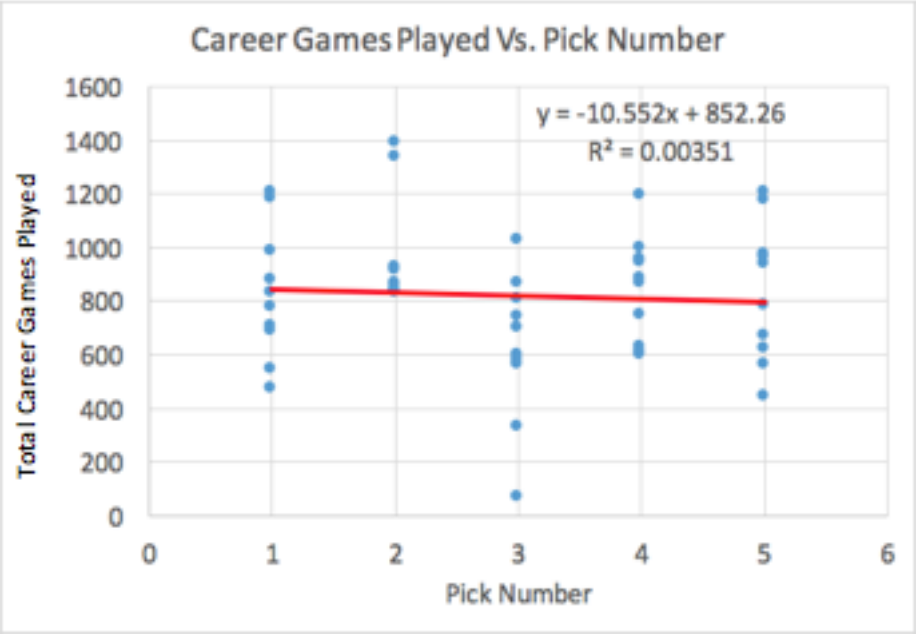
$$Standard\ Deviation = \sqrt{12.3373594}$$

$$Standard\ Deviation = 3.51245775$$

Here we see that there is virtually no correlation between the number of seasons a player plays and the pick number at which he was selected. The coefficient of determination is 0.01026, indicating that about 1% of the change in the number of NBA seasons a player plays is the result of a change in the pick number. The correlation coefficient for this set of data is -0.10129, thus proving that a correlation between the independent and dependent variables for this set of data does not exist. The standard deviation of this data set is 3.51, indicating a fairly large spread. This means that the number of seasons that players play in the NBA is a number that varies quite significantly, implying the uncertainty of the length of a player's career regardless of where they are drafted.

[5] The data used to calculate standard deviation for seasons played is included in the Appendix (Fig. 2). The data points, the mean, the difference between each point and the mean, the squared distance between each point and the mean, and the total number of data points are all included in this spreadsheet. These values were all used to calculate variance, then standard deviation, values also included in the spreadsheet.

The next scatterplot displays the number of games a player plays in the NBA vs. the pick number. The dependent variable, total number of career games played, is numerical and discrete:



This scatterplot, again, reveals no correlation between the number of games a player plays in their career and the pick number at which they were selected. The coefficient of determination shows that less than 1% of change in number of career games played is a result of a change in the pick number. The correlation coefficient is a mere -0.05925, indicating that virtually no correlation exists. It is interesting to note that even if the trend line observed above was determined to represent a strong correlation, the slope of the line indicated that for every successively lower draft pick number, you are only to expect a career shorter by an average of 10.5 games. On the scale of a career between 600 and 1200 games, 10 is quite insignificant. The standard deviation in total career games played among player in this sample is 253.16, again, a

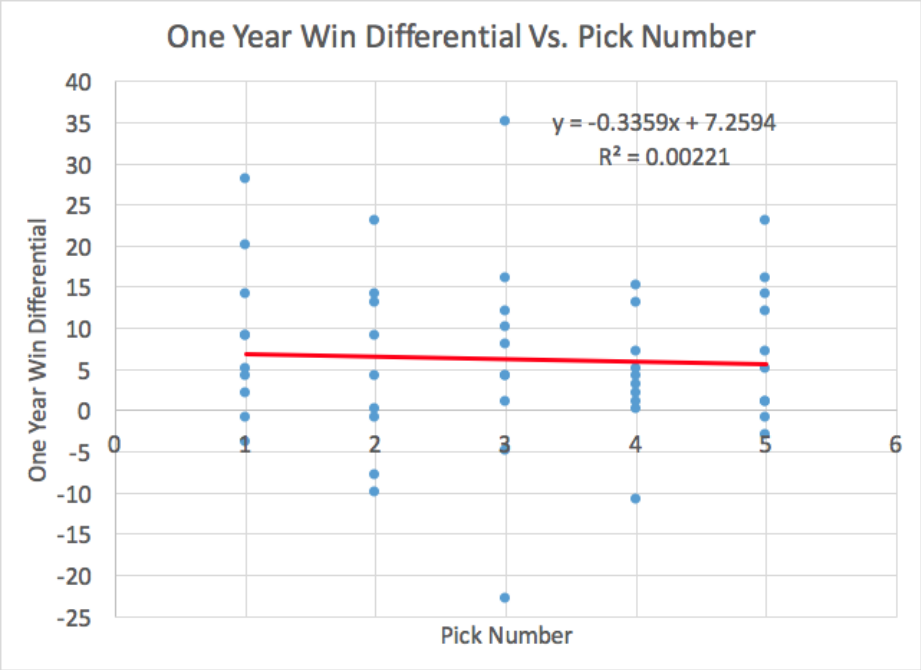
very large number, indicative of the large spread that exists within the data. This proves that the number of games a player is to play in their career is largely variable, and unpredictable.

It is safe to conclude, after analyzing the career lengths of players drafted in the top 5 picks, that first overall picks are not likely to provide a franchise with more lasting service than other players picked in the top 5.

Investigating Top 5 NBA Draft Picks' Effect on Team Success

In order to determine whether or not tanking is a good option for an NBA organization to pursue, it is important to investigate how top 5 draft picks affect the success of their teams immediately, in the short term, and over the long term. For the purpose of this report, we will be judging the success of a team following their selection of a player based on the number of wins they are able to accumulate in the following seasons. Basketball is a business, and the more wins a team has, the greater the fan base, and thus, the greater the team's revenue.

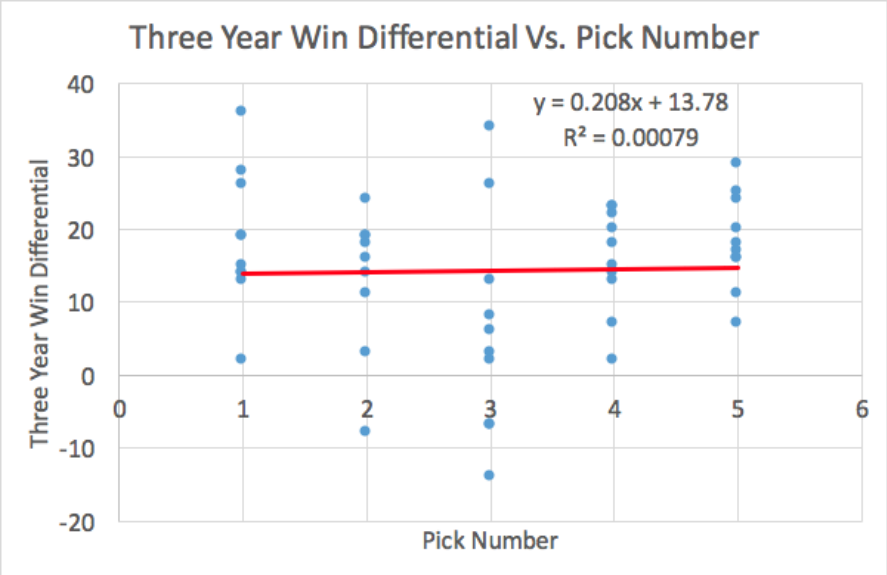
To determine whether or not first overall picks help their teams to more immediate success, we will look at the one-year win differential. This is the difference between the number of wins that a team amasses in the first season that their draft pick plays and the season immediately prior, before the player was selected. For example, if a team finishes with 20 wins in one season, then, after drafting a player with the third overall pick, wins 32 games the next season, that team's one-year win differential would be +12. The following scatterplot plots the one-year win differential vs. the pick number at which the player was selected. The dependent variable, one-year win differential, is numerical and discrete:



In interpreting the slope of the line of best fit, it is evident that even if a correlation did exist, its effect would be so miniscule, with the one-year win differential caused by a first overall pick being only an average of 1.5 wins higher than that of a fifth overall pick. The coefficient of determination is 0.00221, indicating that almost none of the change in one-year win differential is determined by a change in pick number. The correlation coefficient is -0.04701, making it clear that virtually no correlation exists between the variables. The standard deviation of one-year win differential is 10.16. This is a very large spread in a league where each team plays only 82 games a season. This large spread proves that the effects rookies, or newly drafted players, can have on their team can vary significantly, regardless of what number of pick they were selected with.

In an attempt to determine how top 5 draft picks affect the success of their teams in the short term, we can analyze their contributions measured using the three-year win differential. This is calculated similarly to the one-year win differential, except it is the

difference between wins in a player's third season and the number of wins that franchise amassed the season prior to drafting them. The scatterplot containing this data is shown below. The dependent variable in the following graph is three-year win differential, a numerical discrete variable:



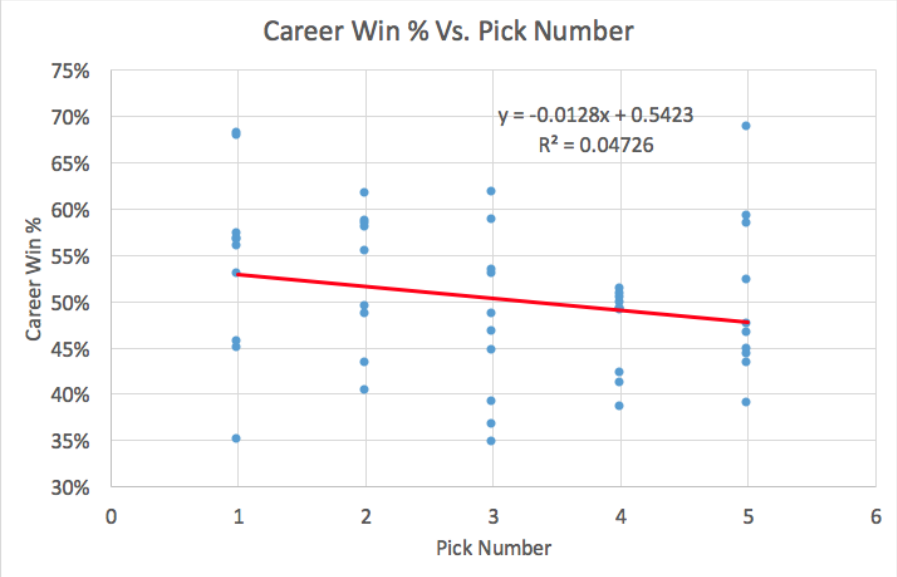
This scatterplot, again, has an extremely small coefficient of determination at 0.00079. The correlation coefficient is +0.02811, another miniscule value implying no correlation between the variables. The standard deviation of this set of data points is 10.52. This, like one-year win differential, is a very large spread, indicating the vast amount of variance that can be observed in this variable.

Finally, this study investigates the effect that draft picks have historically had on their long term team success, through the analysis of players' career win %, career win shares, and NBA Championship wins.

Career win % is a statistic calculated as follows:

$$Career\ Win\ \% = \frac{(Career\ Wins)}{(Career\ Games\ Played)} \times 100$$

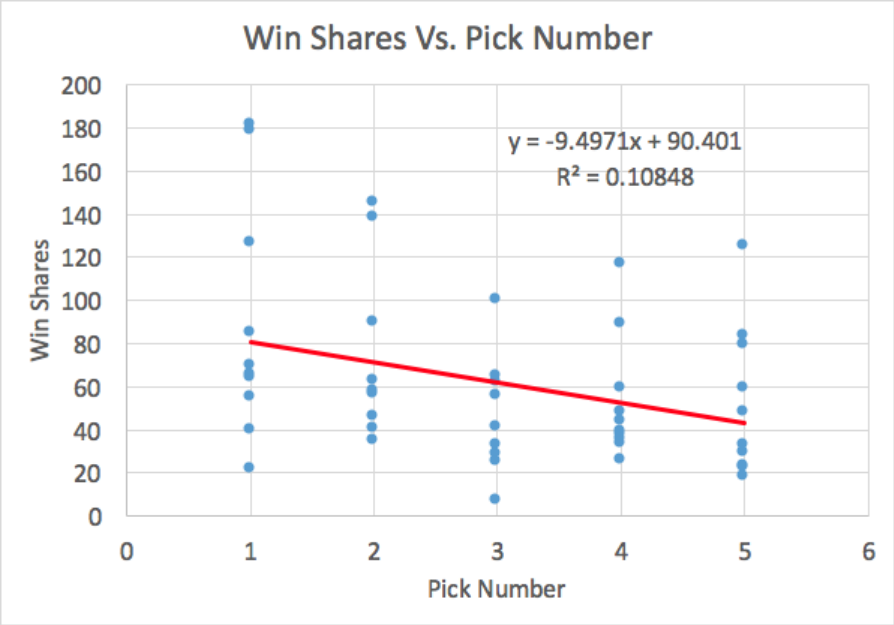
The career win %s of the top 5 NBA Draft picks vs. the pick number at which they were selected from years 1985 through to 1994 are plotted below. The dependent variable for the following graph is career win %, a numerical discrete variable:



The career win %s of players does not appear to be dependent upon the position in which they were drafted, as the coefficient of determination for this data set is 0.04726. The correlation coefficient is -0.21739. This indicates that an incredibly weak, if any, correlation exists between a player's career win % and their draft position. The standard deviation in career win % among the players in the sample is 8.39%. This is a large spread in the data, and one that certainly is indicative of the fact that no matter the pick number with which a player is selected in the draft, there is a wide range in career win %s that they may achieve.

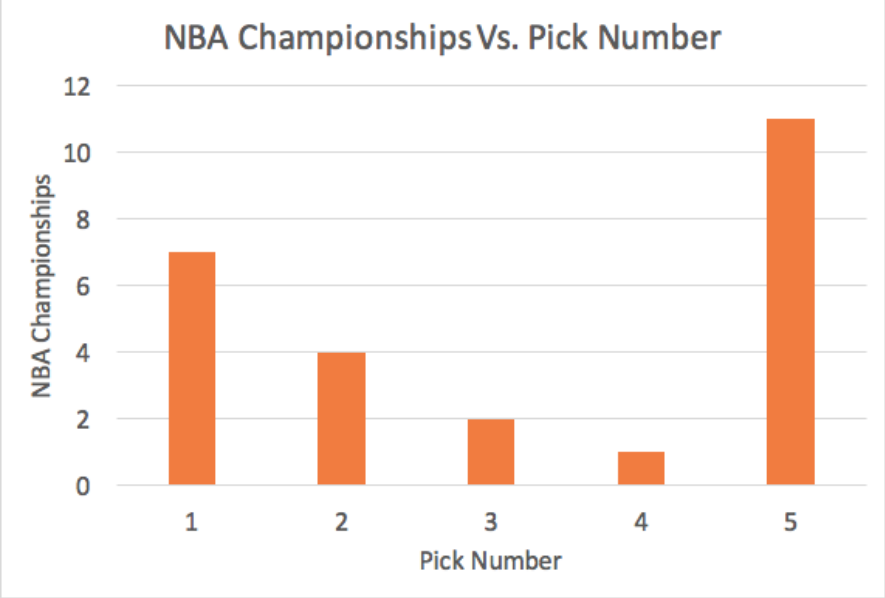
Win shares is an advanced statistic that takes into account a team's success when a player is on the court and compares that to the team's success when the player is off

the court in an attempt to determine the estimated number of wins that a player can individually be accredited with providing his team. Or, in other words, the number of games a team won that they would not have been able to win without that specific player in the lineup. Below is a scatterplot containing players' career win shares vs. the pick number at which they were selected in the draft. The dependent variable for this graph is win shares, a numerical discrete variable, as it is calculated by performing a series of operations on other discrete values:



This set of data reveals a coefficient of determination of 0.10848, meaning approximately 11% of the change in career win shares is determined by a change in the pick number that a player was selected at. This does not represent a significant correlation. The correlation coefficient is -0.32936. This can potentially be interpreted as a weak, but existing, negative correlation. The standard deviation in win shares is 40.98. Again, this indicates that the variance in win shares is large, and thus the spread of the data is large as well.

Finally, the last barometer of long term team success is, of course, NBA Championships. The goal of any NBA franchise is to someday compete for, and hopefully win, a championship. Championship wins mean greater fan base and ultimately maximum team revenue, so for any team looking to tank for a first overall pick, it would be important to know whether or not first overall picks have historically led to more championships. The following bar chart displays the total number of championships won by players in the sample analyzed, categorized by the pick number at which they were selected. The dependent variable is the number of NBA Championships a player has won, a discrete numerical variable:



Although there does appear to be a steady decrease in the number of championships won by players drafted from positions one to four, the greatest number of championships were won by players, from this sample, that were selected with the fifth overall pick. It does not appear as though the number of championships a team will win with a specific player is dependent on the position at which that player was drafted by their team.

Conclusions: Sub-Questions 1 & 2

By analyzing the length of their careers in both and seasons played in the NBA, their one-year and three-year win differentials, their career win %s and career win shares, and finally their total number of NBA Championship victories, we are able to draw conclusions as they pertain to the questions of whether or not tanking is worth is and how draft picks affect the success of their teams. The answer to the first question becomes quite apparent when you interpret the results of the investigation of the second.

There appears to be no correlation between the pick number at which a player was selected and one-year or three-year win differential. The correlations between draft position and career win shares and draft position and career win % are very miniscule, and almost negligible. Finally, the number of total NBA Championships won does not appear to be dependent on a player's draft position either. Therefore, it stands to reason that first overall picks do not, in fact, tend to lead their teams to more success immediately, in the short term, or over the long term.

The answer to the first sub-question, is tanking worth it, has also made itself clear. A successful job of tanking, one that sees the team finish in last place in the NBA standings, only allows a team to receive the first overall pick 25% of the time, and a simulation of 30 draft lotteries only saw the last place team win the first overall pick 13% of the time. The probability distribution also indicates that, in one decade, it is most likely that the last place team will only receive the first overall pick between one and four times, inclusive. In addition to the odds being heavily stacked against teams looking to tank for a first overall pick, it is likely that partaking in tanking will risk the support of a large portion of a team's fan base. Fans do not appreciate mediocrity, and it is

especially demoralizing when this mediocrity was brought upon by choice. Tanking also risks an NBA team's reputation, as many players would be wary of joining a team with a history of tanking. On top of all this, it appears as though there is little to no correlation whatsoever between the position at which a team drafts their player and the team success that follows. Based on measly odds and damage to a loyal fan base and a team's reputation alone, it would be fair to conclude that tanking is not a good option. But coupled with the knowledge that even a successful job of tanking, resulting in a first overall draft pick, will likely not lead to any more success than the second, third, fourth, or fifth overall picks makes it rather obvious that tanking is not, in fact, worth it.

Sub-Question 3: How Much Individual Success Do Top 5 Draft Picks Have Throughout Their Careers?

Background Information

On January 22, 2006, teammates Kobe Bryant and Kwame Brown produced what remains, to date, one of the best combined scoring outputs by a pair of players in NBA history. On that day, these two players alone combined to score 84 points against a shocked Toronto Raptors squad. In that electrifying performance on that cold January night, Kobe Bryant, a fourteenth overall pick in the NBA Draft scored 81 points; Kwame Brown, a first overall pick, scored 3.[6]

It is a common misconception that a player's draft position is a tell-tale indicator of how well that player will fare in terms of individual success throughout their career.

[6] Kobe Bryant 81 Point Game Box Score, ESPN Go, http://espn.go.com/nba/boxscore?gameId=260122013

By analyzing the career statistics of top 5 picks in the NBA Drafts from 1985 to 1994, this study investigates whether or not a player's draft position is, in fact, indicative of how much success a player will go on to have in their NBA career.

This study will look at players' individual accumulated statistics such as points, rebounds, and assists per game, as well as some advanced metrics, in an attempt to judge the individual success of a player.

Investigating Top 5 NBA Draft Picks' Individual Accumulated Statistics

Three of the most commonly used statistics to judge a player's individual performance in basketball are their point, rebound, and assist totals. In basketball, all three of these statistics are determined by taking the mean number of points, rebounds, or assists a player amasses in a season, or career. The calculations for points, rebounds, and assists per game are as follows:

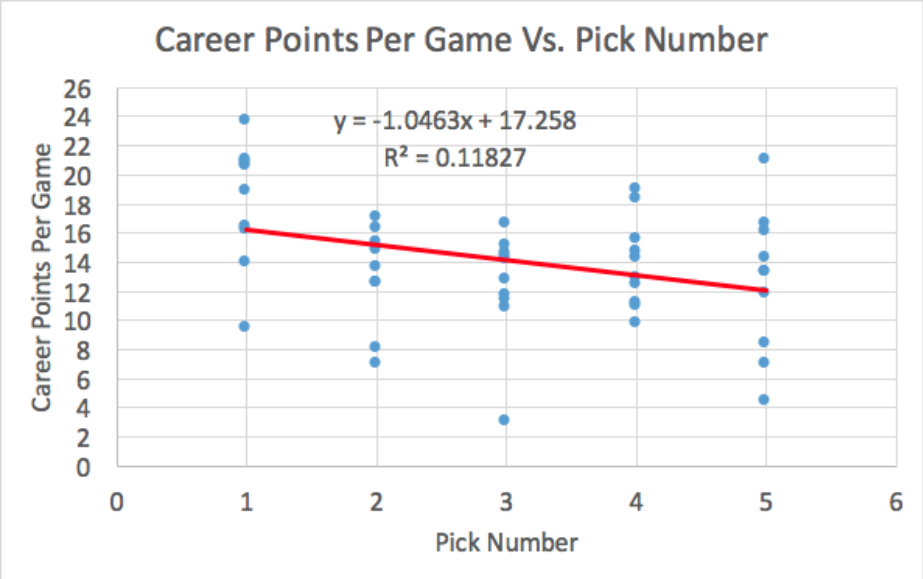
$$Points\ Per\ Game = PPG = \frac{Total\ Points}{Games\ Played}$$

$$Rebounds\ Per\ Game = RPG = \frac{Total\ Rebounds}{Games\ Played}$$

$$Assists\ Per\ Game = APG = \frac{Total\ Assists}{Games\ Played}$$

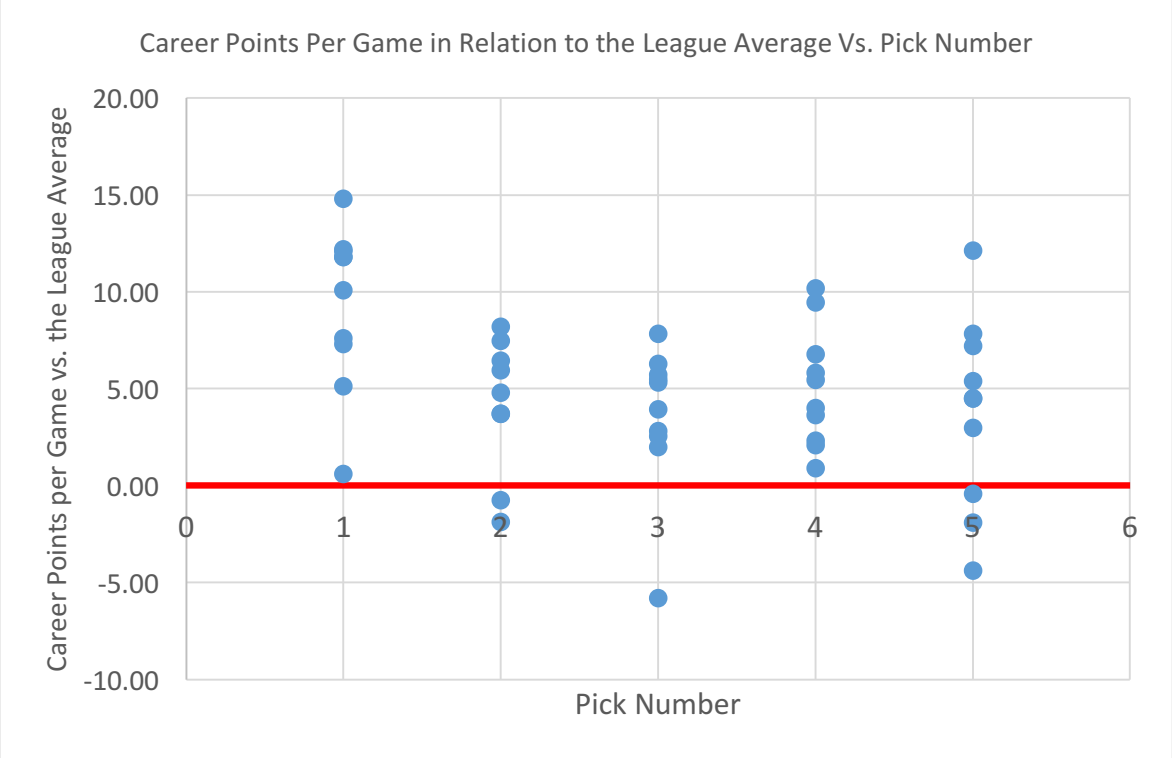
When asked what his team would have to do to beat the mighty Miami Heat in the 2013 NBA Finals, the San Antonio Spurs head coach, the famously sarcastic Gregg Popovich, said with a straight face, "Score more points than them in at least 4 games." As silly as that may sound, it is true. The best way to win more games is to score more points, and thus, scoring ability is a valuable asset in the NBA. A player's career success

can usually be determined by their scoring output, so, below is a scatterplot displaying players' career points per game vs. the pick number at which they were selected. The dependent variable in this graph is career points per game, a discrete numerical variable:



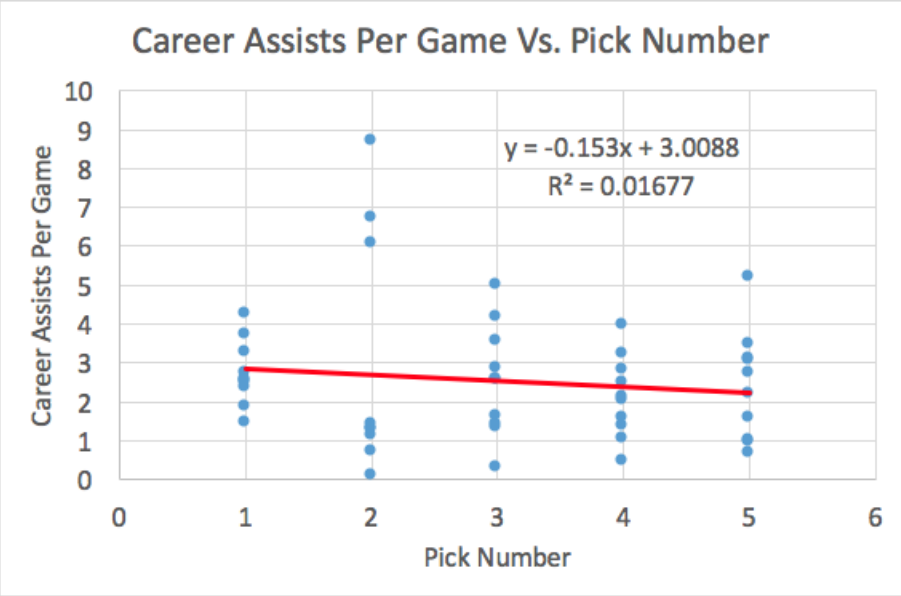
The coefficient of determination for this data set is 0.11827, meaning approximately 12% of the change observed in points per game is determined by a change in draft position. The correlation coefficient is -0.34390, indicating that this data displays a weak negative correlation between these two variables. The standard deviation in points per game is 4.32, which is indicates a fairly small spread in the data from this sample of players. With an average deviation of only 4.32 points per game from the mean, it appears as though the amount of points scored per game by players in this sample is fairly consistent. This is understandable when you take into account the fact that the amount of points scored in NBA games is also fairly consistent, deviating slightly from an average of around 92 points scored by each team per game.

In further investigation of whether or not players in the top 5 draft picks generally produce more points per game than the average player, the points per game ratings of players in the sample were compared to the mean points per game produced by players in the 1990s, the era in which most of these players played the bulk of their careers. Basketball reference indicated that the mean points per game during this era was 8.89, calculated by taking the sum of all players' points per game ratings during that era and dividing by the number of players there were. Below, the scatterplot shows the mean points per game rating of 8.89 subtracted from the points per game ratings of each individual player in the sample:



In analyzing this data, we see that the points per game ratings of top 5 picks is generally above the league average. This means that when a team selects a player in the top 5 in the NBA Draft, statistically speaking they are likely to be a more valuable player than the average player.

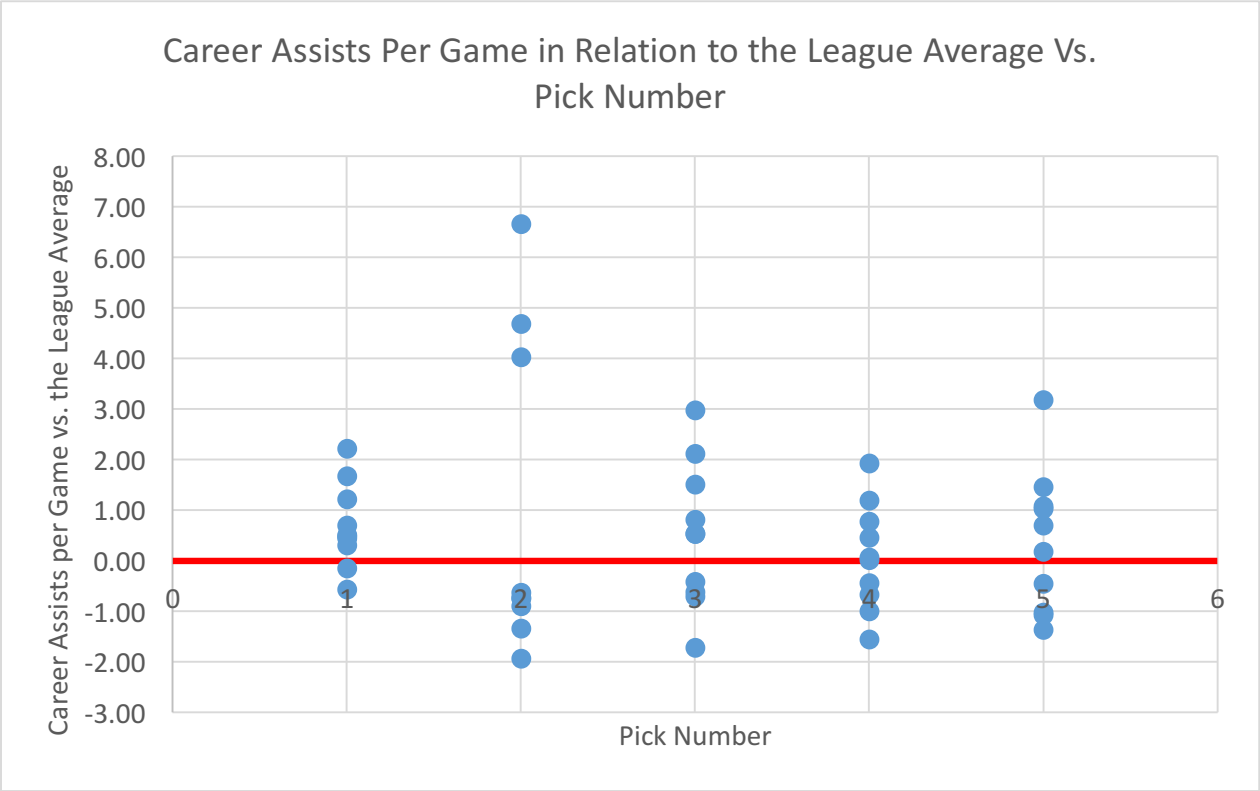
Continuing the theme of accumulated individual statistics, the study investigated players' career assists per game vs. the pick number with which they were selected. An assist in basketball is awarded to a player when their pass directly results in a basket scored by the player they passed to. The dependent variable in this data set is the amount of assists a player amassed per game, a numerical discrete variable. The scatterplot is shown below:



The coefficient of determination between career assists per game and the pick number with which a player was selected is 0.01677, indicating that a player's career assists per game rating is not determined by their draft position. The correlation coefficient is -0.12950. This shows that there is virtually no correlation between the two variables in this set of data. The standard deviation in assists per game is 1.68, again, a fairly small spread in the data.

As with points per game, it is helpful to look at how these players compare to the average player in assists per game. Below is a graph showing the difference between

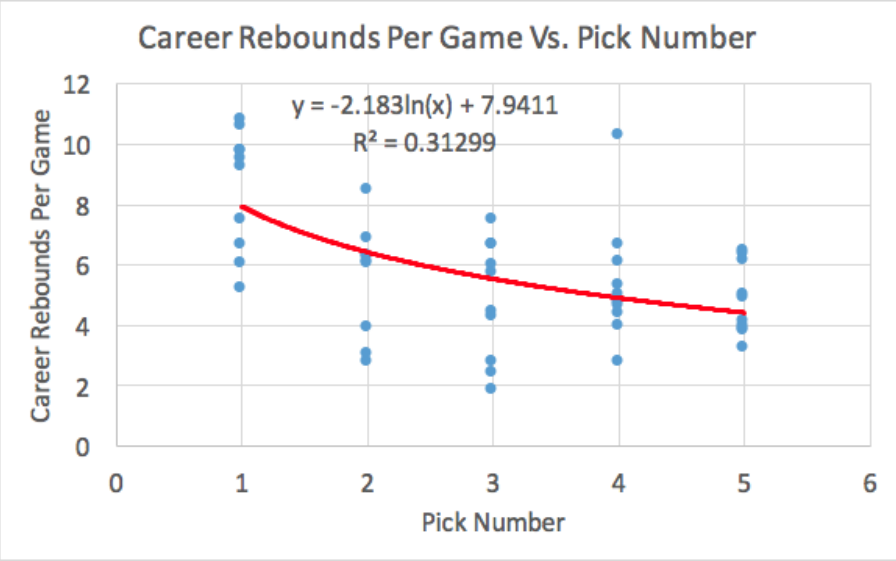
players' career assists per game rating and the league average of 2.02 throughout the 1990s:



Interestingly, it appears as though just under 50% of the sample of players had a career assists per game rating at or below the league average. This may indicate that players selected with the top 5 picks tend to be more focused on scoring than getting their teammates involved.

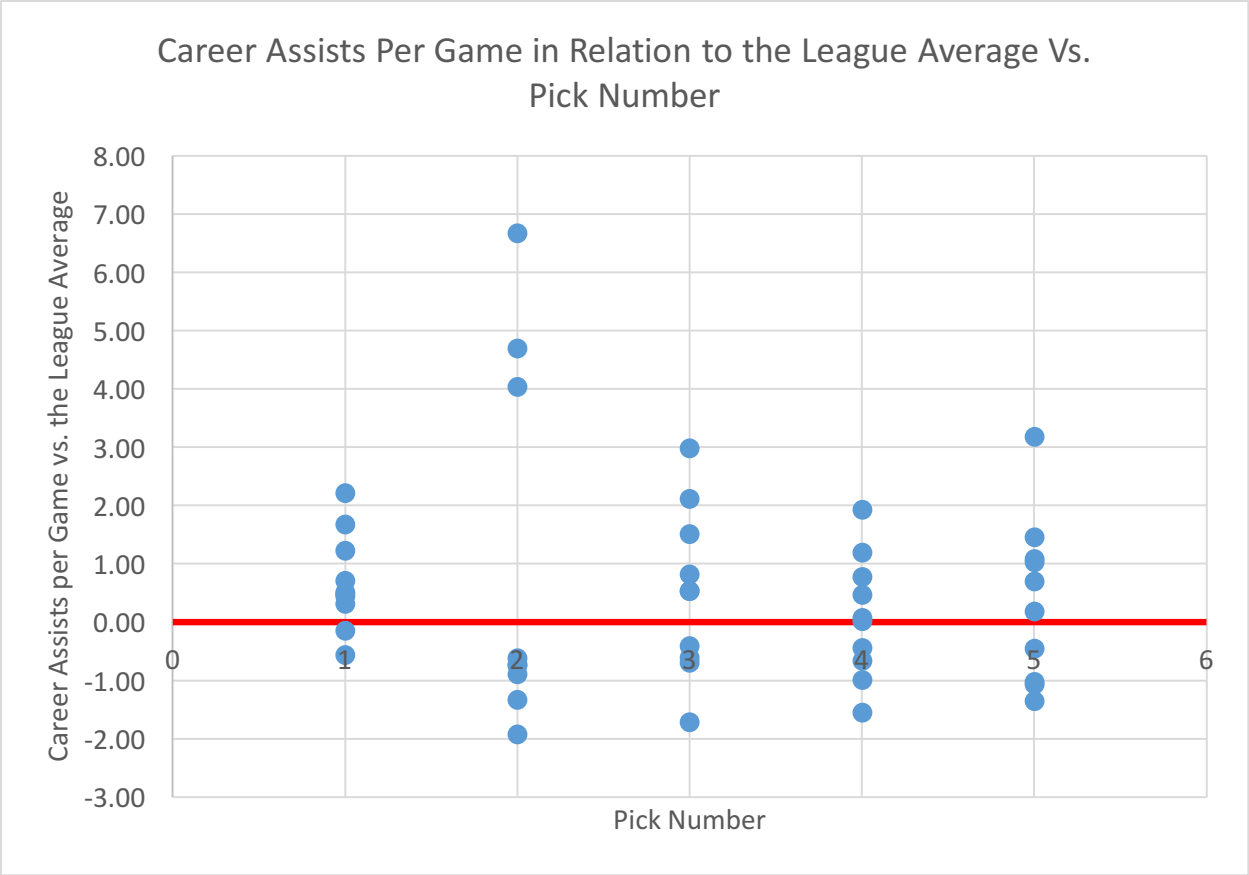
The final commonly used individual accumulated statistic is rebounding. A rebound is awarded to a player when they collect possession after a missed shot, either an opponent's shot on their net, or a missed shot on the opponent's net. Rebounding numbers are often a good indicator of who is controlling a basketball game, so better rebounders tend to be more successful NBA players. The following scatterplot displays players' career rebounds per game vs. their respective draft positions. In this scatterplot,

the dependent variable is the amount of rebounds a player collected per game. This variable is discrete and numerical:



There does appear to be a correlation in this data set, as the coefficient of determination is 0.31299. This means that approximately a third of the change in rebounds per game is determined by change in draft position. The correlation coefficient is -0.55946. This can be interpreted to represent a moderate negative correlation between the two variables. The standard deviation for this set of data points is about 2.24, another fairly small spread in rebounds per game. This implies that the amount of rebounds a player gets throughout their career is fairly consistent, regardless of their draft position. A small spread in such individual statistics may lead one to believe that the draft position of a player may not be all that important, as the amount of variance that can be observed in the amount of rebounds a player attains per game is fairly miniscule.

The following scatterplot compares the career rebounds per game rating of players in this sample to the league average of 3.66 rebounds per game, as indicated by Basketball Reference:



This graph shows that most of the players selected in the top 5 overall picks have a career rebounds per game rating exceeding that of the average NBA player. This means that, again, these players tend to be superior to their peers at least in terms of individual statistics.

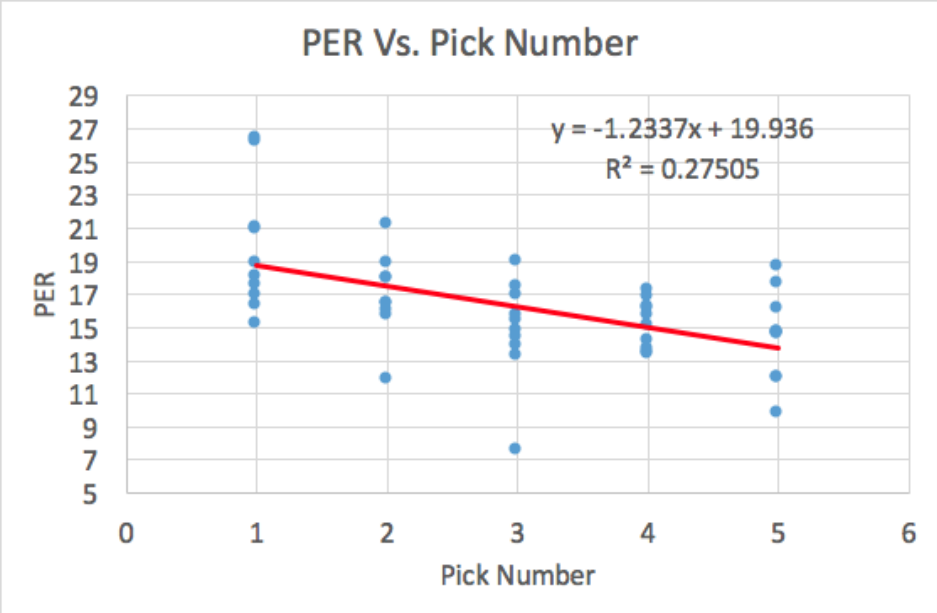
After analyzing players' accumulated individual statistics in relation to their draft position, it is fair to conclude that there is generally a weak correlation between these individual statistics and the pick number with which a player was selected in the draft.

Investigating Top 5 NBA Draft Picks' Individual Advanced Metrics

Advanced metrics, or advanced statistics, have become a large part of how NBA analysts grade players. Since their introduction several decades ago, they have been rapidly gaining popularity for their ability to accurately represent the effectiveness of a

player. Two of the most commonly used advanced stats are Player Efficiency Rating (PER) and Value Over Replacement Player (VORP). This study investigates these two statistics as they pertain to the careers of the players involved in the study, in an attempt to discover whether or not a player's individual success is dependent on their draft position.

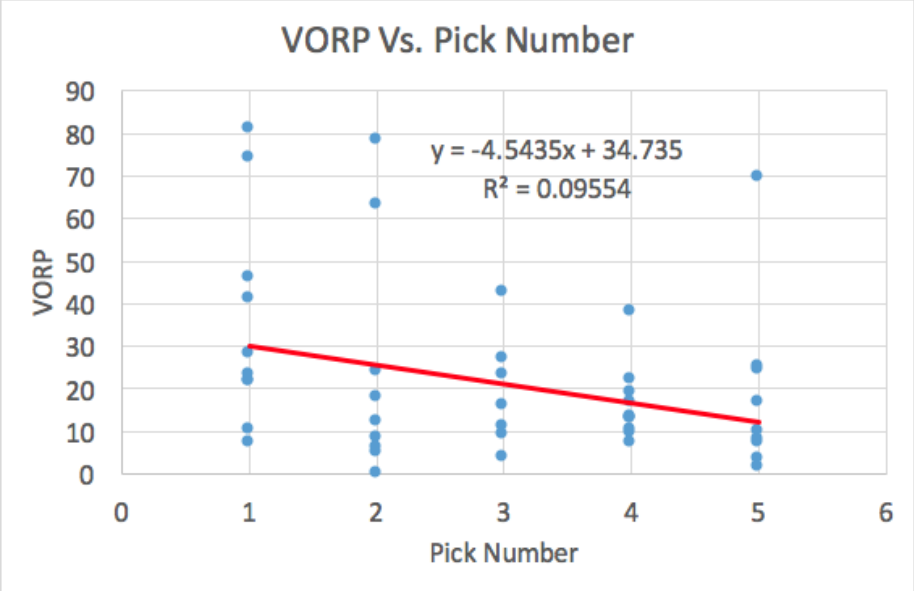
The calculation of PER is very involved, and the statistic is supposed to be an accurate representation of the effectiveness of a player. It is essentially a per-minute production rating that is standardized in order to make the league average 15.0 every season. The following scatterplot displays players' career PER vs. their draft position. PER, the dependent variable in the data displayed below, is a continuous numerical value, as its calculation involves the use of on-court measurements:



The coefficient of determination for this relation is 0.27505, indicating a moderately deterministic relationship. The correlation coefficient for this set of data points is -0.52445, representing a moderate negative correlation between the two variables. The standard deviation in PER is 3.34, a very small spread in the data. This

indicates that a player's PER is fairly predictable, and not accompanied by a large amount of uncertainty.

The other commonly used advanced statistic that was investigated among the sample of 49 players was VORP. This is the estimated box score plus/minus, or points for minus points against, that a player contributes to their team over a statistically average replacement player, adjusted for an 82 game season. A scatterplot of VORP vs. draft position is shown below. The dependent variable, VORP, is a continuous numerical variable:



The coefficient of determination for this set of data is 0.09554, meaning that the change in VORP is not strongly determined by change in the pick number with which a player was selected. The correlation coefficient is -0.30910, indicating that there is a weak negative correlation between these two variables. The standard deviation in VORP is 20.89. This appears to be a large spread, meaning that the value a player can hold over an average replacement player is largely variable.

In terms of advanced statistics, there appears to, in fact, be a weak to moderate correlation between players' advanced metrics and the pick number with which they were drafted.

Conclusions: Sub-Question 3

We are often quick to assume that players picked higher in the NBA Draft will go on to have more successful careers in terms of individual statistics and acclaim, but is this often prematurely made inference warranted? We are able to answer this question by culminating the results of the investigations on both accumulated individual statistics and advanced metrics of top 5 NBA Draft picks.

After careful analysis, we are able to safely conclude that there is generally a weak correlation between a player's individual accumulated statistics like points, rebounds, and assists per game and the position at which they were drafted. There also appears to be a weak to moderate correlation between advanced statistics, effectively measuring a player's overall performance, and their draft position. For those reasons, it stands to reason that draft position does, in fact, seem to be a fair indicator of how much individual success a player may find throughout their career. In terms of their individual numbers, first overall picks do tend to have more success than second, third, fourth, and fifth overall picks.

Sub-Question 4: Is There A Large Discrepancy Between The Career Accolades And Salary-Based Earnings Of First Overall Picks And Second, Third, Fourth, And Fifth Overall Picks?

Background Information

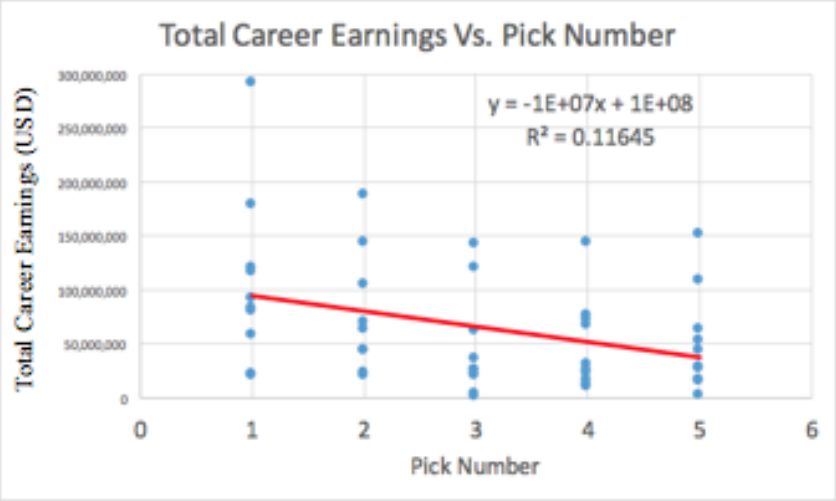
In late January of every year, the NBA releases the list of 24 players that have been selected to represent the league as NBA all-stars. At the end of every season, the NBA releases another elite list of players known as the all-NBA team selections. These are players that excel either specifically on the defensive end of the court or all-around performance. Both being selected to an all-star or an all-NBA team is an incredible honor, which is why NBA all-defensive first team selection, Tony Allen, spent his 2015 playoffs reminding his peers, on court, that he was selected to an all-NBA team. Several times throughout the playoffs, cameras caught Allen getting into the ears of other players, chanting, "First team all defense, don't forget it!"[7] Although Allen's actions may be considered a little childish, he was rightfully excited to be selected to such an elite group of players.

All-NBA and all-star selections are usually indicative of a player's success and achievement on court, so this section of the study will investigate whether or not there is a correlation between the number of these selections players have been honored with and the pick number with which they were drafted. In addition to all-NBA and all-star selections, this section will also investigate the career salary-based earnings of a player.

[7] Tony Allen First-Team All-Defense, Dan Feldman, https://www.youtube.com/watch?v=xhQQbZRjecI

Investigating Top 5 NBA Draft Picks' Individual Accolades and Salary-Based Earnings

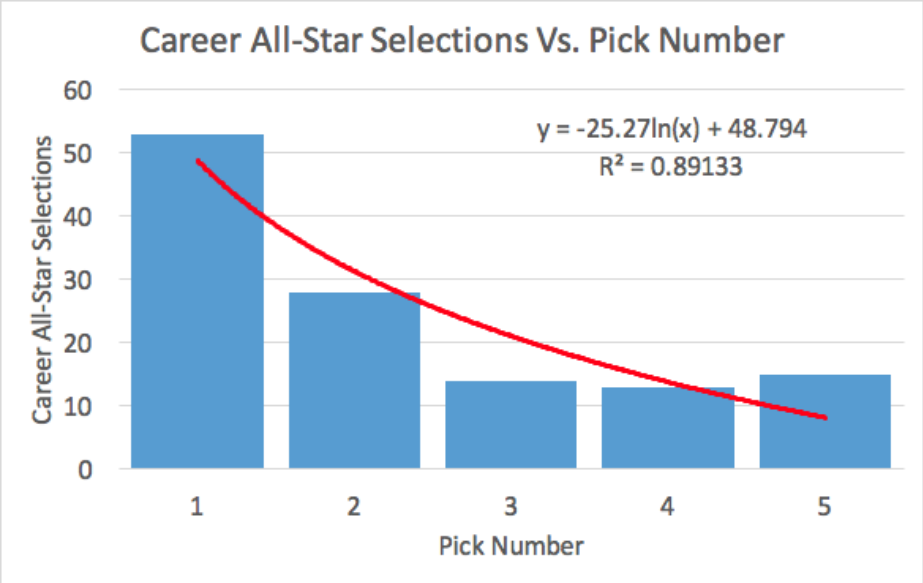
Many NBA players have faced public criticism over the years for their lucrative lifestyles and inappropriate spending habits, so it's no surprise that to many NBA players, a large salary is a very important thing. The following is a scatterplot containing the career salary-based earnings of players vs. their draft position. The dependent variable in this data set, career salary-based earnings, is dependent and discrete, as it results from a count of USD:



The coefficient of determination between career earnings and the pick number with which a player was selected is 0.11645, indicating that approximately 12% of change in career earnings is determined by change in pick number with which that player was selected. The correlation coefficient for this relation is -0.34125. This means that this set of data has a weak negative correlation. The standard deviation in total career salary-based earnings of a player is $58,616,568.71. This is an incredibly large spread, as the average player deviates from the mean by about 59 million US dollars.

This demonstrates that a player's career earnings are, by no means, fixed, and they are likely heavily dependent on a player's performance.

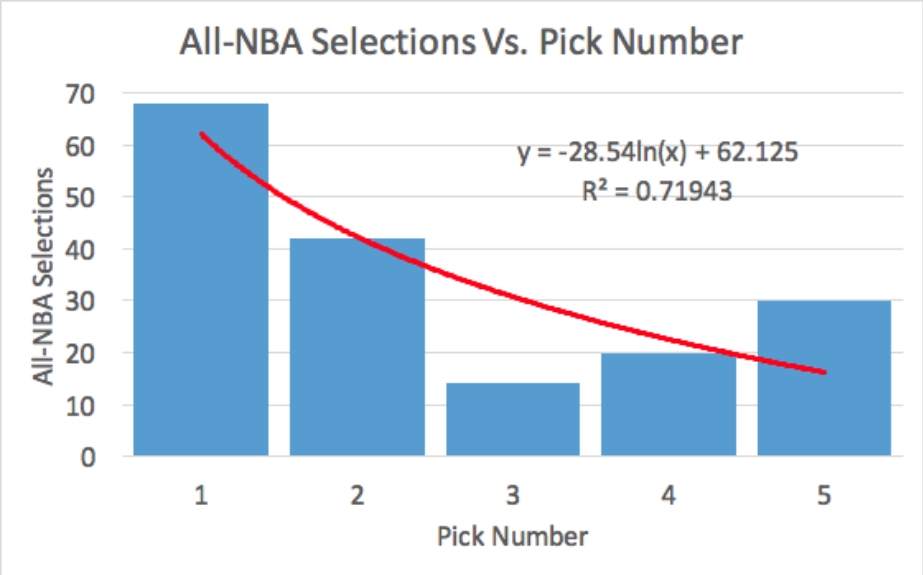
As mentioned before, all-stars are a group of 24 players selected to represent the NBA as the NBA's greatest overall talents. The following is a bar chart that the number of all-star selections accumulated by players within the sample, categorized by their draft position. The dependent variable in this graph, total all-star selections, is discrete and numerical:



For the first time in the entire investigation, there appears to be a strong correlation between these two variables. The coefficient of determination is 0.89133, and the correlation coefficient is -0.94410. This means that there is a very strong negative correlation between the number of all-star selections a player receives and the pick number with which they were selected in the NBA Draft.

All-NBA selections are players selected by NBA league officials who are considered to be outstanding either in defensive ability or overall ability. The following is a bar chart indicating the number of all-NBA team selections players in the chosen

sample have amassed throughout their careers, categorized, again, by the pick number with which they were selected. The number of all-NBA selections is the dependent variable in this scatterplot, and this variable is a discrete numerical variable:



Again, we observe what appears to be a strong correlation. The coefficient of determination for this data set is 0.71943, and the correlation coefficient is -0.84819. This means that there is a strong negative correlation between these two variables.

Conclusions: Sub-Question 4

Michael Jordan, arguably the greatest player to ever play the sport of basketball, was a member of 14 all-star teams, and was selected to a total of 20 all-NBA teams. Many people believe that these accolades are, in fact, an indication of greatness, as opposed to just individual success like individual statistics are. By analyzing the number of all-star and all-NBA selections a player has received, as well as their career salary-based earnings, we are able to make conclusions pertaining to the question of whether

or not there is a large discrepancy between these achievements in the careers of first overall picks when compared to slightly later picks.

There does not appear to be much of a discrepancy, as there is only a weak correlation between career earnings and draft position. In terms of career accolades, on the other hand, there appears to be quite a large discrepancy between those accumulated by first overall picks when compared to slightly later picks. With both all-NBA and all-star selections, there is a strong negative correlation, meaning that first overall picks are far more likely to receive these accolades than players drafted second, third, fourth, and fifth overall.

Conclusions

This investigative study set out to discover if a discrepancy between the success of first overall picks when compared to second, third, fourth, and fifth overall picks exists, and thus, if first overall picks are overvalued in today's NBA. This was to be done by answering a series of sub-questions with data collected on a sample of top 5 selections in every NBA Draft from 1985 through to 1994, a total of 10 NBA Drafts. Before investigating the results of the sub-questions themselves, it should be noted that, when compared to the mean league ratings in points, rebounds, and assists per game, top 5 draft picks generally did significantly better, proving that top 5 picks usually do turn into above average NBA players. Analysis of the spread of most of the data sets also revealed that there is not, in fact, a very large variance in the values obtained. This proves that these top 5 picks have fairly consistent and predictable levels of success throughout their careers. The sub-questions looked at how top 5 draft picks affect their

team's success, how well they fare in terms of individual success based on statistics, and how many career accolades they are able to accumulate. After answering these sub-questions with support from relevant statistical analysis, it is fair to conclude that the main question of this study is impossible to answer without redefining success tailored specifically to the individual parties affected. For example, a successful draft pick to a team or the fan of a team is likely one that contributes to the team's success, helping them to transform from a bottom-of-the-pack team to one of the NBA's elite. A successful pick to a player more interested in racking up individual statistics may be one who scores more points per game and has a higher PER than the average player. And finally, a successful pick to a player most interested in fame and fortune may be one who is honored with a greater salary, more all-star, and all-NBA selections among other accolades. By these separate definitions of success, this study will draw separate conclusions as to whether or not higher draft position leads to more success.

By the first definition of success, team success, a definition of success that is likely valued by not only NBA teams, but also the fans of a team, first overall picks are no more valuable than second, third, fourth, and fifth overall picks. Analysis of relevant data answered the question of whether or not tanking was worth it with a definitive no, and the question of whether or not higher draft picks lead their teams to more success was answered with a no as well. So, from an organizational and a fan's standpoint, first overall picks are, in fact, far overvalued in today's NBA.

Defining success as many players might, by a measure of individual statistics, first overall picks are likely to find slightly more success than players drafted later. There was generally a weak correlation between the accumulated individual stats of a player and their draft position (accumulated individual stats include points, assists, and

rebounds per game), and there was a weak to moderate correlation between players' advanced statistics and their draft position. Therefore, by this definition of success, first overall picks may just be slightly overvalued when compared to second, third, fourth, and fifth overall picks.

Finally, in defining success by the third definition discussed above, one where success is determined by career accolades and fortune, it stands to reason that first overall picks are likely to find far more success than players picked with the following selections. There was a weak correlation between salary-based earnings and the pick with which a player was selected, but a very strong correlation between all-star as well as all-NBA selections and draft position. If you choose to define success by career accolades and fortune, first overall picks are by no means overvalued, and they do, in fact, live up to their lofty expectations.

There is no right or wrong way to define the success of an NBA player, as it all depends on your personal priorities. Some people attribute greatness to team success, where others base their judgement on individual statistics and accolades. It is important to note, however that if you neglect to create these separate definitions of success, it is nearly impossible to arrive at a definitive answer to the question that this investigation set out to solve.

Although this study proved to be quite insightful, it was limited by several factors. The first of which was the inability to collect data from a larger sample due to limitations placed on the study by time. In the future, this study could cover a broader sample, for example 10 players from 10 drafts as opposed to 5 players, or maybe 5 players from 20 drafts, etc. The study was also limited by the availability of information. To answer the question of whether or not tanking is worth it, it would have been helpful to have access

to teams' revenue reports in order to assess the damages done to a franchise and their fan base as a result of tanking. Like revenue reports, home game attendance also would have provided valuable insight into the effects of tanking on a team's fan base. Unfortunately, this information was not made available to the general public. In the future, this study could also look to investigate how the value of first overall picks compared to the later picks has developed over time. It would be fair to assume that in recent years, first overall picks are better living up to their lofty expectations on all fronts, as technology has allowed for scouting reports to become more in depth and detailed.

Appendix

Draft Year	Pick #	First	Last	Position	Win Shares	Years	GP
1985	1	Patrick	Ewing	5	126.4	17	1183
1985	2	Wayman	Tisdale	4	45.7	12	840
1985	3	Benoit	Benjamin	5	32.7	15	807
1985	4	Xavier	McDaniel	3	47.8	12	870
1985	5	Jon	Koncak	5	29.2	11	784
1986	1	Brad	Daugherty	5	65.2	8	548
1986	3	Chris	Washburn	5	-0.6	2	72
1986	4	Chuck	Person	3	38.9	13	943
1986	5	Kenny	Walker	3	17.9	7	448
1987	1	David	Robinson	5	178.7	14	987
1987	2	Armen	Gilliam	4	58.1	13	929
1987	3	Dennis	Hopson	2	7.1	5	334
1987	4	Reggie	Williams	2	26	10	599
1987	5	Scottie	Pippen	3	125.1	17	1178
1988	1	Danny	Manning	4	55.1	15	883
1988	2	Rik	Smits	5	56.6	12	867
1988	3	Charles	Smith	4	40.9	9	564
1988	4	Chris	Morris	3	37.4	11	747
1988	5	Mitch	Richmond	2	79.3	14	976
1989	1	Pervis	Ellison	5	21.8	11	474
1989	2	Danny	Ferry	4	34.8	13	917
1989	3	Sean	Elliot	3	55.7	12	742
1989	4	Glen	Rice	3	88.7	15	1000

1989	5	J.R.	Reid	4	22.5	11	672
1990	1	Derrick	Coleman	4	64.3	15	781
1990	2	Gary	Payton	1	145.5	17	1335
1990	3	Mahmoud	Abdul-Rauf	1	25.2	9	586
1990	4	Dennis	Scott	3	33.4	10	629
1990	5	Kendall	Gill	2	47.8	15	966
1991	1	Larry	Johnson	4	69.7	10	707
1991	2	Kenny	Anderson	1	62.5	14	858
1991	3	Billy	Owens	3	28.6	10	600
1991	4	Dikembe	Mutumbo	5	117	18	1198
1991	5	Steve	Smith	2	83.7	14	942
1992	1	Shaquille	O'Neal	5	181.7	19	1207
1992	2	Alonzo	Mourning	5	89.7	15	838
1992	3	Christian	Laettner	4	64.9	13	868
1992	4	Jim	Jackson	2	35.8	14	885
1992	5	LaPhonso	Ellis	4	32.8	11	624
1993	1	Chris	Webber	4	84.7	15	831
1993	2	Shawn	Bradley	5	40.7	12	832
1993	3	Anfernee	Hardaway	2	61.9	14	704
1993	4	Jamal	Mashburn	3	43.7	11	611
1993	5	Isaiah	Rider	2	22.8	9	563
1994	1	Glenn	Robinson	3	39.8	11	688
1994	2	Jason	Kidd	1	138.6	19	1391
1994	3	Grant	Hill	3	99.9	18	1026
1994	4	Donyell	Marshall	4	59	15	957
1994	5	Juwan	Howard	4	59.4	19	1208

Draft Year	Pick #	First	Last	TP	TRB	TAST
1985	1	Patrick	Ewing	24815	11607	2215
1985	2	Wayman	Tisdale	12878	5117	1077
1985	3	Benoit	Benjamin	9223	6063	1070
1985	4	Xavier	McDaniel	13606	5313	1775
1985	5	Jon	Koncak	3520	3856	785
1986	1	Brad	Daugherty	10389	5227	2028
1986	3	Chris	Washburn	222	176	22
1986	4	Chuck	Person	13858	4763	2645
1986	5	Kenny	Walker	3128	1793	299
1987	1	David	Robinson	20790	10497	2441
1987	2	Armen	Gilliam	12700	6401	88
1987	3	Dennis	Hopson	3633	939	539
1987	4	Reggie	Williams	7508	2393	1492
1987	5	Scottie	Pippen	18940	7494	6135
1988	1	Danny	Manning	12367	4615	2063
1988	2	Rik	Smits	12871	5277	1215
1988	3	Charles	Smith	8107	3246	798
1988	4	Chris	Morris	8184	3544	1182
1988	5	Mitch	Richmond	20497	3801	3398
1989	1	Pervis	Ellison	4494	3170	691
1989	2	Danny	Ferry	6439	2550	1185
1989	3	Sean	Elliot	10544	3204	1897
1989	4	Glen	Rice	18336	4387	2097
1989	5	J.R.	Reid	5680	3381	639
1990	1	Derrick	Coleman	12884	7232	1985
1990	2	Gary	Payton	21813	5269	8966
1990	3	Mahmoud	Abdul-Rauf	8553	1087	2070
1990	4	Dennis	Scott	8094	1774	296
1990	5	Kendall	Gill	12914	4002	2945
1991	1	Larry	Johnson	11450	5300	2298
1991	2	Kenny	Anderson	10789	2641	5196
1991	3	Billy	Owens	7026	4016	1704
1991	4	Dikembe	Mutumbo	11729	12359	1240
1991	5	Steve	Smith	13430	3060	2922
1992	1	Shaquille	O'Neal	28596	13099	3026
1992	2	Alonzo	Mourning	14311	7137	946
1992	3	Christian	Laettner	11121	5806	2224
1992	4	Jim	Jackson	12690	4152	2851
1992	5	LaPhonso	Ellis	7410	4032	981
1993	1	Chris	Webber	17182	8124	3526
1993	2	Shawn	Bradley	6752	5268	573
1993	3	Anfernee	Hardaway	10684	3146	3525
1993	4	Jamal	Mashburn	11644	3271	2414
1993	5	Isaiah	Rider	9405	2166	1535
1994	1	Glenn	Robinson	14234	4189	1879
1994	2	Jason	Kidd	17529	8725	12091
1994	3	Grant	Hill	17137	6169	4252
1994	4	Donyell	Marshall	10716	6376	1305
1994	5	Juwan	Howard	16159	7428	2663

Draft Year	Pick #	First	Last	VORP	PPG	PPG V AVG	RBPG	RPG V AVG	ASTPG	ASTPG V AVG
1985	1	Patrick	Ewing	40.9	20.98	12.09	9.81	6.15	1.87	-0.15
1985	2	Wayman	Tisdale	0	15.33	6.44	6.09	2.43	1.28	-0.74
1985	3	Benoit	Benjamin	4	11.43	2.54	7.51	3.85	1.33	-0.69
1985	4	Xavier	McDaniel	13.4	15.64	6.75	6.11	2.45	2.04	0.02
1985	5	Jon	Koncak	8	4.49	-4.40	4.92	1.26	1.00	-1.02
1986	1	Brad	Daugherty	23.1	18.96	10.07	9.54	5.88	3.70	1.68
1986	3	Chris	Washburn	-1	3.08	-5.81	2.44	-1.22	0.31	-1.71
1986	4	Chuck	Person	12.9	14.70	5.81	5.05	1.39	2.80	0.78
1986	5	Kenny	Walker	1.7	6.98	-1.91	4.00	0.34	0.67	-1.35
1987	1	David	Robinson	80.9	21.06	12.17	10.64	6.98	2.47	0.45
1987	2	Armen	Gilliam	6.2	13.67	4.78	6.89	3.23	0.09	-1.93
1987	3	Dennis	Hopson	-0.3	10.88	1.99	2.81	-0.85	1.61	-0.41
1987	4	Reggie	Williams	10.3	12.53	3.64	3.99	0.33	2.49	0.47
1987	5	Scottie	Pippen	69.6	16.08	7.19	6.36	2.70	5.21	3.19
1988	1	Danny	Manning	21.7	14.01	5.12	5.23	1.57	2.34	0.32
1988	2	Rik	Smits	8.5	14.85	5.96	6.09	2.43	1.40	-0.62
1988	3	Charles	Smith	9.3	14.37	5.48	5.76	2.10	1.41	-0.61
1988	4	Chris	Morris	16.7	10.96	2.07	4.74	1.08	1.58	-0.44
1988	5	Mitch	Richmond	25	21.00	12.11	3.89	0.23	3.48	1.46
1989	1	Pervis	Ellison	7.4	9.48	0.59	6.69	3.03	1.46	-0.56
1989	2	Danny	Ferry	5	7.02	-1.87	2.78	-0.88	1.29	-0.73
1989	3	Sean	Elliot	16.1	14.21	5.32	4.32	0.66	2.56	0.54
1989	4	Glen	Rice	22.1	18.34	9.45	4.39	0.73	2.10	0.08
1989	5	J.R.	Reid	-0.2	8.45	-0.44	5.03	1.37	0.95	-1.07
1990	1	Derrick	Coleman	21.7	16.50	7.61	9.26	5.60	2.54	0.52
1990	2	Gary	Payton	63	16.34	7.45	3.95	0.29	6.72	4.70
1990	3	Mahmoud	Abdul-Rauf	-0.7	14.60	5.71	1.85	-1.81	3.53	1.51
1990	4	Dennis	Scott	7.3	12.87	3.98	2.82	-0.84	0.47	-1.55
1990	5	Kendall	Gill	16.9	13.37	4.48	4.14	0.48	3.05	1.03
1991	1	Larry	Johnson	28.3	16.20	7.31	7.50	3.84	3.25	1.23
1991	2	Kenny	Anderson	18	12.57	3.68	3.08	-0.58	6.06	4.04
1991	3	Billy	Owens	11.2	11.71	2.82	6.69	3.03	2.84	0.82
1991	4	Dikembe	Mutumbo	38.2	9.79	0.90	10.32	6.66	1.04	-0.98
1991	5	Steve	Smith	24.4	14.26	5.37	3.25	-0.41	3.10	1.08
1992	1	Shaquille	O'Neal	74	23.69	14.80	10.85	7.19	2.51	0.49
1992	2	Alonzo	Mourning	24	17.08	8.19	8.52	4.86	1.13	-0.89
1992	3	Christian	Laettner	23.2	12.81	3.92	6.69	3.03	2.56	0.54
1992	4	Jim	Jackson	9.6	14.34	5.45	4.69	1.03	3.22	1.20

1992	5	LaPhonso	Ellis	7.1	11.88	2.99	6.46	2.80	1.57	-0.45
1993	1	Chris	Webber	45.9	20.68	11.79	9.78	6.12	4.24	2.22
1993	2	Shawn	Bradley	12.3	8.12	-0.77	6.33	2.67	0.69	-1.33
1993	3	Anfernee	Hardaway	27.2	15.18	6.29	4.47	0.81	5.01	2.99
1993	4	Jamal	Mashburn	12.9	19.06	10.17	5.35	1.69	3.95	1.93
1993	5	Isaiah	Rider	3.6	16.71	7.82	3.85	0.19	2.73	0.71
1994	1	Glenn	Robinson	10.3	20.69	11.80	6.09	2.43	2.73	0.71
1994	2	Jason	Kidd	78.2	12.60	3.71	6.27	2.61	8.69	6.67
1994	3	Grant	Hill	42.5	16.70	7.81	6.01	2.35	4.14	2.12
1994	4	Donyell	Marshall	19.1	11.20	2.31	6.66	3.00	1.36	-0.66
1994	5	Juwan	Howard	10.1	13.38	4.49	6.15	2.49	2.20	0.18

Draft Year	Pick #	First	Last	SALARY	SLRY V AVG	CAREER Ws	CAREER Ls	CAREER W%	RINGS
1985	1	Patrick	Ewing	$ 119,943,120.00	$94,443,120.00	678	505	57.31%	0
1985	2	Wayman	Tisdale	$ 20,116,000.00	$2,116,000.00	339	501	40.36%	0
1985	3	Benoit	Benjamin	$ 21,905,129.00	-$594,871.00	296	511	36.68%	0
1985	4	Xavier	McDaniel	$ 12,208,000.00	-$5,792,000.00	433	437	49.77%	0
1985	5	Jon	Koncak	$ 15,475,250.00	-$1,024,750.00	464	320	59.18%	0
1986	1	Brad	Daugherty	$ 20,404,000.00	$8,404,000.00	310	238	56.57%	0
1986	3	Chris	Washburn	$ 1,257,200.00	-$1,742,800.00	35	37	48.61%	0
1986	4	Chuck	Person	$ 22,917,826.00	$3,417,826.00	463	480	49.10%	0
1986	5	Kenny	Walker	$ 2,660,000.00	-$7,840,000.00	194	254	43.30%	0
1987	1	David	Robinson	$ 116,500,123.00	$95,500,123.00	673	314	68.19%	2
1987	2	Armen	Gilliam	$ 23,490,600.00	$3,990,600.00	402	527	43.27%	0
1987	3	Dennis	Hopson	$ 2,983,350.00	-$4,516,650.00	116	218	34.73%	1
1987	4	Reggie	Williams	$ 9,536,500.00	-$5,463,500.00	231	368	38.56%	0
1987	5	Scottie	Pippen	$ 109,192,430.00	$83,692,430.00	810	368	68.76%	6
1988	1	Danny	Manning	$ 57,595,666.00	$35,095,666.00	468	415	53.00%	0
1988	2	Rik	Smits	$ 43,750,000.00	$25,750,000.00	480	387	55.36%	0
1988	3	Charles	Smith	$ 24,960,286.00	$11,460,286.00	301	263	53.37%	0
1988	4	Chris	Morris	$ 16,380,000.00	-$120,000.00	367	380	49.13%	0
1988	5	Mitch	Richmond	$ 52,611,000.00	$31,611,000.00	432	544	44.26%	1
1989	1	Pervis	Ellison	$ 21,750,000.00	$5,250,000.00	166	308	35.02%	0
1989	2	Danny	Ferry	$ 44,243,000.00	$24,743,000.00	531	386	57.91%	1
1989	3	Sean	Elliot	$ 35,293,666.00	$17,293,666.00	458	284	61.73%	1
1989	4	Glen	Rice	$ 66,723,900.00	$44,223,900.00	504	496	50.40%	1
1989	5	J.R.	Reid	$ 16,871,000.00	$371,000.00	351	321	52.23%	0
1990	1	Derrick	Coleman	$ 91,366,800.00	$68,866,800.00	351	430	44.94%	0
1990	2	Gary	Payton	$ 104,367,619.00	$78,867,619.00	823	512	61.65%	1
1990	3	Mahmoud	Abdul-Rauf	$ 19,849,500.00	$6,349,500.00	229	357	39.08%	0
1990	4	Dennis	Scott	$ 25,095,000.00	$10,095,000.00	319	310	50.72%	0
1990	5	Kendall	Gill	$ 43,466,195.00	$20,966,195.00	450	516	46.58%	0
1991	1	Larry	Johnson	$ 83,132,856.00	$68,132,856.00	395	312	55.87%	0
1991	2	Kenny	Anderson	$ 63,425,200.00	$42,425,200.00	424	434	49.42%	0
1991	3	Billy	Owens	$ 26,010,200.00	$11,010,200.00	280	320	46.67%	0
1991	4	Dikembe	Mutumbo	$ 143,666,581.00	$116,666,581.00	614	582	51.34%	0
1991	5	Steve	Smith	$ 63,827,900.00	$42,827,900.00	550	392	58.39%	1
1992	1	Shaquille	O'Neal	$ 292,198,327.00	$263,698,327.00	819	388	67.85%	4
1992	2	Alonzo	Mourning	$ 143,906,333.00	$121,406,333.00	491	347	58.59%	1
1992	3	Christian	Laettner	$ 61,485,000.00	$41,985,000.00	388	480	44.70%	0
1992	4	Jim	Jackson	$ 31,245,511.00	$10,245,511.00	374	511	42.26%	0
1992	5	LaPhonso	Ellis	$ 27,939,000.00	$11,439,000.00	243	381	38.94%	0
1993	1	Chris	Webber	$ 178,230,697.00	$155,730,697.00	472	359	56.80%	0
1993	2	Shawn	Bradley	$ 69,580,000.00	$51,580,000.00	404	428	48.56%	0
1993	3	Anfernee	Hardaway	$ 120,469,142.00	$99,469,142.00	414	290	58.81%	0
1993	4	Jamal	Mashburn	$ 75,623,634.00	$59,123,634.00	299	312	48.94%	0
1993	5	Isaiah	Rider	$ 26,398,797.00	$12,898,797.00	252	311	44.76%	1
1994	1	Glenn	Robinson	$ 80,221,250.00	$63,721,250.00	314	374	45.64%	1
1994	2	Jason	Kidd	$ 187,675,468.00	$159,175,468.00	812	579	58.38%	1
1994	3	Grant	Hill	$ 142,854,650.00	$115,854,650.00	543	483	52.92%	0
1994	4	Donyell	Marshall	$ 72,417,867.00	$49,917,867.00	394	563	41.17%	0
1994	5	Juwan	Howard	$ 151,465,633.00	$122,965,633.00	574	634	47.52%	2

Draft Year	Pick #	First	Last	PER	PER V AVG	ALLSTAR SEL	ROY	All NBA
1985	1	Patrick	Ewing	21	6	11	1	10
1985	2	Wayman	Tisdale	15.7	0.7	0	0	0
1985	3	Benoit	Benjamin	14.8	-0.2	0	0	0
1985	4	Xavier	McDaniel	16.1	1.1	1	0	1
1985	5	Jon	Koncak	9.8	-5.2	0	0	0
1986	1	Brad	Daugherty	18.9	3.9	5	0	2
1986	3	Chris	Washburn	7.6	-7.4	0	0	0
1986	4	Chuck	Person	13.7	-1.3	0	1	1
1986	5	Kenny	Walker	11.9	-3.1	0	0	0
1987	1	David	Robinson	26.2	11.2	10	1	28
1987	2	Armen	Gilliam	16.4	1.4	0	0	1
1987	3	Dennis	Hopson	13.3	-1.7	0	0	0
1987	4	Reggie	Williams	14.2	-0.8	0	0	0
1987	5	Scottie	Pippen	18.6	3.6	7	0	17
1988	1	Danny	Manning	16.9	1.9	2	0	0
1988	2	Rik	Smits	17.9	2.9	1	0	1
1988	3	Charles	Smith	15.7	0.7	0	0	1
1988	4	Chris	Morris	15.1	0.1	0	0	1
1988	5	Mitch	Richmond	17.6	2.6	6	1	6
1989	1	Pervis	Ellison	15.2	0.2	0	0	0
1989	2	Danny	Ferry	11.8	-3.2	0	0	0
1989	3	Sean	Elliot	13.9	-1.1	2	0	1
1989	4	Glen	Rice	16.2	1.2	3	0	3
1989	5	J.R.	Reid	11.9	-3.1	0	0	1
1990	1	Derrick	Coleman	18	3	1	1	3
1990	2	Gary	Payton	18.9	3.9	9	0	19
1990	3	Mahmoud	Abdul-Rauf	15.4	0.4	0	0	0
1990	4	Dennis	Scott	13.4	-1.6	0	0	1
1990	5	Kendall	Gill	14.7	-0.3	0	0	1
1991	1	Larry	Johnson	16.3	1.3	2	1	2
1991	2	Kenny	Anderson	16.4	1.4	1	0	0
1991	3	Billy	Owens	14.4	-0.6	0	0	1
1991	4	Dikembe	Mutumbo	17.2	2.2	8	0	10
1991	5	Steve	Smith	16.1	1.1	1	0	1
1992	1	Shaquille	O'Neal	26.4	11.4	15	1	17
1992	2	Alonzo	Mourning	21.2	6.2	7	0	5
1992	3	Christian	Laettner	16.9	1.9	1	0	1
1992	4	Jim	Jackson	13.5	-1.5	0	0	0
1992	5	LaPhonso	Ellis	14.6	-0.4	0	0	1
1993	1	Chris	Webber	20.9	5.9	5	1	5
1993	2	Shawn	Bradley	16	1	0	0	1
1993	3	Anfernee	Hardaway	17.4	2.4	4	0	4
1993	4	Jamal	Mashburn	15.7	0.7	1	0	2
1993	5	Isaiah	Rider	14.7	-0.3	0	0	1
1994	1	Glenn	Robinson	17.5	2.5	2	0	1
1994	2	Jason	Kidd	17.9	2.9	10	1	15
1994	3	Grant	Hill	19	4	7	1	6
1994	4	Donyell	Marshall	16.8	1.8	0	0	1
1994	5	Juwan	Howard	14.6	-0.4	1	0	2

Draft Year	Pick #	First	Last	Wins Before	Wins After 1	1 Year Diff	Wins after 3	3 Year Diff
1985	1	Patrick	Ewing	24	23	-1	38	14
1985	2	Wayman	Tisdale	22	26	4	38	16
1985	3	Benoit	Benjamin	31	32	1	17	-14
1985	4	Xavier	McDaniel	31	31	0	44	13
1985	5	Jon	Koncak	34	50	16	50	16
1986	1	Brad	Daugherty	29	31	2	57	28
1986	3	Chris	Washburn	30	42	12	43	13
1986	4	Chuck	Person	26	41	15	28	2
1986	5	Kenny	Walker	23	24	1	52	29
1987	1	David	Robinson	28	56	28	47	19
1987	2	Armen	Gilliam	36	28	-8	54	18
1987	3	Dennis	Hopson	24	19	-5	17	-7
1987	4	Reggie	Williams	12	17	5	30	18
1987	5	Scottie	Pippen	39	44	5	55	16
1988	1	Danny	Manning	17	21	4	31	14
1988	2	Rik	Smits	38	28	-10	41	3
1988	3	Charles	Smith	36	46	10	44	8
1988	4	Chris	Morris	19	26	7	26	7
1988	5	Mitch	Richmond	20	43	23	44	24
1989	1	Pervis	Ellison	27	23	-4	29	2
1989	2	Danny	Ferry	21	30	9	45	24
1989	3	Sean	Elliot	21	56	35	47	26
1989	4	Glen	Rice	15	18	3	38	23
1989	5	J.R.	Reid	20	19	-1	31	11
1990	1	Derrick	Coleman	17	26	9	43	26
1990	2	Gary	Payton	41	41	0	55	14
1990	3	Mahmoud	Abdul-Rauf	43	20	-23	36	-7
1990	4	Dennis	Scott	18	31	13	41	23
1990	5	Kendall	Gill	19	26	7	44	25
1991	1	Larry	Johnson	26	31	5	41	15
1991	2	Kenny	Anderson	26	40	14	45	19
1991	3	Billy	Owens	25	29	4	28	3
1991	4	Dikembe	Mutumbo	20	24	4	42	22
1991	5	Steve	Smith	24	38	14	42	18
1992	1	Shaquille	O'Neal	21	41	20	57	36
1992	2	Alonzo	Mourning	31	44	13	50	19
1992	3	Christian	Laettner	15	19	4	21	6
1992	4	Jim	Jackson	22	11	-11	36	14
1992	5	LaPhonso	Ellis	24	36	12	41	17
1993	1	Chris	Webber	41	50	9	60	19
1993	2	Shawn	Bradley	26	25	-1	18	-8
1993	3	Anfernee	Hardaway	34	50	16	36	2
1993	4	Jamal	Mashburn	11	13	2	26	15
1993	5	Isaiah	Rider	19	20	1	26	7
1994	1	Glenn	Robinson	20	34	14	33	13
1994	2	Jason	Kidd	13	36	23	24	11
1994	3	Grant	Hill	20	28	8	54	34
1994	4	Donyell	Marshall	20	21	1	40	20
1994	5	Juwan	Howard	24	21	-3	44	20

(Appendix Fig. 1. Data tables containing all variables analyzed in this investigation.)

Years	Years - Mean	(Years - Mean)^2		Mean
17	4.224489796	17.84631404		12.7755102
12	-0.775510204	0.601416077		
15	2.224489796	4.948354852		**Sum (Years - Mean)^2**
12	-0.775510204	0.601416077		604.5306122
11	-1.775510204	3.152436485		
8	-4.775510204	22.80549771		**Number of Values**
2	-10.7755102	116.1116202		49
13	0.224489796	0.050395668		
7	-5.775510204	33.35651812		**(Sum (Years - Mean)^2) / Number of Values**
14	1.224489796	1.49937526		12.33735943
13	0.224489796	0.050395668		
5	-7.775510204	60.45855893		**Sqare root of [(Sum (Years - Mean)^2) / Number of Values]**
10	-2.775510204	7.703456893		3.512457748
17	4.224489796	17.84631404		
15	2.224489796	4.948354852		
12	-0.775510204	0.601416077		
9	-3.775510204	14.2544773		
11	-1.775510204	3.152436485		
14	1.224489796	1.49937526		
11	-1.775510204	3.152436485		
13	0.224489796	0.050395668		
12	-0.775510204	0.601416077		
15	2.224489796	4.948354852		
11	-1.775510204	3.152436485		
15	2.224489796	4.948354852		
17	4.224489796	17.84631404		
9	-3.775510204	14.2544773		
10	-2.775510204	7.703456893		
15	2.224489796	4.948354852		
10	-2.775510204	7.703456893		
14	1.224489796	1.49937526		
10	-2.775510204	7.703456893		
18	5.224489796	27.29529363		
14	1.224489796	1.49937526		
19	6.224489796	38.74427322		
15	2.224489796	4.948354852		
13	0.224489796	0.050395668		
14	1.224489796	1.49937526		
11	-1.775510204	3.152436485		
15	2.224489796	4.948354852		
12	-0.775510204	0.601416077		
14	1.224489796	1.49937526		
11	-1.775510204	3.152436485		
9	-3.775510204	14.2544773		
11	-1.775510204	3.152436485		
19	6.224489796	38.74427322		
18	5.224489796	27.29529363		
15	2.224489796	4.948354852		
19	6.224489796	38.74427322		

(Appendix Fig. 2. Data table used to for sample calculation of standard deviation of NBA seasons played)

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