Receiving a top-five pick in the NBA lottery leads to success

Abstract:

In the NBA, teams face a dilemma when assembling a formidable roster. To acquire a top collegiate prospect, the NBA team needs to be near the bottom of the league in terms of success. The strategy often requires sacrificing current success, leading to short-term challenges such as declining fan engagement and lower team morale. Poor-performing sports franchises also incur economic losses from the decline in revenue from losing. A fanbase becomes disinterested in the team and stops driving up the team's revenue. An NBA franchise would not make this tradeoff in economic and team instability for a collegiate prospect if it did not work. This research shows that careful navigation of these tradeoffs leads to a top draft pick and that a top-five pick provides direct success both in the regular season and in the playoffs.

Introduction:

Every NBA season, basketball fans start the month of October with a hopeful mindset. They have made it through the grueling offseason without basketball, seen their team's moves in free agency and through the draft, and are filled with excitement for the new season. Will this finally be the year that our team reaches the finals? Will the offseason moves made by the front office propel the team forward? These fans and players dream of the team competing for a championship in the NBA finals in June. Unfortunately, for most franchises, the season ends in April, with their team missing the postseason, and they must live through the offseason again.

The NBA draft provides a massive spike of optimism for the teams whose season ended in April without the opportunity to compete in the playoffs. Some teams even allegedly lose games, also known as tanking, to improve their position in the draft. The draft is a lottery system that disincentivizes teams from fully tanking when the season loses all hope. A lottery system selects the first four picks in the draft, and then the remaining teams are sorted by record and awarded the fifth through the fourteenth picks. Based on regular season records, the worst three teams in the league have a 14% chance of winning the first overall pick, with the odds slightly decreasing for the fourth worst team and a continued decrease for each team after that. The worst team in the league cannot drop below the fifth pick, the second cannot drop below the sixth, and so on. While teams often do not move too far from their seeding, every team that misses the playoffs can jump into the top four, and this can cause some absolute chaos in the lottery.

A prime example of this is how the 2003 draft lottery played out. The Detroit Pistons had traded for the rights to the Memphis Grizzlies pick, and the Grizzlies were the sixth-worst team in the league that season, so they were seeded sixth in the lottery. The Pistons ended up with the second overall pick in the draft lottery and were ecstatic to have gained such a valuable asset. Their luck ended there as they drafted the only player in the top five picks who will not go on to be inducted into the Naismith Memorial Basketball Hall of Fame.[1]

Securing a top-five draft pick relies on lots of luck, but this is not the only portion of the draft where luck comes into play. Even if a team lucks out and gets a pick higher than their seeding, they also have to draft an impact player, which may need more luck than the draft lottery. This is not what fans and front offices of poor-performing NBA franchises want to hear— that losing leads to the team getting a few lottery tickets, not a surefire guarantee of future success. Losing in the NBA is a horrible experience for everyone involved. A team could go through a season's worth of pain to end up with a pick three slots lower than their seed and drafting a player who does not impact the team. Fortunately for these fanbases and teams, top draft pick success can lead them out of this hole of misery and provide success for years to come. This paper will show that acquiring a top-five pick leads to a franchise's success over the first six years of that player's career.

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[1] 2003 NBA Draft." *Wikipedia*, The Free Encyclopedia, en.wikipedia.org/wiki/2003_NBA_draft.

Literature Review:

Many articles and studies have explored the relationship between NBA draft picks and team success. The draft is such an interesting topic as so many different aspects go into the draft, such as scouting, player evaluation, lottery luck, and even the luck of drafting the right player. These different variables that go into a draft pick provide a significant opportunity for research into each aspect. A consistent finding across this research is that higher draft picks tend to provide teams with more productive players, which can lead to increased team performance and increased franchise values. However, the literature also cautions that relying solely on a top draft pick to cause all this improvement is not feasible as outcomes depend on factors such as player development, organizational history and success, and even a bit of luck. This section reviews the existing research and provides context to the question of how impactful NBA prospects can be on the success of a franchise.

Research reinforces the claim that a higher draft pick provides more value to an NBA franchise. This value spreads from economic valuations to team success additions from adding a top-valued pick. Justin Kubatko, the creator of the website Basketball Reference[2], a website widely used by NBA fans and analysts for compiling player statistics, wrote an article about how the value of an NBA player diminishes as their draft position gets further from the top.[3] When fitting a logistic regression to this data,

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[2] "Basketball Reference." *Sports Reference LLC*, https://www.basketball-reference.com/.
[3] Kubatko, Justin. "What Research Says About NBA Draft Pick Value." 2009, https://tonyelhabr.github.io/nba-decision_analysis/what-research-says-about-nba-draft-pick-value.html#justin-kubatko.

there was a clear trend of decreasing win shares over the career and the player's rookie contract as their draft position fell. Win shares are used heavily in the NBA analytics world to estimate how impactful a player is toward winning by splitting the team's total wins into shares and giving each player a portion based on their offensive and defensive impact.[4] A sharp decline in win shares as the draft position falls signifies that top picks significantly impact team success. This same result is reinforced in other research. Nate Silver, the founder of FiveThirtyEight, wrote in an article in 2014 titled "How Much Is Winning the (NBA Draft) Lottery Really Worth?" This article found that since the start of the draft lottery in 1985, the first overall pick provided around 11 more win shares on average over their first five seasons compared to the second overall pick.[5] This trend has a decreasing logarithmic curve, with the top-five picks averaging between 20-25, the bottom of the lottery averaging around 10 win shares, and the bottom of the first round nearing an average of 5. This trend and curve clearly show a consistent drop-off in production as the draft picks get further from the first overall pick.

This value extends beyond simply providing a franchise with wins. In Silver's article, NBA draft picks are assigned an explicit numerical value in dollars. In 2014, the difference between the first and fourth overall picks was estimated to be around $11 million in profits for the franchise.[6] Similarly, rookies are signed to a cheaper deal than their four-year relative value. Silver shows that first-overall picks, on average, produce a

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[4] "Glossary." Basketball Reference, *Sports Reference LLC*, https://www.basketball-reference.com/about/glossary.html.
[5] Silver, Nate. "How Much Is Winning the (NBA Draft) Lottery Really Worth?" *FiveThirtyEight*, 20 May 2014, https://fivethirtyeight.com/features/how-much-is-winning-the-nba-draft-lottery-really-worth/.
[6] Silver, Nate. "How Much Is Winning the (NBA Draft) Lottery Really Worth?" *FiveThirtyEight*, 20 May 2014, https://fivethirtyeight.com/features/how-much-is-winning-the-nba-draft-lottery-really-worth/.

market value that is around $28 million higher than the team's salary obligations to that player. This added value follows through the whole first round, with even the 30th overall draft pick providing an excess of $4 million higher than the salary obligations. While these valuations will not be the same today as in 2014, there is still a significant gap in the valuation of a top draft pick on a rookie contract and their added value.

Adding value does not just come from saving money on rookie contracts compared to that player's performance; NBA teams get a significant margin of their revenue from the fans. Jersey sales, ticket sales, game attendance, sponsorships, and even television broadcasting rights deals (where the most revenue comes from) are directly related to fan engagement. The best way to attract fans in the NBA is by having an All-Star level player that the fans connect with and want to watch perform. Each year, 24 of the best players in the league are selected as All-Stars. An analysis by Bruin Sports Analytics stated that teams with one or more All-Stars are likely to have increased viewership compared to those who don't.[7] This is not a new concept, as most championship teams employ an All-Star player, and fans want to watch teams with championship aspirations. Many of these All-Stars come from the top of the draft. This same analysis provides insight into the likelihood of an All-Star appearance for a top draft pick. The first overall pick has a 75.7% chance to make an All-Star roster, with the rest of the top five averaging around a 40% chance of being awarded an All-Star appearance. This declining trend, as seen in the previously mentioned research, also exists here, with lottery picks having around a 27% rate and the rest of the first round

[7] Jiang, Claire, and Wilson Yu. "NBA Draft Analysis." *Bruin Sports Analytics*, 21 Mar. 2021, https://www.bruinsportsanalytics.com/post/nba_draft_analysis.

only having a 7.4% probability of being an All-Star. This same trend exists for players who accumulate three or more All-Star appearances in their career, with the top five having an average rate of 35%, which declines as the draft pick gets closer to the end of the first round. All-Star level players are among the best in the league, and not only do they give fans exciting performances, but they also are highly correlated with overall team success.

Win shares and All-Star appearances are highly relevant to winning percentage in the regular season. Still, the postseason is one of the most critical times of the year for NBA franchises. All-Stars are held to a higher standard in the postseason, and even though having All-Stars all over a team may lead to the playoffs, playoff success is difficult to predict. The same analysis that Bruin Sports Analytics conducted included a section on playoff success. This research found that the top 10 players selected in a draft were much more likely to reach the conference finals, the finals, and even be crowned champions.[8] From 2000-2020, top 10 picks had 212 appearances in the conference finals, with the other 20 picks in the first round only having 180 appearances combined. This same trend followed in finals appearances, with the top 10 picks having 115 appearances and the other 20 picks only having 87, and for championships, where the top 10 had 56 players who won a championship, and the other 20 picks only had 43. These playoff success differences are not as large as those shown in other research, but this is because of the nature of this data. There is less playoff data than the regular season, especially when looking at the finals and conference finals. Playoff analysis

[8] Jiang, Claire, and Wilson Yu. "NBA Draft Analysis." *Bruin Sports Analytics*, 21 Mar. 2021, https://www.bruinsportsanalytics.com/post/nba_draft_analysis.

needs to be looked at through a different lens than regular season analysis, and these differences are still valuable to understand.

The literature portrays the NBA draft as a pivotal element of team-building. Top five and lottery picks correlate with greater team success and franchise growth. Wise franchises leverage top picks effectively by developing these players into All-Stars and surrounding them with the right pieces. This strategy develops these top picks into sustained regular season wins, deep playoff runs, and increased franchise equity. In contrast, teams that bank on the draft without sound infrastructure often become cautionary tales, illustrating that while draft picks are invaluable assets, their value is realized only through successful execution and integration into a winning team culture. Top draft picks have a massive impact on an NBA franchise's economic and sport-specific success, both in the regular season and in the playoffs.

Data:

Multiple different types of NBA data were collected and used in this analysis. The four main data sets are draft data, player statistics data, playoff success, and regular season winning percentage. This data is used to determine the impact of high draft picks on team success.

Players' statistics and team winning percentages were aggregated to determine the effectiveness and growth of players over their first few seasons. The player statistics[9] and winning percentage data[10] were collected from 2000-2023 from NBA.com. The winning percentage data is a simple data frame containing the wins and losses for a team in each season. A percentage was used here as the NBA lockout that impacted the 2011-2012 and 2019-2020 season that COVID-19 impacted. Both have a lower amount of games in the season than 82. The percentages help account for these outside factors that directly impact the analysis. Similarly, the playoff data was collected from the same time frame, from NBA.com[11], with each round comprising the winning and losing teams in the playoff series. The playoff data used in this analysis is the number of wins a team achieved during a single playoff run.

The player statistics dataset averages six main statistics per game for each season. These stats are minutes played, points, rebounds, assists, blocks, and steals. A

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[9] NBA. *Player Stats Leaders*. NBA.com, https://www.nba.com/stats/leaders.
[10] NBA. *NBA Standings*. NBA.com, https://www.nba.com/standings.
[11] Basketball Reference. *NBA Playoff Series Results*. Sports Reference, https://www.basketball-reference.com/playoffs/series.html.

few filters were introduced to select only the players that significantly impacted the team's season. The first filter selected only players who had to play 27 of the 82 games (approximately one-third of the season). After this initial filtering, the players were grouped by their team and arranged by their average minutes played. Then, the top eight players in minutes played were kept and used for analysis. This top eight was selected because that is typical for a playoff rotation in the NBA. Typically, only the five starters and around two to three bench players get significant minutes during playoff runs. Filtering down to just these athletes provides us with the players who significantly impact the team's success.

Draft data was accumulated for all players to determine the effectiveness of drafting. The collected draft data was from 1980 to 2023, including the players drafted earlier who played in the 2000 season from NBA.com[12]. NBA draft data is recorded directly after a pick is made and is not changed, meaning a player can be drafted by a team and never play for that team. If a draft pick is traded or swapped too close to the draft, the NBA needs to approve the trade so the trade sends the player, not the draft pick. This lag in approval leads to the data stating that the original team drafts the player, and then that player is traded. A prime example of this is the 1996 draft that included Kobe Bryant. Kobe was originally drafted by the Charlotte Hornets, then subsequently traded on draft day to the Los Angeles Lakers, where he built a storied career. On NBA.com, Kobe Bryant is listed as being drafted by the Charlotte Hornets, but his impact was with the Los Angeles Lakers. To account for this, if a player has a

[12] NBA. *Draft History*. NBA.com, https://www.nba.com/stats/draft/history.

different team listed for their rookie season and their draft team, the draft team is set to the team they were on for their rookie season. This data manipulation helps eliminate the majority of discrepancies caused by the unique classifications of NBA draft data.

Figure 1

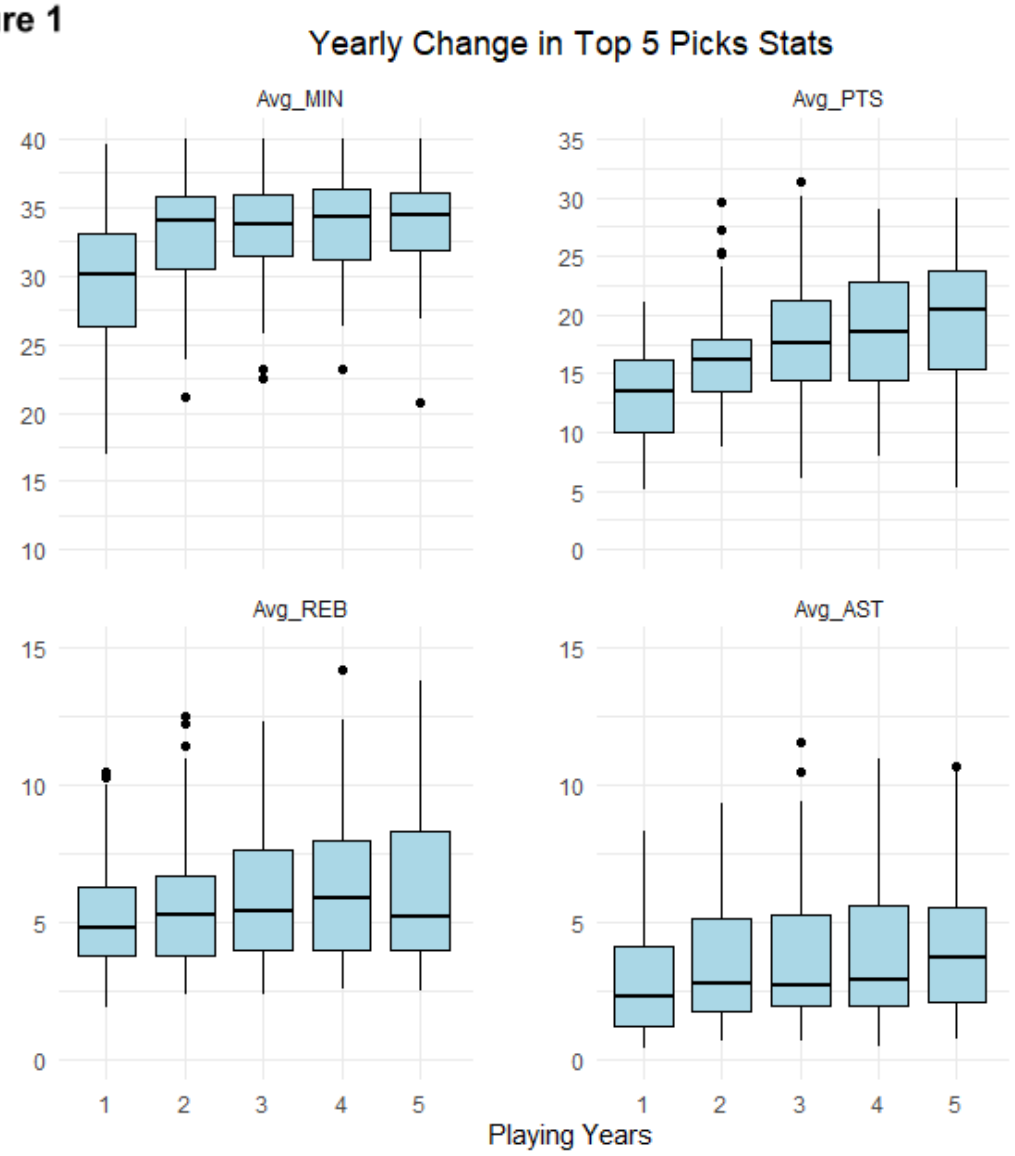


Figure 1 shows the improvement of a top-five pick that played significant minutes in all five of their first five seasons in the league. The charts show their average minutes, points, rebounds, and assists and how those averages change as their careers

progress. The only significant jump in minutes is from their rookie season to the second year in the league. After this initial jump, the minutes stay relatively stable. An increase in statistics in these years is related to basketball improvements and not just an increase in minutes. The points chart shows a jump from year one to year two, but it also shows a consistent improvement over the whole period—the overall average increases every year at a diminishing rate. The main quantile also increases through these five years, showing that top-five picks improve their scoring ability the longer they are in the league.

There is not as large of a jump or increase for the bottom two charts of points and assists. There is a slight increase over the five years, but this increase is not large enough to be significant. Given how assists and rebounds are more position-dependent than points, we expect not to see an extensive increase here. One thing we can take away is that the top “whisker” on both the assists and rebounds continues to reach higher, showing that the players who get many rebounds or assists are improving.

Figure 2

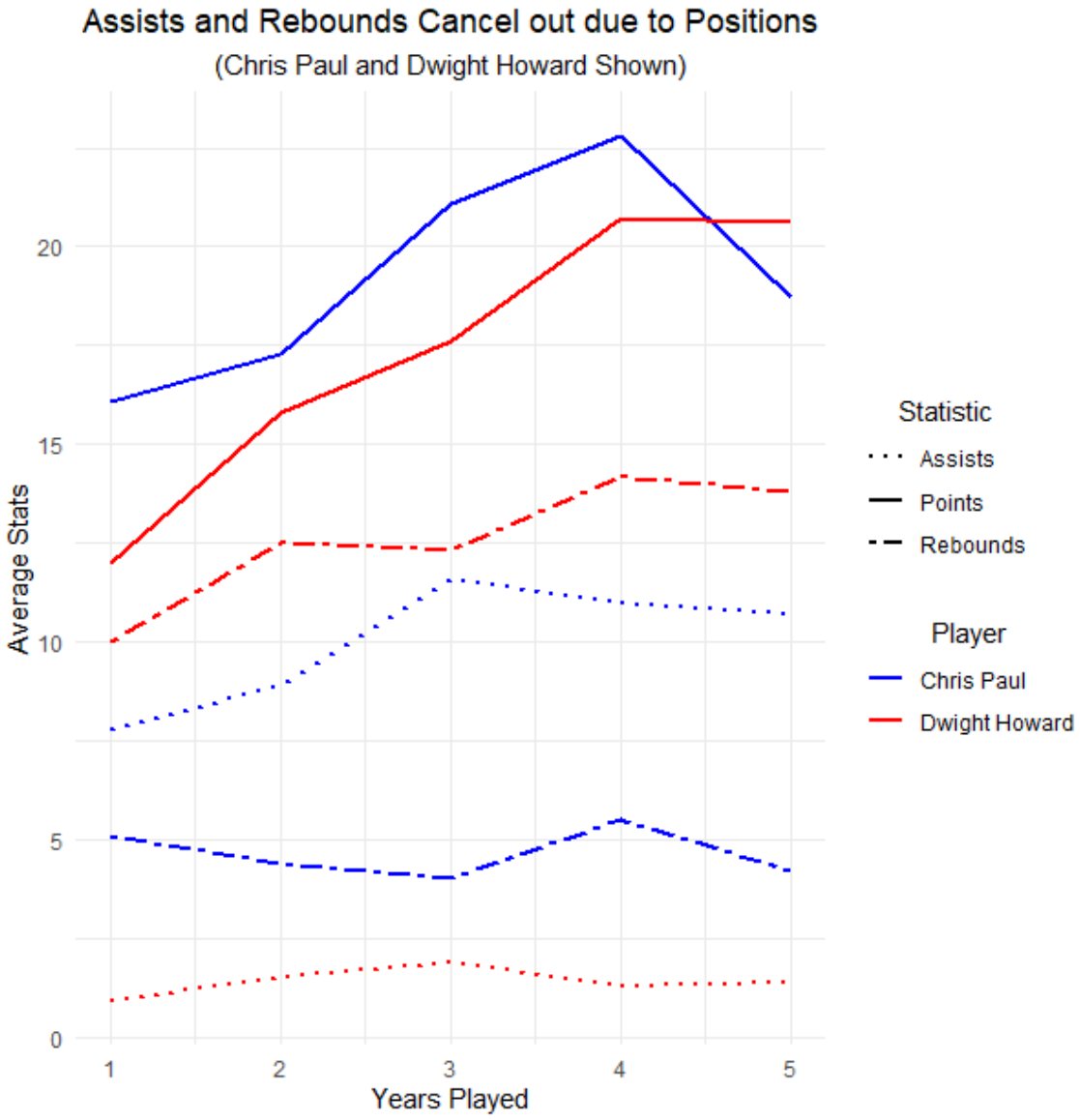


Figure 2 examines two famous top-five picks with different skill sets, Dwight Howard and Chris Paul. Chris Paul was the fourth overall pick in the 2005 draft selected by the New Orleans Hornets to be their franchise's leading point guard for the foreseeable future. Over his first five seasons, Chris Paul peaked at 23 points and 11.5 assists per game. These numbers were a massive improvement from his rookie season averages of 16 points and 8 assists. His rebounds barely shifted, with the range over

the five years being from 4 to 5.5. With his minutes staying stable throughout these first five years, Chris Paul showed significant improvement in the stats that matter for the point guard position.

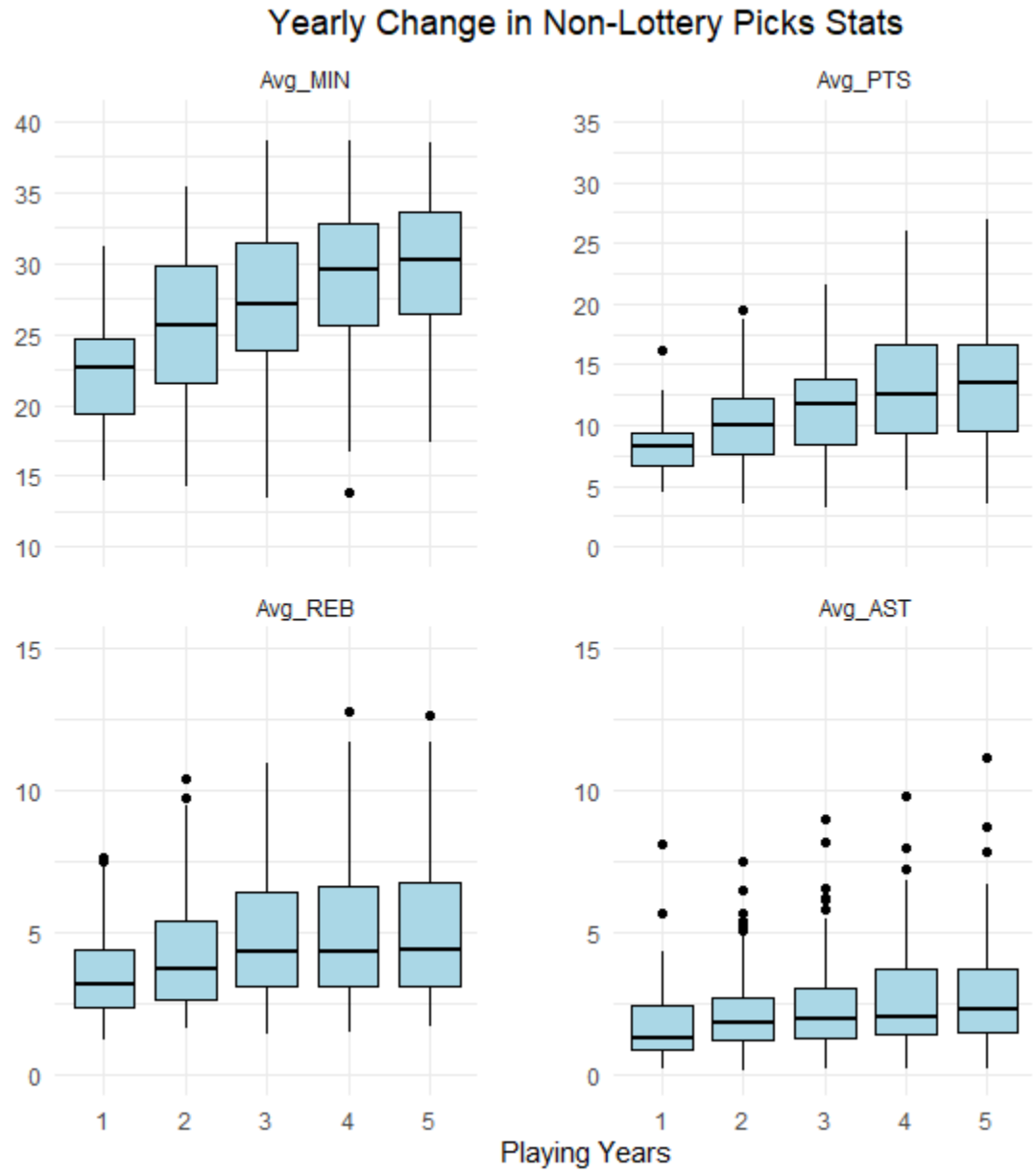
Dwight Howard was the first overall pick in the 2004 draft selected by the Orlando Magic to be their star center and was often called “Baby Shaq” in reference to the hall-of-fame center Shaquille O’Neal. Dwight averaged 12 points, 10 rebounds, and only 1 assist in his rookie season. He then averaged 21 points and 14 rebounds but only reached 2 assists. Dwight had a slight minute increase from his rookie season to his second year, but nothing significant enough to explain these statistics jumps fully. Dwight drastically improved his abilities as a top center in the NBA.

Given that a center and a point guard, both drafted one year apart, improved their scoring and respective statistics, this explains why there is a noticeable increase in points but not as much in the other stats. The improvements in assists and rebounds counteract each other due to the different positional demands in the NBA. While these players improve independently, this is not fully captured as we averaged out some of these improvements by merging all players.

First-round draft picks outside the lottery do not show nearly the same results. The lottery in the NBA consists of the first 14 draft picks in any given draft. The players selected for this following analysis played the top eight minutes on their team for at least three of the five years in the NBA. These prerequisites are different from the ones used

for the top five picks. For the top five picks, they had to play all five of their first five seasons. This was to ensure that the top five picks could show their development and remove those whose early careers were heavily impacted by injuries. Compared to the bottom 16 picks of the first round, many of these players do not have the opportunity to start or play significant minutes in their first few seasons. These draft picks usually are not given as much of an opportunity or role as the earlier ones. These players were already filtered to only the top eight in minutes played. If these players were filtered to only those who played all five seasons, the selected players would only be the best of the best. This is why the thresholds were set differently based on the different draft pedigree.

Figure 3



The bottom 16 first-round draft picks were plotted in the same box plot chart used for the top five picks. Figure 3 shows the progress of an NBA player over their first five seasons in the league. Minutes played, points, rebounds, and assists are still the key metrics. The main takeaway from these charts is how the minutes played moved throughout these first five years. The minutes show a steady increase year over

year. Comparing this to the trends of the top five picks, the minutes for the non-lottery picks increase at a much larger and steadier rate. These minute increases are enough to explain many of the other statistics' increases.

The points category increases yearly at a diminishing rate, which is highly similar to how the top five chart looks. The overall increase is almost as large, but two things downplay this increase. First, the increase in minutes accounts for a lot of the increase in points. Getting more opportunities typically leads to more scoring for a player. A more prominent role in the team does not mean that is the only reason that the player is scoring more often; they are also improving. This improvement is there for these rookies but is not at the same level as the top five. Looking at the averages for these rookies, the non-lottery rookies see an improvement from around 7-8 points a game to around 14-15. The top five rookies see an improvement from around 15 points a game to somewhere near 23. These improvements are comparable in size, with about an 8-point increase over the five years, but the difference lies in how they increase.

Scoring in the NBA follows a pattern of diminishing returns in a sense, where each additional point gets harder and harder to accumulate. Many NBA players can achieve the feat of averaging 5 points in a game, but few can reach the heights of averaging above 20 points per game. Not only does the player have to make more shots in an NBA game to reach these higher averages, but defensive attention will be shifted toward the player, making scoring even more difficult. The non-lottery pick

players improve their points, but a lot of that improvement can be attributed to a minute increase and a more manageable area to improve than the top five picks.

The assists and rebounds follow a similar trend with the top five picks. There is a slight increase in both statistics, but looking at averages, there is nothing with a large enough magnitude to be significant. Once again, some of the lack of growth can be attributed to different positional needs, canceling the improvement in others. The peaks of statistics also show improvement, similar to the top five picks charts.

Overall, the top five picks significantly improve more than the non-lottery picks. By analyzing just averages and the spread of specific statistics that are tracked, it is clearly shown that these high draft picks can be expected to show more improvement early in their NBA careers than players selected later in the draft.

Knowing that these top five picks are expected to improve, the assumption that this improvement will help the team's overall success comes into play. In order to determine this, both an event study and linear regressions were conducted to analyze the effects of high draft picks on overall team success and winning.

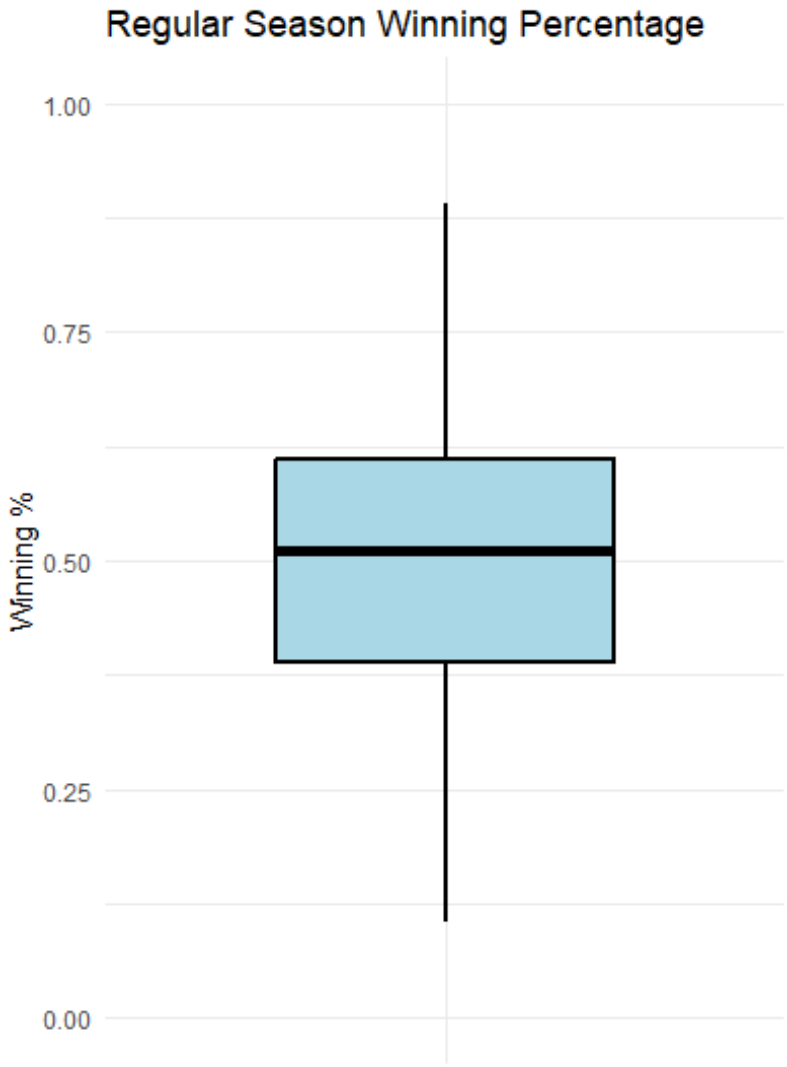
Model:

The models used in this analysis of NBA draft data are ordinary least squares (OLS) regressions, negative binomial regressions, and event studies. The OLS regression method estimates the coefficients of the variables that minimize the sum of the squared residuals, which gives the linear predictions and which variables are the most important for explaining the dependent variable. In our case, the linear regressions use winning percentages of different seasons as the dependent variable and prior seasons' win percentages as independent variables. In half of the regressions, we also use a "big market" control to account for free agency aspects of the NBA. The regression equation is shown below as equation 1.

(1)
$$WinsYear3_{i,t+2} = \beta_0 + \beta_1(Top5Draft_{i,t}) + \beta_2(RookieWins_{i,t}) + \beta_3(Lag1_{i,t-1}) + \beta_4(Lag2_{i,t-2}) + \beta_5(BigMarket_i) + \epsilon_{i,t}$$

Equation 1 has a winning percentage in a future year as the dependent variable, an intercept term, a dichotomous variable for a top-five draft pick in year one, a winning percentage in year one, lagged winning percentages for year zero, and year negative one, another dichotomous variable for big markets, and the error term. Year one references the year the rookie was drafted, that rookie’s first season. This specific regression references the wins in year three, but this is switched out in the regressions to include future years from year two through year six.

Figure 4



Although the winning percentage is a variable naturally bounded between 0 and 1, a standard linear regression model is still used rather than a Tobit or truncated regression. This choice is because the winning percentage variable in an NBA context never approaches 0 or 1. As shown in the boxplot in Figure 4, the tails of the box plot never cross .9 or .1. The best winning percentage in NBA history is 89%, and the worst is 10.5%. With the box plot also being centered around 50%, there is minimal risk of

violating the assumptions of a standard linear regression. The lack of extreme values allows this relationship to be modeled without substantial biases or distortions that call for a different model.

(2) $$PlayoffWinsYear3_{i,t+2} = \exp\left(\beta_0 + \beta_1\left(Top5Draft_{i,t}\right) + \beta_2\left(RookiePlayoffWins_{i,t}\right) + \beta_3\left(Lag1_{i,t-1}\right) + \beta_4\left(Lag2_{i,t-2}\right) + \beta_5\left(BigMarket_i\right) + \epsilon_{i,t}\right)$$

Equation two models playoff success using a negative binomial regression to account for the nature of the playoff wins variable. The models for playoff success use almost the same equation, with the win variables changed to playoff wins, and the whole equation is raised to the exponential power. The playoff regressions also span year two through year six.

A Poisson regression model is typically used to predict values with count data. The Poisson distribution has a characteristic where the mean is equivalent to the variance. In certain situations, the variance is greater than the mean, which is known as overdispersion and can cause the model not to be appropriate for the data. The negative binomial regression accommodates overdispersion by including an additional dispersion parameter to counteract this. It specifically helps with data with high variability. The Poisson model showed signs of severe overdispersion with the playoff data. This led to using the negative binomial regression model to show these results.

An event study examines the effect of a treatment or event on a group over time. The event study centers all the observations at the event time of 0 and plots the trends

before and after. For this analysis, the event is a top-five draft pick and the winning percentage in that rookie season. The event time goes from 5 years before the draft pick and 7 years after. This event analysis determines how the winning percentage changes, coming into a top-five draft pick and the performance afterward.

$$\textbf{(3)} \quad Wins_{i,t} = \beta_0 + \sum_{k=-4}^{8} \beta_k P(EventTime = k) + \gamma_i + \delta_t + \epsilon_{i,t}$$

Equation 3 shows the event study used. The equation has a winning percentage as the dependent variable, an intercept term, a summation of indicator variables for each year before and after the draft (with the rookie season of year 1 being omitted to avoid collinearity), team fixed effects (gamma), time fixed effects (delta), and an error term. The indicator variables capture the effect of event time as the coefficient changes with each event time. The event study for playoff success only changes the winning percentage variable from the regular season winning percentage to playoff wins.

Results:

Figure 5

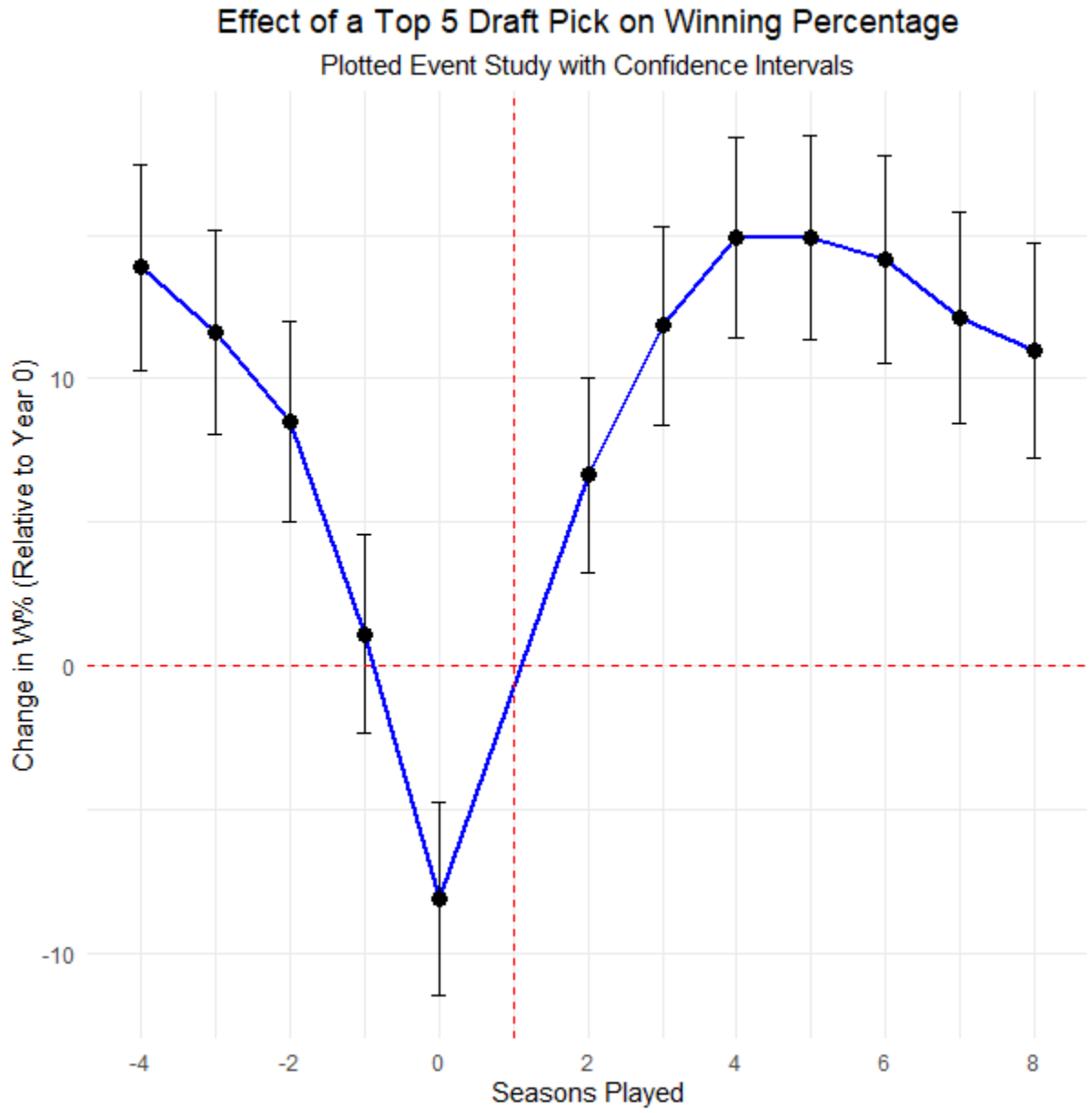


Figure 5 shows an event study with confidence intervals centered around the rookie year (where seasons played are set to 1) when a team had a top-five draft pick. The red dotted lines signify the rookie season winning percentage on the y-axis and the rookie year on the x-axis. The aggregated event was if an NBA team had a top

5 pick, and it compared the win percentages for the team before and after the event occurred. The chart shows a decrease in the winning percentage heading toward the pick, with an ultimate dip in the season before the pick, as expected.

Event studies often show a stationarity in the data trend before the event occurs. In this case, this is irrelevant as it is expected to see the NBA team decline in winning percentage to get a top-five pick. This downward trend before the pick is expected and can either result from poor team performance, a designed rebuilding or tanking phase suggested by the front office, or a mixture of both. Knowing that the winning percentage is dipping, coming into the top-five pick, the main takeaway would be to see if there is a significant rebound out of this decline.

The event study centers on the winning percentage of the top-five picks in their rookie season. We see around a 7-8 percentage point increase in winning percentage from the year before the draft to the rookie season of the top five picks. There is a near equivalent jump in winning percentage from the rookie season to the second year and another 5 percentage point increase from year two to year three. This diminishing trend continues into year four, where we see another slight increase in winning percentage, which then tapers off and starts to decline.

This event study shows that the winning percentage significantly increases in the rookie's second, third, and fourth years. Having a top-five pick is expected to lead to an increased winning percentage in reference to their rookie year and the years

before the draft. This same result occurs when modeling this relationship using an OLS linear regression.

Figure 6

Regression Results: Impact of top-five draft picks on regular season winning %

	Year 2	Year 3	Year 4	Year 5	Year 6
(Intercept)	0.218 ***	0.345 ***	0.427 ***	0.468 ***	0.475 ***
	(0.024)	(0.028)	(0.030)	(0.032)	(0.033)
Top5Draft	0.012	0.036 *	0.052 **	0.035	0.028
	(0.016)	(0.019)	(0.021)	(0.022)	(0.023)
Rookie W%	0.615 ***	0.400 ***	0.148 ***	0.033	-0.052
	(0.040)	(0.048)	(0.052)	(0.055)	(0.057)
Lag 1	0.054	-0.040	0.027	-0.026	0.039
	(0.052)	(0.063)	(0.069)	(0.072)	(0.075)
Lag 2	-0.108 ***	-0.059	-0.042	0.047	0.054
	(0.039)	(0.047)	(0.052)	(0.055)	(0.056)
R^2	0.370	0.128	0.028	0.008	0.006
Adj. R^2	0.366	0.122	0.021	0.000	-0.002
Num. obs.	628	598	568	538	508

*** p < 0.01; ** p < 0.05; * p < 0.1

Figure 6 shows five linear regressions with the winning percentage in future years as the dependent variable using past winning percentages as independent variable controls. The first regression has the top-five draft pick's second year in the NBA's winning percentage as the dependent variable. The independent variables are the win percentage in the rookie year for the top-five pick and the winning percentage in the year before and two years before the rookie season. The last independent variable indicates whether or not the team had a top-five draft pick. The rest of the regressions

follow this exact format, with the only difference being the change in the dependent variable.

The variable of interest from these regressions is how the top-five draft pick indicator variable. At first glance, the top-five pick's fourth year is the only significant year at a five percent level. This coefficient on the top-five pick dummy variable says that if the team had a top-five pick, it is predicted that they would have a 5.2 percentage point increase in win percentage three years after the pick. For example, in the 2000 season, the Chicago Bulls had a top-five pick, but the Boston Celtics did not. This regression says that both teams are expected to have a base winning percentage of 42.7% in the 2003 season. Since the Bulls have a top-five pick, they add the impact of this draft pick to the winning percentage, which gives them a predicted 47.9% winning percentage, holding all other factors equal to zero. Overall, the main point is that having a top-five pick increases the winning percentage by about five percentage points (equivalent to around four wins in an NBA season) in the draft pick's fourth season in the NBA.

While the only statistically significant coefficient for the top-five draft pick indicator variable was in year 4, year 3 has a p-value of 0.06, and year 5 has a p-value of 0.113. These are not statistically significant under the usual requirements for statistical analysis, but this data is not from an experimental setting. This data is collected from a practical setting where these athletes compete at the highest level to help their team succeed. It is impossible to control for all confounding factors, such as travel time,

sleep, personal matters, training age, and other factors that impact how an NBA player performs on the court. Given how many things could impact the results of this analysis that are not quantifiable, the statistical significance that is of interest in this study is at a 10% level. This allows for a more nuanced discussion around the model results. In this situation, a p-value of 0.06 can show that some relationship exists, while the p-value for year 5, being at 0.11, may discourage the effect of the draft pick on the fifth year. Overall, having a top-five draft pick will impact the winning percentage in that player's third and fourth seasons with the team.

Figure 7

Regression Results: Impact of top-five draft picks on regular season winning % (with a market size control)

	Year 2	Year 3	Year 4	Year 5	Year 6
(Intercept)	0.216 ***	0.341 ***	0.422 ***	0.462 ***	0.469 ***
	(0.024)	(0.028)	(0.030)	(0.032)	(0.033)
Top5Draft	0.012	0.037 *	0.053 **	0.036 *	0.029
	(0.016)	(0.019)	(0.021)	(0.022)	(0.023)
Rookie W%	0.612 ***	0.395 ***	0.142 ***	0.029	-0.056
	(0.040)	(0.048)	(0.052)	(0.055)	(0.057)
Lag 1	0.054	-0.039	0.028	-0.024	0.038
	(0.052)	(0.063)	(0.068)	(0.072)	(0.075)
Lag 2	-0.109 ***	-0.060	-0.044	0.042	0.050
	(0.039)	(0.047)	(0.052)	(0.054)	(0.056)
BigMarket	0.017	0.027 **	0.032 **	0.037 **	0.039 **
	(0.011)	(0.013)	(0.014)	(0.015)	(0.015)
R^2	0.372	0.134	0.037	0.019	0.019
Adj. R^2	0.367	0.127	0.028	0.010	0.009
Num. obs.	628	598	568	538	508

*** p < 0.01; ** p < 0.05; * p < 0.1

These same models were rerun in Figure 7, with a market size variable to help adjust for some of the free agency acquisitions that shape rosters. It is well known that some cities and franchises are more attractive in the NBA than others. Warmer climates and large cities have attracted high-level NBA free agents to these franchises. A dummy variable identifying the eight most prominent markets in the NBA accounted for this free agency impact. This variable selects the eight cities based on population and NBA franchise success, both historical and during the timeframe of this analysis. The eight teams included in this variable are the Los Angeles Lakers, Golden State Warriors, Chicago Bulls, Miami Heat, New York Knicks, Philadelphia 76ers, Boston Celtics, and the Dallas Mavericks.

We get similar results with this analysis but with more refined coefficients and p-values. Once again, the fourth year is statistically significant at a 5% level, with the coefficients on the intercept and the top-five draft pick variable staying relatively the same. The market size variable changed the significance of years 3 and 5, making both statistically significant at a 10% level. The coefficients in these years stay relatively stable as well. Given these values, the win percentage significantly increases in the third, fourth, and fifth years if a team has a top-five draft pick. This follows the trend shown in the event study. The event study showed jumps in win percentage in the second, third, and fourth years, with the fifth year staying at the same level as the fourth. These OLS regressions show similar trends and results for all of these years, except for the second year, indicating that having a top-five draft pick significantly increases the team's winning percentage.

The next question is whether or not this success continues into the playoffs. A top-five draft pick significantly impacts the winning percentage in the regular season, which likely leads to the team making the playoffs and potentially playoff success. The following event study and regressions are predicted using playoff wins as the dependent variable. NBA teams in the playoffs can win anywhere from 0-16 games throughout the playoffs. Winning 16 means the team won the title, and each increment of 4 wins means the team won their series and advanced a round. To account for the achievement of making the playoffs, all 14 teams who missed the playoffs were assigned a value of 0, and all teams who made the playoffs got an additional 4 “wins” added. This variable reordering was done as the negative binomial regression requires only non-negative numbers, and a four-point gap is the equivalent of moving up playoff rounds. Setting the baseline for making the playoffs at four wins and increasing all other playoff wins per this baseline avoids giving teams who missed the playoffs the same respect as those who made the playoffs but did not win a game.

Figure 8

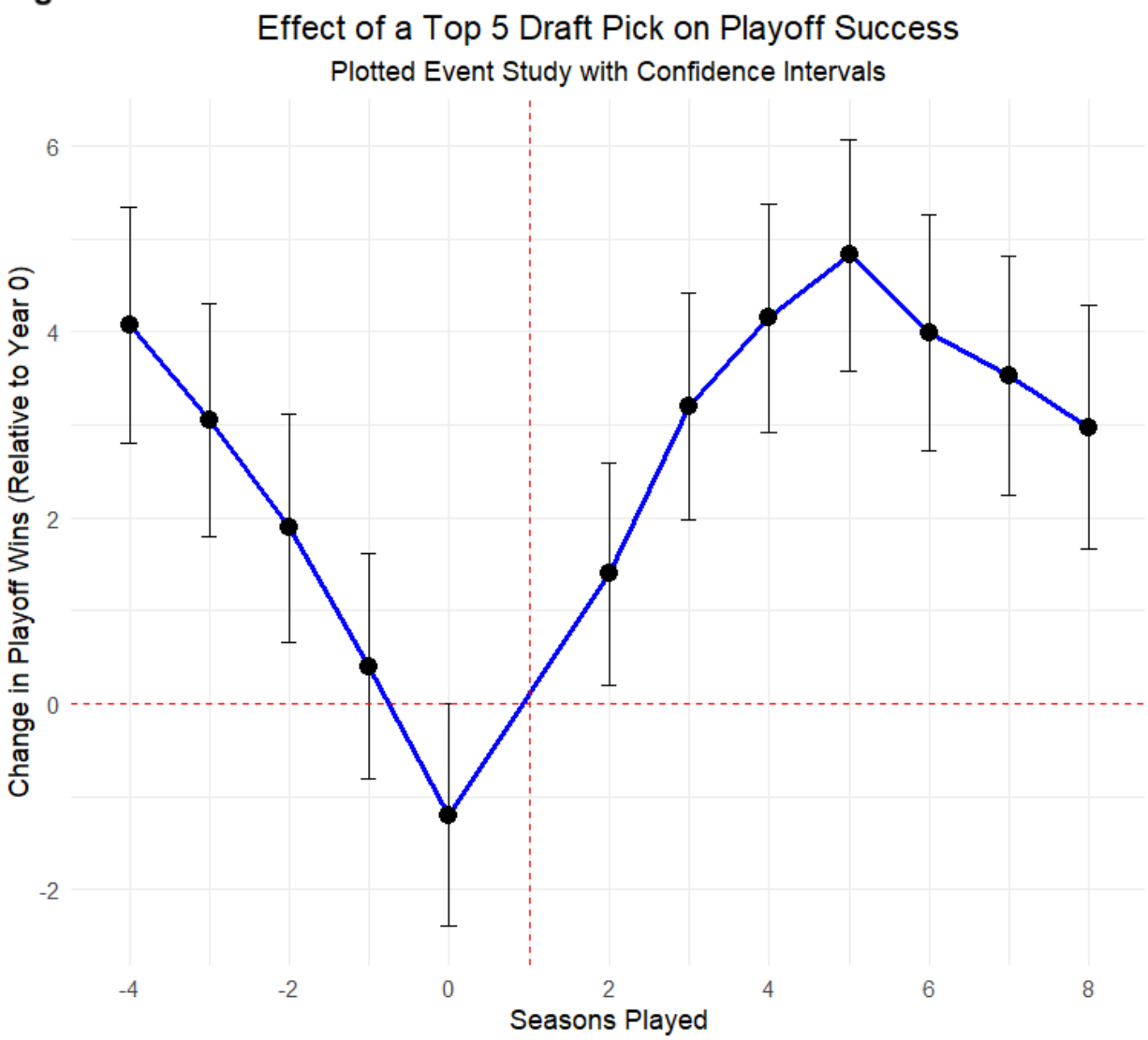


Figure 8 shows an event study on the number of playoff wins centered around the playoff success in the rookie season (one season played). The red dotted lines signify the rookie season playoff wins on the y-axis and the rookie year on the x-axis. This event study follows a trend similar to the winning percentage study, with a steep decline before the pick and a solid climb back in the following years. This study does not

stay at the peak as long as the regular season winning percentage does, but both studies reach their peaks in the fifth season.

This event study shows that a team is expected to win one fewer playoff game the year before the pick than the rookie season. The season a team receives a top-five pick, their playoff wins will be set to 0, meaning the rookie season playoff wins are predicted to be 1 in this context. Although that number does not have an actual explicit value, we can use it to compare it to other values. In the third season, the team is expected to have three more playoff wins than in the rookie season, meaning the total playoff wins are predicted to be four. This predicts that a team with a top-five draft pick is expected to be in the playoffs by that player's third season. This trend continues with the team being predicted to win two playoff games in the rookie's fifth season (five more playoff wins than the rookie season).

Once the time frame goes past this fifth season, the playoff wins begin to taper off. Similar to the regular season winning percentage, this could be due to many factors. These data points are far from the draft pick, so significant roster movements could impact this. A key player or two could have left in free agency, or a player relevant to the rotation may have retired. A clear trend of increased playoff success still exists throughout the first five years of the rookie's career.

Figure 9

Regression Results: Impact of top-five draft picks on playoff wins (Negative binomial regression with a market size control)

	Year 2	Year 3	Year 4	Year 5	Year 6
Intercept	0.919 ***	1.105 ***	1.331 ***	1.331 ***	1.406 ***
	(0.114)	(0.120)	(0.034)	(0.035)	(0.036)
Top5Draft	-0.175	0.238	0.238 ***	0.385 ***	0.188 ***
	(0.195)	(0.203)	(0.053)	(0.052)	(0.056)
Rookie Playoff Wins	0.076 ***	0.067 ***	0.030 ***	0.020 ***	-0.017 ***
	(0.013)	(0.014)	(0.004)	(0.004)	(0.004)
Lag 1	0.030 **	0.004	0.010 **	-0.015 ***	0.006
	(0.014)	(0.015)	(0.004)	(0.005)	(0.005)
Lag 2	-0.013	-0.016	-0.024 ***	0.004	0.009 **
	(0.013)	(0.014)	(0.004)	(0.004)	(0.004)
BigMarket	0.317 **	0.358 **	0.413 ***	0.446 ***	0.498 ***
	(0.148)	(0.157)	(0.040)	(0.041)	(0.042)
AIC	3113.794	3004.746	5168.411	4909.171	4685.099
BIC	3144.903	3035.513	5198.818	4939.199	4714.726
Log Likelihood	-1549.897	-1495.373	-2577.206	-2447.586	-2335.550
Deviance	644.342	607.268	3946.065	3755.140	3596.811
Num. obs.	629	599	569	539	509

*** p < 0.01; ** p < 0.05; * p < 0.1

Figure 9 shows five negative binomial regressions where the dependent variable is playoff wins. These regressions also include the same big market indicator variable that impacted the regular season winning percentage regressions. For continuity, these regressions were also run without the big market indicator variable, and the estimates were slightly different but not enough to dedicate another section of this paper to the market size. Adding this variable again removed a lot of error and noise from the model refining estimates. The big market impact is largely positive for all five regressions. Some of this impact can be explained since some of these teams have had continued playoff success over the 2000-2023 time frame. A small part of the

impact of free agency is once again being accounted for in this variable, as free agents are more likely to go to a large market.

The controls are the rookie season and the two years prior. These controls are less relevant than they were in winning percentage as the year before the rookie season, the team is most likely not making the playoffs and getting a top-five pick. This would only occur through a draft day trade, and while this is still relevant to the analysis, it is not a common occurrence, so these controls have a lighter impact. The top-five draft pick indicator variable is the primary variable of interest in these regressions.

The significance level of interest is still at 10%, with this study not being conducted in an experimental environment. At this significance level, the fourth, fifth, and sixth years are all statistically significant for a top-five pick impacting the team's playoff success. This follows what was seen in the event study, where the team was predicted to make the playoffs in the top-five picks in the third year and to continue this success until a peak in the fifth year, with the sixth year expecting success. The negative binomial regression did not predict that having a top-five pick would impact the third year.

These significant playoff results increase the winning, but the coefficients can be slightly misleading without the proper context. The coefficients in a negative binomial regression are returned in log-odds since the equation is in the exponential power. In year four, the log-odds increase in playoff wins from having a top-five pick is

.238, and when exponentiating that, the actual wins increase is that teams with a top-five pick have a 26.8% increase in playoff wins than teams without this pick. This follows with year five having a 47% increase and year six having a predicted 20.4% increase. Year six tapers off compared to this earlier growth as getting further from the pick reduces its overall effect on winning. When increasing these percentages, most of the league does not have any playoff wins at all or only makes the first round (which is equivalent to 4 playoff wins in this model). While these percentages can look large, they are not always highly indicative of deep playoff success. These predictions show that having a top-five pick is relevant to making the playoffs and winning some games, but there is no significant predicting power for deep playoff runs.

Conclusion:

Acquiring a top-five draft pick impacts both regular season and playoff success. Event studies and OLS regressions show this impact. According to the statistical models, a top-five pick has the most significant effect in that player's fourth and fifth seasons in the NBA. Before that, the rookie does not provide enough of an impact to change the team, and after those seasons, the effect of the pick diminishes as more and more factors start to account for wins. The effect size is not massive, but it is still practically significant. For playoff wins, the regression and event study shows an increase of around four wins at the peak of the predictions. This would mean that if the team made the playoffs in the top-five picks rookie season, they would advance a round, but if they missed the playoffs, this model predicts that the team would make the playoffs. The regular season winning percentage models showed a 5-10 percentage point increase in the significant seasons. This percentage point increase is equivalent to an increase of around 4-8 wins in a standard 82-game regular season.

The playoff predictions only show the impact a top-five pick has on the first round of the postseason. These models cannot accurately predict success in the conference finals or the finals but can with lower rounds in the postseason. The more considerable impact of these models is based on the regular season winning percentage. Four wins can be the difference between the play-in and the playoffs. Eight wins can be the difference between getting home-court advantage and going on the road in the playoffs.

Overall, having a top-five pick leads to future success in the regular season and early in the postseason.

In the future, more can be done to understand the impact of a top-five pick further. These models can be updated with controls for losing or gaining important players year by year. The importance of adding a player could be analyzed using summaries of advanced statistics, but their proper fit within a team is challenging to quantify qualitatively. This idea could be translated into defining if a team is “tanking” by trading or releasing their best players with a rebuild in mind. The tanking teams could be analyzed similarly to this study and compared to teams in a similar situation but did not trade their players. With all the luck that goes into acquiring a top draft pick and drafting the correct player, this luck could also be modeled and compared to franchise misevaluations of players. Understanding more about the draft evaluation process would help refine the results of these top draft picks. These models and results provide valuable insights and opportunities for further research into different team-building options in the NBA.

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