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Examining the Effectiveness of NBA General Managers at Determining Value in the NBA draft, and the Impact of Drafting Team on Player Future Value

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Abstract

This study examines the effectiveness of NBA general managers at accurately drafting in accordance with the future values of players. Using draft position as a metric representing perceived value at the time of the draft, and second contract size to represent value of a player at the time of free agency, I compare the effects of different draft positions on the expected size of a players second contract. By examining divergences in the expected negative linear trend, I can identify positions in the draft which are being over/undervalued. I additionally look at the effect of team on second contract size and acquisition rate to determine if drafting team has a significant impact on a player's career, as well as which positions in the NBA draft seem to have consensus value across NBA general managers. Results indicate that while NBA managers do a good job drafting accurately at most draft positions, there is a league-wide consensus overvaluation of the second overall pick. Additionally, team environment or "culture" does not seem to be a key predictor among drafting teams on a player's expected second contract size but being drafted by some teams does have a significant impact on the probability of second contract acquisition.

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Finally, I would like to dedicate this senior thesis to the 2022-23 Boston Celtics and their ongoing quest to bring Banner 18 home to Beantown. The Celtics inspired my love of basketball and helped make this project an interesting and gratifying one. Shoutout Jayson Tatum and Jaylen Brown – I finished my thesis, your turn to get the job done. Go Celts.

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I. Introduction

Every summer, sixty of the best young basketball players are selected and awarded rookie contracts in the NBA draft. Thirty professional basketball teams one by one select prospects roughly in reverse order of the previous year's standings. Each prospect is thoroughly analyzed by each team in order to determine which players are likely to grow into productive NBA players and help the organization achieve its goals. Draft selections are treated as extremely valuable assets in the NBA community and are held close to the chest by NBA general managers. For one, a high NBA draft pick presents the opportunity to add a player with the potential to be a high caliber contributor for the foreseeable future, as one or two highly drafted prospects each year often develop into "franchise-player" quality stars. Even if a team's draft position is not in the top five or ten selections, effective evaluation of prospects at any draft position can have massive benefits for a team.

Rookie contracts are structured to extend four years with relatively low annual salaries, set in accordance to draft position. The NBA sets a standard rookie contract for each draft position each year, and teams can sign their draft picks to annual salaries between 80% and 120% of the NBA-set salary. Salary brackets are highest for early draft positions and decrease as the draft progresses. These team friendly contracts offer teams with lower draft positions the opportunity to sign productive players to below market deals and retain them for up to four years before they become free agents, if they can draft effectively.

Player value is reassessed at the end of the four years; or after year two or three when teams have the option to opt out of the contract. At this point, a player becomes a free agent. This is when a player is no longer contractually obligated to play for a team at the predetermined salary and can test the open market to seek out a second contract. Players who have proven to be effective contributors at the NBA level over the course of their rookie deal sign new contracts, while others who have not played to the expected level do not. Some early draft picks will sign max deals indicating that they were worthy of teams sacrificing a high draft selection a few years prior. For later draft picks who have proven effective at the NBA level, free agency provides the first chance for a player to acquire a contract that accurately represents their ability and value.

The purpose of this analysis is to evaluate the ability of NBA scouts and managers to consistently select the best players available at each draft position and identify draft positions which regularly produce higher or lower-level players than would be expected at that point in the draft. To do this, I use draft position as a metric representing NBA managers' perceived value of a player at the date of the draft. Second contract size represents a player's perceived value when they reach free agency. If NBA managers drafted perfectly, the position to which players are drafted would have a perfectly linear relationship with the average contract size signed by players at each draft position when they reach free agency. The first picks would sign the largest contracts, the second picks would sign the second largest, and so on. This would imply that NBA general managers are drafting players accurately according to their future value in the league. Draft positions which diverge from this trend would indicate that players drafted at sed position are consistently being over/undervalued by managers at the time of the draft.

To further understand the decision-making process of NBA general managers, examining which draft positions are most / least often traded provides insight as to which positions have agreed upon value, and where there are discrepancies.

Through these two angles of study, I will show which draft positions have agreed upon value by NBA managers, and which positions are being over/undervalued. NBA teams are constantly trying to gain a competitive edge over other teams in their drafting processes. Understanding which positions in the draft are being misevaluated by other managers could provide an immense advantage in trade negotiations and draft strategy. Additionally, if being drafted at certain positions provide environmental factors beneficial to a player's development and eventual second contract size, this could also impact how a player approaches the NBA combine, team workouts, and interviews.

Another factor that has large implications on the early career of NBA players is the team which they are drafted to. In NBA circles today, the importance of team culture and environment on player development has never been so heavily emphasized. NBA teams with a strong organizational culture are lauded for their ability take low value deemed players and turn them into contributing pieces of a quality team. In contrast, other organizations are made fun of and slandered for the negative effect they have on player productivity. From a player perspective, understanding if these are simply untrue stereotypes cast on specific organizations, or if certain teams truly have significant impact on the success of a player's career, is imperative to crafting an effective pre-draft strategy. In order to gain a well-rounded understanding of factors that impact relevant parties in the draft process, team by team analysis has been included in this study as well.

II. Hypothesis Development

Over the course of this analysis, I will analyze five separate models to answer five questions.

A. What is the Effect of Draft Position on Size of Second Contract?

This question will analyze the effect of draft position on the expected size of a player's second contract.

H_0 = There is no significant effect of draft position on expected second contract size
H_a = There is a significant effect of draft position on expected second contract size

I will attempt to disprove the null hypothesis that draft position has no significant effect on second contract size. Further, I expect there to be a negative trend relating earlier positions in the draft to have a larger positive effect on size of second contract than later positions. A basic understanding of the NBA draft suggests that players who are expected to be the most successful are selected earlier in the draft, and those with more risk / lower potential are selected later. This would likely cause a general trend of players who will not earn the largest NBA second contracts being selected later in the draft.

B. What is the Effect of Drafting Team on Size of Second Contract?

This question will analyze the effect of drafting team on the expected size of a player's second contract.

H_0 = There is no significant effect of drafting team on expected second contract size
H_a = There is a significant effect of drafting team on expected second contract size

I will attempt to disprove the null hypothesis that drafting team has no significant effect on second contract size, and that some teams have a more positive effect than others. The team to which a player is drafted has significant implications on their NBA career. Worse teams often have more playing time available for rookies, while better teams often have strong role models already on the roster and present the opportunity to learn from the best.

C. What is the Effect of Draft Position on Probability of Second Contract Acquisition?

This question will analyze the effect of draft position on the probability of second contract acquisition.

H_0 = There is no significant effect of draft position on probability of receiving a second contract
H_a = There is a significant effect of draft position on probability of receiving a second contract

I will attempt to disprove the null hypothesis that draft position has no significant effect on the likelihood of second contract acquisition. Further, I expect there to be a negative trend relating earlier positions in the draft to have a larger positive effect on the probability of second contract acquisition than later positions. I come to this conclusion using similar rationale as I did in the first question. Players who are expected to be the most successful are selected earlier in the draft, and those with more risk / lower potential are selected later in the draft. This would likely cause a general trend of players who will not earn a second NBA contract being selected later in the draft.

D. What is the Effect of Drafting Team on Probability of Second Contract Acquisition?

This question will analyze the effect of drafting team on the probability of second contract acquisition.

H_0 = There is no significant effect of drafting team on probability of receiving a second contract
H_a = There is a significant effect of drafting team on probability of receiving a second contract

I will attempt to disprove the null hypothesis that drafting team has no significant effect on the likelihood of second contract acquisition. Previous literature has shown that large market teams have additional means to sign players to larger contracts. Further, research has also shown that small market teams often have additional motivation to offer lucrative contracts to young players to lure players from more attractive, larger markets. For this reason, I expect teams of high and low franchise values to have a larger positive effect on contract acquisition probability than teams of medium franchise values.

E. What is the Effect of Draft Position on Probability of Selection Being Traded?

This question will analyze the effect of draft position on the probability of a selection being traded.

H_0 = There is no significant effect of draft position on probability of a selection being traded
H_a = There is a significant effect of draft position on probability of a selection being traded

I will attempt to disprove the null hypothesis that draft position has no significant effect on the likelihood of a selection being traded. Further, I expect some draft positions to have a significantly larger effect on selection trade likelihood than others. Because a trade only occurs when both teams believe they are gaining value, positions of which there is consensus on the value are rarely traded. In contrast, draft positions with diverging value assessments across the league are traded more often, as a deal in which both parties feel that they gained value becomes possible.

III. Literature Review

Regarding the sports draft process and factors that affect player salary, the current academic landscape is divided in two sectors: The study of how draft position impacts on-court/field performance metrics, and the study of how performance metrics impact salary. However, research regarding the direct impact of how draft position affects future salary is sparce.

Previous research on the NBA draft has shown that changing policies have had a positive effect on draft parity and fairness. Additionally, research has focused on the relationship between draft position and playing opportunities, as well as the financial effects that a star player brings to their franchise. However, there is little scholarly research focusing on draft positions' immediate ability to affect how a player is evaluated by the league when their first contract expires. Players who have outperformed their rookie contract (which is determined by draft position) often become ideal trade chips as they approach their contract year (the year in which a player rookie contract expires, and they become a free agent). Further, having a player on a team friendly contract is often instrumental to a team's ability to compete for a championship. In either scenario, players which the league evaluates at a higher level after a few years compared to on draft night present great opportunities for NBA teams. Therefore, identifying draft positions in which players often outperform their contract is crucial to the success of a team, and will be a goal of this analysis.

The NBA Players Draft is a process employed by the NBA to distribute incoming talent throughout the teams in the league. By drafting a player, teams are given exclusive rights to sign a player to a contract. By using a system which on average awards higher draft picks to teams with less success in the year prior, the goal is to maintain a skill balance of players across the league. Further, the draft limits team ability to enter bidding wars for young, talented players so that no team can monopolize the strongest incoming talent and challenge this balance (Popper, 2004).

Kaplan (2020) examines the difference between a player's economic value due to skill, and economic value due to player popularity. Kaplan concludes that popularity is a more impactful determinant than skill of a viewer's willingness-to-pay to watch a player play. This may lead to diverging contract allocation strategies across the league, depending on the goals of the organization. If the goals of a team lie in on-court success, contract allocation will be dependent on basketball value. For teams not challenging for a championship, the financial incentives of acquiring a popular player may outweigh the true on-court value.

There is significant risk associated with the drafting process, as an early first round pick can be awarded contracts of up to five times as much as a player at the end of the round (Rollins, 2018). This implies an expectation that players drafted at the beginning of the draft will be more productive and hold stronger market value than players drafted later. However, Massey and Thaler (2010) have shown that managers of professional sports teams tend to significantly overestimate the value of high draft picks relative to lower picks with little economic rationale. This raises the question: "Where are NBA managers over and undervaluing draft positions?"

One factor to consider while approaching this analysis is the effect of draft selection on other variables that may impact player success. Staw and Hoang (1995) conducted a study to determine the relationship between the round a player is selected in the NBA draft and the playing time each player receives. While the draft format has changed numerous times and now only includes two rounds of drafting, trends related to early and late drafting are still relevant. Staw and Hoang focused on the effect of sunk costs (guaranteed rookie salaries) and on court opportunities. They determined that earlier drafted players have higher survival rates (more minutes for more years) due to the sunk costs incurred by the team (being the money invested on their rookie contract), however were not statistically superior to players drafted later. This understanding can help inform interpretations of coefficients of early draft position variables throughout this analysis.

Similarly, Berri and Simmons (2009) focused on the NFL draft. They addressed the question of "What is the relationship between an NFL quarterback's draft position and his subsequent performance?" They found there to be a very weak relationship between draft position and performance. In contrast, draft position did have a strong positive relationship with total plays, suggesting again that highly drafted players are granted more minutes based on benefit of the doubt more so than lower drafted players. In order to focus on the effect of draft position, regardless of this effect, I will limit my analysis to only players drafted in the first round, and the first three selections of the second round so that opportunities to play for all observations are relatively similar.

Although there is little evidence of high draft position ensuring the drafting of a superstar, Hausman and Leonard (1997) showed us how large the economic impact of successfully drafting a star player on a team is. This may be motivating teams to overvalue high picks and hoping they get lucky with a difference maker.

As I will address the methodology employed by teams to optimize their draft order position and maximize the value of their draft picks, it is important to understand how bringing in different levels of talent affects different types of teams. Yang (2009) estimates the value of alliances between high, medium and low-level players with large, medium and small market teams. They found that high level players generate the largest revenue impact on medium brand equity teams. This finding may incentivize medium level teams to be more inclined to overvalue top draft picks, in the hope that a large brand player will drastically increase team revenues. Given the large impact franchise value has on the decision making of the team, I will control for this in my analysis.

Another study (Hausman and Leonard, 1997) found that having a superstar (defined as "having an incremental positive effect on television ratings") has enormous economic benefits for a team. By increasing team revenues by as much as $53 million dollars, a team with a superstar may have an increased ability to sign other free agents, leading to an inefficient distribution of player talent. This effect is magnified when referring to superstars bound to relatively cheap rookie contracts, further motivating teams to shoot for a superstar rather than optimize the economic value of their draft picks.

Previous literature clearly depicts an illogical trend for managers to overvalue early draft picks, and the reasons behind this. The large positive economic ramifications of succeeding in drafting a superstar have also been studied. These massive economic effects compound manager's tendency to overvalue high draft picks, resulting in inefficient drafting strategies and lost value. To build from this research, I believe it is necessary to directly compare the value attributed to players in certain draft positions at the time of the draft, and the next point in which a player is evaluated by the market, free agency.

In addition to evaluating the value of players at these two junctures from a team perspective, understanding which positions in the draft more often lead to a second contract acquisition than others is extremely important from a player's perspective. If the goal is to simply acquire a second contract, how does your draft position affect your ability to do so? Are there teams whose players are more likely to receive a large second contract? These are all questions imperative to the decision making of a player entering the draft which will be addressed in this analysis.

In order to analyze the way our predictor variables affect the probability of acquiring a second contract, I use a logit model. When looking at models in which the response variable is continuous, such as contract size, a standard OLS multiple linear regression model is appropriate. However, as I analyze the way draft position and team affect the probability of contract acquisition, this model is no longer suitable. To solve this problem, Guneri & Durmus (2020) apply logit models to regressions in which the dependent variable is categorical, using a maximum probability estimate. In a logit regression model, the assumption of linear distribution of the dependent variable is not required, providing more flexibility and allowing for discrete dependent variables. In contrast with Guneri & Durmas, I use non-continuous variables as predictors for my discrete dependent variable. Although slightly unorthodox, this does not breach any of the necessary assumptions/conditions of a logit model.

IV. Data

There are no comprehensive datasets which include year over year draft information as well as financial data. Furthermore, while there is a large amount of active contract data consolidated, my research required data specifically on the length and magnitude of the second contract that a player signs. Because the length of rookie contracts vary, one cannot simply pull all contract information from a given year and expect all of the contracts in a certain draft class to have been renegotiated at the same time. In order to overcome this, I manually scraped both draft and contract data from four main sources: basketball-reference.com[1], spotrac.com[2], prosportstransactions.com[3] and nbcsports.com[4]. I am focusing on the first thirty-three selections of the NBA draft spanning from 2005-2018. The lower bound of this time period is set at the year of the most recent NBA expansion. This will ensure a consistent number of picks per round throughout my dataset, and the teams included in the draft remain constant. The upper limit of this period was set to ensure that every player included in the dataset has completed their rookie contract and has had the opportunity to sign a new contract. From Basketball Reference, I was able to acquire data on every player drafted in my range of interest, including draft position, drafting team and the year they were drafted. While 462 total players were drafted within these constraints, two players were removed due to non-basketball related factors that impacted their ability to receive second contracts. In regressions related to probability of receiving a second contract, I used this full 460 observation dataset. However, to analyze relationships related to the size of second contracts, players who did not receive a second contract were removed, leaving a reduced dataset of 407 observations.

For each of the 460 players in the full dataset, sportrac.com was leveraged to scrape expired contract data from previous years, breaking annual salary down by each contract. From here, I added information such as the total value of the second contract of each player, the length of the contract, and the year it was signed. By combining this with NBA salary cap data acquired from basketball-reference.com, I was able to construct a dependent variable by adjusting the annual value of the second contract to be a proportion of the total money a team is allowed to

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[1] https://www.basketball-reference.com/draft
[2] https://www.spotrac.com/nba/contracts
[3] https://www.prosportstransactions.com/basketball/DraftTrades/Years/index.htm
[4] https://www.nbcsports.com/bayarea/kings/nba-team-values-2012

spend in a given year (Salary Cap). This ensures that my data is scaled proportionally over the years, as total available money and therefore contract sizes have drastically increased due to expanding NBA revenues over the past 15 years.

An interesting facet of looking at NBA draft position data is the possibility of trades before the selection of a player. This allows for teams which are theoretically not drafting in the order of worst to best to bring rookie players into a different team environment than the draft system aims to place them in. Additionally, this practice provides an opportunity for NBA managers to gain draft capital / value before the draft begins. To look at this, I must also acquire data showing which draft selections in our dataset were traded. This data was acquired from prosportstransactions.com and is used to create a comparable model by removing players who were drafted by teams not in their original draft position. I am left with 288 observations which have both received a second contract, as well as were drafted by a team with original ownership of that draft position.

The franchise value of the drafting team likely influences the expected value of a player's second contract. There is a tendency for small market teams which do not have the social allure of a large city to overpay their young players in an effort to have them remain on their team. However, larger teams may also possess the means to pay a luxury tax, granting them permission to spend more money on player contracts than their smaller counterparts. To control for these effects, I added data regarding the drafting team value in 2012 as a control variable, scraped from nbcsports.com. Although the overall value of teams across the league have increased over the years, they have stayed relatively proportional, validating the use of data from only one year in the center of my time period of interest as the control. This variable was divided by one billion to produce a more easily interpretable coefficient in my models.

A description of all included variables, a breakdown of the NBA salary cap by year, all team values in 2012, as well as descriptive statistics related to our main response variable can all be found in the Appendix A1-A4.

V. Methodology

To evaluate variables which affect the magnitude of NBA second contracts, contract acquisition likelihood, and draft position trade volume, I run five regressions analyzing the effect of two key predictor variables, modeled as dummy variables, and three response variables. In some models, a few relevant controls are also included.

In these models, the response variable can be any of the three response variables depending on the regression: *ContractSize*, *ContractAquired*, and *PickTraded*. The predictor variable can be either of two binary predictor variables I use throughout the regressions: *pickX*, or *teamX*.

It makes sense intuitively to not include an intercept term in these models. Typically, the intercept term represents the expected response value when an observation records a value of "0" on all prediction metrics. In this case, values of all "0" would represent a player who has not been drafted into the NBA, therefore is not eligible to receive any sized second contract, and the expected value of our response should be zero as well.

In the following sections, I provide the specific models which I study throughout this analysis, and rationale for the construction of each.

A. Second Contract Size Analysis

To analyze the effect of draft position and team on the magnitude of NBA second contracts, I use two OLS multiple linear regression models:

$$ContractSize_i = \beta_1 pick1_i + \beta_2 pick2_i + \beta_3 pick3_i + \cdots + \beta_{33} pick33_i + \beta Controls_i + \epsilon_i \quad (1)$$

$$ContractSize_i = \beta_1 team1_i + \beta_2 team2_i + \beta_3 team3_i + \cdots + \beta_{30} team30_i + \beta Controls_i + \epsilon_i \quad (2)$$

In Model 1, second contract size is predicted by a series of 33 binary dummy variables representing the draft position of each player. For each observation, a "1" is recorded for the variable representing the draft position in which a player was selected. For all other draft position variables, a "0" is recorded. The beta coefficient on each of these variables represents the positive or negative impact being drafted at a certain position has on the expected size of a player's next contract. Additionally, I include two control variables: *Age at Draft*, and *Value of Team in 2012*. Younger players are typically viewed with higher potential and are often granted larger contracts with this hope in mind. For this reason, I must control for the age of the player entering the draft. Additionally, franchise value has both positive and negative effects on a player's expected second contract size, as previously discussed. To control for these effects, franchise value is included in the model as well. In the NBA draft, the players expected to have the greatest success are drafted in descending order. Therefore, I expect the highest picks (lowest position numbers) to have the strongest positive relationship with second contract size.

In Model 2, second contract size is predicted exclusively by the team players are drafted to. For each observation, a "1" is recorded for the variable representing the team by which a player was selected. For all other team variables, a "0" is recorded. Because I am attempting to look at the direct effect different teams have on a player's second contract size, including the *Value of Team in 2012* metric would dilute this effect, and is therefore not included.

B. Second Contract Acquisition Probability Analysis

To analyze the effect of draft position and team on the likelihood of a player acquiring a second contract, an OLS model is no longer appropriate. Instead, I use two logit models to create a maximum likelihood estimation for contract acquisition:

$$ContractAquired_i = \beta_1 pick1_i + \beta_2 pick2_i + \beta_3 pick3_i + \cdots + \beta_{33} pick33_i + \epsilon_i \tag{3}$$

$$ContractAquired_i = \beta_1 team1_i + \beta_2 team2_i + \beta_3 team3_i + \cdots + \beta_{30} team30_i + \epsilon_i \tag{4}$$

In both models, *ContractAquired* is a binary response variable, where "1" marks that a player received a second contract. A "0" implies that this player did not receive a second contract. the In Model 3, each observation records an "1" for the variable representing the draft position in which a player was selected. For all other draft position variables, a "0" is recorded. In Model 4, a "1" is recorded for the variable representing the team by which a player was selected. For all other team variables, a "0" is recorded.

In contrast to my previous models where the beta coefficient on each dummy variable represents the direct impact of the predictor variable on the value of the outcome variable, coefficients in Models 3 and 4 represent the effect of the variable on the odds of occurrence ratio of *ContractAquired*, which is the probability of a second contract acquisition occurring divided by the probability of the nonevent. Practically speaking, I can determine from each coefficient if a draft position or specific team increases the likelihood of a player receiving a second contract, relative to all other positions or teams.

C. **Draft Position Trade Volume Analysis**

After analysis regarding draft position and team's effect on second contract size and acquisition rate, it is also important to understand how NBA managers have valued different draft positions throughout the period of focus. One way to look at this is by analyzing the likelihood for each position in the draft to be traded. To do this, I use another logit model to estimate the effect of each draft position on the likelihood for a specific pick to be traded:

$$PickTraded_i = \beta_1 pick1_i + \beta_2 pick2_i + \beta_3 pick3_i + \cdots + \beta_{33} pick33_i + \epsilon_i \tag{5}$$

Because the vast majority of overall draft positions are not traded, each individual position variable will likely record a negative coefficient, representing that a selection at any position is not likely to be traded. However, a statistically significant coefficient on a position variable which is more negative (further from zero) indicates that this position is less likely to be traded than others. In contrast, position variables with significant coefficients that are less negative than others (closer to zero) indicate that picks at this position have a reduced probability of being traded.

VI. Results

A. Effect of Draft Position on Size of Second Contract

The first model I am examining measures the impact of draft position on the expected size of the second contract signed by a given player. Contract size is modeled by the outcome variable: *ContractSize*, thirty-three biary dummy variables (*pickX*) represent the position a player was drafted, and *Age.At.Draft* and *Value.of.Team.in.2012* act as control variables.

Table 1. Effect of Draft Position on Size of Second Contract

	Effect on Size of Second Contract (As a % of Salary Cap)	
	Traded Picks Included	Traded Picks Not Included
	(1)	(2)
pick1	0.371***	0.439***
	(0.071)	(0.089)
pick2	0.300***	0.357***
	(0.072)	(0.089)
pick3	0.360***	0.407***
	(0.071)	(0.090)
pick4	0.283***	0.348***
	(0.072)	(0.089)
pick5	0.295***	0.344***
	(0.072)	(0.092)
pick6	0.263***	0.325***
	(0.074)	(0.094)
pick7	0.268***	0.320***
	(0.072)	(0.090)
pick8	0.226***	0.285***
	(0.073)	(0.091)
pick9	0.243***	0.291***
	(0.073)	(0.092)
pick10	0.271***	0.350***
	(0.072)	(0.090)
pick11	0.252***	0.326***
	(0.074)	(0.092)
pick12	0.253***	0.320***
	(0.074)	(0.094)
pick13	0.262***	0.339***
	(0.076)	(0.095)
pick14	0.240***	0.303***
	(0.076)	(0.094)
pick15	0.260***	0.314***
	(0.073)	(0.092)

pick16	0.212***	0.293***
	(0.076)	(0.098)
pick17	0.239***	0.318***
	(0.073)	(0.092)
pick18	0.213***	0.262***
	(0.074)	(0.093)
pick19	0.274***	0.329***
	(0.075)	(0.096)
pick20	0.205***	0.300***
	(0.075)	(0.096)
pick21	0.234***	0.264***
	(0.077)	(0.101)
pick22	0.247***	0.334***
	(0.077)	(0.100)
pick23	0.220***	0.282***
	(0.076)	(0.097)
pick24	0.233***	0.318***
	(0.074)	(0.095)
pick25	0.194**	0.266***
	(0.075)	(0.093)
pick26	0.221***	0.284***
	(0.077)	(0.097)
pick27	0.274***	0.379***
	(0.077)	(0.096)
pick28	0.178**	0.241**
	(0.077)	(0.100)
pick29	0.194**	0.264***
	(0.076)	(0.095)
pick30	0.238***	0.304***
	(0.079)	(0.100)
pick31	0.221***	0.256***
	(0.076)	(0.098)
pick32	0.191**	0.261***
	(0.077)	(0.098)
pick33	0.198**	0.296***
	(0.078)	(0.102)
Age.At.draft	-0.008**	-0.012***
	(0.003)	(0.004)
Value.of.Team.in.2012	0.055*	0.072*
	(0.031)	(0.040)
Observations	407	288
R2	0.670	0.673
Adjusted R2	0.639	0.628
Note:		*p<0.1; **p<0.05; ***p<0.01

In Table 1, variables representing draft position, control variables, and their coefficients are shown. Significant positive coefficients for pick variables represent the positive effect being drafted at a certain position has on the expected size of a second contract. Because there is no intercept, these coefficients are relative to not being drafted at all, so it makes sense that being drafted at any position has a positive effect on the size of your second contract.

The coefficients on our control variables are both significant, proving their importance to the model. As expected, age has a significant negative correlation with contract size, implying older players are less likely to receive larger second contracts. The value of the franchise also had a significant positive effect.

Overall, a negative trend is visible as pick number increases. This result was generally expected as this negative trend promotes league parity, a leading goal of NBA infrastructure systems over the past twenty years. Players who are selected with earlier draft positions are evaluated to have a high probability of becoming productive NBA players. As the draft progresses, the expectations of success become lower and lower. While the goal of the NBA is to have a perfectly linear negative relationship between draft position and player success, our model has identified two draft positions of interest which diverge from this target trend.

As expected, the draft positions with the largest impact on expected second contract size are the first three picks. This is likely due to a combination of the best players often being drafted earliest, as well as the league giving the benefit of the doubt to underperforming top three picks and still rewarding them with large contracts. However, the coefficient on the *pick2* variable, 0.300, is noticeably lower than coefficients on *pick1* (0.371) or *pick3* (0.360). This suggests that players who are drafted second are often not the second most productive player in the draft. Examination of the data confirms this, as the average second contract of players drafted second only takes up 16.34% of a signing team's total cap space, while the first and third picks average 22.9% and 21.53%, respectively. By the time players reach free agency, players drafted with the second overall pick are more often evaluated as comparable to players drafted fourth and fifth, who on average sign contracts filling 13.89% and 14.75% of the signing team's salary cap, respectively (See Appendix A2).

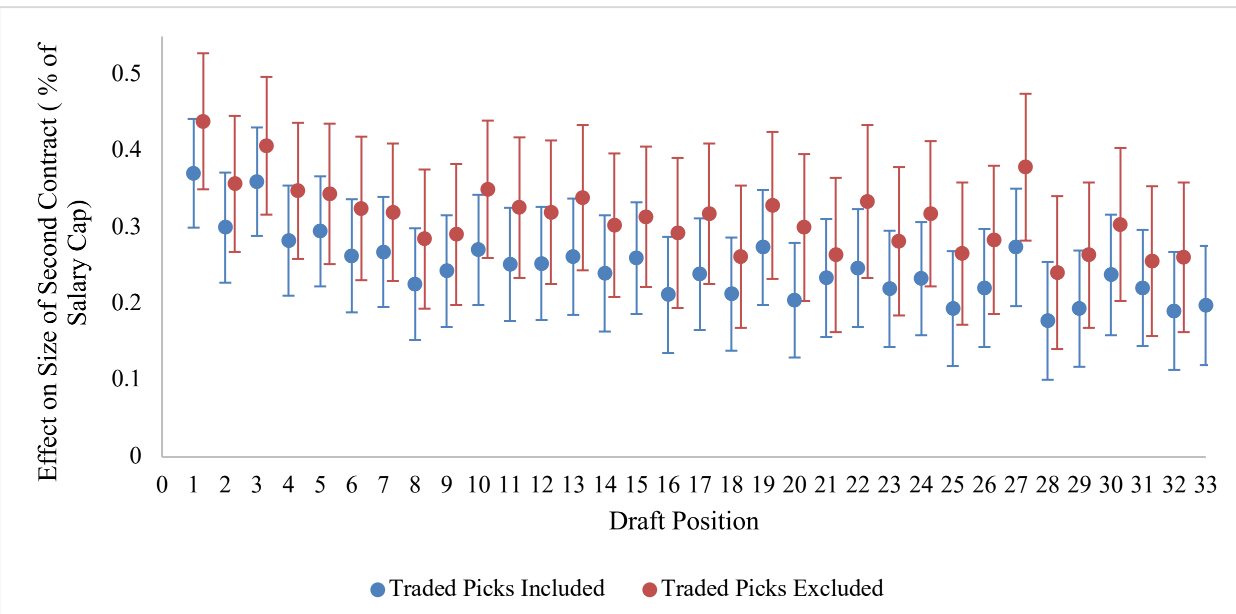
While standard errors overlap and this difference is not statistically significant, the cause of this decline may be worth investigating in a future study.

The coefficient on the *pick27* variable is also notable. The variable representing the 27th pick in the draft recorded a notably large coefficient: 0.274. This statistically significant variable has a larger positive impact than any draft position occurring after the fifth overall pick. Further, this is the only draft position which records a coefficient statistically significantly different than the following pick. The 27th pick as a point of interest is consistent with examination of the data. Excluding the top ten draft positions, the average percentage of the salary cap a second contract takes up is 6.48%. The average percentage of the salary cap taken up by the second contract of a player drafted 27th is 10.40% (See Appendix A2), an extremely high value given how far back that position is.

Sensitivity Testing: Removing Observations Where Draft Position was Traded

In some instances, NBA teams will trade their draft selections before the draft to either target a specific player or to increase overall value. This disrupts the linear draft order of teams which performed poorly in the previous year selecting before the better performing teams. To understand if this occurrence has any impact on the results of my model, I ran the same regression again but removed all observations in which the draft position had been traded before the draft. Coefficients can be seen in Table 1.

Figure 1. The Effect of Draft Position on Size of Second Contract



In Figure 1, the no-trade model mirrors the trends of coefficients in the trade inclusive model. Both models show a similar negative relationship between draft position and expected second contract size. The points of interest, *pick2* and *pick27* both show the same divergence from linearity in the model with no trades. Interestingly, it seems as though the model with no trades expects second contract sizes to be higher overall, as the coefficients on most position variables are higher when using the non-trade-inclusive model. This suggests that players who are selected by the team with original ownership of their draft position are likely to receive larger second contracts than those who were selected with traded draft positions.

Although the second model is statistically significant and shows clear trends, I will continue to use my original model for three interconnected reasons. First, the adjusted R-squared slightly decreases when using the no-trades model, 0.639 to 0.628. This is likely due to the reduced number of observations in the second model, which falls from 407 to 288, the second reason to prefer the original. Lastly, the standard errors in the second model are all significantly larger than the former.

B. Effect of Drafting Team on Size of Second Contract

The second model I am examining measures the impact of drafting team on the expected size of the second contract signed by a given player. Contract size is modeled by the outcome variable: *ContractSize* and thirty binary dummy variables (*teamX*) represent the team to which a player was drafted. *Age.At.Draft* remains acting as a control variable, but because I want to see the effect of different teams, *Value.of.Team.in.2012* has not been included.

Table 2. Effect of Drafting Team on Size of Second Contract

	Effect of Team on Size of Second Contract (As a % of Salary Cap)
TmATL	0.493***
	(0.074)
TmBKN	0.480***
	(0.075)
TmBOS	0.470***
	(0.073)
TmCHA	0.462***
	(0.072)
TmCHI	0.509***
	(0.074)
TmCLE	0.482***

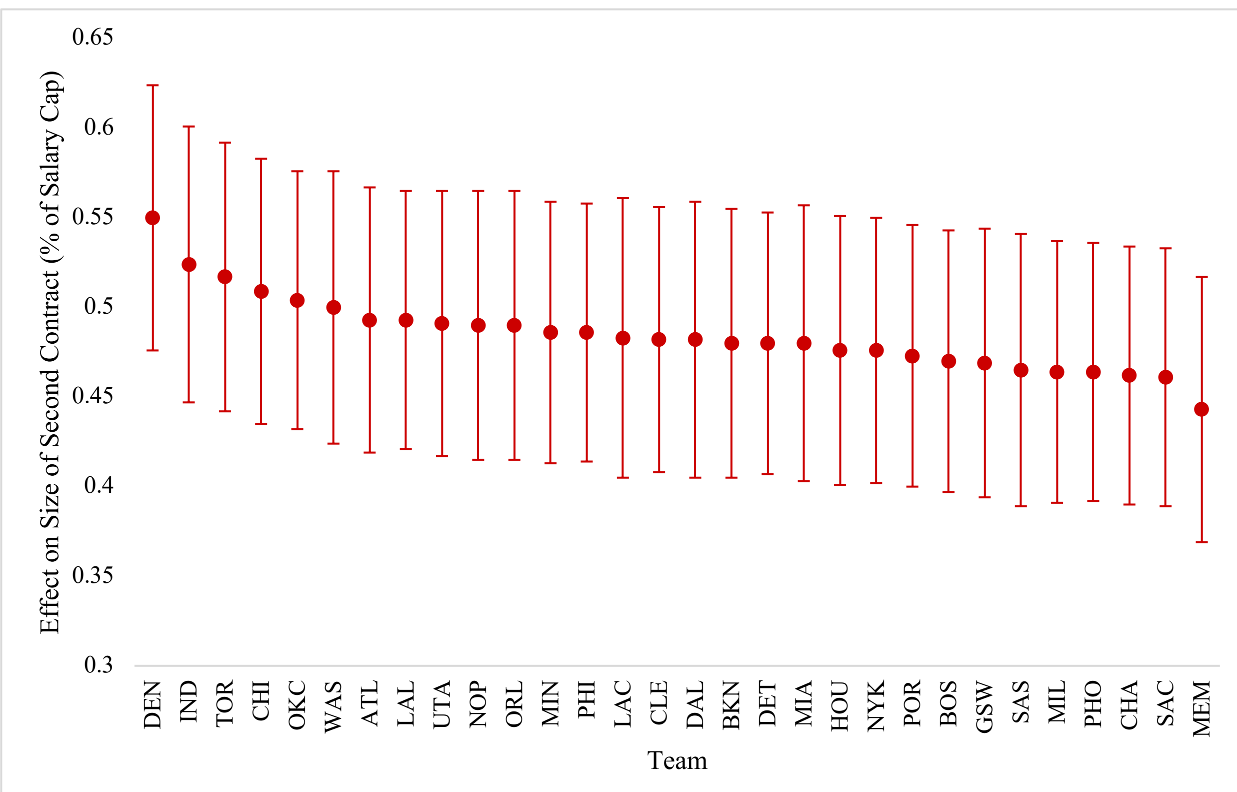
	(0.074)
TmDAL	0.482***
	(0.077)
TmDEN	0.550***
	(0.074)
TmDET	0.480***
	(0.073)
TmGSW	0.469***
	(0.075)
TmHOU	0.476***
	(0.075)
TmIND	0.524***
	(0.077)
TmLAC	0.483***
	(0.078)
TmLAL	0.493***
	(0.072)
TmMEM	0.443***
	(0.074)
TmMIA	0.480***
	(0.077)
TmMIL	0.464***
	(0.073)
TmMIN	0.486***
	(0.073)
TmNOP	0.490***
	(0.075)
TmNYK	0.476***
	(0.074)
TmOKC	0.504***
	(0.072)
TmORL	0.490***
	(0.075)
TmPHI	0.486***
	(0.072)
TmPHO	0.464***
	(0.072)
TmPOR	0.473***
	(0.073)
TmSAC	0.461***
	(0.072)
TmSAS	0.465***
	(0.076)
TmTOR	0.517***
	(0.075)
TmUTA	0.491***
	(0.074)
TmWAS	0.500***
	(0.076)
Age.At.draft	-0.018***
	(0.003)
Observations	407

```
R2                                    0.598
Adjusted R2                           0.565
=====================================================================
Note:                                     *p<0.1; **p<0.05; ***p<0.01
```

Overall, the model fits well, reporting an adjusted R-squared statistic of 0.565. In Table 2, variables representing drafting team, the control variable age, and their coefficients are shown. Significant positive coefficients for team variables represent the positive effect being drafted to a certain team has on the expected size of a second contract. As with the previous model, because there is no intercept, these coefficients are relative to not being drafted by any team, so it makes sense that being drafted by any team has a positive effect on the size of your second contract.

The coefficient on our control variable, *Age.At.Draft*, is once again significant. As expected, age has a significant negative correlation with contract size, implying older players are less likely to receive larger contracts.

Figure 2: Effect of Drafting Team on Second Contract Size



Overall, there is some variation in the effect on a player's second contract size from team to team. According to the model, being drafted to the Denver Nuggets has the largest positive effect on expected the size of a second contract, with a coefficient of 0.550. In contrast, being drafted to the Memphis Grizzlies seems to have the smallest positive impact on second contract size, with a coefficient of 0.443.

Although the model may suggest being drafted by some teams has a more positive impact on second contract size than others, this conclusion is not statistically significant. While each individual coefficient is significant, no two teams expected effect is different enough from one another to prove this variation is not by chance. Even when comparing the two teams with the largest and smallest expected effect on contract size, these estimates are within two standard deviations of each other, rendering the results statistically insignificant.

C. Effect of Draft Position on Probability of Second Contract Acquisition

The third model I am examining measures the impact of draft position on the probability of acquiring a second contract. The acquisition of a contract is modeled by a binary response variable: *ContractAquired*, where a "1" represents that a player received a second contract, and "0" if they did not. The predictors are thirty-three binary dummy variables (*pickX*), representing the draft position a player was taken. Significant positive coefficients represent an increased likelihood that a player drafted at sed position will receive a second contract.

Table 3. Effect of Draft Position on Probability of Second Contract Acquisition

	Effect of Draft Position on Probability of Second Contract Acquisition
pick1	19.566
	(2,874.131)
pick2	19.566
	(2,874.131)
pick3	19.566
	(2,874.131)
pick4	19.566

	(2,874.131)
pick5	19.566
	(2,874.131)
pick6	2.565**
	(1.038)
pick7	19.566
	(2,874.131)
pick8	19.566
	(2,874.131)
pick9	19.566
	(2,874.131)
pick10	19.566
	(2,874.131)
pick11	2.565**
	(1.038)
pick12	2.485**
	(1.041)
pick13	1.792**
	(0.764)
pick14	2.565**
	(1.038)
pick15	1.792**
	(0.764)
pick16	1.299**
	(0.651)
pick17	2.565**
	(1.038)
pick18	1.792**
	(0.764)
pick19	1.299**
	(0.651)
pick20	2.565**
	(1.038)
pick21	0.916
	(0.592)
pick22	0.916
	(0.592)
pick23	1.792**
	(0.764)
pick24	2.565**
	(1.038)
pick25	0.916
	(0.592)
pick26	2.485**
	(1.041)
pick27	1.792**
	(0.764)
pick28	1.792**
	(0.764)
pick29	1.299**
	(0.651)
pick30	0.288
	(0.540)

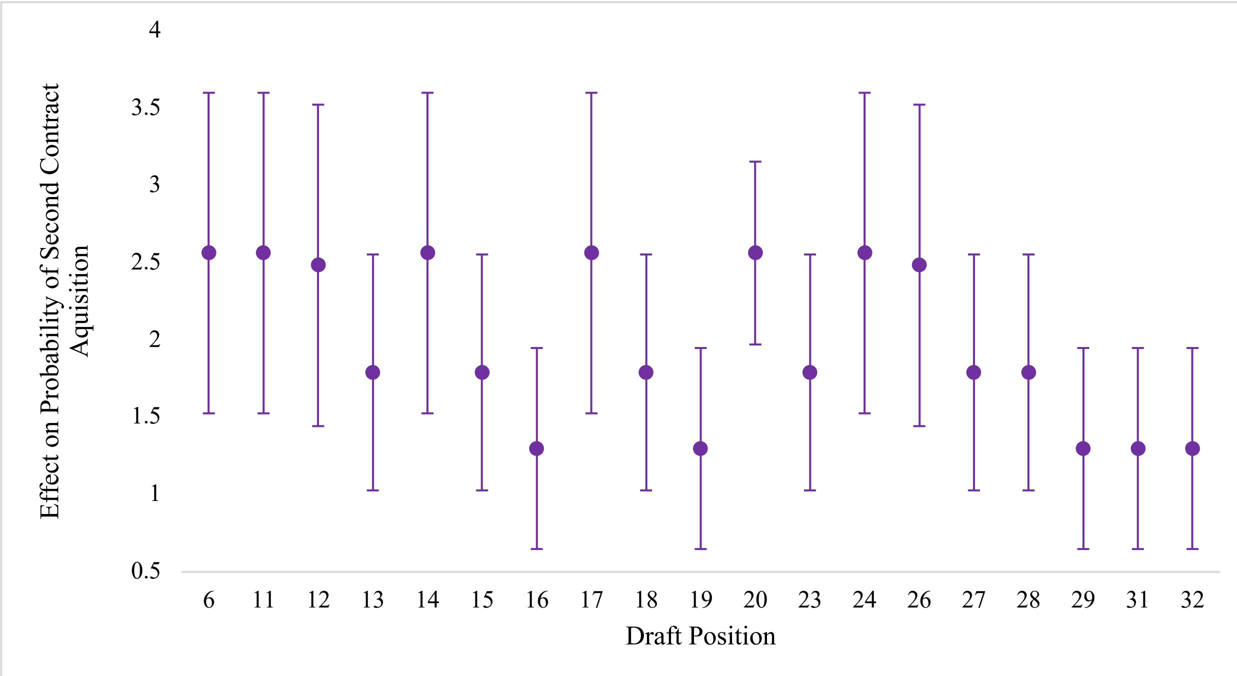
```
pick31                                          1.299**
                                                (0.651)
pick32                                          1.299**
                                                (0.651)
pick33                                          19.566
                                              (2,874.131)
--------------------------------------------------------------------------------
-
Observations                                      460
Log Likelihood                                -134.174
Akaike Inf. Crit.                               334.348
================================================================================
=
Note:                                                      *p<0.1; **p<0.05;
***p<0.01
```

Because this is a logit model, adjusted R-squared is not a reported metric. Instead, I must calculate the McFadden's R-squared, which also ranges from zero to one, with higher values indicating a better fit. Our model records a 0.571 McFadden R-squared statistic, indicating that the model is highly predictive.

As can be seen in Table 3, many of the draft position variables have insignificant coefficients. Specifically, nine of the top ten draft position dummy variables are not statistically significant. This is likely because it is extremely rare for players in the top ten selections of a draft to not receive a second contract. This would form a drastically non-normal distribution of the data for these variables, restricting the model's ability to make an accurate estimate. After examination of the dataset, I found that only one player (Jan Vesely, 2011, 6th Overall Pick) was drafted in the top 10 between 2005-2018 and did not receive a second contract. As a result, many of the high draft position variables have returned insignificant.

Interestingly, this is also the source of the problem for the 33rd pick variable. Over the time period in observation, every player drafted with the 33rd selection has received a second contract. If I expand this examination to look at every player in the model drafted in the early second round (draft positions 31, 32 and 33), thirty-six out of forty-two players drafted received second contracts (85.7%). For players drafted in the final three positions of the final round (draft positions 28, 29, and 30), only thirty-one out of forty-two players received second contracts (73.8%). Compared to the dataset average of 88.5%, it seems as though players fare better being drafted in the early second round than the late first round.

Figure 3. Effect of Draft Position on Probability of Second Contract Acquisition



When looking at only draft positions with statistically significant coefficients, there is a slight negative effect on the likelihood on second contract acquisition as draft position increases. There would likely be a stronger, more clear linear relationship if accurate / significant coefficients for more positions in the top ten were included.

All significant coefficients in the model are positive due to each being relative to not being drafted, but a higher coefficient represents a larger effect on the probability of second contract acquisition. In Figure 3, there is a dip in calculated effect of being drafted between the 15th and 19th draft position, implying that being drafted in these positions do not have as much of a positive effect on contract acquisition probability as surrounding positions.

D. Effect of Drafting Team on Probability of Second Contract Acquisition

The fourth model I am examining measures the impact of drafting team on the probability of acquiring a second contract. The acquisition of a contract is modeled by a binary response variable: *ContractAquired*, where a "1" represents that a player received a second contract, and "0" if they did not. The predictors are thirty binary dummy variables (*teamX*), representing the team to which a player was drafted. Significant positive coefficients represent an increased likelihood that a player drafted by sed team will receive a second contract.

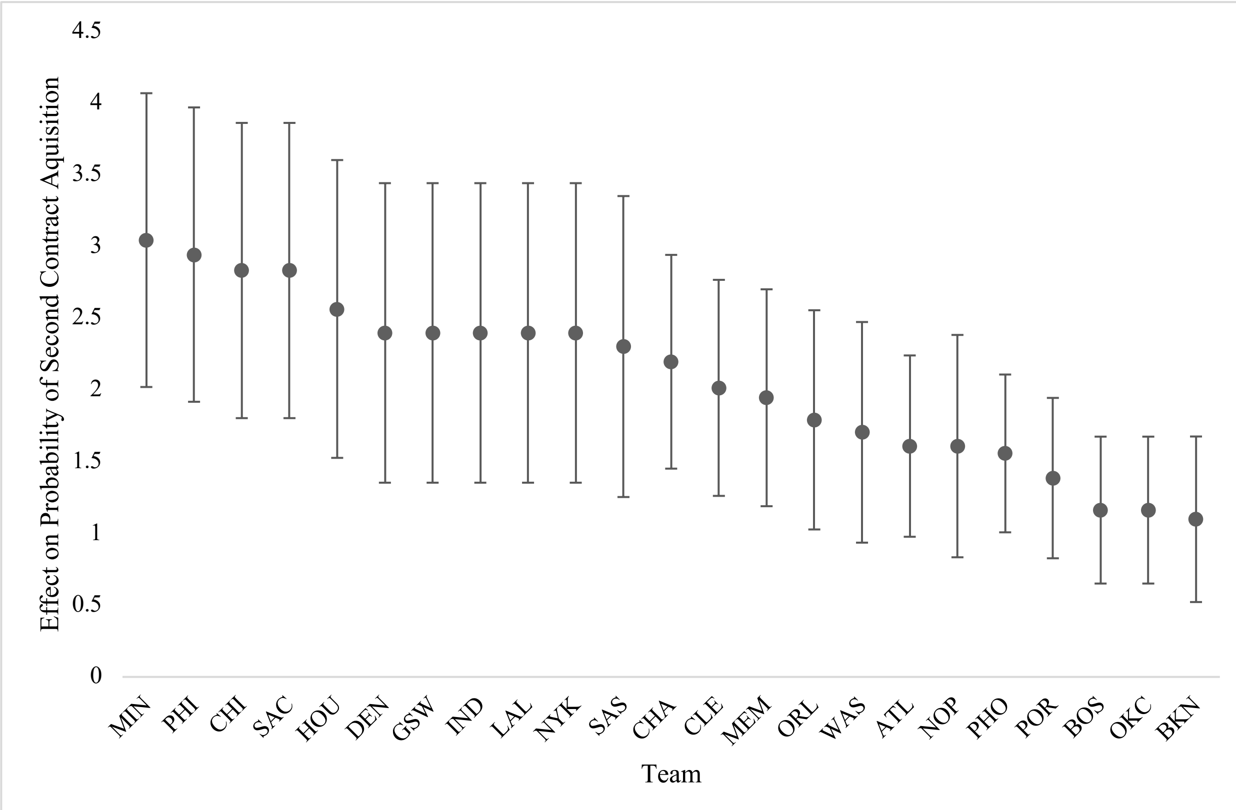
Table 4. Effect of Drafting Team on Probability of Second Contract Acquisition

	Effect of Drafting Team on Probability of Second Contract Acquisition
TmATL	1.609**
	(0.632)
TmBKN	1.099*
	(0.577)
TmBOS	1.163**
	(0.512)
TmCHA	2.197***
	(0.745)
TmCHI	2.833***
	(1.029)
TmCLE	2.015***
	(0.753)
TmDAL	18.566
	(2,174.213)
TmDEN	2.398**
	(1.044)
TmDET	18.566
	(1,809.054)
TmGSW	2.398**
	(1.044)
TmHOU	2.565**
	(1.038)
TmIND	2.398**
	(1.044)
TmLAC	0.981
	(0.677)
TmLAL	2.398**
	(1.044)
TmMEM	1.946**
	(0.756)
TmMIA	1.253
	(0.802)
TmMIL	18.566
	(1,743.248)
TmMIN	3.045***
	(1.024)
TmNOP	1.609**
	(0.775)
TmNYK	2.398**
	(1.044)

TmOKC	1.163**
	(0.512)
TmORL	1.792**
	(0.764)
TmPHI	2.944***
	(1.026)
TmPHO	1.558***
	(0.550)
TmPOR	1.386**
	(0.559)
TmSAC	2.833***
	(1.029)
TmSAS	2.303**
	(1.049)
TmTOR	18.566
	(1,809.054)
TmUTA	18.566
	(1,581.972)
TmWAS	1.705**
	(0.769)
Observations	460
Log Likelihood	-147.351
Akaike Inf. Crit.	354.702
Note:	*p<0.1; **p<0.05; ***p<0.01

Here, I expected to see all positive coefficients, as they are being measured relative to not being drafted at all. Again, our model records a strong McFadden R-squared of 0.538. Seven teams recording insignificant coefficients: The Dallas Mavericks, Detroit Pistons, LA Clippers, Miami Heat, Milwaukee Bucks, Toronto Raptors, and The Utah Jazz. For Dallas, Detroit, Milwaukee, Toronto and Utah, this is likely due to the uneven distribution of the outcome variable. From these five teams, every player drafted from 2005-2018 has received a second contract.

Figure 4. Effect of Drafting Team on Probability of Second Contract Acquisition



In Graph 4, all team variables which recorded a significant coefficient are displayed along with their coefficient. It is clear that some teams have a much larger effect on the probability of second contract acquisition than others. For example, according to the model, being drafted to the Minnesota Timberwolves (Coef: 3.045) has almost three times the positive effect on second contract acquisition probability than being drafted to the Brooklyn Nets (Coef: 1.099).

One important factor to consider when analyzing the results of this model is the effect of team value on the relationship between team and probability of second contract acquisition. Because I did not include this as control in this model, the impacts of this variable are shown throughout the coefficients, rather than as a separate control coefficient. When looking at the top four teams in terms of positive effect on probability of second contract acquisition, two teams: Philadelphia and Chicago, are extremely large market teams. Interestingly, the other two: Sacramento and Minnesota, are both very small market teams. Previous literature has suggested that significantly large and small franchises have additional means or motivation to offer contracts to young players. This is consistent with the results of this model.

These four teams' results are all statistically significantly different than the bottom three teams: Boston, Oklahoma City, and Brooklyn. I suggest two possible explanations for this variation. First, Philadelphia, Chicago, Sacramento, and Minnesota may be teams more prone to offering contracts to players whose value is very close to the threshold to earn a new contract. Given the literature previously discussed, this seems plausible. Another possible cause for this variation could be that the bottom three teams, BOS, OKC, and BKN, are more often drafting "busts", which are players who do not live up to their deemed potential and quickly fall out of the league.

E. Effect of Draft Position on Probability of Selection Being Traded

The fifth and final model I am examining measures the impact of draft position on the probability of an individual pick being traded before a selection is made. In contrast to previous models which focus on the effect of variables on the perceived value of players, this model seeks to identify which draft positions are more likely to be traded, helping to explain the perceived value of varying draft positions, indifferent to the players available.

Whether or not a pick has been traded is modeled by a binary response variable: *PickTraded*, where a "1" represents that a draft position was traded before a selection was made, and "0" if it was not. The predictors are thirty-three binary dummy variables (*pickX*), with a "1" recorded for the draft position to which an observation was selected. A "0" is recorded for all other draft position variables. Because the vast majority of draft selections are not traded before a pick is made, and each coefficient represents the effect of a draft position on the probability of trade occurrence, all significant coefficients will be negative. Significant negative coefficients on a given draft position variable represents a decreased likelihood that sed draft position will be traded before a selection is made, while less negative coefficients (closer to zero) represent an increased probability that sed position will be traded.

Table 5. Effect of Draft Position on Probability of Selection Being Traded

	Effect of Draft Position on Probability of Selection Being Traded
pick1	-1.792**
	(0.764)
pick2	-2.565**
	(1.038)
pick3	-0.916
	(0.592)
pick4	-16.566
	(641.305)
pick5	-1.299**
	(0.651)
pick6	-1.299**
	(0.651)
pick7	-2.565**
	(1.038)
pick8	-2.565**
	(1.038)
pick9	-0.916
	(0.592)
pick10	-0.916
	(0.592)
pick11	-1.792**
	(0.764)
pick12	-0.470
	(0.570)
pick13	-2.565**
	(1.038)
pick14	-2.565**
	(1.038)
pick15	-0.288
	(0.540)
pick16	-0.288
	(0.540)
pick17	-1.792**
	(0.764)
pick18	-0.000
	(0.535)
pick19	-0.916
	(0.592)
pick20	-0.288
	(0.540)
pick21	-0.288
	(0.540)
pick22	-0.288
	(0.540)
pick23	-0.288
	(0.540)
pick24	-0.288
	(0.540)

pick25	-0.916
	(0.592)
pick26	-0.154
	(0.556)
pick27	-0.000
	(0.535)
pick28	0.000
	(0.535)
pick29	-1.299**
	(0.651)
pick30	0.288
	(0.540)
pick31	-0.288
	(0.540)
pick32	-0.588
	(0.558)
pick33	0.288
	(0.540)
Observations	460
Log Likelihood	-250.416
Akaike Inf. Crit.	566.833
Note:	*p<0.1; **p<0.05; ***p<0.01

As can be seen in Table 5, a large portion of the coefficients on the *pickX* variables are insignificant. Of the five models tested, this seems to be the least predictive, reporting a McFadden R-squared statistic of 0.215, however this is still a large enough to extract value from the results. A position that is traded more often implies a divergence in the expected value of a draft position among managers throughout the league. In the model, two cases of this are identified. Positions such as *pick5* and *pick6* seem to have a positive effect on the likelihood of a trade relative to other positions. For the occurrence of a trade to be possible, two teams must both believe that they are receiving a more valuable return for what they are giving up. In contrast, for draft positions of which there is consensus of the value, such as *pick2*, trades are less likely. If the value of a draft position is viewed equally among two managers, a trade in which both parties feel as though they gained value is impossible.

Figure 5. Effect of Draft Position on Probability of Selection being Traded

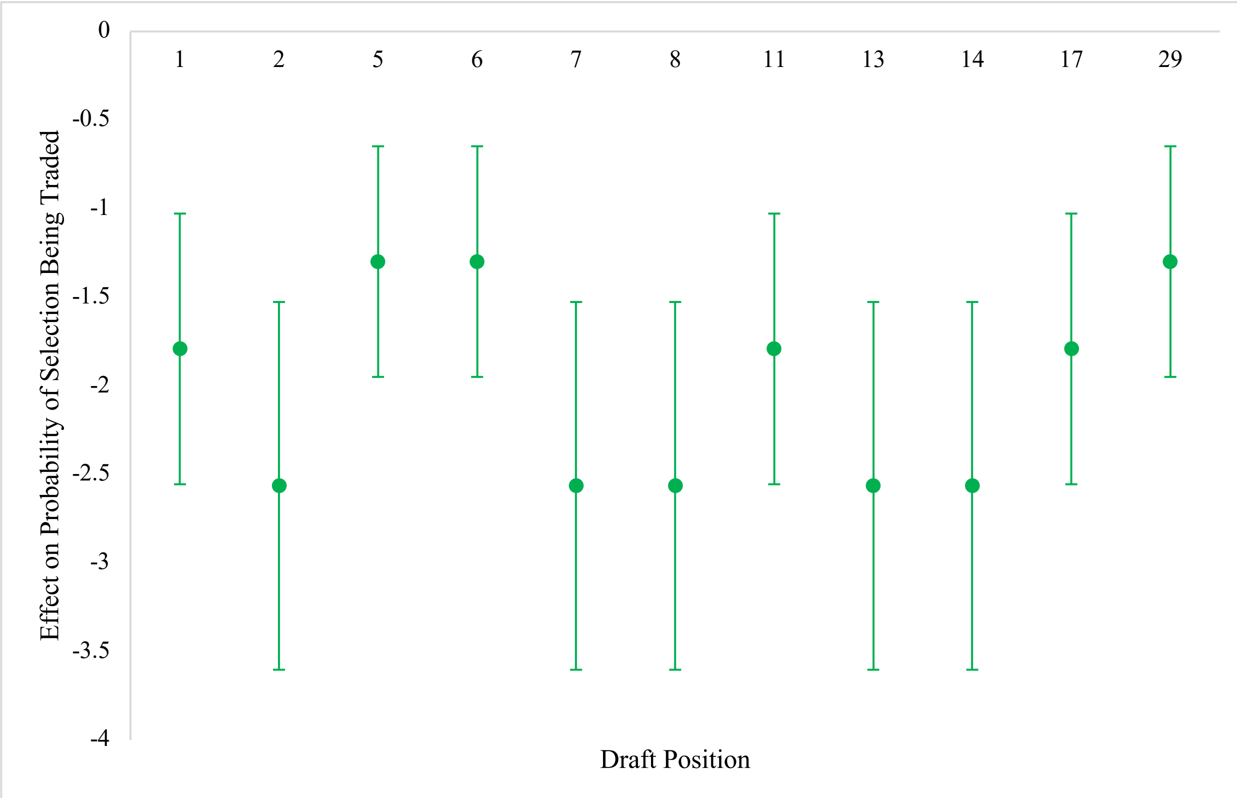


Figure 5 shows each draft position which records a statistically significant relationship with the probability of a pick being traded. Largely negative coefficients for *pick2*, *pick7*, *pick8*, *pick13*, and *pick14* suggest that individual picks at these draft positions are less likely to be traded than others. This is consistent with examination of the data, as only five out of seventy draft picks at these five positions were traded, roughly 7.14%. Compared to 30.65% trade rate of draft selections overall, this result is extremely notable.

One limitation of this model is the lack of distinguishment between draft selections that were traded before the draft, and selections which were traded during the draft. In some cases, when a team is interested in a specific player, they will attempt to trade up in the order after the draft has already begun. Observations where this is the case detract from the predictive power of the model because these types of trades are made to target a specific player, rather than the perceived general value of the draft position.

VII. Conclusions and Suggestions for Future Study

A. Effect of Draft Position on Size of Second Contract

Model 1 has identified two draft positions which diverge from the expected trend of accurate drafting. The first position of interest is the 2nd pick of the NBA draft. Model 1 suggests that being selected with the second overall pick has a notably smaller positive effect on the expected value of a player when they reach free agency (modeled by second contract size) than surrounding draft positions, pick 1 and pick 3. Further, the effect of being selected second on the expected future value of a player is more comparable to that of players selected in the fourth and fifth position. This suggests that NBA general managers are consistently overvaluing players with the second pick in the draft, as players drafted here do not receive the second largest contract sizes at free agency.

Another position diverging from the expected trend is the 27th position in the draft. This position has a larger positive impact on the future value of a player than any draft position occurring after the fifth overall pick. This is also the only position which records statistically significant difference than the following pick. The large positive effect when compared to surrounding positions suggests that players being drafted at this position are consistently undervalued, and on average secure higher second contracts than would be expected of players this far back in the draft.

When omitting observations in which a draft pick was traded before a player selection was made, conclusions regarding any individual draft position were not affected. However, comparison of the two models shows that the positive effect on expected contract size increases overall when the pick is not traded. This suggests that players who are drafted by the team with original ownership of the pick are likely to receive larger contracts than those who are drafted with traded picks.

Overall, I would be excited to see a future study focus its analysis on the top three draft positions and include demographic and college/international statistical data to determine what is the cause of the second pick being overvalued.

B. Effect of Drafting Team on Size of Second Contract

Model 2 analyzed the isolated effect teach team has on the expected size of a player's second contract. Results of this model can be interpreted in two ways. One interpretation is that a team with a stronger effect on expected second contract draft more efficiently than other teams, leading to more players who will demand large contracts to begin their careers with them. Another interpretation could be that these teams provide a stronger environment and are better at developing players, therefore increasing the value of the players they draft. Overall, this model did not find any teams to be statistically significantly better or worse than any of their competitors. This result may dispel the notion that team culture is a key determinate of player development. While I certainly still believe that culture is essential to team success, a theory untested in this study, it does not seem to have direct impact on the future value of a young player.

C. Effect of Draft Position on Probability of Second Contract Acquisition

While many draft position variables were deemed insignificant in Model 3, there are still interesting conclusions that can be drawn. After examination of data related to the top ten draft positions, it became clear that this data was drastically skewed positively, meaning an overwhelming percentage of the observations received a second contract. This led to the vast insignificance, but also helps to inform my interpretation of the model overall. With this knowledge, it is clear that there is a general negative trend relating draft position to probability of second contract acquisition through the first round. Interestingly, there seems to be evidence that players drafted in the first three selections of the second round are actually more likely to receive a second contract than those drafted in the final three selections of the first round. One possible explanation of this could be that worse teams drafting early in the second round have more minutes available for young players. This would present a greater opportunity for players to exhibit their value and earn a second NBA contract.

Because some of the conclusions drawn from this analysis include variables which this model did not find to be statistically significant, I would be excited for a future study to limit its analysis to comparison of the end of the first round and beginning of the second, focusing on the impact of playing opportunity. These players are all expected to be relatively similar in terms of caliber, but players drafted in the early second round go to the worst teams of the previous year, while late first round picks go to the best teams of the previous year.

This model additionally identified a section of the draft, between the 15th and 19th position, which seem to have a weaker effect on the probability of acquiring a second contract, suggesting more "bust" players are drafted here.

D. Effect of Drafting Team on Probability of Second Contract Acquisition

Model 4 shows that there is a significant effect different teams have on the probability of a player's second contract acquisition. While the effects of all teams can be seen in Figure 4, it is most interesting to look at the top and bottom of the spectrum. The top four teams which have the largest positive effect on the probability of second contract acquisition are Minnesota, Philadelphia, Chicago, Sacramento. The bottom three are Boston, Brooklyn, and Oklahoma City. One explanation regarding the top four teams is that large and small market teams are more willing to give out contracts than medium sized teams due to additional means or motivation. Philadelphia and Chicago are large market, and Sacramento and Minnesota are small market, so this explanation may be valid. However, Boston is also one of the largest markets in the NBA, and Brooklyn and Oklahoma City are both very small. Because teams of high or low market size can be found on both ends of the spectrum, franchise value is not likely to be the key determinate of the team-by-team effect. Instead, this model more likely shows which teams offer more value development opportunities for young, fringe NBA-level players (PHI, MIN, SAC, CHI), and which teams (BOS, BKN, OKC) devote more of these resources to proven talent.

E. Effect of Draft Position on Probability of Selection Being Traded

Model 5 shows which draft positions have the largest impact on the probability of a selection being traded. From this, conclusions can be drawn regarding the consensus or lack thereof of draft position values across NBA general managers. A pick swap trade can only occur when both teams feel that they are gaining value in terms of draft capital. If two general managers both evaluate the value of draft positions equally, it becomes impossible to form a trade of which both parties feel that they gained value. Therefore, it can be assumed that positions which are traded less often have a consensus value across the league. In contrast, positions which have a more positive effect on probability of a trade imply that these positions have diverging perceived values between NBA general managers.

While many of the later positions in the draft rendered insignificant results, positions 2, 7, 8, 13, and 14 have all shown significant negative effects on the probability of a selection being traded, suggesting that NBA general managers agree on the expected value of these positions.

In contrast, positions 5, 6, and 29 have shown more positive effects on the probability of a selection being traded, suggesting these positions have diverging values depending on which NBA manager is evaluating it.

F. Conjoined Analysis

Through this study, I have determined that NBA teams do a generally good job when evaluating talent during the NBA draft, but some specific positions are being over/undervalued. When analyzing the results of Model 1 in conjunction with Model 5, which analyses to which positions there is consensus value, it seems that there is a consensus of the value of the 2nd position in the NBA draft. However, Model 1 suggests that this position is being consistently overvalued, and players drafted here often do not live up to the expected value of the second position in the draft. Overall, there seems to be a league-wide, agreed-upon, overvaluation of the second pick in the NBA draft.

G. Overall Summary

This study has shown that while most positions in the NBA draft have been accurately evaluated over the period in question, there are specific positions in the draft which are being over/undervalued. Further, I have also shown that team environment is not a strong determining factor of expected second contract size. Regarding contract acquisition rate, this study has uncovered an interesting trend in which players drafted in the early second round may be more likely to acquire a second contract than those drafted late in the first round. Additionally, it seems that the team to which a player is drafted has a significant effect on the likelihood of receiving a second contract, as some teams may be devoting more resources to developing fringe NBA level prospects than others. Finally, analysis of draft position's effect on the probability of a selection being traded has provided insight as to which draft positions are evaluated consistently across NBA general managers, and to which positions there is variation in expected value.

VIII. Appendix

A1 - Variable Explanations

Variable	Description	Variable Type
Pk	Position Drafted (1-33)	Predictor
Tm	Drafting Team of Player	Predictor
Player	Name of Player	Key
Year.Drafted	Year in which a player was drafted	Key
Pick.Traded	Dummy Variable where "1" represents that the draft pick was traded to another team before selcting,"0" represents no trade	Response, Key
2nd.Contract.Total	Total value of the first contract signed after the completion of a player's rookie contract	Construction of Response
Year.of.2nd.Contract	The year in which a player signed their first contract following the expiration of their rookie contract	Construction of Response
Length.of.2nd.Contract	The length of the first contract that a player signs following the expiration of their rookie contract	Construction of Response
Average.Salary…Year	The Total Value of a player's second contract divided by the number of years on the contract	Construction of Response
Salary.Cap…Contract.Signing	The total amount of money a team is allowed to spend on player salaries in the year which a player signs his second contract	Construction of Response
X..of.Salary.Cap	The percentage of the total team salary cap spent on a player's second contract in the signing year	Response
Year.Born	The year in which a player signed their first contract following the expiration of their rookie contract	Construction of Control
Age.At.Draft	The age of a player in the year they are drafted	Control
Value.of.Team.in.2012	The value of the franchise which drafts a given player in the year 2012	Control
pick X	33 dummy variables where "1" represents that a player's draft position is X, and "0" represents that it is anything else	Predictor

A2 - Summary Statistics of Second Contract Size by Draft Position

Draft Position	Average of % of Salary Cap	Standard Deviation of % of Salary Cap	Min of % of Salary Cap	Max of % of Salary Cap
1	22.90	10.38	1.35	32.50
2	16.34	9.07	2.10	30.72
3	21.53	10.62	1.58	34.80
4	13.89	9.82	0.02	27.57
5	14.75	11.00	1.43	34.80
6	10.34	9.92	0.00	29.72
7	12.66	8.72	1.59	29.00
8	8.47	8.61	1.13	28.36
9	9.75	9.41	1.53	27.02
10	12.70	10.43	0.41	29.04
11	9.31	9.62	0.00	29.00
12	8.88	7.04	0.00	25.23
13	9.19	10.14	0.00	29.00
14	8.21	9.79	0.00	29.00
15	9.50	9.08	0.00	26.96
16	5.06	6.50	0.00	18.93
17	8.64	8.67	0.00	25.17
18	5.76	8.14	0.00	22.20
19	9.70	8.46	0.00	22.86
20	5.23	5.95	0.00	18.06
21	5.76	6.48	0.00	18.95
22	6.63	6.90	0.00	17.86
23	5.83	5.10	0.00	16.01
24	7.82	8.86	0.00	22.86
25	3.43	6.56	0.00	19.86
26	6.52	4.50	0.00	14.06
27	10.40	9.23	0.00	31.36
28	2.38	2.76	0.00	10.31
29	3.69	5.54	0.00	15.57
30	5.08	7.66	0.00	26.38
31	5.35	6.98	0.00	20.45
32	3.05	2.91	0.00	9.16
33	3.77	5.36	0.78	21.03

A3 - Breakdown of NBA Salary Cap by Year

Year	Salary Cap ($)
2005	49500000
2006	53135000
2007	55630000
2008	58680000
2009	57700000
2010	58044000
2011	58044000
2012	58044000
2013	58679000
2014	63065000
2015	70000000
2016	94143000
2017	99093000
2018	101869000
2019	109140000
2020	109140000
2021	112414000
2022	123655000

A4 - Franchise Values in 2012

Team	Team Value in 2012 ($)
LAL	$900,000,000.00
NYK	$780,000,000.00
CHI	$600,000,000.00
DAL	$497,000,000.00
BOS	$482,000,000.00
MIA	$457,000,000.00
HOU	$453,000,000.00
GSW	$450,000,000.00
SAS	$418,000,000.00
PHO	$395,000,000.00
ORL	$385,000,000.00
TOR	$382,000,000.00
POR	$370,000,000.00
BKN	$357,000,000.00
OKC	$348,000,000.00
UTA	$335,000,000.00
DET	$332,000,000.00
CLE	$329,000,000.00
WAS	$328,000,000.00
LAC	$324,000,000.00
DEN	$316,000,000.00
PHI	$314,000,000.00
SAC	$300,000,000.00
NOP	$285,000,000.00
IND	$283,000,000.00
CHA	$277,000,000.00
MIN	$272,000,000.00
ATL	$270,000,000.00
MEM	$269,000,000.00
MIL	$268,000,000.00

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