

The relationship between NFL players' compensation and performance

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## **Abstract**

The purpose of this study is to find a relationship between compensation, performance, and pick value for running backs, kickers, and quarterbacks. Previous research suggests that compensation is sometimes related to performance but can also be dictated by the popularity of a player. We hypothesize there is a relationship between base compensation and player performance stats in the starting quarterbacks, running backs, and kickers who are currently playing on their second contract in the NFL. Second, we hypothesize there is a relationship between pick value and player performance stats for the same quarterbacks, running backs, and cornerbacks. Starting quarterbacks, running backs, and cornerbacks who played in their 2024 season on their second contract were used, and we collected their performance statistics to rank players. We found that compensation is related to the skills of running backs and quarterbacks. The pick value is only related to running backs' performance. We found no relationship between pay, performance, and pick value for kickers. Our data shows that quarterbacks and running backs are generally paid what they are worth, but that same connection isn't supported for kickers.

## Does an NFL player's skill determine their pay?

### Introduction

In 2024, the NFL salary cap per team is set at 255.5 million, with the average salary being 2.8 million (1, 2). This is important because each NFL team must allocate the money without going over the cap with the end goal of constructing the best roster. We are wondering if the salary is wholly based on their skill. Research on compensation and performance includes which positions are over- and undervalued, which players are over- and undervalued, and how an NFL team should orchestrate the best roster (3). This is important because we want to know if businessmen and team owners should invest the most money in the best players. This can also be good information for sports betters and fans who want to understand how a team allocates its pay. In our study, we collected contract compensation, pick values, and recorded performance stats for kickers, running backs, and quarterbacks to see if these positions pay based on their skill.

NFL contracts may be confusing, but there are a few key ideas to understand (4). An NFL contract is a written document that is agreed upon by the player and team and breaks down how they get paid. The base for the contract is the "base salary". The base salary is the money that you earn just by earning a spot on the roster. This is dished out every week to the player is either guaranteed or non-guaranteed based on the clauses in the contract. The next big part of a salary is the guaranteed money. This allows the player to have the money that is promised. There are many types of guarantees, such as cap, injury, and skill guarantees; these combined are called the full guarantee. This is all agreed on during the negotiation process.

The next part of the contract is the signing bonus, which is a fully guaranteed payment owed by the player (4). The player gets a portion of the signing bonus up front, but it can be distributed over 5 years if the player is cut, it is deemed as a "dead cap," and the team is required to pay that money all at once, and is also counted against their salary cap spending. The next big section of the contract is the roster bonus, which is granted to the player just for being on the roster in the new league year. The last two portions of the contract are workout bonuses and incentives. Those are both granted by meeting a certain threshold that was set in the contract. The combination of a player's salary and bonus is what makes up a player's "cap hit," or the amount that goes towards a team's salary cap. The important takeaway is that the total compensation of a contract is the hypothetical potential worth of the contract over many years, and players rarely, if ever, see all of that money. However, that is the value the team places on the player in comparison to other players and the total compensation cap.

Another way to measure the value of a player is called his pick value (5). There are 256 total draft picks each year. The margin between early picks (like 1-10) is much higher than the margin for later picks, like 255 or 256. At the top of the draft, there is a large opportunity cost for each player, but less for less desired players. We measure using pick value, where a pick 1 is worth 3000 points, and a pick 256 is worth 190 points. Pick values are important because they give the relative value of a player without having to deal with the confusing parts of a contract.

Research suggests that player talent is sometimes related to the cost of acquiring it (6). Barney et al. looked at pick value and draft number and how they related to the appearance score. An appearance score shows you how well a team has drafted based on the return value of the picks. This scores the individual performance of the player, how much they appear in the game, and the team's performance when that player is present in the game. The researchers found that safeties have the highest appearance score, regardless of cost. Teams as a whole spend the most to acquire quarterbacks, defensive ends, and offensive tackles. This makes sense because these three positions are key to winning the game and are some of the hardest to perform well in because of the high level of skill required. However, centers, guards, and kickers are often undervalued; they tend to do better than what they cost. This may be due to how they are viewed and may be underappreciated, as a lot of teams may see them as replaceable. This is important to our project because we are looking at pick value and pay, to see if the same relationships exist when it comes to actual dollars.

In my research essay, I will research how the salary cap is distributed while detailing the risk preferences in the teams' ownership. Even though the salary cap is designed to instill a competitive balance in the league, this study shows that there isn't a true correlation in the player salaries (7). The owners value more than just expecting good performance in the future they value the players' potential to become a star. Because of a star player's leadership or popularity, they can make the owners more money by jersey sales, marketing, and even an increase in ticket sales, compared to simply winning games (7). Using the data collected on the players from 2005-2009, research shows that owners factor in off-the-field antics and star potential when determining a contract. Thus proving that on-field performance doesn't fully determine their salary and pay (7).

In 1993, the NFL introduced the salary cap and allowed player movement between teams (3). So this would essentially mean that teams have a set amount of money that they can allocate between their players to construct the best roster. Winsburgh collected data on the overall team's performance (points scored or points allowed) and wins. This study's main findings are that teams that are exceeding the league spending average on offensive linemen usually have a negative trend in overall team performance. This also shows a trend that spending above the league average on both the offensive line and quarterback positions negatively affects offensive performance. For every 1,000,000 additional spent on a quarterback, the team's ranking drops two spots in the offensive rankings. There was no connection between salary and team performance for defensive linemen. Overall, research suggests that taking a superstar approach and overspending on individuals, as a result, means a team losing quality in other positions and can negatively affect the team's performance (3). Paying above-average salaries to individual players does not lead to better team performance.

Overall, the research on player pay and skill is mixed (7). Some research says that owners view players' value based on their superstar potential, while other research says a player's compensation is based on their skill (3,7). This study contributes to the question of whether a player is paid what they are worth. Superstar potential is crucial to owners because they tend to invest heavily in players who they feel would bring in more revenue to the organization (7). Skilled players are valued because they are important to build the best roster (6, 3).

We hypothesize there is a relationship between compensation and player performance stats for current quarterbacks, running backs, and kickers on their second NFL contract. This is because some research says that players' compensation is due to their "superstar" potential, and some research says the pay is due to their skill (6, 7, 3). Second, we hypothesize there is a relationship between pick value and player performance stats in the same players and positions.

### **Materials and Methods**

In this study, we chose three positions: kicker, quarterback, and running back. When conducting the research, we collected the main stats to determine the best ranking for the best players. For kickers, we collected their field goal percentages from different distances, along with their extra point percentages. When collecting data for quarterbacks, we chose their quarterback rating score, which is a metric used to determine their overall score. And when collecting data for running backs, we chose their rushing attempts, total rushing yards, total touchdowns, yards per carry, and total yards per game. Player compensation was measured by cap hit and pick value. Player statistics were retrieved from multiple public data databases (9, 5, 9, 10).

The list of players for each position were chosen by determining the starting player for each position for each team who is in at least their second contract. This is because the rookie contract is not necessarily based on a player's proven skill, so if we want to see how compensation is related to player performance, we only want to include contracts that could be based on a player's real value and not their potential value. Players were taken from the 2024 NFL season, and there were a total of 8 kickers, 20 quarterbacks, and 12 running backs included in the study.

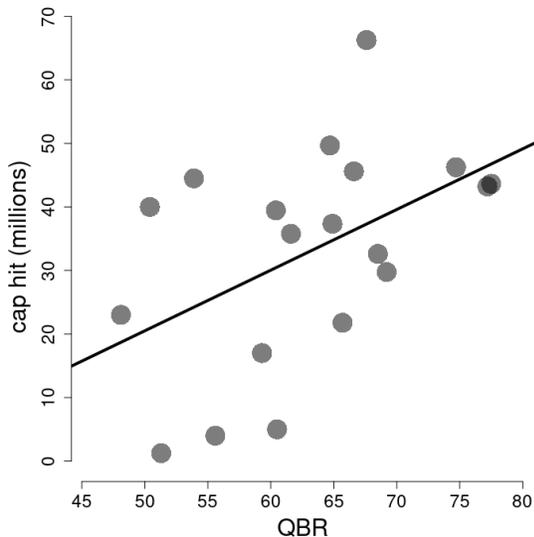
When comparing running backs and kickers, we used rank values. When ranking running backs and kickers, we ranked who the best player was in each stat, then averaged all the ranks together and would deem the player with the lowest average rank as the best player in that position.

In order to investigate the relationship between a player's rank and their pick values and base compensation, we used a Spearman rank-order correlation coefficient test. The quarterback's data was analyzed with a Pearson correlation coefficient test. The tests are abbreviated with the symbol  $r_s$  and  $r$ , and we used the website [vassarstats.net](http://vassarstats.net) with a 0.05 cut-off for significance.

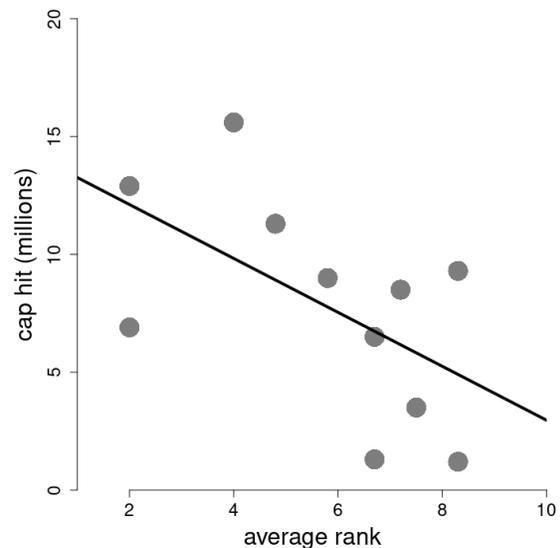
## Results

The purpose of our project is to test if the best players get paid the most money. We did this by collecting performance stats in kickers, running backs, and quarterbacks in the 2024 NFL season, along with their pick value and cap hit. A total of the 19 starting quarterbacks selected had an average of 33 million dollars, with most players being past their first contract. There were also 11 running backs collected, with an average cap hit of 7.5 million dollars, and they were all past their second contract. There were 8 kickers with an average cap hit of 5.2 million dollars and they were all past their second contract.

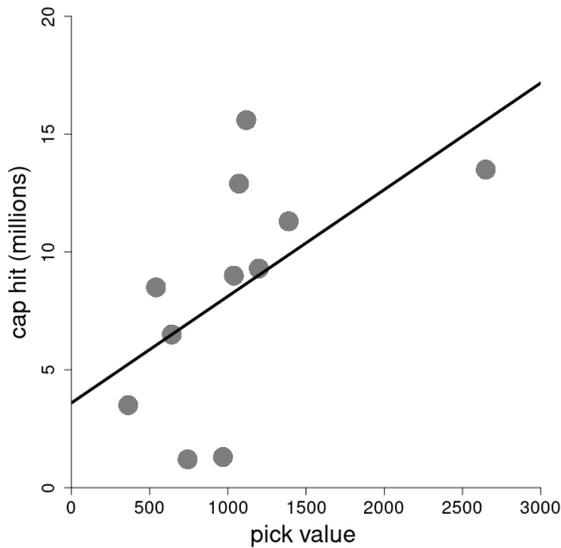
Our first hypothesis was that there is a relationship between skill and pay. For quarterbacks, we used the quarterback rating (QBR) to scale the skill of a quarterback. For running backs and kickers, we used average player rank, which is the average of how each player compares to the other players for each performance stat. The lower the average rank, the better the players' skill. An r-test found a positive relation between their cap hit and total QBR ( $r=0.48$ ,  $p=0.02$ , Figure 1). More skilled quarterbacks are, in general, paid more. For the running back position, a Spearman r-test found a negative relationship between skill and cap hit ( $r_s = -0.56$ ,  $p=0.04$ , Figure 2). More skilled running backs are ranked lower and tend to make more money. For the kicker position, the Spearman r-test found no relationship between player rank and cap hit ( $r_s=0.22$ ,  $p=0.41$ , Figure 3).



**Figure 1. Higher-skilled quarterbacks have a higher cap value.** 20 quarterbacks were collected from the 2024 NFL season along with their salary cap hit for the season. Their QBR was collected and compared to their salary cap hit. The r-test found a positive relationship between QBR and salary cap value.

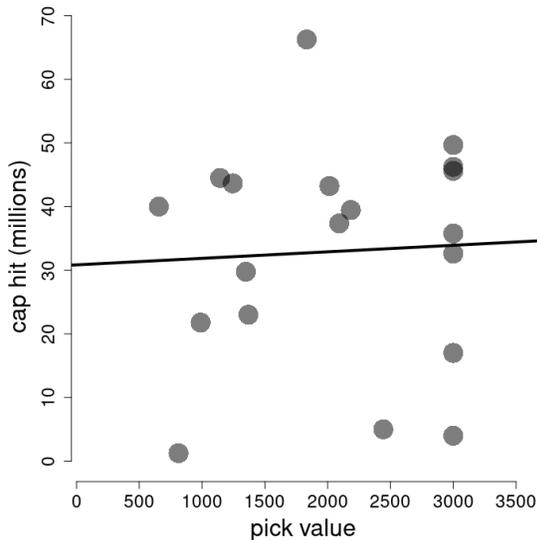


**Figure 2. For running backs, the lowest average rank does correlate with cap hit.** 12 running backs were collected along with their cap hit for the 2025 NFL season, along with their average rank. The average rank is a valid way to rank based on cap hit. The t-test found a positive correlation between average rank and cap hit.

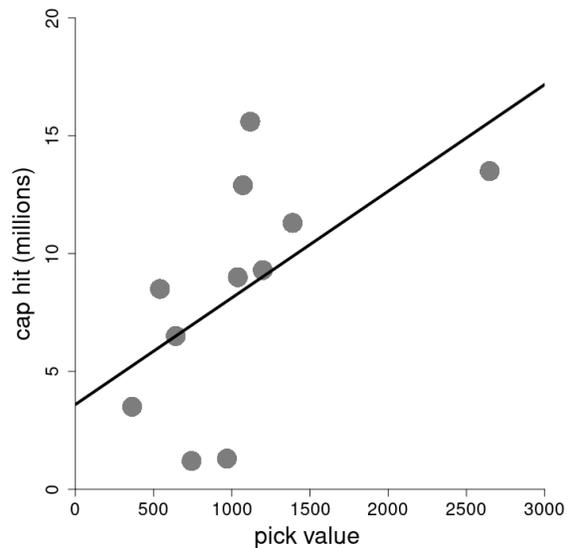


**Figure 3. For kickers, average rank does not correlate with cap hit.** 9 nfl kickers were collected along with the average rank and cap hit. The cap hit is not dependent on a player's average rank. The t-test found a negative relationship between average rank and cap hit for kickers.

Our second hypothesis was that there is a relationship between pick value and pay. For quarterbacks, the r-test found no relationship between pick value and cap hit ( $r=0.05$ ,  $p=0.42$ , Figure 4). For running backs, the Spearman r-test found a negative relationship between pick value and cap hit ( $r_s = -0.56$ ,  $p=0.04$ , Figure 5). For kickers, there is no relationship between pick value and compensation.



**Figure 4. Higher pick value does not correlate to higher cap value for quarterbacks.** 20 quarterbacks were collected who were rewarded a 2nd contract along with their original pick value. The cap hit is not in any way dependent on the player's pick value. The t-test



**Figure 5. Pick value does correlate with cap hit for running backs.** 12 running backs were collected along with their cap hit for the 2025 NFL season, along with their pick value. The cap hit is dependent on pick value.

*found a negative relationship between pick value and cap value.*

*The t-test found a positive correlation between pick value and cap hit.*

## **Discussion**

In our study, we considered that if NFL players perform better, they would also be compensated with higher pay. Our first hypothesis was that there is a relationship between compensation, measured by cap hit, and player performance stats. This was partially supported as there was a positive relationship between quarterbacks' performance and compensation, and for running backs, the lowest average rank (highest skilled) player does correlate with cap hit (Figures 1 and 2). However, for kickers, our hypothesis was not supported as there was no relationship between pay and performance (Figure 3). Our second hypothesis was that there is a relationship between pick value and player performance, and this was also partially supported, as there is no relationship between quarterbacks' pick value and pay, but there is a positive relationship in running backs' pick value and cap hit (Figures 4 and 5).

Our results are inconsistent with other studies relating to paid performance by Winsberg and Chakravarthy (3,7). We found no significant relationship between "the superstar strategy" and compensation. Winsberg found that team owners don't spend more money on the best players; they spend more money on players who are or have the potential to be "superstars" and would essentially use their popularity to increase sales for jerseys and tickets. Our study found that the best quarterbacks and running backs get paid what they're worth based on efficiency and performance, but this is not supported for kickers. This makes sense for quarterbacks because they are valued as one of the most important players on the team, so it would be important to invest in a high-quality quarterback as they are needed to have a good team. This also makes sense for running backs as they are undervalued, but the good ones are paid what they're worth, as a strong running game is the key to controlling possession of the ball and controlling the game.

No other studies have studied the relationship between compensation, pick value, and player performance in kickers. In the NFL, there are only 266 picks available in the draft, which is for college players to be selected by NFL teams. If a player is drafted, he is seen as valuable to whatever franchise he was selected by, but the value of the position of the picks is valued differently. And statistically, NFL teams don't value kickers as much as other positions, as we rarely see any kickers get drafted, thus resulting in them having little to no pick value. Another trend we see for NFL teams is that they view kickers as interchangeable; many teams don't retain the same kicker for more than 4 years, indicating that they can be replaced with little to no drop in performance. Another reason this holds true is that the kickers have no control of the conditions they kick in. When a kicker is attempting to kick, it is solely a decision made by the head coach. The coach can decide if a kicker attempts a 60-yard field goal or a 19-yard field goal, and that also depends on the performance of the offense. It's the offense's job to score a touchdown, and if not, then get as close as possible to ensure that the kicker can score a field goal. Therefore, it makes sense that there is no relationship between player performance and pay for kickers, as kickers have very little control over the conditions they perform under in a game.

Barney et al. found that the more money one spends on quarterbacks over the league average, the team's offensive ranking drops 2 spots in the rankings. This is because when you spend more on a quarterback, you take away money that would be used to fill other positions of need. In our research, we found that better quarterbacks are paid more, but investing too much in a quarterback statistically doesn't make your team better. Barney points out that the best position to invest in is a safety because he found that they have the best return on investment and have a higher impact on the game.

Our study only had one limitation. Our only limitation was the finite number of kickers. This makes it hard to have a valid scatterplot due to the fact that there is a small number of players' records for the plot (9 players). A future improvement could be extending the number of seasons used when finding the data, as well as using more players from previous seasons. It would be more helpful to use the season before the player received their contract extension. This would give a more accurate picture when trying to evaluate their value based on their most recent season's statistical performance. Also, it would also be beneficial to compare the contracts from the previous contract as well as include the percentage increase in the player's pay from the previous contract. For example, if a running back was previously signed to a 2-year contract worth 7 million annually, then in the last year of his contract, he had a breakout season and led his position group in the major stats, and then signed a 3-year contract worth 14 million annually. This would show the increase in pay as well as give a comparison.

According to our research, compensation is related to skill for running backs and quarterbacks. The pick value is only related to running backs. Compensation is not related to kicker performance. Therefore, we argue that scouts and coaches should not overvalue quarterbacks in the draft and free agency. Studies prove that spending more on a quarterback will give you a player of better quality, but will consequently lower the team's overall quality because it lowers the overall cap available to spend on other important positions. For running backs, teams should use the draft to get a good running back, as studies show that there is a relationship between performance and pick value. For kickers, our study suggests that pay or pick value and performance may not be related; therefore, teams should favor real-life gameplay over the kicker's stat sheet when deciding what they should pay for a kicker.

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