# Contract Renewal Incentive Effect: Reality or Myth?

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## Abstract

The contract renewal incentive effect is an economic topic that has been controversial in the National Basketball Association (NBA). This study investigates whether or not the performance and effort of NBA players tend to increase in contract years and decrease afterward. With the most recent data set, this paper evaluates performance and effort variables, conducts multiple linear regressions, and presents discussions related to the real world. The results conclude that based on the reality-based metric, performance decreases by approximately 1.3 points and 0.7 points in contract years and post-contract years, respectively, while effort persists at the same level. From the perspective of basketball fans, this surprising finding provides a reference when understanding the world of basketball.

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# 1 Introduction

The contract-renewal incentive effect induces workers to strategically increase their performance or effort prior to a contract renewal decision. Individuals respond to pay-for-performance (Prendergast, 1999). In terms of contract renewal, if employees expect to earn new contracts with better performance, they will work harder. This economic topic is applicable to many industries, including professional sports leagues such as Major League Baseball (MLB) and the National Basketball Association (NBA). Moreover, the contract year effect is particularly likely to happen in the NBA. In general, NBA players could earn income on and off the court: they sign contracts with their teams and for sponsorship. However, sponsorship is the privilege of super-stars, so the NBA contract is the sole source of income for the majority of the players. Under the Collective Bargaining Agreement (CBA), many NBA players are allowed to sign multi-year and guaranteed contracts. Consequently, they would have a relatively long time that they do not worry about their earnings regardless of their performance.

Teams provide players with contracts, hoping that their performance will meet or exceed the value of their salaries to enhance the team's performance. Unfortunately, many players disappointed their teams after signing the new contract. In fact, there is a widespread belief called the contract year phenomenon that precisely describes this problem (White and Sheldon, 2014). It describes the occurrence of athletes performing better in the last season of their current contract and worse once they have secured a new contract. Draymond Green, the starting power forward of the Golden State Warriors, and former Defensive Player of the Year, exemplifies this. Playing in the most successful team over the past decade, the 2019-20 season was the only season where he averaged above ten points per 36 minutes for the past five years. After signing another four-year contract with the Warriors in 2020, he never scored that many points again. This could be a coincidence, or he just happened to play better and cooled off to his average level. Regardless of the reason, his better performance brought him another contract, and he does not seem to deserve his contract. Fans care about this because it is detrimental to the quality of the games; general managers also care about it since they intend to maximize the profit out of players. However, this issue is difficult to address. When signing new contracts, nobody would know the future performance of the player, so general managers have to take the risk. Thus, the contract-related incentive effect is always a crucial problem that people need to deal with.

Although the idea of the contract year phenomenon exists, this impression might be due to survival bias, which means concentrating on players who have contract year phenomenon and overlooking those who do not, or exaggerations from the media. Studies such as Stiroh (2007) and White and Sheldon (2014) have developed implications about this topic, and their conclusions partially agree with each other that performance is increased before signing new contracts. Inspired by previous research and given that the world in general and the world of basketball develop rapidly, I examined this topic based on the up-to-date contexts. Using the most updated, specifically tailored data set of NBA players, this study investigates the contract renewal incentive effect and assesses the legitimacy of the contract year phenomenon. Moreover, taking a step further from the existing studies that only provide implications between performance and contracts, this study also considers the contract-related influence on effort.

I aggregated nine performance measures and four effort measures into single-dimensional performance and effort indices. I follow two approaches. First, based on scoring, I formulate conjectural models that capture theoretical performance and effort. Second, with probit models, another reality-based formula is obtained. Subsequently, relationships between contract status and the two aspects of the court are estimated with both metrics. The results are unexpected: both metrics suggest that there is a significant decline in the performance level in contract years, and the probit metric also reveals that players perform worse in the year after signing new contracts. Moreover, both metrics indicate that there is no significant change in effort level during and after the contract year.

In addition, tenure is an influential factor that can impact players' performance on the court. As players spend more time in the league, they gain valuable experience and knowledge. This experience allows players to develop a deeper understanding of the game, including its pace, rhythm, and nuances. Moreover, tenured NBA players have faced a wide variety of opponents, and this exposure can help them to better anticipate the moves and tactics of their opponents. Although the athleticism gradually declines, tenured players have accumulated higher level of confidence, decision-making, and leadership skills, all of which can translate into better performance and overall success. Thus, I included the fix effect on tenure and repeated the analyses to control this important factor.

The result of declined contract-year performance implies that for the majority of NBA players, it is difficult to maintain performance at a certain level due to various reasons, such as injuries and competition from other new players. With only thirty teams and limited roster spots, the league is too competitive so players are rarely able to maintain a high level of physical fitness, mental focus, and discipline. The effort, which reflects the attitude and mentality, is consistent because it is essential and necessary to become an NBA player. I conjecture that players who do not put in enough effort are excluded by the NBA in the first place.

## 2 Related Literature

Dalen, Moen, and Riis (2006) discuss how government renewal policy in public procurement programs can incentivize firms to provide high-quality services. The firms compete in a tournament where they are ranked based on the quality of their services and rewarded with contract renewals. The study finds that the optimal renewal policy is to renew 50% of the contracts to balance incentive provisions and the entry costs of new firms. This balance maximizes the firms' incentives to produce high-quality services.

Stiroh (2007) examines the contract-year effect using data on individual performance and individual contracts of professional basketball players in the 1980s and 1990s. The study finds that individuals score 0.847 points more in the year before signing a multi-year contract but decline after the contract is signed. This suggests that players may increase their effort to obtain a lucrative, multi-year contract, but then reduce it once the contract is secured. The study highlights the dual nature of long-term contracts, which can be beneficial for employers when workers are competing for them, but less so when workers have already signed them.

White and Sheldon (2014) assemble the performance data of basketball and baseball players during different stages of their careers, including pre-contract year, contract year, and post-contract year. The study finds that during the contract year, players show a boost in certain scoring statistics compared to the pre-contract year, but there is no change in non-scoring statistics. However, in the post-contract year, the study finds that many statistics are undermined compared to both the contract year and the pre-contract year. The boost in performance during the contract year is real, but it may be followed by a performance crash during the post-contract year. The study suggests that team managers should be aware of the potential "contract year syndrome" when considering player contracts.

Bodvarsson and Brastow (1998) present a monitoring and signaling model based on the salary data in 1991 and performance data such as points and field goal percentage to explore how employers determine compensation when a worker's performance is variable over time and the average performance is unknown. The model predicts that monitoring costs increase with inconsistency, resulting in lower pay for inconsistent workers. The study tests these predictions using data from the NBA and finds that consistent professional basketball players are paid more. Contrary to previous studies, the analysis shows no evidence of discrimination, and minority workers are not rewarded less than majority workers for improving consistency.

Gómez, Lago, Gómez, and Furley (2019) analyze performance differences of soccer players before and after signing a new contract, taking various factors into account. The study focused on 249 players from four major European leagues from the seasons 2008 to 2015 and analyzed various dependent variables such as shooting accuracy, defense, yellow cards, red cards, passing accuracy, tackle success, and minutes played per match. The results showed that the performance of some players improved in the year before signing a new contract, but decreased in the following year, while other players showed better performance in defense and more minutes played after signing a new contract. These findings could assist coaches in deciding when to sign a new contract and the duration of the contract.

These studies concern contracts and incentives and can give general ideas about the topic of this paper. However, the studies related to the NBA are all performed decades ago, and as the world economy develops and NBA constantly modifies its salary rules, those conclusions may not apply anymore. For instance, NBA has its salary cap raised multiple times over the past decades, and the maximum salary of players with less than 6 years of experience in the NBA has considerably increased from approximately 10 million dollars in 2000 to approximately 27 million dollars in 2020 (RealGM, 2022). Despite inflation, this is still a considerable boost in salary. This obviously will be more attractive to players to strategically play harder in their contract years. Also, in 2011, NBA implemented the Rose Rule, allowing teams to compensate their rookie star with a higher maximum salary (Louis, 2022). Similarly, the Designated Rookie Extension, also implemented in 2011, allows teams to give their young star a longer contract (Gozlan, 2022). Arguably, these changes may somewhat alter the situation. So it is necessary to conduct more recent research to avoid anachronism.

Another important factor that should not be ignored is that over the past decades, the NBA has modified the rules of basketball games, resulting in a drastic change in game styles. For example, in the 2004-05 season, the NBA implemented the hand check rule, which marked the start of a new era (Fujita, 2022). This rule limits the defensive intensity and gives perimeter players a better environment to play. It took the NBA teams about ten years to gradually realize and adapt how to take advantage of this rule. Consequently, in the past ten years, NBA teams shoot more three-pointers. In other words, teams emphasize efficiency more, because shooting threes has higher expected points scored than shooting a mid-range two. For example, a player who made two out of six threes and a player who made three out of six mid-range twos both score six points, but the former has a 33% three-point percentage while the latter has a 50% two-point percentage. A 33% three-point percentage is more achievable than a 50% two-point percentage, so theoretically shooting more threes is more efficient. Therefore, research should focus on performance measures relevant to current games, which are distinct from decades ago.

# 3 Background, Data, and Methods

## 3.1 Institutional Background

### 3.1.1 Contracts

The contracts that NBA players sign with their teams strictly follow the rules described in the collective bargaining agreement (CBA)(Freedman, 2019). First of all, there are multiple types of contracts. Uniform Player Contract (UPC) is the most basic and thus the most common NBA contract (Dixon, 2021). A UPC is essentially a blank canvas from where a team and a player can work as they add whatever provisions they can agree to. Max contracts are available only for NBA players with longer careers, which is a type of UPC that allows for higher salaries. The Supermax is offered to players who have played at least seven seasons and are resigning contracts with the team they played for on their rookie deal. Rookie Scale Contract is the initial agreement between a team and their first-round draft pick. These contracts always feature two guaranteed seasons with a team option for the third and fourth years. Designated Veteran Player Contract becomes available for any player in free agency with eight to nine years of NBA experience. All of these are legitimate NBA contracts with differences in length or value. Note that this paper is only concerned about if players successfully obtain new contracts, so it does not distinguish different types of contracts.

Another important distinction among contracts is whether or not it is guaranteed. A fully guaranteed contract means that the NBA team is obligated to pay the player a predetermined amount regardless of their performance or injury status(White, 2023). In addition, teams are barred from reducing or terminating the contract without cause. From the beginning of each season until a specified date in early January, each team may have one or two players whose contracts are not guaranteed. Those players typically perform not well enough in the preceding season, so teams are not sure if they want to keep them. By that specified date in early January, non-guaranteed contracts have to be either waived or turned fully guaranteed. Thus, the contracts included in the sample are assumed all guaranteed, because non-guaranteed contracts are either temporary or they do not give players a sense of security to slack off.

Furthermore, some contracts have either a player option or a team option. With the player option, a player can decide whether to stay another year with their team or become an unrestricted free agent (Lockhart, 2021). With the team option, the decision is made by the team. Typically, if a player has the player option and plays well, he will not execute the option if hopes of signing a new contract with the team; if a player is not confident to get a renewal, he will execute the option to secure the salary of next year. Since the contract data in the data set only have information about the total length but do not specify the options, for simplicity, contract lengths are calculated based on the assumption that the option is executed.

According to the current salary rules, the maximum length of a contract is five years, but most of the players are not eligible to sign such long contracts. Many players sign contracts about every two to four years. Thus, when investigating the contract-related effects, each year falls into one of three categories: contract years, post-contract years, and regular years.

A contract year is the last year of each contract. Usually, in these years, players are worried about getting a new contract to continue their careers, which agrees with the idea that career concerns – concerns about the effects of current performance on future compensation – can have important effects on performance even in the presence of contracts

(Gibbons and Murphy, 1992). In cases where players are said to have the contract year phenomenon, this is when they perform at a higher level.

A post-contract year is the first year immediately after signing a new contract. If a player signed a multi-year contract, at this point, he would not have career concerns until his next contract year, so the level of performance or effort may decline. However, if a player signed a one-year contract, then this year is both his post-contract year and contract year. In this case, career concerns still exist, so the performance level and effort level are not expected to drop, which is why one-year contracts are not included in the data set as described before.

Regular years are neither contract years nor post-contract years. The performance level and effort level during these years are the baseline to which contract years and post-contract years are compared.

### 3.1.2 Performance vs. Effort

Before getting to all the details about performance data and effort data, it is necessary to make the distinction between the two terms. At first glance, it might be confusing because performance and effort seem interchangeable, but at least in the context of basketball, they are not equivalent. The performance level is objective. It simply tells how many points a player scored, or what his field goal percentage is, but it does not reflect how hard a player is playing because playing well does not necessarily mean playing hard. Effort level, on the other hand, is more subjective. It reflects the hustle of players, usually something hard to notice such as ball deflections and charges drawn. For example, a player who is very eager to sign a new contract is playing very hard on the court. When he gets an opportunity to take a shot, despite trying his best to shoot, he is still likely to miss, so his field goal percentage cannot capture his effort. But if he tries very hard on defense, and is willing to sacrifice his body to draw offensive fouls on his opponent, he is likely to succeed and his effort will be captured in charges drawn.

One may argue that if he plays hard, he will score more. That is not always the case because all NBA players are talented, and it is impossible for everyone to score a lot. So many players have to find other ways to contribute, which may not be recorded by performance data.

For a long time, those contributions are not included in any traditional statistics. Fortunately, NBA has started to track hustle data since the 2015-16 season to give people a better understanding of what happened on the court and let general managers know the players in more comprehensive ways. Therefore, this research takes advantage of hustle data and will take both traditional and hustle statistics into account to investigate the contractual incentive effect on NBA players using a data set from 2011 to 2022 with hustle data from 2016 to 2022.

### 3.1.3 Performance Statistics

This paper considers nine performance statistics: points, rebounds, assists, steals, blocks, personal fouls, turnovers, effective field goal percentage, and true shooting percentage. The first five statistics have positive influences on the games; personal fouls and turnovers have negative influences on the games; effective field goal percentage and true shooting percentage capture the shooting skills.

In the game of basketball, the result is determined by points scored. So when evaluating the performance of players, points scored is the most straightforward and most important statistic. Also, many awards, such as the Most Valuable Player or the All-NBA Teams, are largely based on average points per game, and sometimes awards are needed to meet certain criteria to increase the value of the contracts, so average points is also what players care about the most. Rebounds and steals are also traditional statistics. Every rebound or steal secures a new possession for the team, so the team can potentially score more. But with another possession, the team is not necessarily able to score, and these two statistics do not contribute to the total points directly, so they are less important than average points. Assist is a statistic that tracks how many times a player helps other teammates to score, so it contributes to the total points but is less important than points because he is not the one who scored. Block is the most direct defense statistic, but it also has certain limitations such as it does not assure another possession, so it is also less important. Turnovers and personal fouls will both result in losing the possession, so they are major data to capture negative contributions on the court.

To understand shooting efficiency, Field Goal Percentage is the most fundamental statistic. It is simple to calculate it: the number of field goals made divided by the number of field goal attempts. Prior to 1979, Field goal percentage made complete sense since there was no three-point line and every field goal was worth two points(Jacobs, 2017). However, it is more complicated with the introduction of the three-point line. Suppose Player A made three out of six two-point shots and scored six points, whereas Player B made two out of six three-point shots and also scored six points. The field goal percentages of Player A and Player B are 50% and 33%, respectively, but they both scored six points.

Thus, Effective Field Goal Percentage ($eFG\%$) was introduced to capture three-point shots. It is calculated by

$$eFG\% = \frac{FGM + 0.5 * 3PM}{FGA} \tag{1}$$

where $FGM$ denotes field goal made, $3PM$ denotes three-point made, and $FGA$ denotes field goal attempts. This means the number of field goals made is weighted by 1.5 if it is a three-point attempt, so effective field goal percentage captures scoring efficiency per field goal attempt in an unbiased manner in comparison to field goal percentage.

True Shooting Percentage ($TS\%$) attempts to take this idea a step further by capturing the effect of shooting free throws. It is calculated as

$$TS\% = \frac{PTS}{2 * (FGA + 0.44FTA)} \tag{2}$$

where $PTS$ denotes points and $FTA$ denotes free throw attempts. The factor 0.44 is merely the estimated percentage of free throws that terminate a possession(Jacobs, 2017). Thus, free throws are taken into account and the true shooting percentage reflects "points per shooting possession".

Rather than using the traditional field goal percentage, this paper uses effective field goal percentage and true shooting percentage to measure shooting efficiency.

#### 3.1.4 Effort Statistics

Effort level is slightly different from performance level since it is more subjective. Performance level depends on so many factors, many of which are not under the player's control. For example, a player's performance level depends on his role on the team, the structure of the team, the skill sets of his teammates, the overall health of the team, and sometimes even his relationship with the coach. Effort level, on the other hand, solely depends on how hard players are willing to compete. Thus, I incorporate effort into the analyses to have a more comprehensive understanding of the contract-year effect.

The NBA officially started to track "hustle data" since the 2015-16 season, which is a great reflection of effort. Those statistics, such as screen assists, deflections, loose balls recovered, and charges drawn, are details that are rarely noticed during the game. With those statistics, we can capture more indiscernible contributions that players make. Screen assist is the number of times an offensive player sets a screen for a teammate that directly leads to a made field goal by that teammate (NBA.com, 2022). Deflection refers to a defender deflecting the ball when the other team is passing the ball, but the other team does not lose the possession. Since it does not help the team to acquire the possession, it differs from a steal. But it can greatly disrupt the other team, increasing the chance of a successful defense. Loose balls recovered is the number of times a player gains sole possession of a live ball that is not in the control of either team (NBA.com, 2022). Charges drawn is when a defender stands in front of an offensive player and causes the offensive player to commit an offensive foul, resulting in a change in possession.

All of these "dirty works" require more physicality. They are not captured by any traditional statistics, but they are all very helpful to the team and increase morale. Since the hustle data are relatively new, the investigation on effort level, an integral part of this paper, is primarily how this paper extends this field of study.

## 3.2 Primary Hypothesis

The primary hypothesis of this study is that there will be a difference in player performance and effort across regular years, contract years, and post-contract years. Specifically, it is hypothesized that players will perform better and put more effort in their contract years, given the career concerns present, than in their regular years. Conversely, it is hypothesized that players will perform worse and put less effort in their post-contract years, after the career concerns have been removed, than in their regular years.

### 3.3 Data

The data set of this research consists of three main parts: contract data, performance data, and effort data. The contract data is collected from Spotrac.com (2022). It contains all the contracts signed by NBA players from 2012 to 2021, including which year the contract was signed, the age of the player when signing the contract, and the length of the contract. The performance data is collected from NBA.com (2022). It contains all the traditional statistics from 2011 to 2022, including games played, points, field goal percentage, three-point percentage, free-throw percentage, rebounds, assists, steals, blocks, turnovers, etc. The effort data is collected from NBA.com (2022), which is a separate category called "hustle data" collected since the 2016-17 season. The data set therefore only includes those hustle data from 2016 to 2022 and includes screen assists, deflections, loose balls recovered, and charges drawn. In addition, both performance and effort data are converted to the per-36-minute scale, because the average time played per game will strongly affect players' statistics, and this influence can be eliminated using per-36-minute instead of per game. Lastly, only the data from regular season games are included.

The three types of data are combined into a single panel with observations for each player year. Over the period of 2011 to 2022, a player will have his contract data in his contract years, performance data in every year he played, and hustle data in every year he played after 2016. Then, effective field goal percentage and true shooting percentage were calculated using the formula described before, and the summary statistics of performance data and effort data are shown in Table 1 and Table 2, respectively. The number of observations for effective field goal percentage and true shooting percentage being slightly smaller is the result of missing variables needed in the calculations.

Table 1: Summary Statistics for Performance Data

| | No. Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| $PTS$ | 5625 | 13.995 | 5.947 | 0 | 209.0 |
| $REB$ | 5625 | 6.549 | 3.576 | 0 | 92.3 |
| $AST$ | 5625 | 3.056 | 2.108 | 0 | 18.1 |
| $STL$ | 5625 | 1.134 | 0.780 | 0 | 18.6 |
| $BLK$ | 5625 | 0.736 | 0.776 | 0 | 13.4 |
| $TOV$ | 5625 | 1.980 | 1.141 | 0 | 28.5 |
| $PF$ | 5625 | 3.339 | 1.579 | 0 | 35.7 |
| $eFG\%$ | 5598 | 0.493 | 0.107 | 0 | 1.5 |
| $TS\%$ | 5599 | 0.525 | 0.103 | 0 | 1.5 |

Source: NBA.com/stats/players/traditional

Notes: Summary statistics for performance variables include observations for 11 seasons from 2011 to 2021 for players that have signed multi-year contracts. Traditional (first seven) statistics are per-36-min values for a season. Composite shooting efficiency statistics, effective field goal percentage and true shooting percentage, are for the season. Season refers to regular seasons in which every player is eligible to play.

Table 2: Summary Statistics for Effort Data

| | No. Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| $SAST$ | 3230 | 1.474 | 1.955 | 0 | 24.0 |
| $DEF$ | 3230 | 2.144 | 1.728 | 0 | 72.0 |
| $LBS$ | 3230 | 1.041 | 0.699 | 0 | 18.0 |
| $CD$ | 3230 | 0.088 | 0.267 | 0 | 12.0 |

Source: NBA.com/stats/players/hustle

Notes: Summary statistics for effort variables include observations for 6 seasons from 2016 to 2021 for players that have signed multi-year contracts. All statistics are per-36-min values for a season. Season refers to regular seasons in which every player is eligible to play.

The contract data, as shown in Table 3, is primarily used to determine contract years and post-contract years. Contract Year and Post-Contract Year are two dummy variables to indicate if the player is in his contract years or post-contract years. Moreover, the data set also contains other helpful information. The Signing Age and Tenure show the maturity of the players. The length of the contract has the minimum value of 2 because all the one-year contracts are excluded from the sample as stated before. Renewed is a dummy variable to indicate if the player gets a new contract, which is helpful when performing probit regressions that will be discussed later. The specific values of the contracts are not considered in this study. The number of observations for the first four variables is the same because they are directly collected from Spotrac.com (2022) and all 1710 observations have these four variables. However, players in this data set do not sign contracts every year. For example, a player who has played for 10 years may have signed 3 contracts, so the contract observations are considerably smaller. Some players have too many missing variables that prevent me from determining their contract year, so the number of observations for $Contract\ Year$ is smaller than that of $Post-Contract\ Year$ and $Tenure$. For each contract year, the dummy variable $Renewed$ is created, so $Contract\ Year$ and $Renewed$ have the same number of observations.

Table 3: Summary Statistics for Contract Data

| | No. Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Signing Age | 1710 | 24.644 | 4.388 | 18 | 46 |
| Start Year | 1710 | 2016.191 | 2.831 | 2012 | 2021 |
| Length | 1710 | 2.981 | 0.939 | 2 | 5 |
| End Year | 1710 | 2019.172 | 3.072 | 2014 | 2026 |
| Contract Year | 5195 | 0.370 | 0.483 | 0 | 1 |
| Post-Contract Year | 5812 | 0.294 | 0.456 | 0 | 1 |
| Renewed | 5195 | 0.189 | 0.392 | 0 | 1 |
| Tenure | 5812 | 3.554 | 2.537 | 1 | 11 |

Source: Spotrac.com/nba/contracts

Notes: Summary statistics for contract information include observations for 10 seasons from 2012 to 2021 for all individuals that signed a multi-year contract. Data include the age of the player when signing the contract (Signing Age), the year the contract started (Start Year), the length of the contract (Length), and the last year under contract (End Year).

## 3.4 Methodology

The primary hypothesis is that performance level and effort level will increase in contract years compared to the regular years, and decrease in post-contract years.

### 3.4.1 Designed Performance and Effort Metrics

To summarize the performance level of player $i$ with a single-dimensional index, the following formula is designed:

$$
\begin{aligned}
P_i^{designed} = {} & PTS_i + 0.87 * REB_i + 2.5 * AST_i + 0.87 * STL_i \\
& + 0.43 * BLK_i - 0.87 * TOV_i - 0.43 * PF_i + 100 * eFG\%_i + 100 * TS\%_i \quad (3)
\end{aligned}
$$

where $PTS$ denotes points, $REB$ denotes rebounds, $AST$ denotes assists, $STL$ denotes steals, $BLK$ denotes blocks, $TOV$ denotes turnovers, $PF$ denotes personal fouls, $eFG\%$ denotes field goal percentage, and $TS\%$ denotes true shooting percentage. All those data except the two percentages are in the per-36-min scale.

Points, as the most important data that determines the result of the game of basketball, has a weight of 1. Rebounds and steals, both give the team another possession, have a weight of 0.87 because the average point scored in each possession of all NBA teams over the past ten years is 0.87 point, so one possession can be approximated as 0.87 point (BasketballReference, 2022). Assists could result in either a two-point shot or a three-point shot, so 2.5 is used as its weight since it is the average of 2 and 3. Block can prevent the opponent from scoring, but it does not necessarily give the team another possession, so half of 0.87, which is 0.43, is assigned as the weight of blocks. Turnovers will result in a loss of one possession, so its weight is $-0.87$. Personal fouls will interrupt the game, but do not necessarily give possession to the opponent, so its weight is $-0.43$. Effective field goal percentage and true shooting percentage are multiplied by 100 to convert from percentages to numbers.

Similarly, to quantify the effort level of player $i$, the following formula is designed:

$$E_i^{designed} = 2.5 * SAST_i + 0.43 * DEF_i + 0.87 * LBR_i + 0.87 * CD_i \tag{4}$$

where $SAST$ denotes screen assists, $DEF$ denotes deflections, $LBR$ denotes loose balls recovered, and $CD$ denotes charges drawn. All of these statistics are in the per-36-min scale.

Screen assists, following the same logic as assists, is assigned a weight of 2.5. Ball deflections can interrupt the game but do not give the team another possession, so its coefficient is 0.43. Loose balls recovered and charges drawn will both bring the team another possession, so they both have 0.87 as their weights.

With these metrics, it is more straightforward to interpret the overall performance level and effort level in quantitative ways.

### 3.4.2 Probit Regressions and Probit Metrics

Generally speaking, everything in clutch time is more important. For example, if a player only scored a lot in the clutch time, people would perceive him as a good player, but he might not have very outstanding per-36-min points scored. Similarly, players who did not score for almost the entire game but were on fire during garbage time would have decent per-36-min points scored, but his actual performance is awful.

In addition, when providing new contracts to players, general managers may value performance differently. Based on the team's specific needs, some general managers might look for shooters while others might look for elite defenders. Also, championship contenders tend to sign players in their prime years to boost the team right away, whereas reconstructing teams prefer young players with great potential. Therefore, to get new contracts, just having great per-36-min data is not enough, so the performance and effort metrics defined above will have limitations that make them inconsistent with reality.

To address this discrepancy, probit regressions are conducted to determine the weight of each statistic in general managers' minds. The dependent variable is a dummy variable called *Renewed* that is equal to 1 if a player gets a new contract after a contract year and equals 0 otherwise. If 2021 is the contract year, *Renewed* will be a missing value because the data set does not have any information about 2022, so it is unknown if the contract was renewed. The independent variables are the same statistics included in the designed metrics. Thus, the probit regression model for the performance level is

$$\begin{aligned} Renewed^P = & \, w_1 PTS + w_2 REB + w_3 AST \\ & + w_4 STL + w_5 BLK + w_6 TOV + w_7 PF + w_8 eFG\% + w_9 TS\% \end{aligned} \quad (5)$$

and the probit regression model for the effort level is

$$Renewed^E = w_1 SAST + w_2 DEF + w_3 LBR + w_4 CD \quad (6)$$

where all the statistics are denoted the same as before and $w_i$ are the weights assigned to each statistic.

Table 4 shows the results of probit regression models for the performance level. The first column displays the weights of different statistics related to the renewal of player contracts. After dropping the statistics with significance level less than 90%, the probit regression was applied again, and the results are shown in the second column. This time, all the remaining

Table 4: Probit Regression Results of Performance

| | (1) | (2) |
|---|---|---|
| $PTS$ | 0.0429** | 0.0434*** |
| | (0.0178) | (0.0154) |
| $REB$ | 0.0322** | 0.0359*** |
| | (0.0135) | (0.0129) |
| $AST$ | 0.0283 | |
| | (0.0239) | |
| $STL$ | 0.1594*** | 0.1662*** |
| | (0.0569) | (0.0525) |
| $BLK$ | 0.0736 | |
| | (0.0749) | |
| $TOV$ | -0.0243 | |
| | (0.0384) | |
| $PF$ | -0.1473*** | -0.1495*** |
| | (0.0404) | (0.0333) |
| $TS\%$ | 1.9878* | 2.3078*** |
| | (1.0978) | (0.5842) |
| $eFG\%$ | 0.2320 | |
| | (0.8886) | |
| Constant | -1.5732*** | -1.5676*** |
| | (0.3933) | (0.3401) |
| / | | |
| lnsig2u | -14.1104 | -14.0943 |
| | (527775.1217) | (411818.1777) |
| Observations | 1764 | 1764 |

Notes: Results are from least squares regressions. Contract information and traditional data are collected from Spotrac.com and NBA.com, respectively. Standard errors are in parentheses. $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.

statistics have a significance level greater than 99%, and their signs are consistent with their counterparts in the designed metric. Then, these statistics, along with their weights, formulate the probit metric of the performance level:

$$P_i^{probit} = 0.0434 * PTS_i + 0.0359 * REB_i + 0.1662 * STL_i - 0.1495 * PF_i + 2.3078 * TS\%_i$$

To make it comparable to Equation 3 and easy to interpret, I normalize the weights so $PTS$ has the weight of 1 by dividing the entire equation by 0.0434:

$$P_i^{probit} = PTS_i + 0.8272 * REB_i + 3.8295 * STL_i - 3.4447 * PF_i + 53.1751 * TS\%_i \quad (7)$$

Table 5 shows the results of probit regression models for effort level. Similarly, the first column shows the weights of all statistics, and the second column only shows the ones with significance levels greater than 90%, which is only deflections. Thus, the probit metric of the effort level is obtained:

$$E_i^{probit} = 0.1224 * DEF_i$$

Similarly, to make it comparable to Equation 4 and easy to interpret, I normalize the weight so $DEF$ still has the weight of 0.43:

$$E_i^{probit} = 0.43 * DEF_i \quad (8)$$

Table 5: Probit Regression Results of Effort

| | (1) | (2) |
|---|---|---|
| $SAST$ | -0.0055 | |
| | (0.0275) | |
| $DEF$ | 0.1237** | 0.1224** |
| | (0.0493) | (0.0487) |
| $LBR$ | -0.0137 | |
| | (0.0481) | |
| $CD$ | -0.2058 | |
| | (0.3161) | |
| Constant | -0.3998*** | -0.4382*** |
| | (0.1452) | (0.1253) |
| / | | |
| lnsig2u | -0.4053 | -0.4032 |
| | (0.4453) | (0.4448) |
| Observations | 885 | 885 |

Notes: Results are from least squares regressions. Contract information and hustle data are collected from Spotrac.com and NBA.com, respectively. Standard errors in parentheses. $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.

Table 6: Summary Statistics for Performance and Effort Metrics

| | No. Observations | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| $P^{designed}$ | 5598 | 127.333 | 25.498 | -14.300 | 508.928 |
| $P^{probit}$ | 5599 | 40.211 | 11.877 | -43.059 | 288.724 |
| $E^{designed}$ | 3230 | 5.589 | 4.933 | 0.000 | 65.160 |
| $E^{probit}$ | 3230 | 0.922 | 0.743 | 0.000 | 30.960 |

Table 6 summarizes basic statistics for $P^{designed}$, $P^{probit}$, $E^{designed}$, and $E^{probit}$. The number of observations for $P^{designed}$ is smaller than that of $P^{probit}$ by 1 due to missing data. $E^{designed}$ and $E^{probit}$, on the other hand, are calculated based on hustle data, which are available only after 2016, so they have fewer observations. Moreover, since the coefficients of variables in the two effort metrics are all positive, $E^{designed}$ and $E^{probit}$ cannot be negative, so the minimum value is 0.000 for both of them.

### 3.4.3 Performance Level and Contract Status

When analyzing the relationship between performance level and contract status, two separate regression models are conducted. Both regressions have the performance level as the dependent variable. One uses the designed performance metric to calculate performance level:

$$P^{designed} = \beta_{CON} CON + \beta_{POST} POST + \alpha_y + \alpha_t + \alpha_i + \epsilon \tag{9}$$

while the other one uses the probit metric:

$$P^{probit} = \beta_{CON} CON + \beta_{POST} POST + \alpha_y + \alpha_t + \alpha_i + \epsilon \tag{10}$$

where $CON$ is a dummy variable set equal to 1 in the contract year and 0 otherwise and $POST$ is a dummy variable set equal to 1 in the post-contract year and 0 otherwise. Dummy variables for year ($\alpha_y$), tenure ($\alpha_t$), and each individual player ($\alpha_i$) control for features related to them.

$\beta_{CON}$ and $\beta_{POST}$ are the coefficients of interest and measure the conditional impact of contract status on players' performance. If the contract year phenomenon exists, players would have fluctuations in their performance level, and $\beta_{CON}$ would be positive, and $\beta_{POST}$ would be negative.

#### 3.4.4 Effort Level and Contract Status

Similarly, when estimating the contractual incentive effect on players' effort level, both the designed metric and probit metric are treated as dependent variables. So the following two regression models are estimated:

$$E^{designed} = \beta_{CON}CON + \beta_{POST}POST + \alpha_y + \alpha_t + \alpha_i + \epsilon \tag{11}$$

$$E^{probit} = \beta_{CON}CON + \beta_{POST}POST + \alpha_y + \alpha_t + \alpha_i + \epsilon \tag{12}$$

where all the variables are defined in the same way as in the performance regressions. If there is indeed a change in effort level due to contract renewal, $\beta_{CON}$ would again be positive, and $\beta_{POST}$ would be negative.

# 4 Empirical Results and Analyses

This section is organized into four primary parts. First, the empirical results of the correlation between performance level and contract status are shown and interpreted. Next, the same procedure is applied to the relationship between effort level and contract status. Then, I analyze the results and draw implications. Finally, some limitations of this study are discussed in detail.

## 4.1 Level of Performance

The results of regression models described in equation (9) and equation (10) are shown in columns (1) and (2), respectively, of Table 7 below. I also regressed only on points and the results are presented in column (3). Then I repeat all three regressions without the tenure fix effect, and the results are shown in columns (4), (5), and (6).

Table 7: Performance Level and Contract Status

| | (1) $P^{designed}$ | (2) $P^{probit}$ | (3) $PTS$ | (4) $P^{designed}$ | (5) $P^{probit}$ | (6) $PTS$ |
|---|---|---|---|---|---|---|
| $CON$ | -2.8996*** | -1.3394*** | -0.4850*** | -2.2937*** | -0.9448*** | -0.3484** |
| | (0.6815) | (0.3113) | (0.1588) | (0.6710) | (0.3079) | (0.1564) |
| $POST$ | -1.0485 | -0.7113** | -0.3016* | -1.4174** | -0.9267*** | -0.3091* |
| | (0.7813) | (0.3569) | (0.1823) | (0.7032) | (0.3227) | (0.1641) |
| Constant | 125.8485*** | 40.8889*** | 14.2379*** | 125.1859*** | 40.4658*** | 13.9734*** |
| | (1.1250) | (0.5138) | (0.2628) | (1.0090) | (0.4630) | (0.2355) |
| Observations | 5002 | 5002 | 5020 | 5002 | 5002 | 5020 |

Notes: Results are from least squares regressions with year, and individual player dummy variables. Columns (1), (2), and (3) also have the tenure dummy variable. Standard errors are in parentheses. $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.

First, in columns (1) and (2), $\beta_{CON}$ is negative and statistically significant for both performance metrics. This means that both metrics suggest a decline in players' performance during their contract years at 99% significance level. In column (3), $\beta_{CON}$ is also negative but smaller in magnitude compared to the composite metrics. This is because column(3) only captures the change in points but ignores other variables. If the tenure fix effect is removed, as shown in columns (4), (5), and (6), the results are consistent but slightly smaller in magnitudes. This contradicts the impressions of the general public and the hypothesis of this study.

Additionally, the absolute values of the coefficient in column (1) are larger than those of the coefficient in column (2). So, does the designed metric suggest a larger decrease than the probit metric does? Not necessarily. The constant term in column (1), 125.8485, is considerably larger than the constant term in column (2), 40.8889, which means in regular years, the designed metric summarizes the performance with a larger value. The number is "inflated" under the designed metric. In fact, the summary statistics for the two performance metrics, shown in Table 6, demonstrate this in a more straightforward way. The standard deviation of the designed metric is 25.498, and that of probit metrics is 11.877. Thus, the designed metric is more volatile and larger in magnitude. So, if the coefficients are converted in terms of standard deviation, the two metrics imply that the declines in performance, $\Delta P$, are, respectively,

$$\Delta P^{designed} = \frac{2.8996}{25.4985} \approx 0.1137 \text{ SD and } \Delta P^{probit} = \frac{1.3394}{11.877} \approx 0.1128 \text{ SD.}$$

Thus, both metrics exhibit that the performance level decreases by approximately 0.1 standard deviation during contract years.

In the context of basketball, $P^{designed}$ and $P^{probit}$ suggest that the average points scored per 36 minutes decreases by approximately 2.9 points and 1.3 points, respectively, with tenure fix effect. How important is that? According to NBA.com (2022), in the 2011-12 season, the highest points scored per 36 minutes by a team is 77.3 points, and the lowest is 65 points. In the 2020-2021 season, with the changes in game styles, the two data become 89.8 and 77.2, respectively. Thus, the decrease in performance is not only significant in statistics but also significant in basketball games.

Moreover, in columns (1) and (2), both coefficients of dummy variable $POST$ are also negative, which means that there is a decline in performance during post-contract years agreed by the two metrics. This is more intuitive and correspondent to the hypothesis of this study. However, the two metrics are inconsistent at the significance level. The probit metric determines that the negative coefficient has a significance level of 95%, while the designed metric gives the negative coefficient with a significance level lower than 90%. If the tenure fix effect is removed, as shown in columns (4) and (5), the results are more statistically significant. However, since tenure is an indispensable factor when analyzing the performance of NBA players, it is more reasonable to take it into account. Thus, I prefer the results with the tenure fix effect. This means that the argument of players having worse performance in post-contract years is not as strong as the interpretation regarding contract years.

## 4.2 Level of Effort

The results of regression models described in equation (11) and equation (12) are shown in columns (1) and (2), respectively, of Table 8 below. I repeat the two models without the tenure fix effect, and the results are shown in columns (3) and (4), respectively.

Table 8: Effort Level and Contract Status

| | (1) $E^{designed}$ | (2) $E^{probit}$ | (3) $E^{designed}$ | (4) $E^{probit}$ |
|---|---|---|---|---|
| $CON$ | -0.2325** | 0.0068 | -0.2114* | 0.0083 |
| | (0.1138) | (0.0165) | (0.1102) | (0.0159) |
| $POST$ | 0.0170 | 0.0187 | -0.0169 | 0.0079 |
| | (0.1242) | (0.0180) | (0.1101) | (0.0159) |
| Constant | 5.2562*** | 0.9543*** | 5.5104*** | 0.9839*** |
| | (0.1636) | (0.0237) | (0.1157) | (0.0167) |
| Observations | 2625 | 2625 | 2625 | 2625 |

Notes: Results are from least squares regressions with year, and individual player dummy variables. Columns (1), (2), and (3) also have the tenure dummy variable. Standard errors are in parentheses. $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.

$\beta_{CON}$ is negative under the designed metric and positive under the probit metric, regardless of the imposition of the tenure fix effect. However, the negative coefficient has the 95% (or 90% without tenure fix effect) significance level while the positive coefficient has a significant level lower than 90%. If the negative coefficient, $-0.2325$, is interpreted in terms of standard deviation based on Table 6, the decrease in effort level in contract years compared to regular years is

$$\Delta E^{designed} = \frac{0.2325}{4.933} \approx 0.047 \text{ SD} \tag{13}$$

Overall, this is hardly convincing to conclude that players have any changes in effort during contract years.

In addition, $\beta_{POST}$ is positive under both metrics yet the significance level did not exceed 90% with tenure fix effect, as shown in column (1) and (2). Without the tenure fix effect, $\beta_{POST}$ is negative in column (3) and positive in column (4), but again both values have the significance level less than 90%. This means that based on the data set, players have no significant change in effort during post-contract years either.

## 4.3 Analysis

Combining the results of the contract year dummy and post-contract year dummy, this study concludes that players tend to perform at a significantly lower level during their contract years and have another diminish in performance to a less severe extent in post-contract years and that no significant change in effort level is observed during any year. Thus, the so-called contract year phenomenon is unfounded, which leaves a puzzle to future researchers.

This conclusion is counter-intuitive, and there are several reasons that can possibly explain this surprising result. The most important one is that the NBA, representing the world's highest level of basketball, is extremely competitive. There are 30 teams in the NBA and each team has 15 players, so with the oversimplified calculation, there are approximately 450 NBA players each year. As a comparison, the International Basketball Federation (FIBA) states that at least 450 million people worldwide are playing basketball today (Brian, 2020). This indicates that only one out of a million basketball players can enter the league. In fact, because of injuries, new talent, or disappointing performance, the average NBA career lasts only 4.5 years, which is barely longer than the rookie contract which is typically four-year. Thus, every year, there are numerous players lost their jobs and quietly disappeared from the league. Even though this happens to the majority of the players, people would not even know about it. However, if examining a sample that incorporates most players, the competitiveness of the professional sports league will be manifested.

The interpretation of effort level is less detectable and could have multiple understandings. One explanation would be that just fighting for the opportunity to play in NBA requires players to put in all their effort. Usually, each team has nine to eleven players in their rotations, meaning that one-third of the players do not always have the opportunity to play on the court. The competition is not only between teams but also between teammates. Everyone trains hard and plays hard in order to win the trust of the coach and acquire steady roles. Every time they stand on the court, it is a precious opportunity, so players would cherish these valuable minutes by doing their best. Despite there being differences in ability, the attitude is universal.

Another explanation is that successful athletes always have the mentality to do their best. Every individual in this league is an elite player. They were the young stars of their teams throughout their lives. It is demanding to achieve this, and as players who have gone through all the endeavors, they would never shirk from putting in all their effort.

It could also be explained by the derivation of effort metrics. The effort is inherently difficult to quantify. With the hustle data, I managed to find one way to calculate it, but that might not have been a good approach. Hopefully, future researchers can formulate more comprehensive models to clarify this topic.

## 4.4 Limitations

It is noteworthy that this study draws conclusions based on the data set that includes all players regardless of their fame and ability. In reality, frankly speaking, general managers, fans, and media may only pay attention to the major players and wonder if the contract year phenomenon is true to them, and if the data set only focuses on players who meet certain criteria, the conclusion may vary. One major difference between great players and marginal players is that general managers have more patience than the former. Even if they performed not as well, they are allowed more chances to adjust and bounce back. If the marginal players are in this situation, they would have no opportunity to save their careers. Also, great players typically sign larger contracts and are more influential to the team, so teams should be more cautious about the contractual incentive effects when providing new contracts to those players. After all, players who signed minimum contracts are not that impactful.

Another crucial factor that general managers should be aware of is age. On one hand, young players (aged between 18 to 25) are adapting and learning. If they did play well in contract years, it is likely the result of actual improvement instead of contract-related incentive effects. In this case, general managers can expect them to maintain their performance level in the following seasons. On the other hand, for veteran players, their athleticism is declining, and they tend to perform poorly after signing another contract. Although this study applied the tenure fix effect, age is still a variable that general managers have to consider accordingly. Back to the example of Draymond Green at the beginning of this paper. Although he seemed to perform well only in his contract year during the 2019-20 season when he was 30, he also averaged the highest score of his career in his post-contract year in the 2015-16 season when he was 25, after signing a five-year contract with Warriors.

In addition, players could contribute on the court in various ways. Although Draymond Green did not score many points, as the former Defensive Player of the Year, he has always been the best defender of his team. His performance on the defensive end of the court has been consistent and incredible. Even though the probit metric values points more than rebounds, when it comes to the case of specific players, general managers may value rebounds over points, depending on the skill sets of the players and the needs of the team. Nowadays, there are abundant statistics to capture all the details, and analysis should be performed comprehensively when evaluating the value of players.

In the future, this study can be improved in several ways. First, the effect of changing teams should be considered. If a player signs a new contract with another team or is traded during his contract, it is possible that his performance will fluctuate due to the difference in the environment on and off the court. The new coach might give him different tasks; new teammates might be good at different aspects; the new team might run a different system; fans in the new city might be less supportive. Everything could impact the performance of the player and results would be more accurate with this issue being addressed.

The position is another factor that can be included. Traditionally, there are five positions on the court: point guard, shooting guard, small forward, power forward, and center. Now, as the players are more skillful, the positions are less distinct and can be generally categorized into guard, forward, and center. For guards, points and assists may be the primary statistics. For forwards, shooting skills and defense are more important. For centers, rebounds and blocks are necessary. Thus, when signing new contracts, general managers may value the players differently depending on their positions. Further research could build upon my findings by investigating this underlying difference.

# 5 Conclusion

This study examines the contractual incentive effects, also known as the contract year phenomenon, on NBA players. Incentive effects are investigated in terms of both performance and effort. The data set constructed for this paper has three categories: contract, performance, and effort. Contract data, from 2012 to 2021, are collected from Spotrac.com (2022). Performance data, from 2011 to 2021, are collected from NBA.com (2022). Effort data, from 2016 to 2021, are collected from NBA.com (2022). Then, I formulated metrics to quantify performance and effort using points scored as a reference. The metrics are complemented with another way of measuring determined by probit regression models. Finally, with the tailored data set and metrics, this paper conducts empirical regression analyses to determine if there are statistically significant changes in performance and effort before and after signing a contract. Based on the probit metric, this study concludes that performance declines by 1.3 points in contract years and 0.7 points in post-contract years while effort is consistent.

Due to the salient modifications in salary rules and shifts in game styles, previous research related to this topic is outdated. More importantly, using the newly-invented hustle data that reflect the level of effort, this paper incorporates effort as an integral aspect of the methodology to capture more subjective information, expanding the field of study.

Nevertheless, despite the addition of dummy variables for years ($\alpha_y$), tenure ($\alpha_t$), and individual player ($\alpha_i$), this study considers all NBA players collectively and draws a general conclusion. It is possible that the situation will differ if the data set only contains famous players (e.g. Instagram followers exceed 100,000). Typically, these players sign larger contracts and play irreplaceable roles in their teams, so they will less likely to lose their jobs even if they slightly slack off. Future researchers could make this distinction and investigate deeper. Moreover, this paper does not include any variables for contract value, team, and position, and future studies could explore the impact of these factors.

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# Appendices

Table 9: Performance Level and Contract Status with Tenure Fix Effect Shown

| | (1) $P^{designed}$ | (2) $P^{probit}$ | (3) $PTS$ | (4) $P^{designed}$ | (5) $P^{probit}$ | (6) $PTS$ |
|---|---|---|---|---|---|---|
| $CON$ | -2.8996*** | -1.3394*** | -0.4850*** | -2.2937*** | -0.9448*** | -0.3484** |
| $POST$ | -1.0485 | -0.7113** | -0.3016* | -1.4174** | -0.9267*** | -0.3091* |
| Tenure=1 | 0.0000 | 0.0000 | 0.0000 | | | |
| Tenure=2 | 0.9428 | 0.5576 | 0.0561 | | | |
| Tenure=3 | 4.3399*** | 2.4800*** | 0.7773*** | | | |
| Tenure=4 | 5.9856*** | 3.8618*** | 1.4149*** | | | |
| Tenure=5 | 4.7385*** | 2.7612*** | 1.2700*** | | | |
| Tenure=6 | 3.9151** | 2.5702*** | 1.1212*** | | | |
| Tenure=7 | 0.4738 | 0.2224 | 0.5476 | | | |
| Tenure=8 | 1.7476 | 1.2242 | 0.5817 | | | |
| Tenure=9 | -0.1758 | -0.2231 | 0.2125 | | | |
| Constant | 125.8485*** | 40.8889*** | 14.2379*** | 125.1859*** | 40.4658*** | 13.9734*** |
| Observations | 5002 | 5002 | 5020 | 5002 | 5002 | 5020 |

Notes: $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.

Table 10: Effort Level and Contract Status with Tenure Fix Effect Shown

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | $E^{designed}$ | $E^{probit}$ | $E^{designed}$ | $E^{probit}$ |
| $CON$ | -0.2325** | 0.0068 | -0.2114* | 0.0083 |
| $POST$ | 0.0170 | 0.0187 | -0.0169 | 0.0079 |
| Tenure=1 | 0.0000 | 0.0000 | | |
| Tenure=2 | 0.1173 | 0.0273 | | |
| Tenure=3 | 0.4407** | 0.0353 | | |
| Tenure=4 | 0.4979** | 0.0461 | | |
| Tenure=5 | 0.6078*** | 0.0158 | | |
| Tenure=6 | 0.3390* | 0.0371 | | |
| Tenure=7 | 0.3992* | 0.0209 | | |
| Tenure=8 | 0.2236 | 0.0079 | | |
| Tenure=9 | -0.0988 | 0.0178 | | |
| Constant | 5.2562*** | 0.9543*** | 5.5104*** | 0.9839*** |
| Observations | 2625 | 2625 | 2625 | 2625 |

Notes: $*$, $**$, $***$ indicate statistical significance at the 90%, 95%, and 99% level, respectively.