Minimum Salaries, Employment Losses and Labor Unions:

The Case of Professional Football*

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I. Introduction

According to a recent survey published in the *Journal of Economic Perspectives,* the vast majority of graduate students in top economics programs (other than the University of Chicago) disagree with the statement that "a minimum wage increases unemployment among the young and unskilled." Although a number of studies have demonstrated that youth employment declines when the real minimum wage increases, public opinion may be influenced by the lack of empirical evidence linking minimum wage increases and widespread job destruction. Graduate student opinions may also be reinforced by empirical studies that sometimes find a positive correlation between state minimum wage increases and employment growth, and speculation that monopsony or labor market frictions could account for these positive correlations.

The most likely explanation for observed nonnegative correlations between minimum wage changes and employment growth is the endogeneity of changes in the minimum wage. Lawmakers are loath to increase the minimum wage when the labor market is sluggish. Business opposition to an increase in the minimum wage is weakest after the real minimum wage has eroded sufficiently, and labor demand is strong. In other words, we only observe increases in the minimum wage when it causes minimal job destruction. The difficult task of accurately measuring the effects of minimum wage changes, requires an empirical model linking labor market conditions to the political process determining minimum wage legislation. Although it would be instructive, in the interests of economic science, to randomly impose large minimum wage increases, it is unlikely that such harmful legislation would ever be observed in a democratic society. Thus most minimum wage studies speculate about the impact of nonrandom minimum wage changes that are binding for a few percent of the labor force.

In this paper, I look for the employment effects of minimum wages in an unlikely place – the National Football League (NFL). In contrast to the Federal minimum wage law, minimum salary requirements in the NFL are binding constraints for a substantial fraction of players, and minimum salaries vary substantially over time. Although it would be unwise to use the results in

this paper to ascertain the impact of minimum wages on the employment of low wage workers, the findings are nonetheless instructive. I find that the minimum salary provisions of the NFL's collectively bargained contract cause significant employment reductions, through substantially shorter careers, for players at the bottom of the skill distribution. These employment losses occur despite the fact that there is no capital/labor substitution in professional football, the total number of jobs on a football team is fixed, and employers have substantial monopsony power.

The data show that NFL players, who are not constrained by the minimum salary in their rookie year, have much longer careers than low salary rookie players for whom the minimum salary is binding. The estimated labor demand elasticities of -1.1 to -1.2 imply that, in the absence of the NFL's steeply rising minimum salaries, nearly 80 percent more low salary rookies would survive until at least a third season in the NFL. Put differently, the NFL's sharply increasing minimum salaries have cut short far more players' careers than knee injuries or concussions.

This study measures the elasticity of labor demand from collectively bargained changes in wages and salaries. Empirical studies that attempt to measure labor demand elasticities from union wage and employment bargains face a number of potential problems. First, union wages are endogenously determined. Bargained union wage changes must satisfy union leadership and survive management opposition in the same way that legislated changes in the minimum wage must gain political support from labor union lobbyists and survive political opposition from business lobbyists. Second, co-movements in union wages and employment may either be movements along a labor demand curve, or along a contract curve between management and the labor union. These co-movements can be viewed as movements along a labor demand curve if firms are free to choose employment levels conditional on the wage negotiated by the union. In contrast, if unions and employers agree to wages that are indexed to employment, observed co-variation in union wages and employment is likely to be along a contract curve.

The collectively bargained contract between the NFL and the NFL Players' Association, with its minimum salary requirements, is a textbook example of a wage-setting union that allows employers to make unilateral employment decisions. In addition, the contract mandates that total employment on the team is fixed, and each team's payroll must fall within a relatively narrow interval. As I have shown in an earlier paper, the salary cap, or ceiling on a team's payroll, leads to a substantial reduction in the pay of elite players. Union leadership faces a tradeoff between more lucrative contracts for elite players and shorter careers for low salary players, and lower pay for elite players and longer careers for low salary players. In this paper, I show that a sharp increase in the demand for the NFL's output caused the union to negotiate for a steep increase in minimum salaries, especially for players with several years experience in the NFL. A higher minimum salary for experienced players enables a transfer of rents to elite experienced players. First, a higher minimum salary directly improves the bargaining position of elite players by raising their threat points in a Nash bargaining framework. Second, a higher minimum salary for experienced players encourages management to substitute away from experienced players near the bottom of the skill distribution towards less expensive players with little or no experience. The cost savings obtained through this substitution of labor frees up "salary cap space", and allows management to allocate more of their payroll to elite players. The changes in the NFL labor contract that occurred during the late 1990's, as NFL revenues grew rapidly, increased the share of rents accruing to elite experienced players. The goal of this paper is to measure the amount of labor substitution induced by the NFL's minimum salary scale, and interpret the parameter estimates within the context of a Nash bargaining model.

II. The NFL Collective Bargaining Agreement

A. Contract Provisions

In 1993, the NFL and the NFL Players' Association entered into a collective bargaining agreement (CBA) that was amended in 1996 and 1998, and extended through the 2007 season. The CBA has allowed professional football to avoid the contentious labor/management disputes

and work stoppages that plagued professional baseball, basketball and hockey in the past fifteen years. A key requirement of the CBA is that a team's payroll must be at least 56% of the team's share of league revenues but cannot exceed the "salary cap", which is 64.75% of the team's share of league revenues from ticket sales and television contracts[1]. For example during the 2004 season, teams could spend no more than $80.58 million on salaries and bonuses[2]. The CBA also requires that each team employ no more than 53 players on their combined active and inactive rosters throughout a season, but must employ between 42 and 45 players on their active roster at all times throughout a season.

A key provision of the CBA, utilized throughout this paper, is a mandated minimum salary schedule that is indexed to a player's years of experience in the NFL. The minimum salary schedule is a binding constraint for a number of players entering the league; 24.2 percent of all rookie players, and 19.1 percent of second year players earned compensation that was within five percent of their respective minimum salaries. The league minimum salary schedule only applies to players on the active roster. Players on the inactive roster earn salaries below the league minimum, and players only accrue an additional year of NFL experience (as it pertains to the minimum salary schedule) if they spent the season on a team's active roster.

As in all professional sports leagues, NFL teams have monopsony power early in a player's career. Most players enter the league through the annual college draft, whose rules are described in the CBA. The draft assigns the exclusive negotiating rights of a college player to the NFL team that drafted the player. A team that drafts a player automatically tenders an offer to the player for a one-year contract at the minimum salary. A drafted player may accept this offer at any time up to the 10^{th} week of a 17 week season or negotiate with the team for a higher salary. If the player and team fail to reach an agreement by one month before the beginning of the season, the team may not trade the player to another team, and the player may only play with the team that drafted him that season. If the drafted player and team still have not agreed to a contract by the 10^{th} week of the season, the player is prohibited from playing in the NFL for the

remainder of the season. In the case of a lockout, the drafting team retains the sole negotiating rights with the player until next year's player draft. The player may then choose to enter the next year's draft and negotiate a contract with the new team that drafts him. Finally, if the team releases a drafted player before the season, he is free to sign a contract with another team.

Beginning in 1994, the draft consists of seven rounds, with each team in the league receiving an endowment of one selection per round. The draft order in each round is inversely related to teams' ranking by won-loss percentage in the previous season. After seven rounds of the draft have been completed, players remaining in the eligible draft pool are free to negotiate and sign contracts with any team as a "free agent". Shortly after the draft, teams' management and players' agents negotiate the terms of players' contracts for both drafted and undrafted players. Players selected early in the draft often agree to multi-year contracts with pay in excess of the minimum salary in each year. Players selected late in the draft, and those who sign contracts as undrafted free agents, typically sign contracts that are shorter in length, and earn compensation at or near the league minimum. For example, among players entering the league as undrafted free agents, 62.8 percent of rookie players, and 50.2 percent of second year players earned compensation within five percent of the league minimum. Although teams have no monopsony power over undrafted free agents (they are free to negotiate with any team in the league), they are often constrained by the league minimum, because their expected marginal revenue products are lower than those of players selected earlier in the draft.

The CBA describes the rules of free agency for veteran players. If a team exercises its option on a player with less than three years of NFL experience, the player can only negotiate a contract with this team. A team can exercise its option by offering the player a one year contract at the league minimum salary corresponding to the player's NFL experience. If the team declines to exercise its option, the veteran player is free to negotiate with any team. Free agent players with one or two years of previous experience, laid off by their current team, are often constrained by the league minimum salary when attempting to negotiate a new contract with a new team.

Veteran players with three years of previous NFL experience may become restricted free agents after their contract expires. These restricted free agents may negotiate with other teams, but their current team can match the offer of a bidding team and retain the player. These players are considered restricted free agents because: (i) bidding teams cannot make counter-offers once a salary offer has been matched, and (ii) if a player moves to a new team, the current team receives compensation and the acquiring team is penalized by a transfer of one or more selections in a future player draft.

Veteran players with four or more years of NFL experience become unrestricted free agents after their contract expires. These unrestricted free agents, with few exceptions, are "completely free to negotiate and sign a player contract with any club, and any club shall be completely free to negotiate and sign a player contract with such player, without penalty or restriction, including, but not limited to, draft choice compensation between clubs or first refusal rights of any kind."[3] Despite this unfettered free agency, in a earlier paper I show that many elite veteran players earn far less than their marginal revenue product because teams bidding for their services are constrained by the salary cap.

At the end of each season, whether or not a player is a free agent, a player and team can renegotiate the player's contract, or the team can terminate the player by removing him from the team's roster. The two largest components of a player's compensation are the player's base salary, which is not guaranteed in a multi-year contract, and the player's signing bonus, which is paid during the first year of the contract and is guaranteed even if the team terminates the contract. Even in the case of multi-million dollar, multi-year contracts, NFL players are only guaranteed the portion of their contract that has been paid through a signing bonus.

In calculating a team's salary cap in a given year, the lump sum signing bonus for a player on the active roster is prorated equally over the length of the player's contract. In other words, signing bonuses allow teams to "borrow" funds out of future salary cap allotments at a zero interest rate. For example, a player who signs a 5 year contract with a $5 million signing

bonus receives the entire signing bonus now, but only $1 million of the bonus counts against the salary cap in each year. Therefore, by using signing bonuses judiciously, the present value of player contracts paid by a team can exceed the present value of current and anticipated salary cap allotments. Because signing bonuses are guaranteed, and paid in advance, management is reluctant to compensate a player through a signing bonus if there is a great deal of uncertainty about his future productivity. The primary disadvantage of signing bonuses occurs whenever a player's contract is terminated before it expires, and the remaining portion of the prorated signing bonus must be accelerated into the current year's payroll. Consider again the five year contract with a $5 million signing bonus, and assume the team terminates the player after only one year. In this case, there is $4 million of signing bonus payments that have not yet been allocated to any year's salary cap. The team terminating this contract is obligated to allocate the entire $4 million in payments to the current year's payroll for the purposes of salary cap calculations. Therefore it is quite costly to layoff a player who received a large signing bonus and has a number of years remaining on his contract.

NFL management is adept at using signing bonuses to compensate players. Over half of the present value of compensation is achieved through lump sum signing bonuses. Moreover, signing bonuses are the *only* form of compensation in excess of league minimum salaries for more than forty percent of players. Players selected earlier in the draft earn a larger share of their compensation from signing bonuses, especially during their first two years in the league. Table 1 illustrates the relationship between draft order and the fraction of total compensation received through signing bonuses, over a player's first two years in the NFL. Signing bonuses account for well over half of total compensation for the first 90 players selected in the draft each year. For players selected late in the draft, or those entering the league as undrafted free agents, signing bonuses are a small fraction of total compensation and the opportunity cost of employing a player is roughly equal to his annual compensation.

B. The Evolution of NFL Minimum Salaries over Time

Before examining the pattern of changes in real minimum salaries between 1994 and 2004, it is useful to understand the history of labor/management relations in the NFL. At the time of the CBA agreement in 1994, the NFL Players' Association was viewed as one of the weakest unions in professional sports. The union was decertified in 1987 after an unsuccessful month-long players' strike. As the strike began, the NFL hired replacement players, and resumed its regular schedule after a one week break. There was sufficient fan interest in network television broadcasts of three replacement games to convince a majority of union members to vote to end the strike and return to work. Players worked without a collectively bargained contract between 1987 and 1993, as the decertified NFL Players' Association fought for player free agency in the courts through the application of antitrust law. After achieving some success in the courts, the NFL Players' Association was reconstituted as a union in 1993, and began negotiating the landmark collective bargaining agreement that is still in force today.

In late 1993, the NFL negotiated a new four year contract with the television networks that generated slightly higher nominal revenues per team compared to the previous four year agreement. Over the next four years, the NFL grew substantially in popularity, largely at the expensive of Major League Baseball, which endured a players' strike in 1994 and a cancellation of the World Series. When the NFL signed its next seven year agreement with the television networks, each team was guaranteed almost $75 million in annual revenue from television contracts, almost twice the annual amount received from the previous contracts. Neither NFL owners, nor the Players' Association, accurately forecasted the demand shift that caused the NFL to become the most popular and successful sports league in the United States. It is evident that this demand shift was unanticipated by examining the prices paid by new franchise owners to gain entry into the league. In 1993, the Carolina Panthers and Jacksonville Jaguars paid $140 million to gain entry into the NFL. Just four years later, the Cleveland Browns paid $530 million, 3.4 times as much in real dollars as the previous fee, to enter the NFL.

With this historical perspective, consider Table 2, which presents the annual nominal minimum salaries, by experience level, specified by the CBA. There are two types of salary changes to be considered in Table 2. First consider changes in minimum salaries for players of a given experience level, by moving down each column of the table. The minimum salary for first year players increased from $108,000 in 1994 to $230,000 in 2004. Over the same period the minimum salary for fifth year players increased from $162,000 to $535,000. The minimum salary increases negotiated during the initial phase of the contract, led to 12% real growth in minimum salaries in each experience category (column) between 1994 and 1997. As a result of the largely unanticipated increase in revenues from the new television contracts, the union renegotiated the CBA to increase the real minimum salary for rookie players by about 60%, and for fifth year players by roughly 140%, between 1997 and 2002. Finally, in the last three years of data, nominal minimum salary requirements have changed very little, for all experience categories. The sharp differences in real minimum salary growth, over three distinct time periods, is an important source of relative wage variation used in the analysis below.

Next consider minimum salary changes that evolve over a player's career by moving diagonally across Table 2. Players entering the league in 1994 face a minimum salary which rises from $108,000 in their rookie year to $300,000 in their fifth year in the league. Players entering the league in 2000 face a minimum salary of $193,000 in their rookie year and $535,000 in their fifth year. Long term changes in real minimum salaries are quite similar across entry cohorts from 1994 to 2000. Every entry cohort between 1994 and 2000 faces a real minimum salary in their fifth year that is 2.5 to 3 times higher than the real minimum salary in their rookie year. Earlier cohorts received a disproportionate share of the minimum salary increase between their fourth and fifth year, while later entry cohorts experienced a more balanced increase in minimum salaries across years.

Table 3 presents the percentage increases in real minimum salaries that players faced as they gained experience in the league. On average, the transition between a player's first and

second year was accompanied by a real minimum salary increase of 33.4%, and the transition between a player's second and third year led to a 27.5% increase in the real minimum salary. In almost all years, first and second year players experience the highest percentage gain in real minimum salaries, and the percentage changes have been rather stable from year to year. In contrast, the percentage changes in the real minimum salary for more experienced players vary considerably from one year to the next. For example, the real minimum salary for third year players decreased by 2.27% in 1996, but increased by 36.38% in 1998.

III. Empirical Framework

A. New Hire Decisions

I model the impact of the minimum salary schedule on the labor demand of NFL teams, by examining the new hiring and retention decisions for low salary players. First consider the impact of a minimum salary schedule on the new hire rate for players near the bottom of the skill distribution. The ability to substitute rookie players for marginal players with some NFL experience causes labor demand curves to be negatively sloped. Thus we expect the new hire rate to be decreasing in the growth rate of rookie minimum salaries, and increasing in the growth rate of minimum salaries for experienced players. As relative minimum salaries change over time, rational general managers substitute away from relatively more expensive players towards relative less expensive players, with similar skills.

Consider an employer who is constrained by a minimum salary schedule that is indexed to an employee's experience. Let $E_{s,t}$ equal the number of players with s years of experience demanded in period t, and let $W_{s,t}$ be the minimum salary paid to these players. Thus in period t, $E_{1,t}$ entry level players are demanded, and each entry level player earns a salary of $W_{1,t}$. If the employer faces $E_{0,t-1}$ potential new hires, the new hire rate in period t is $E_{1,t}/E_{0,t-1}$. As argued above, the new hire rate is decreasing in the relative minimum salary paid to entry level players, and increasing in the relative minimum salaries paid to experienced players, because retaining a higher fraction of currently employees is a substitute for hiring new players. If the team retains

an additional low wage player, labor costs rise by the change in the minimum salary for current players as they gain an additional year of experience. If the team hires a new player, labor costs rise by the change in the minimum salary for entry level players. A parsimonious parameterization of the double difference of these costs is the change in the log minimum salary for entry level players relative to experienced players, or $\ln(W_{1,t}/ W_{1,t-1}) - \ln(\overline{W}_t/\overline{W}_{t-1})$, where $\ln(\overline{W}_t/\overline{W}_{t-1})$ is the average percentage increase in minimum salaries for current employees as they gain an additional year of experience.

Table 4 presents measures of the change in the log minimum salary for entry level players relative to experienced players in the NFL, from 1994 to 2004. The first column measures the real percentage minimum salary change for rookie players (holding experience constant), while the second column presents the average real minimum salary change for current players with one to four years of experience, as they gain an additional year of experience. For example, in 1995 rookies earning the minimum salary were paid 6.90% more than rookies earning the minimum salary in 1994. Column two presents the average percentage change in real minimum salaries, for players with one to four years of experience, as they gained an additional year of experience. For example, in 1995, players with two to five years of experience faced real minimum salaries that were 16.87% higher than they faced in their previous NFL season (when they had one to four years of experience). The third column of Table 4 presents the double difference in these real minimum wages. For example, in 1995 the cost of hiring a rookie decreased by 9.97% relative to the cost of retaining a player from the previous season.

I estimate the sensitivity of new hire decisions in the NFL to relative minimum salary changes by examining the fraction of late round draft selections employed by NFL teams in each year. I define a "late round draft selection" as any player selected after 6M players have already been chosen, where M is the number of teams in the league. The set of all late round draft selections comprises the pool of potential new hires, or $E_{0,t-1}$.[4] For each of these individual

players, I observe whether or not they are hired in year t, i.e. whether or not they are included in $E_{1,t}$. Let $H_{i,t}$ be an indicator variable which equals one if potential new player i is hired in period t, and 0 if he is not. I model the new hiring decisions of teams by estimating the following probit model for all late round draft selections

$$\text{Prob}(H_{i,t}=1) = F(\ln(W_{1,t}/ W_{1,t-1})- \ln(\overline{W}_t/\overline{W}_{t-1}), X_{i,t}) + \varepsilon_{i,t} \quad (1)$$

The key variable in the probit model is the double difference in real minimum wages, which only varies across time periods, and not across players. Therefore I allow for a time period specific component of the error term, $\varepsilon_{i,t}$, when computing standard errors. $X_{i,t}$ includes a variable measuring the job growth rate in the NFL due to expansion in the number of teams, the player's draft order, the player's position on the football team (whether the player is a quarterback, running back, etc.), and a time trend.

B. Player Retention Decisions

Consider again an employer who is constrained by minimum wage schedules that are indexed to an employee's experience. Let $E_{s-1,t-1}$ equal the number of workers with s-1 years of experience demanded in period t-1. In period t, this cohort of workers will have an additional year of experience, which may raise their productivity, but also means they face a higher minimum wage. Let $E_{s,t}$ denote the number of workers demanded in period t, with s years of experience. In general, the fraction of workers retained by the employer, $E_{s,t}/ E_{s-1,t-1}$, is decreasing in the change in the relative minimum wage for workers in this cohort. A parsimonious parameterization of the change in the relative minimum wage is $\ln(W_{s,t}/\overline{W}^{s}_{t})- \ln(W_{s-1,t-1}/\overline{W}^{s-1}_{t-1})$, where $W_{s,t}$ is the minimum wage paid to workers with s years of experience in period t, $\overline{W}^{s}_{t}$ is the average of the minimum wages paid to workers in period t, for all experience levels other than s, and $\overline{W}^{s-1}_{t-1}$ is the average of the minimum wages paid to workers in period t-1, for the same

cohorts of workers used in the calculation of $\overline{W}^{s}_{t}$. For example, $\overline{W}^{1}_{t-1}$ is the average minimum wage for workers with 2 or more years of experience in period t-1, and $\overline{W}^{2}_{t}$ is the average minimum wage for workers with 3 or more years of experience in period t. This relative wage change equals $[\ln(W_{s,t}) - \ln(W_{s-1,t-1})] - [\ln(\overline{W}^{s}_{t}) - \ln(\overline{W}^{s-1}_{t-1}]$, or the double difference in log minimum wages for employees with s years of experience in period t, relative to the average log minimum wage for other cohorts of employees.

Table 5 presents the double difference in real minimum salaries, as players gain an additional year of experience, by season and years of experience. The first column of Table 5 presents the difference between the percentage increase in the real minimum salary for rookie players and the average percentage increase in real minimum salaries for players with 2 to 4 years of experience, by season. For example, between 1994 and 1995, the real minimum salary of first year players increased by 29.39% as they entered their second season in the league. On average, players with two to four years of experience faced real increases in their minimum salary of 12.70% between 1994 and 1995. Thus, between 1994 and 1995, the real minimum salary of rookie players increased by 16.69% (29.39%-12.70%) relative to the real minimum salaries of players at other experience levels.

I estimate the sensitivity of rehiring decisions in the NFL with respect to changes in real minimum wages by examining the retention rate of low salary NFL players with one or two years of experience. For transitions from the first to second season, I define low salary players to be those earning less than 1.35 times the rookie minimum during their first year in the league. On average, the nominal minimum a player faces in his second season is about 1.43 times the minimum salary he faced in his rookie season. In the absence of productivity gains or new information about productivity, most low salary rookie players will be directly impacted by the minimum salary in their second season. For transitions from year two to year three, I focus on players earning less than 1.25 times the second year minimum during their second season in the

NFL. On average, the nominal minimum salary in a player's third season is about 1.35 times the minimum he faced as a second year player. Again, in the absence of productivity gains or new information about a player's productivity, most of the low salary second year players will be directly affected by the minimum salary in their third season.

For each low salary rookie and second year player, I observe whether or not he is retained by the NFL in the next season. Let $R^k_{i,t}$ be an indicator variable which equals one if low salary player i is rehired in period t, given he was employed as a k-th year (k=1,2) player in period t-1, and 0 if he is laid off. I model retention decisions by estimating the following probit models:

$$\text{Prob}(R^k_{i,t}=1) = F(\ln(W_{k+1,t}/\overline{W}^{k+1}_t) - \ln(W_{k,t-1}/\overline{W}^{k}_{t-1}), Z_{i,t}) + u^k_{i,t}, \text{ for } k=1,2 \quad (2)$$

The key variable in the probit model is again the double difference in real minimum wages, which only varies across time periods, and not across players. Therefore I allow for a time period specific component of the error term, $u^k_{i,t}$, when computing standard errors. $Z_{i,t}$ includes the job growth rate in the NFL due to expansion in the number of teams, the player's draft order, the player's position on the football team (whether the player is a quarterback, running back, etc.), the ratio of the team's payroll to the NFL average (to control the potential impact of the salary cap), and a time trend.

IV. Data

The new hire and player retention data sets used in this study are derived from a comprehensive list of all players who were ever on an NFL roster from 1994 to 2004, as published in *USA Today*. The data set contains information on the team employing the player, the player's base salary, the player's bonus payments, and the amount of the player's salary allocated to the team's salary cap in each year. Between 1994 and 2004, 5557 different players participated in the NFL and are included in the *USA Today* data base, and 4915 of these players were on an active NFL roster in at least one of the seasons between 1994 and 2004. Careers are short in the

NFL and there is a substantial amount of player turnover. Roughly 20 percent of all active roster positions are held by rookie players, and about 16 percent of active roster positions are held by second year players.

The compensation data set is merged to a comprehensive list of all college players selected from the draft immediately prior to the 1995 season until the draft immediately prior to the 2004 season. Recall that a player is considered a "late round draft selection" if he was selected after 6M players have been chosen, where M equals the number of NFL teams. Over the period 1995 to 2004 the number of NFL teams increased from 30 to 32. Over the eleven drafts between 1995 and 2004, 2516 college players were selected by NFL teams, and 671 of these players are considered late round selections and potential new hires for the league.

A majority of the 671 players in the potential new hire data set were employed by an NFL team for the season immediately after being drafted. For the purposes of this paper, a player is a new hire only if he is employed in a full-time active roster position, receiving at least the NFL minimum salary. Using this definition 51.4 percent of late draft selections were new hires, 16.7 percent were placed on the inactive roster and received a sub-minimum salary, and the remaining 31.9 percent were not employed in the NFL at all during the season following their draft. The players selected late in the draft are indeed marginal players who are constrained by the NFL minimum salary. Only one of the 345 new hires received a salary that exceeded 1.35 times the rookie minimum. Signing bonuses for these marginal players are small or nonexistent: 84.9 percent of the new hires earned less than 1.1 times the rookie minimum, and 45.8 earned less than 1.05 times the rookie minimum. All positions on a football team are represented in the pool of late round selections; 37.3 percent of potential new hires are skill position players (quarterback, running back, and receivers), 44.0 percent are defensive players, and the remaining 18.7 percent are either offensive linemen or special teams players such as kickers and punters.

There are two player retention data sets used in this paper, one for rookie to second year transitions and the other for second to third year transitions. Before turning to these data sets, it is

important to note that compensation is measured as the "cap value" of compensation throughout the analysis. Thus signing bonuses are prorated over the life of the players' contract. For players with substantial signing bonuses (i.e. those selected in the first few rounds of the draft), the cap value of compensation will not accurately reflect the opportunity cost of retaining the player. For players with small signing bonuses, the cap value of compensation closely approximates the opportunity cost of retaining the player.

The rookie retention data set contains 1911 low salary (less than 1.35 times the rookie minimum salary) rookie players employed on active rosters between 1994 and 2003. This data set excludes about 43 percent of all rookie players because they earned compensation more than 1.35 times the minimum. The vast majority of low salary rookie players entered the NFL as either late round draft selections or undrafted free agents; 52.5 percent of low salary rookies were not drafted at all, and 23 percent were selected in the draft after 180 players had already been chosen. Less than one percent of low salary rookies were among the first 90 players (approximately the first three rounds of selections) taken in their college draft.

All positions on a football team are represented in the low salary rookie data set; 34.7 percent are skill position players (quarterback, running back, and receivers), 45.4 percent are defensive players, and the remaining 19.9 percent are either offensive linemen or special teams players such as kickers and punters.

The low salary second year player data set contains over 1100 low salary (less than 1.25 times the second year minimum salary) second year players employed on active rosters between 1994 and 2003. This data set excludes about 65 percent of all second year players because they earned compensation more than 1.25 times the minimum. Most low salary second year players entered the NFL as either late round draft selections or undrafted free agents; 41.4 percent of low salary second year players were not drafted at all, and 24.1 percent were selected in the draft after 180 players had already been chosen. Over five percent of low salary second year players were among the first 90 players selected in their college draft. These relatively high draft selections

are problematic for our analysis of player retention decisions, because a substantial portion of their compensation is received through lump sum signing bonuses. I therefore deleted the 62 players who were selected early in the draft, leaving 1118 players who were either undrafted or selected late in the draft, *and* who earned low salaries in their second year.

All positions on a football team are represented in the low salary second year data set; 32.8 percent are skill position players (quarterback, running back, and receivers), 44.9 percent are defensive players, and the remaining 22.3 percent are either offensive linemen or special teams players such as kickers and punters.

V. Empirical Results

A. New Hire Probit

Table 6 presents estimates of a probit model for the new hiring decision for late round draft selections. Column one shows the probit coefficients, with standard errors, z-statistics, and p-values in columns two through four. The marginal effects of the explanatory variables are presented in column five. The key result is reported in the first row, indicating that the semi-elasticity of the new hiring rate with respect to the relative minimum salary is -1.12, and statistically significantly different from zero. Each one percent increase in the rookie minimum salary, relative to the average minimum salary change for players continuing their NFL employment, reduces the new hire rate by 1.12 percentage points.

The probit coefficients for two other explanatory variables are significantly different from zero. A player's draft order is significantly negatively related to his chance of being hired. With each additional position a player moves down the selection order, his chance of being employed falls by 0.36 percent. Finally, there is a strong and significant negative time trend in the hiring rate for late round selections. The marginal effect indicates that the new hire rate for late round selections was falling by over four percent per year. This negative trend is apparent in the raw data; over 60 percent of late round selections were hired between 1995 and 1997, while fewer than 40 percent were hired between 2002 and 2004.

The observed negative trend in hiring propensities might have occurred because there are two more NFL teams in 2004 than there were in 1995. Thus late round draft selections in 2004 dig deeper into the college talent pool than they did earlier in the period. This effect should at least be partially offset because there are proportionately more positions to fill with two more teams in the NFL. Nonetheless, the results strongly indicate that, over time, teams have become less successful in identifying valuable players late in the draft. Finally, I included an explanatory variable that measures the percentage increase in NFL jobs in each year due to expansion in the number of teams. This variable only takes on positive values in two years, 1999 and 2002, when the Cleveland Browns and Houston Texans entered the NFL. I found no statistical evidence that the new hire rates for late round selections increased in years in which there was NFL employment growth.

B. Player Retention Probits

Table 7 presents estimates of probit models for the retention of low salary rookie players. The first panel of Table 7 presents results for all rookie players earning less than 1.35 times the NFL minimum. The second panel presents results for rookie players earning less than 1.05 times the player minimum. I present both sets of results because economic theory predicts that a minimum wage change should have the most substantial effects on the players most constrained by the minimum wage. Column one shows the probit coefficients, with standard errors, z-statistics, and p-values in columns two through four. The marginal effects of the explanatory variables are presented in column five.

The main results are reported in the first row, and indicate that the semi-elasticity of the retention rate with respect to the relative minimum salary is: (1) between -.385 and -.702, (2) statistically significantly different from zero, and (3) substantially stronger for players most constrained by the minimum salary. Each one percent increase in the minimum salary of rookie players as they move to their second year, relative to the average minimum salary changes for

other players continuing in the NFL, reduces the retention rate of rookie players by .385 to .702 percentage points.

The probit coefficients for several other explanatory variables are significantly different from zero, in the two samples. A player's draft order, and a dummy variable indicating that the player entered the NFL as an undrafted free agent, are both significantly negatively related to the retention rate in the sample of rookie players earning less than 1.35 times the NFL minimum. It is not surprising that draft order has no effect on retention, conditional on players earning less than 1.05 times the minimum, because there is little variation in these players' compensation or expected productivity. Both the time trend and NFL employment growth variables have a significant positive effect on the retention rate in the sample of players earning less than 1.05 times the rookie minimum. In both samples defensive players have significantly lower retention rates. Finally, I included an explanatory variable measuring the team's annual payroll relative to the mean NFL payroll. This variable accounts for possible differences in behavior across teams depending on how strictly the NFL salary cap binds, but is insignificantly related to retention rates in both samples.

Table 8 presents estimates of probit models for the retention of low salary second year players. The first panel of Table 8 presents results for all second year players earning less than 1.25 times the NFL minimum. The second panel presents results for second year players earning less than 1.05 times the player minimum.

The main results, reported in the first row, show that the semi-elasticity of the retention rate of second year players with respect to the minimum salary is: (1) between -.781 and -.823, and (2) statistically significantly different from zero. Each one percent increase in the minimum salary of second year players as they move to their third year in the NFL, relative to the average minimum salary changes for other players continuing in the NFL, reduces the retention rate of players entering their third year by .781 to .823 percentage points.

The probit coefficients for several other explanatory variables are significantly different from zero, in the two samples. A dummy variable indicating that the player entered the NFL as an undrafted free agent is significantly negatively related to the retention rate in the sample of players earning less than 1.25 times the NFL minimum. NFL employment growth through expansion has a significant positive effect on the retention rate in the sample of players earning less than 1.05 times the rookie minimum. In both samples defensive players and skill position players have significantly lower retention rates. Finally, a team's annual payroll relative to the mean NFL payroll is positively but insignificantly related to retention rates in both samples.

VI. Interpretation of Empirical Results

The raw data on career durations for players starting their NFL careers between 1995 and 2002 indicates that 81.5 percent of players, who are paid more than 1.35 times the rookie minimum in their first year, survive to their third year in the league. In contrast, only 46 percent of players paid less than 1.05 times the rookie minimum during their first year survived until their third year in the NFL. Thus the three year survivor rate for high salary rookies is 77 percent higher than the rate for low salary rookie players. There are two reasons why this could occur. First, low wage rookies are adversely affected by steeply rising minimum salary schedules that prematurely end their careers. Second, NFL salary cap rules may artificially lengthen the career of highly paid rookies who receive large signing bonuses, because the NFL requires a team to accelerate a portion of the signing bonus into the salary cap if the team terminates a contract before it expires.

In order to determine the contribution of the NFL's minimum salary schedule to the large career length differential between rookies with different starting salaries, consider the following hypothetical policy change. Suppose that a small group of players first hired at the rookie minimum salary, were exempted from the NFL's steeply rising minimum salary schedules as they gained experience. Thus, instead of facing the typical 33.36% and 27.49% increases in the minimum salary between their first and second, and second and third years in the NFL, these

rookies will face constant real minimum salaries over their career. Using the estimated labor demand semi-elasticities of -.702 and -.823, which correspond to labor demand elasticities for second and third year players of -1.075 and -1.193, respectively, I predict that low salary rookie players would see a 79 percent increase in their three year survivor rate in the absence of rising minimum salaries. Thus, it appears that the entire difference in the three year survivor rates between marginal rookie players and star rookie players is explained by the minimum salary provisions of the NFL's labor contract.

VIII. A Theoretical Framework and Suggestions for Future Research

The empirical model presented above estimates the demand elasticity for low salary NFL players with one to three years of experience. Because of the fixed number of positions on a football team, and the bilateral bargaining between highly productive players and team management, these demand elasticities are not related to production and output demand parameters as they would be in a neoclassical model of labor demand. This section presents the beginnings of a theoretical model of union/management bargaining in a setting comparable to the market for professional football players.

Consider an overlapping generations model where a monopsonistic employer produces, with market power in the output market, employs two types of labor, inexperienced workers (H_1) and experienced workers (H_2). Each labor input is measured in terms of efficiency units. Workers can only gain experience through the monopsonistic employer, so that, in the steady state, the number of experienced employees must be less than or equal to the number of experienced employees in the steady state. Assume that all workers appear identical *ex ante*, but worker productivity is uniformly distributed along the unit interval. Workers are indexed by their location on the unit interval, and this index equals the efficiency units of human capital that they contribute to the production process. In other words, a worker with an index of 2s contributes the same amount of human capital as two employees, each with an index of s. Neither inexperienced workers nor the firm know individual productivity until production has been completed.

After one period of employment, the monopsonistic employer learns the true value of each worker's productivity. Finally, assume that total employment at the firm is fixed and equal to N. Let L_1 denote the fraction of employees who are inexperienced, and $L_2=(1-L_1)$ equals the fraction of experienced employees. The amount of human capital contributed by the N employees of the firm depends on L_1, which influences both the mix of experienced and inexperienced employees and the skill distribution of the workers employed.

For the purposes of this paper, I focus on steady state solutions to the firm's problem. Because experienced workers this period can only be hired from the pool of last period's inexperienced workers, L_1 must be at least ½, and the retention rate of employees is $(1-L_1)/L_1$.

The L_1N inexperienced workers hired in each period are expected to contribute $H_1=L_1N/2$ units of human capital each period, on average. Although there is individual uncertainty about productivity, assume that enough employees are hired so that no aggregate uncertainty exists, and the firm receives exactly $H_1=L_1N/2$ units of human capital from inexperienced workers in every period. After individual productivities are revealed, an efficient firm retains the $(1-L_1)N$ most productive employees. Given the assumption that productivity is uniformly distributed, it follows that experienced employees contribute $H_2=(4L_1-3L_1^2-1)N/2L_1$ units of human capital each period.

In order to generate simulation results from this model, one must specify a functional form for the production process. To keep the analysis simple, assume that the firm's revenue generating function is Cobb Douglas, with $R=2H_1^{1/2}H_2^{1/2}$. In this case it is easy to demonstrate that the revenue maximizing employment choice is $L_1=2/3$ and $L_2=1/3$, so that 1/2 of the workers are retained. At the optimum, inexperienced workers contribute N/3 units of human capital and experienced workers contribute N/4 units of human capital each period. The average experienced worker is twice as productive as the average inexperienced worker because the all inexperienced workers with below average productivity have been laid off.

As a reference point, consider what would happen in this model if wages were competitively determined. The hypothesized Cobb Douglass revenue function implies that each

type of labor accounts for ½ of the total payroll. The wage ratio for experienced to inexperienced labor, per efficiency unit of human capital, is 4/3. Because all inexperienced workers are identical, *ex ante*, I assume that all inexperienced labor receives the same earnings, but experienced workers are paid according to their individual skill index. At the optimum, the least productive experienced worker has the same innate productivity as the average experienced worker, but earns 33 percent more because of the difference in skill prices. The average experienced worker earns twice as much as inexperienced workers, and the most productive experienced workers earns 2.67 times as much as inexperienced workers.

Now suppose that workers at this monopsonistic employer form a union that bargains over the terms of a labor contract. Assume that the types of contracts under consideration are those which specify minimum salaries for both experienced and inexperienced employees, denoted by W_1 and W_2. Given these minimum salaries, the union allows the firm to unilaterally make layoff and retention decisions. Because all inexperienced workers are identical, ex ante, they all receive W_1. Experienced workers differ in their productivity, but the firm has monopsony power. I therefore assume that experienced individual workers engage in Nash bargaining with the firm, and receive a weighted average of their marginal revenue product and the experienced minimum salary, W_2. To keep the analysis simple, I assume that the weights used in the Nash bargaining framework are ½ for the firm and ½ for the experienced workers.

The first order condition for the firm's optimal choice of L_1, given minimum salaries W_1 and W_2, is a (rather messy) quadratic equation. Thus it is easy to generate iso-profit curves in W_1 and W_2 for the firm. The firm is indifferent between combinations of W_1 and W_2 on the same iso-profit curve, but the union need not be. A higher minimum salary for inexperienced workers leads to a lower value of L_1, a higher retention rate, fewer rents being earned by experienced workers, and a smaller union in terms of membership. A lower minimum salary for inexperienced workers leads to a higher value of L_1, a lower retention rate as the monopsonistic firm because more selective in choosing which workers to retain, more rents being earned by

experienced workers, and a larger union in terms of membership. The union's optimal choice of W_1 and W_2, for a given level of firm profits, depends on the union's preferences over the division of rents between experienced and inexperienced employees, and the size of the union.

In future work I intend to analyze the comparative statics of this model, for alternative assumptions about union preferences, as the revenue generating function shifts out by a factor of 2. This scenario roughly approximates the situation faced by NFL management and the Players' Association in the late 1990's. The empirical evidence shows that the union responded to this increase in demand by negotiating for a larger percentage increase in W_2 than in W_1. Optimizing firms respond to these minimum salary changes by increasing L_1 and decreasing the retention rate. My goal is to calibrate union preferences, in a suitably modified version of this model, to match the model's semi-elasticity of the retention rate $[(1-L_1)/L_1]$, with respect to the relative wage ratio (W_2/W_1), to the estimated semi-elasticity of -.7 to -.8 in the empirical section of the paper.

VIII. Conclusions

The NFL's collectively bargained minimum salaries are indexed to a player's experience and typically rise rapidly over a player's career. On average, players experience a 33.4% increase in their real minimum salary between their first and second years, and a 27.5% increase between their second and third years in the league. Minimum salary schedules increased sharply in the late 1990's, after the NFL signed a lucrative new television contract that provided a large and unexpected increase in team revenues. This paper used variation in the NFL's minimum salary schedules, and in the new hire and retention rates of players most likely to be constrained by minimum salaries, to estimate labor demand elasticities for "low salary" NFL players.

I find that each 1 percent increase in the minimum entry level salary reduced the new hire rate by 1.1 percentage points, and each 1 percent increase in the minimum salary for experienced players reduced retention rates by .7 to .8 percentage points. These employment effects are quite large given that (1) no capital/labor substitution is available, (2) the total number of positions on a

football team is fixed, and (3) NFL teams have monopsony power in hiring inexperienced players.

The sharply rising minimum salary requirements over a player's career, combined with the labor demand estimates obtained here, suggests that the NFL's minimum salary contract provisions have substantially shortened the careers of players in the bottom half of the skill distribution. I predict that a low salary rookie player exempted from rising minimum salaries over his career would experience a 79% increase in his three year survivor rate, and enjoy a career that is similar in length to those of elite NFL players. These estimates suggest that the median NFL player's career is short because of union/management wage bargains, rather than debilitating injuries.

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TABLE 1
SIGNING BONUSES AS A SHARE OF COMPENSATION DURING A PLAYER'S FIRST TWO YEARS IN THE NFL BY DRAFT ORDER

Draft Order	Mean Value of (Signing Bonuses/Total Compensation)
1-30	83.21%
31-60	72.48%
61-90	53.25%
91-120	40.89%
121-150	32.87%
151-180	18.81%
181-210	14.34%
211+	7.94%
Undrafted	6.37%

TABLE 2
NFL MINIMUM SALARIES
BY SEASON AND YEARS OF EXPERIENCE

Season	Rookie	Second Year	Third Year	Fourth Year	Fifth Year
1994	$108,000	$135,000	$162,000	$162,000	$162,000
1995	$119,000	$149,000	$178,000	$178,000	$178,000
1996	$131,000	$164,000	$196,000	$196,000	$196,000
1997	$131,000	$164,000	$196,000	$196,000	$196,000
1998	$158,000	$198,000	$238,000	$275,000	$300,000
1999	$175,000	$250,000	$325,000	$350,000	$375,000
2000	$193,000	$275,000	$358,000	$385,000	$413,000
2001	$209,000	$298,000	$389,000	$418,000	$448,000
2002	$225,000	$300,000	$375,000	$450,000	$525,000
2003	$225,000	$300,000	$375,000	$450,000	$530,000
2004	$230,000	$305,000	$380,000	$455,000	$535,000

TABLE 3
CHANGES IN REAL MINIMUM SALARIES IN THE NFL
AS PLAYERS GAIN EXPERIENCE

	Changes in Player Experience			
Season	1st to 2nd Year	2nd to 3rd Year	3rd to 4th Year	4th to 5th Year
1994 to 1995	29.39%	24.86%	6.62%	6.62%
1995 to 1996	29.16%	24.51%	6.72%	6.72%
1996 to 1997	20.20%	15.56%	-2.27%	-2.27%
1997 to 1998	39.76%	35.69%	32.32%	41.02%
1998 to 1999	43.70%	47.37%	36.38%	28.83%
1999 to 2000	41.89%	32.60%	13.64%	13.25%
2000 to 2001	40.63%	31.87%	12.69%	12.35%
2001 to 2002	34.58%	21.41%	13.00%	21.22%
2002 to 2003	26.51%	20.06%	15.98%	14.11%
2003 to 2004	27.79%	21.01%	16.71%	14.67%
Average	33.36%	27.49%	15.18%	15.65%

TABLE 4
RELATIVE CHANGE IN REAL ROOKIE MINIMUM SALARIES BY SEASON

Season	Percent Change in Rookie Minimum Salary	Percent Change in Experienced Minimum Salary	Relative Change in Rookie Minimum Salary
1994 to 1995	6.905%	16.873%	-9.968%
1995 to 1996	6.697%	16.779%	-10.082%
1996 to 1997	-2.269%	7.804%	-10.073%
1997 to 1998	17.194%	37.199%	-20.005%
1998 to 1999	8.035%	39.071%	-31.037%
1999 to 2000	6.484%	25.344%	-18.859%
2000 to 2001	5.159%	24.387%	-19.228%
2001 to 2002	5.808%	22.553%	-16.745%
2002 to 2003	-2.253%	19.166%	-21.419%
2003 to 2004	-0.430%	20.047%	-20.477%

TABLE 5
CHANGES IN RELATIVE MINIMUM SALARIES IN THE NFL
AS PLAYERS GAIN EXPERIENCE

	Changes in Player Experience			
Season	1st to 2nd Year	2nd to 3rd Year	3rd to 4th Year	4th to 5th Year
1994 to 1995	16.69%	10.65%	-13.67%	-13.67%
1995 to 1996	16.51%	10.32%	-13.41%	-13.41%
1996 to 1997	16.53%	10.34%	-13.43%	-13.43%
1997 to 1998	3.42%	-2.01%	-6.50%	5.10%
1998 to 1999	6.17%	11.07%	-3.59%	-13.65%
1999 to 2000	22.06%	9.67%	-15.61%	-16.13%
2000 to 2001	21.66%	9.98%	-15.59%	-16.05%
2001 to 2002	16.04%	-1.52%	-12.74%	-1.78%
2002 to 2003	9.79%	1.19%	-4.25%	-6.74%
2003 to 2004	10.33%	1.29%	-4.47%	-7.17%
Average	13.92%	6.10%	-10.33%	-9.69%

TABLE 6
NEW HIRE PROBIT FOR LATE ROUND NFL DRAFT CHOICES
1994-2004

	Coeff	S.E.	z	Prob>z	Marginal Effect
Relative Minimum Wage Change	-2.7985	1.0223	2.74	0.006	-1.1158
Draft Order/100	-0.9043	0.3486	-2.59	0.009	-0.3605
NFL Employment Growth from Expansion	-0.3918	1.2249	-0.32	0.749	-0.1562
Year Trend	-0.1094	0.0289	-3.79	0	-0.0436
Player in Skill Position	-0.01702	0.1454	-0.12	0.907	-0.0068
Player in Defensive Position	-0.01084	0.1525	-0.07	0.943	-0.0043
Intercept	218.33	57.498	3.80	0	
N=671					

TABLE 7
PLAYER RETENTION PROBIT FOR LOW SALARY ROOKIE PLAYERS
(EARNING LESS THAN 1.35 TIMES THE NFL MINIMUM)
1994-2003

	Coeff	S.E.	z	Prob>z	Marginal Effect
Relative Minimum Wage Change	-1.030	0.397	-2.59	0.009	-0.385
Draft Order/100	-0.368	0.123	-3.00	0.003	-0.138
Player Not Drafted	-0.989	0.201	-4.92	0.000	-0.354
NFL Employment Growth from Expansion	-0.585	0.821	-0.71	0.476	-0.218
Time Trend	0.011	0.009	1.21	0.225	0.004
Player in Skill Position	-0.209	0.133	-1.57	0.117	-0.079
Player in Defensive Position	-0.197	0.115	-1.70	0.089	-0.074
Relative Payroll	0.235	0.333	0.71	0.480	0.088
Intercept	-21.380	18.554	-1.15	0.249	
N=1911					
ROOKIE PLAYERS EARNING LESS THAN 1.05 TIMES THE NFL MINIMUM					
	Coeff	**S.E.**	**z**	**Prob>z**	**Marginal Effect**
Relative Minimum Wage Change	-1.795	0.540	-3.33	0.001	-0.702
Draft Order/100	-0.119	0.153	-0.78	0.436	-0.046
Player Not Drafted	-0.234	0.288	-0.81	0.416	-0.090
NFL Employment Growth from Expansion	2.548	1.414	1.80	0.072	0.997
Time Trend	0.032	0.012	2.70	0.007	0.012
Player in Skill Position	-0.177	0.137	-1.30	0.195	-0.070
Player in Defensive Position	-0.206	0.096	-2.14	0.032	-0.080
Relative Payroll	-0.231	0.414	-0.56	0.578	-0.090
Intercept	-61.985	23.335	-2.66	0.008	
N=1107					

TABLE 8
PLAYER RETENTION PROBIT FOR LOW SALARY SECOND YEAR PLAYERS
(EARNING LESS THAN 1.25 TIMES THE NFL MINIMUM)
1994-2003

	Coeff	S.E.	z	Prob>z	Marginal Effect
Relative Minimum Wage Change	-2.400	1.223	-1.96	0.050	-0.781
Draft Order/100	0.086	0.135	-0.63	0.526	-0.028
Player Not Drafted	-0.523	0.244	-2.14	0.032	-0.172
Expansion	2.373	2.744	0.86	0.387	0.772
Time Trend	-0.006	0.021	-0.27	0.789	-0.002
Player in Skill Position	-0.348	0.109	-3.18	0.001	-0.117
Player in Defensive Position	-0.124	0.080	-1.56	0.120	-0.041
Relative Payroll	0.657	0.544	1.21	0.227	0.214
Intercept	11.988	42.701	0.28	0.779	
N=1118					
SECOND YEAR PLAYERS EARNING LESS THAN 1.05 TIMES THE NFL MINIMUM					
	Coeff	**S.E.**	**z**	**Prob>z**	**Marginal Effect**
Relative Minimum Wage Change	-2.282	0.988	-2.31	0.021	-0.823
Draft Order/100	0.150	0.228	0.66	0.510	0.054
Player Not Drafted	0.199	0.397	0.50	0.616	0.073
Expansion	4.656	2.458	1.89	0.058	1.679
Time Trend	-0.017	0.024	-0.73	0.468	-0.006
Player in Skill Position	-0.438	0.081	-5.40	0.000	-0.161
Player in Defensive Position	-0.190	0.108	-1.75	0.079	-0.069
Relative Payroll	0.999	0.809	1.23	0.217	0.360
Intercept	34.117	47.506	0.72	0.473	
N=632					

[1] Teams earn returns from additional sources such as preferred seating licenses, leases on luxury suites, and increases in the market value of the franchise that are not included in this total.

[2] In addition to these rules, there is a "salary cap" for rookies, which is essentially a cap within a cap. For most teams, rookie salaries may not exceed 3.5% of the team's share of league revenues. If a team has more or fewer draft selections than other teams (due to previous trades and compensation for the loss of free agents in previous seasons), the rookie salary cap is adjusted in proportion to the number of selections.

[3] Each year a team may designate one player to be a franchise player, and retain their exclusive bargaining rights with the player. A franchise player must earn at least the average of the top 5 player salaries at his position, or 120% of his previous salary, whichever is greater. Alternatively, a team may designate one player as a transition player, and retain its right of first refusal with the player. A transition player must earn at least the average of the top 10 player salaries at his position, or 120% of his previous salary.

[4] Ideally, I would like to include undrafted players in the pool of potential new hires, but I do not have a comprehensive list of these players.