

Does crime pay? The effect of off-field behavior on player salaries in the National Football League

Brad R. Humphreys* Brian P. Soebbing†
West Virginia University University of Alberta

This version: February 2026

Abstract

Mixed evidence exists on the relationship between arrest and labor market outcomes such as employment and earnings. We analyze the effect of arrest on earnings in a sample of National Football League players who were arrested between 2000 and 2015, omitting 2010. We use propensity score matching to construct a comparison sample of players who were not arrested over the same period. Regression results suggest that players who were involved in incidents with law enforcement did not see any significant impact in salary. When examining different types of incidents (e.g., drugs), we do see significant impacts on salary.

JEL Codes: L83, J31

Keywords: arrest, earnings, National Football League

1 Introduction

Beginning with Becker's (1968) seminal research on the economics of crime, economists have devoted significant theoretical and empirical attention to understanding the economic causes and consequences of crime. Becker (1968) posited that committing crime represented a rational economic choice, where the expected total economic benefit generated by the crime exceeded the

*John Chambers College of Business and Economics, 1601 University Avenue, Morgantown, WV 26506-6025, Phone: 304-293-7871, E-mail: brad.humphreys@mail.wvu.edu

†Faculty of Kinesiology, Sport, & Recreation, 2-158 Van Vliet Complex (University Hall), Edmonton, Alberta, Canada T6G 2J9 ; E-mail: brian.soebbing@ualberta.ca

expected total economic cost. While this approach can be used to explain a wide array of illegal and illicit activities, like robbing banks and securities fraud, some illegal activities, for example drunk driving or domestic abuse, generate little or no economic benefit, making the commission of these crimes difficult to rationalize in economic terms (Draca and Machin, 2015).

Although drunk driving, domestic battery, possession of small amounts of drugs, and other crimes lacking significant economic payoffs may be difficult to motivate in the context of rational economic decisions, committing these crimes and getting caught and (possibly) punished has economic consequences. Grogger (1995) reported that the average earnings of male subjects over the period 1980-1984 in the National Longitudinal Survey of Youth (NLSY) who had been arrested before 1980 was 15% lower than males in the NLSY who had never been arrested. Grogger (1995) analyzed the earnings of a sample of young males born in the late 1950s and early 1960s who had been arrested in the 1970s; the average age of males in this sample was 23. Grogger (1995) found the effects of arrests on later earnings were moderate and short lived: the average arrestee's earnings dropped by about 4% of the sample mean earnings in the quarter following the arrest and were 2%-3% lower over the next 4 to 6 quarters. Unobserved characteristics of these arrestees explained most of the correlation between an arrest and earnings, suggesting that ability and other personal characteristics were more important determinants of earnings than arrest for the commission of a crime in this context. Nagin and Waldfogel (1998) found that the post-conviction legitimate earnings of males under the age of 30 who were convicted of larceny or fraud was higher than their pre-conviction legitimate earnings, based on data from administrative records of the Administrative Office of the US Courts. Nagin and Waldfogel (1998) appealed to standard human capital theory to explain this result; young men are still acquiring human capital, and in this setting, the positive effect of human capital investment offset the negative effect of conviction.

In this paper, we perform an analysis similar to Grogger (1995) in a specialized context: professional athletes in the National Football League (NFL). This setting contains several interesting features. The sample consists of young men, but these men were employed in a high profile profession with relatively high salaries. Previous research on the arrest-earnings relationship analyzed populations with high levels of unemployment. The individuals in our sample all have exceptional physical abilities and are college educated, having to attend college for at least three years prior to playing professional football. In addition, these individuals all perform exceptionally in an orga-

nized activity that requires a high degree of both mental and physical awareness. The unobservable characteristics of males in this sample should be more homogenous than in the sample analyzed by Grogger (1995) and other previous research. Finally, the males in this sample were employed continuously throughout the sample period. We observe the firms that employed these young males, thus, are able to control for observable firm characteristics and unobservable firm-level heterogeneity.

We estimate a reduced form model of the determination of earnings of NFL players over the 2000 to 2015 seasons, omitting 2010 due to not being able to retrieve salary information. Kahn (2000) observed that sport is a strong setting to study labor market outcomes due to both data availability and clear performance measures. The sample contains all NFL players who had a run-in with law enforcement of any kind over this period, including players who were arrested (formally detained by a police officer), charged (a formal legal decision that a realistic chance of conviction for commission of a crime exists) or cited (a written order from a law enforcement official requiring a person to appear in a designated court at a specific time) because of some illegal activity. We refer to these events as “arrests” or “incidents”, however, it should be noted that not all of these events involved the formal detention of the player by a law enforcement official.

We use propensity score matching to match each of the players who were arrested during this period to the two players with the most similar characteristics who were not arrested; the propensity score matching is based on the round the player was drafted in the NFL entry draft, the length of the player’s career, the player’s position on the football field, and the winning percentage of the player’s team. The final sample contains data for 659 players; 235 were arrested during the sample period and 424 were not. We observe the entire career of players in the sample; the average number of seasons played is about 6 for both arrestees and non-arrestees.

The econometric model allows for arrests to affect the earnings of players over time. The results suggest that players who were arrested during the sample period had higher earnings than those in the propensity score matched sample who were not arrested. Players who were arrested earned about 10% to 14% more than similar players who were not arrested. More aggressive players, and players willing to take more risks, may be more successful on the field, leading to higher earnings. These characteristics may also lead these players to make poor decisions off the field. The results suggest the NFL values on-field behavior more highly than off-field behavior. In addition, the results provide avenues for future research examining the likelihood of an individual committing a

crime and the effects on the player, team, and city in which the team is located.

2 Context: Research on Crime, Earnings, and Sports

2.1 Arrest, Incarceration, and Earnings

There is a rich literature focused on relationships between crime and the labor market outcomes.¹ For the purposes of the present study, we focus on the literature looking at arrest and incarceration on earnings. This literature centers on the collateral penalties faced by criminals (Draca and Machin, 2015). The total penalties for committing a crime include direct penalties like fines, legal costs, and incarceration and indirect penalties like social stigma, loss of employment or loss of earnings (Rasmusen, 1996). Lott (1992) undertook an early study of the effect of arrest and conviction on pre- and post-conviction earnings of a sample of more than 1,000 high-income individuals convicted of embezzlement and fraud or larceny and theft by a Federal court. All of the individuals analyzed were convicted of one of these crimes; only about 18% of the sample were sentenced to prison, and the average term of incarceration was only 2 months. Post-conviction legitimate income was between 75% and 100% lower than pre-conviction income in this sample, suggesting that the total economic penalty greatly exceeded the direct penalties paid by law breakers. Waldfogel (1994) looked at income of convicted individuals through data obtained by the Administrative Office of the U.S. Courts. He found individuals who were convicted of crimes for the first time had lower incomes following the conviction. Incomes were increasingly lower for certain types of individuals. For example, individuals who earned a college degree had lower earnings. In addition, incomes were lower for individuals who served time in prison for their offenses and those individuals who were convicted of fraud.

Grogger (1995) analyzed the relationship between arrest, conviction and earnings in a sample of male arrestees born in the late 1950s and early 1960s who were arrested at least once between 1973 and 1987. Arrested individuals were matched to quarterly earnings data collected by the California Employment Development Department, the state unemployment insurance agency, over the period 1980-1986. Grogger (1995) found that the effects of arrests on later earnings were moderate and short lived: the average arrestee's earnings dropped by about 4% of the sample mean earnings in

¹See Draca and Machin (2015) for a recent review of the literature.

the quarter following the arrest and were only 2%-3% lower over the next 4 to 6 quarters.

Research by Nagin and Waldfogel (1995) examined 300 young convicted individuals to examine the impacts that being convicted of a crime impacted job stability and individual wage. They found a criminal conviction increased job instability of these individuals, which was consistent with previous research. However, they found that criminal conviction increased wages of these individuals, which was not consistent with their hypothesis and previous research. Nagin and Waldfogel (1995) believed this positive relationship between criminal conviction and wages had to do with the type of jobs these individuals were hired into after being convicted of a crime. The jobs that past criminals were taking were spot market jobs which tended to have higher initial salaries but did not grow over time compared to career jobs. They believed that career jobs would be much harder to obtain for these individuals, thus, they tended to apply and be hired for spot market jobs. Nagin and Waldfogel (1998) analyzed the relationship between arrest, conviction and earnings in a sample of 1,336 individuals who were arrested and convicted of fraud or larceny in 1984 and were released from probation or custody by 1987. These 187 first time offenders younger than 30 when convicted had post-conviction legitimate income higher than their pre-conviction income, which was consistent with the findings of Nagin and Waldfogel (1995). However, first time offenders older than 30 had lower post-conviction income. Nagin and Waldfogel (1998) explained these results using standard human capital models of the age-earnings relationship. Individuals younger than 30 years old were on the upward sloping portion of their age-earnings profile. While arrest and conviction for a white-collar crime like fraud or larceny put these individuals on a lower age-earnings profile, due to stigma, or lost experience while incarcerated, they still accumulated human capital through learning-by-doing or experience, so their post-conviction earnings were higher. Individuals older than 30 years of age were on the flat or downward sloping portion of the age-earnings profile and experienced earnings losses due to arrest and conviction.

Finally, Kling (2006) looked at the earnings impact from individuals who were convicted and incarcerated in the states of California and Florida. He noted that while previous literature rationalizes a decrease in wages due to human capital and experience declining while in prison, the decrease in wages due to these factors is small. Results from the two states showed that incarceration length yielded higher wages in the short-term with no discernable difference in the medium- and long-term following a criminal's release from prison.

2.2 Crime in Sport

A substantial body of literature examines the economics of crime using sport as an empirical setting (Jewell, Moti, and Coates, 2012). Much of this literature focuses on the idea that rule infractions occurring with the game represent a form of crime and game officials or referees police games. Becker's (1968) model of crime is applied to this type of "criminal" behavior, since the violation of rules in sporting contests represents attempts to increase the probability of team success through these actions, which may or may not be detected and punished by the authorities (e.g., referees). McCormick and Tollison (1984) performed the first analysis of this type, using the addition of a referee in Atlantic Coast Conference men's college basketball games to analyze the effect of additional police (referees) on the commission of crimes (fouls in basketball games). Allen (2002) and Heckelman and Yates (2003) examined the National Hockey League, looking at the role that an additional referee had on the detecting on-ice "criminal" behavior. Allen (2002) looked at the NHL's initial experimentation with adding an additional referee and its impact on player behavior and the enforcement of rules. He found a tradeoff existed between benefits and costs of committing penalties. In addition, he found violent offenses, such as fighting, increased with the presence of a second referee. Heckelman and Yates (2003) found an additional referee increased the ability to enforce rule breaking players, however, Heckelman and Yates (2003) determined increased enforcement did not deter players from breaking the league rules.

More recent research by Bradbury and Drinen (2007) examined the role that having a pitcher bat in Major League Baseball (MLB) is a deterrent for that same pitcher to hit batters of the opposing teams in MLB games. Their results found that pitchers who have to bat in an MLB game are less likely to hit opposing batters compared to pitchers who do not have to bat in an MLB game. Kitchens (2014) looked at the changes in penalties of NFL games as the NFL repositioned one of the referees officiating the match. He found the total number of penalties called in a match was unchanged. However, the number of penalties called on offensive players increased while penalties called on defensive players decreased by the same amount. Kendall (2008) looked specifically at superstar behavior in the NBA and the propensity for these player to commit technical fouls and receive an ejection from the game. His results concluded that individuals who received the highest salary relative to his peers on the team misbehaved more than the second highest

players. Furthermore, examining the impact that misbehavior had on a player's wage, Kendall (2008) concluded a player's earnings increased with an increase in misbehavior.

Another line of research examines the economic causes and consequences of crime. Within this line of research, early literature focused primarily on violent crime. In particular, fighting in the NHL has been a popular area of examination. While the NHL institutionally condones fist fights among players during games, fights during the game is still a fairly common occurrence. Paul (2003), Jones, Stewart, and Sunderman (1996), Rockerbie (2012), Kahane, Longley, and Simmons (2013) and Rockerbie (2016) analyzed fans' demand for violent behavior in hockey. In particular, Paul (2003) found in his examination of the 1999-2000 NHL season that an increase of one fight per game would lead to an increase of roughly 4,000 fans. In separating games that occurred in Canada compared to games that occurred in the US, the attendance increase was larger for US games. Kahane et al. (2013) examined the impact that major penalties had on the salaries of NHL players before and after the lockout that occurred in the mid 2000s. They found that committing of major penalties did not influence a player's wage prior to the lockout, however, there was a significant decrease in a player's wage following the lockout. Kahane et al. (2013) attributed this finding to NHL team devaluing violent on-ice play post the lockout which could be due to increased rules by the league to police fighting. Rockerbie (2016) looked at fighting and attendance over a 12 season period in the NHL. His findings concluded that fights had a negative impact on attendance, concluding that for a team to encourage fighting by its players within the game was not a profit-maximizing decision.

More recent research in this area expanded the nature of inquiry looking at such things that the role that culture has on the commission of crimes, the spillover effects of team performance on crimes committed by non-players, team outcomes, and the wage impacts of players who commit on-court violations. Allen (2005) attempted to distinguish cultural factors from individual factors in examining rule breaking in the NHL. His findings supported the overall theory of crime outlined by Becker (1968) while illustrating that individual factors play a much larger role in committing offenses than larger cultural factors. Both Card and Dahl (2011) and Kalist and Lee (2016) examined how NFL games and outcomes impacted crime committed by individual's in a team's local market. Card and Dahl (2011) specifically examined family violence and found that it increased in the local area following the team's loss. In addition, an upset of the home team lead to an increase

of family violence of roughly 10%. Card and Dahl’s (2011) findings were consistent with previous work by Rees and Schnepel (2009) who looked at several categories of crime to examine the relationship with home losses in NCAA Division I-A college football. Kalist and Lee (2016) analyzed how the crime level changes in NFL cities on game days. They partitioned crime into economically and noneconomically motivated crimes. Their results found that economically motivated crime increased by almost 3% on regular season game days while noneconomically motivated crimes were not impacted. Playoff games saw a reduction in economically motivated crimes while a playoff game in the city still did not impact noneconomically motivated crime. Overall, Kalist and Lee (2016) estimated the cost due to this increase in crime was approximately \$90,000. Marie (2016) looked at the impact that soccer games had on crime rates in London. The findings indicated that property crimes increased for home games but decreased for away games. In addition, violent crime was not impacted by soccer games. Yu, McKinney, Caudill, and Mixon Jr (2016) examined the impact of NBA and Division I College Basketball games impacted crime in Memphis, Tennessee. They found home games of both teams led to an increase in robberies, with no discernable impact on crime for away games.

Using Becker’s (1968) seminal research as the foundation, there has been a rich history in sport at looking at different aspects of criminal behavior, detection and deterrence, and the economic consequences. Most of the literature examines “crime” as penalties that occur on the playing field and not off-field misconduct by players. For the most part, the examination on off-field crimes focused on non-players and the increase or decrease in crime rates in cities that host professional or college sport teams. Below, we look at the impact that off-field behavior has on a player’s wage. The league under examination is the National Football League.

2.3 The National Football League

Player on- and off-field behavior and general criticism leveled at the violent and aggressive nature of American football has been raised over the course of the last few decades (Ambrose, 2007). Recent research by Beaver et al. (2016) found that adolescents participating in football were more likely to self report violent behavior. Furthermore, they found similar factors influencing an adolescent’s choice in participating in football also were the same factors influencing violent behaviors as well as an overall finding that participation in football causes these adolescents to become more violent

compared to non football participants.

To examine the impact that off-field behavior has on the earnings of individuals, the present research looks at off-field misconduct in the NFL. Early research by Benedict and Yaeger (1998) found that 21 percent of the 509 players examined in the 1996-1997 NFL season were either arrested or indicted for what the authors categorized as a “serious crime.” Both Blumstein and Benedict (1999) and Leal, Gertz, and Piquero (2015) examined NFL player arrest rates and compared these rates to the general population. Both studies indicated that arrest rates for NFL players are lower than the general population. Leal et al. (2015), examining a longer time period than Blumstein and Benedict (1999), did find that NFL player crime rate for those crimes categorized as violent crimes are higher than the general population for 43% of the sample period. Leal, Gertz, and Piquero (2016) expanded on the work of Leal et al. (2015) by looking at whether NFL players who commit violent crimes do so at a high frequency or are NFL players as a whole are more likely to commit a violent crime. They found only few NFL players commit violent crimes, but engage in violent criminal behaviors at a high frequency.

In addition to comparing crime rates of players versus the general population, research also looks at the impact that off-field behaviors as on team and player outcomes. Weir and Wu (2014) examined the impact on- and off-field misconduct had on an amateur player’s NFL draft position. The NFL Draft is the mechanism through which leagues allocate amateur talent to member clubs. The authors positioned misconduct into three categories: arrests that did not lead to formal charges, arrests that did lead to formal legal charges, and suspension from the team for either team rules or NCAA rule violations. Results from their study showed that being arrested but not charged led to an improvement of draft selection meaning that the player was selected higher in the draft. If an amateur player was charged with a crime or was suspended from the team for any reason, he was selected lower in the amateur draft. Furthermore, Weir and Wu (2014) looked at the impact that these misbehaviors had on games started. They found suspended players started less games, while arrested and not charged with a crime led to an increase in games started. It could be surmised that the arrested and not charged with a crime is a proxy for aggressive characteristics, something that team executives look for when evaluating player talent. Palmer, Duhon, and Soebbing (2015) extended Weir and Wu’s (2014) and looked at the impact of a league’s personal conduct policy had the relationship between misconduct and draft performance. They found that a modification of the

conduct policy did lead to some change in behavior by teams when drafting amateur players who had been in trouble with the law. These impacts varied by position groups.

Stair et al. (2008) examined that the cumulative number of player arrests had on NFL team wins. They found that the cumulative number of arrest did not impact organizational outcomes measured by the number of wins in a season. Allen (2015) looked at the role that off-field misbehavior had on amateur draft selection for rookies and the days on the free agent market for veterans. His results indicated that there was no significant impact on a player’s draft status with off-field incidents or suspensions. When looking specifically at these relationships under a new commissioner, these do have a significant effect resulting in a lower draft position. Allen (2015) also examined the role that off-field incidents or suspensions had on the number of days a veteran player was on the draft market. He found that previous suspensions and fines increased the number of days a player was on the free agent market. However, previous suspensions and fines were not significant after the change in commissioner.

3 Empirical Analysis

The above review of the theoretical relationship between arrests and earnings, and past empirical analysis of this relationship, shows that most previous research estimated reduced form models of the determination of earnings of individuals over time that included variables reflecting individual characteristics and variables that reflected when the individuals were arrested and, in some cases, when these individuals were incarcerated. These models can be interpreted as standard “Mincerian” earnings or wage models.

In the present research, we analyze three specific types of individual compensation from 2000 to 2015: base salary, total salary, and cap value. Data on these three compensation types comes from the *USA Today* NFL salary database from 2000 until 2009 and from the website *Spotrac* from 2011 until 2015. We were unable to obtain compensation information for the 2010 season. Base salary is the player’s listed base salary in the observed season, while total salary reflects the base salary with all the performance bonuses a player receives. Finally, the cap value is the player’s listed cap value for that season. The NFL salary cap, which limits the total amount of money a team can spend on all players on the roster, was adopted at the beginning of the 1994-1995 season (Leeds

and Kowalewski, 2001). The NFL salary cap is considered a hard cap, meaning that teams cannot exceed the maximum amount of money paid to all of its player (Késenne, 2000). However, there are some specific, complex rules regulating how player compensation counts towards the final team cap number. The unit of observation in the present research is a team season.

3.1 Econometric Model

We adopt the basic approach used by Grogger (1995), who estimated a reduced form econometric model of the relationship between current and past arrest status and labor market outcomes for males over a sample period $t = t_1, T - 2, \dots, t_N$. We choose this approach due to broad similarities to our sample (i.e., young men). His model contains distributed lags, in that an arrest at time $t = t_a$ is assumed to affect current and future earnings. The econometric model takes the form:

$$y_{ijt} = \sum_{j=0}^m X_{i,t-j} \beta_j + Z_{ijt} \gamma + \nu_j + \tau_t + \varepsilon_{ijt} \quad (1)$$

where y_{it} is an outcome measure which reflects earnings by individual i in period t , $X_{i,t-j}$ is a vector of variables reflecting individual i 's arrest status as of period t , Z_{ijt} is a vector of control variables that affect individual i 's earnings in period t , and $\beta = [\beta'_0, \beta'_1, \dots, \beta'_m]$ and γ are vectors of unknown parameters to be estimated. ν_j and τ_t are team-specific and time-specific intercept shift variables. ε_{it} is an unobservable error term capturing all other factors that affect the earnings by individual i in period t ; we assume ε_{it} is heteroscedastic.

In Equation (1) the overall effect of arrest on earnings is captured by the vector of parameters $\beta = [\beta'_0, \beta'_1, \dots, \beta'_m]$. β'_0 captures the contemporaneous effect, and $\beta'_1, \dots, \beta'_m$ capture the lagged effect of arrest on earnings. Since this is a distributed lag model, the overall impact of arrest on earnings is reflected in the sum of these parameter estimates.

The expanded regression model estimated is:

$$\begin{aligned} Wage_{ijt} = & \beta_1 DraftPick_i + \beta_2 Exp_{it} + \beta_3 FA_{i(t-1)} + \beta_4 Winpct_{i(t-1)} + \beta_5 FldInc_{i(t-1)} + \\ & \beta_6 FldInc_{i(t-2)} + \beta_7 Arrest_{it} + \beta_8 Arrest_{i(t-1)} + \beta_9 Arrest_{i(t-2)} + \beta_{10} Pos_{it} + \nu_j + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (2)$$

where i indexes players, j indexes teams, t indexes seasons, ν_j and τ_t are team-specific and time-

specific effects respectively, and ε_{it} is an unobservable error term. *Wage*, the dependent variable, reflects player compensation from the sources outlined above. These compensation figures were converted to 2015 real dollars using the Consumer Price Index. In addition, the compensation variables are log-transformed for each season. As Scully (1974) observed, the use of logarithms is important in salary regression models in sport due to the skewness in the salary distribution generated by high-salary players.

Equation (2) includes a number of control variables to isolate the impact that off-field incidents have on player compensation. *DraftPick* is a variable reflecting the overall draft pick a player was selected at in the annual NFL amateur entry draft.² Draft pick is important because it is a signal regarding the ability of a player coming into the league Kahn (1992); Hendricks et al. (2003) with research showing how draft position impacts earnings and length Hendricks et al. (2003). It is anticipated this variable will be negative and significant meaning that a player selected higher in the draft (lower overall draft number) will receive higher compensation. *Exp* is the number of years the observed player has played in the NFL. It is expected that more experienced players will receive higher compensation. *FA* is a variable indicating if the individual was a free agent before the current season. Since a free agent can sell his services to all teams in the NFL, it is expected that a free agent player will see an increase in compensation. Data regarding *DraftPick*, *Exp*, and *FA* were obtained from the website Pro Football Reference.

Winpct is the final team regular season winning percentage for the observed player in the previous season.³ We anticipate that the higher the player's winning percentage of the team he played for last season would increase a player's compensation. *FldInc* controls for on-field misconduct. This variable is an indicator variable for if the player was involved in a on-field incident in which the NFL later reviewed and punished in the form of a fine or suspension from play. We include *FldInc* from the past two seasons to control for the aggressive nature of football which is sought after by NFL teams (Leal et al., 2015). Data on these on-field incidents are obtained from the websites *Just Fines* and *Spotrac*. *Pos* is a vector of indicator variables controlling for an individual's on-field position as NFL compensation varies based on position. For the present study,

²For players not selected in the NFL Draft, they received a value of 332, which is beyond any pick selected in the NFL draft.

³In the case where we observe a player's first observation in the database, we use the current team's final regular season winning percentage. In the case where there is a player entering the database and is playing for an franchise's inaugural year, the winning percentage provided is 0.000.

we use the following positions: Defensive Back (DB), Defensive Lineman (DL), Linebacker (LB), Offensive Lineman (OL), Punter or Place Kicker (P/K), Quarterback (QB), Running Back (RB), Tight End (TE), and Wide Receiver (WR). Information regarding position played were collected from the two salary databases as well as Pro Football Reference.

The main variables of interest are the *Arrest* variables in the current and previous two seasons. These variables are indicator variables for if the player was involved in at least one off-field incident during the noted season. These explanatory variables reflect players' off-field behavior and come from two websites: *San Diego Union Tribune* and *USA Today*. These database contains information on all NFL player incidents with law enforcement officers since the year 2000; records include detailed information about each incident and any criminal and league punishments levied as a result of each incident. This data was verified by checking the data against other websites and newspaper searches on the player around the date of each incident. In addition, a full newspaper search was conducted to ensure that the various arrest databases were comprehensive. The newspaper search did not reveal any additional incidents involving NFL players.

3.2 Propensity Score Matching

Our data do not feature random assignment of players into treatment (arrested) and control (not arrested) groups. We observe players who were arrested during the sample period and players who were not arrested; since the decision to behave in a way that leads to arrest is under the control of players, and is likely correlated with unobservable player-specific factors that affect earnings, a regression model using the full sample of players and a simple indicator variable for arrest will not be able to estimate the true effect of arrest on earnings.

Because of the potential problem of selection into the treatment group, we construct an artificial control group of players who were not arrested using propensity score matching (Rosenbaum and Rubin, 1985). Propensity score matching pairs observations from the treatment group, in this case players who were arrested, with one or more observations from the control group, players who were not arrested, using observable characteristics of players. When relevant differences between treated and untreated players are reflected in pre-treatment observable characteristics, propensity score matching generates unbiased estimates of the effect of treatment on outcome variables like earnings. Propensity score matching has been extensively used in economics to estimate the impact

of labor market interventions like public training programs on the earnings of individual workers (Friedlander, Greenberg, and Robins, 1997).

The basic idea behind propensity score matching is to estimate a logit or probit model where the dependent variable is membership in the treatment group and the explanatory variables include observable characteristics of individuals in the sample. These explanatory variables must include variables observed before the player is assigned to the treatment group. We use the round the player was drafted in the NFL entry draft, an indicator variable for attendance at a university that is a member of a Bowl Championship Series Automatic Qualifying (BCS-AQ) conference, the winning percentage of the NFL team the players played for during his career, an indicator variable for defensive players, and an indicator for skill position players on offense (quarterback, running back, wide receiver, and tight end). Propensity score matching uses the predicted values from this regression to identify non-treated individuals who have similar characteristics to members of the treatment group.

We use k -nearest neighbor matching to identify the two players in the sample that were not arrested that most closely resemble the observable characteristics of the players who were arrested during the sample period. This process matches 777 players who were not arrested to 445 players who were arrested over the period 2000 to 2015, omitting 2010. The untreated group does not contain two players for every player in the treatment group because in some cases an untreated player is matched to more than one treated player. Table 1 shows the average values of the observable characteristics for each group of players, and the sample average for these variables.

	Not arrested	Arrested	Total
Round Drafted	3.475	3.218	3.381
NFL Team's Winpct	0.506	0.504	0.505
Univ was BCS AQ	0.763	0.778	0.768
Plays on Defense (1=Yes)	0.566	0.546	0.559
Skill Position (QB, RB, TE, WR)	0.291	0.333	0.306
Observations	777	445	1,222

A t-test of means on these two sub-samples accepts the null of no difference in means for all variables at the 95% confidence interval. There is no difference in the observable characteristics of the treated and untreated groups of players, in terms of round drafted, position played, attendance at BCS-AQ colleges and universities and success of the NFL team(s) that each player played for over his career. These 1,222 players constitute our analysis sample in the empirical analysis below.

3.3 Results and Discussion

The 1,222 players used in our sample results in 8,522 player-season observations. Table 2 presents summary statistics. The average real base salary and cap value were \$1,329,000 and \$2,310,000 respectively. The average draft position was the 127th overall pick. The average experience in the sample was 4 seasons with a range of 1 year to 15 years of NFL experience. Four percent of the players in the sample were involved in an on-field incident in the current season while six percent were involved in an off-field incident in the previous season.

Table 2: Summary Statistics

	mean	sd	min	max
Base Salary (in 000)	1329.42	1743.65	0.34	18581.96
Total Salary (in 000)	2727.76	3445.23	0.34	43962.58
Cap Value (in 000)	2310.68	2754.87	0.34	29318.20
Overall Draft Pick #	127.74	110.50	1.00	332.00
Experience (years)	4.15	2.70	1.00	15.00
Free Agent	0.51	0.50	0.00	1.00
Winpct	0.51	0.19	0.00	1.00
FldInc -1	0.04	0.20	0.00	1.00
FldInc -2	0.03	0.17	0.00	1.00
Arrested	0.06	0.24	0.00	1.00
Arrested season -1	0.05	0.21	0.00	1.00
Arrested season -2	0.04	0.19	0.00	1.00
Observations	8522			

Table 3 presents the team and year fixed effects OLS. We estimate the parameters of Equation (2) using OLS with standard errors clustered by player to capture specific player variance such as individual performance. The models in Table 3 explain between 41 and 44 percent of the observed variation in the dependent variables. In models where the dependent variable has been log-transformed and the explanatory variables have not (semi-log models) the interpretation of the

parameter estimates is that the dependent variable changes by $100 \times (\text{estimated coefficient})$ percent for a one unit increase in an independent variable, while all other variables in the model are held constant. We find that the effect of overall draft pick on both compensation variables is consistent with expectations; a higher the draft selection (moving down in the draft) leads to a decrease in both compensation variables. The effect on salary is less than 1% in total compensation for a one unit increase in overall draft pick (e.g., moving from the 50th overall selection to the 51st overall selection). We also find the effect of experience to be positive and significant looking at all three compensation types. Depending on type of compensation, an additional year of experience leads to an increase of between 7.4% (Total Salary) to 11.5% (Base Salary). This increase could be a reflection of rules governing the minimum salaries for veteran players who would earn a higher base wage compared to less experience players in the league. We also find that free agency leads to a positive and significant increase across both types of compensation. These effects range from a 65% increase (Base Salary) to a 78% increase (Total Salary). This increase reflects an increase bargaining power for players once they reach unrestricted free agency. By signing these players, the new team does not have to compensate the previous team with draft picks that is necessary under other league rules governing restricted free agency. We find that team winning percentage is insignificant across all three models, reflecting the idea that team executives do not take into account the success of the previous team when determining individual player compensation.

Table 3: Regression Results: Overall Crime

	(1)		(2)		(3)	
	Ln Base		Ln Total		Ln Cap	
	β	Std. Err.	β	Std. Err.	β	Std. Err.
DraftPick	-0.002***	(0.000)	-0.004***	(0.000)	-0.004***	(0.000)
Exp	0.115***	(0.007)	0.074***	(0.008)	0.096***	(0.008)
FA(t-1)	0.658***	(0.031)	0.787***	(0.038)	0.717***	(0.037)
Winpct(t-1)	-0.045	(0.047)	0.114	(0.060)	0.091	(0.057)
FldInc(t-1)	0.239***	(0.045)	0.411***	(0.056)	0.424***	(0.054)
FldInc(t-2)	0.212***	(0.053)	0.293***	(0.058)	0.295***	(0.059)

Arrest	0.055	(0.037)	-0.006	(0.045)	0.046	(0.042)
Arrest(t-1)	-0.023	(0.036)	-0.064	(0.047)	-0.041	(0.046)
Arrest(t-2)	-0.031	(0.048)	-0.068	(0.061)	-0.059	(0.059)
DL	0.001	(0.038)	0.075	(0.050)	0.077	(0.051)
LB	-0.017	(0.037)	0.008	(0.052)	0.001	(0.052)
OL	-0.043	(0.040)	-0.042	(0.056)	-0.040	(0.057)
P/K	0.008	(0.063)	0.022	(0.083)	0.033	(0.086)
QB	0.283***	(0.081)	0.508***	(0.103)	0.494***	(0.108)
RB	-0.075	(0.041)	-0.052	(0.057)	-0.075	(0.058)
TE	-0.139**	(0.050)	-0.194**	(0.063)	-0.185**	(0.063)
WR	0.042	(0.042)	0.086	(0.058)	0.072	(0.060)
Constant	13.429***	(0.084)	14.071***	(0.101)	14.070***	(0.101)
N	8522		8522		8522	
R^2	0.433		0.414		0.439	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The position indicator variables illustrate the value that team executives place on certain positions, probably because the marginal productivity of players varies systematically across positions. We find that quarterbacks receive significantly higher compensation in relation to the reference group (Defensive Backs) than other positions across all compensation types. This increase in salary, particularly for quarterbacks, can be large. The size of the quarterback premium is not surprising, given the influence of quarterbacks, who touch the ball on every offensive play, on game outcomes. We find that Tight Ends receive less compensation in relation to the reference group.

Examining on-field incidents, we find that the variable coefficients are positive and significant. For a player being involved in an on-field incident in the previous season that the NFL later punished resulted in an increase in compensation between 23.9% (Base Salary) and 42.4% (Cap Value). Being involved in an on-field incident two seasons prior to the observed season still results in a positive increase in compensation. However, the increase in compensation is lower than the season prior to the observed season. We believe the positive and significant variable coefficients

reflects the premium that the NFL pays for aggressiveness amongst players. Furthermore, this finding may also indicate the risk that these players are more willing to take compared to other players. This risk taken by players may improve their on-field performance which leads to higher compensation. In addition, team executives and coaches may prefer players who are violent and aggressive on the field which is similar to what is observed and reported regarding the New Orleans Saints bounty scandal in 2012 where players were provided cash payments in exchange for injury players on the opposing team. These executives might be willing to tolerate misconduct off-the-field because the same qualities that are not acceptable in broader society (e.g., violence and aggression) are acceptable in the context of play on the football field.

The variables of interest are the three variables reflecting involvement in off-field incidents in the current season, the previous season ($t - 1$), and two seasons prior to the current season ($t - 2$). The results show off-field incidents have no impact amongst the three compensation types (Base Salary, Total Salary, Cap Value). The fact that lagged involvement in off-field incidents is not associated with lower compensation, compared to the propensity score matched comparison group, does indicate that teams do not necessarily care about player off-field behavior.

The findings related to the *Arrest* variables suggest the NFL personal conduct policy does not significantly reduce current and future compensation of players. The NFL Personal Conduct Policy was first implemented by then NFL Commissioner Paul Tagliabue in 2000 to deter off-field deviance in response to negative public attention from the media, fans, and politicians (Benedict and Yaeger, 1998; Edelman, 2008) In early 2007, this policy was modified by Commissioner Roger Goodell, supposedly placing an increased emphasis on players and coaches conducting themselves properly off the field (Ambrose, 2007). Results from Table 3 does not seem to indicate that the personal conduct policy through the sample period has any impact on emphasizing the personal conduct of players off-the-field.

3.4 Results by Crime Type

As mentioned earlier, the data from *San Diego Union Tribune* and *USA Today* contains detailed information of the incident. As a result, we are able to read those incident reports and code the incident reports on a broad category of types. For our analysis, all crimes are partitioned in the follow crime types: Alcohol, Drugs, Driving, Harm to Others (non domestic), Domestic, Weapon,

Other. Each incident may be coded under multiple types. For example, a drunk driving incident would be coded under both alcohol and driving. Figure 1 provides both the total number of player incidents (crime) through the sample period and how those total incidents are broken down by type. Looking at Figure 1, the number of incidents reached their peak between 2006 and 2008. Driving and alcohol incidents are consistently the two highest incident types.

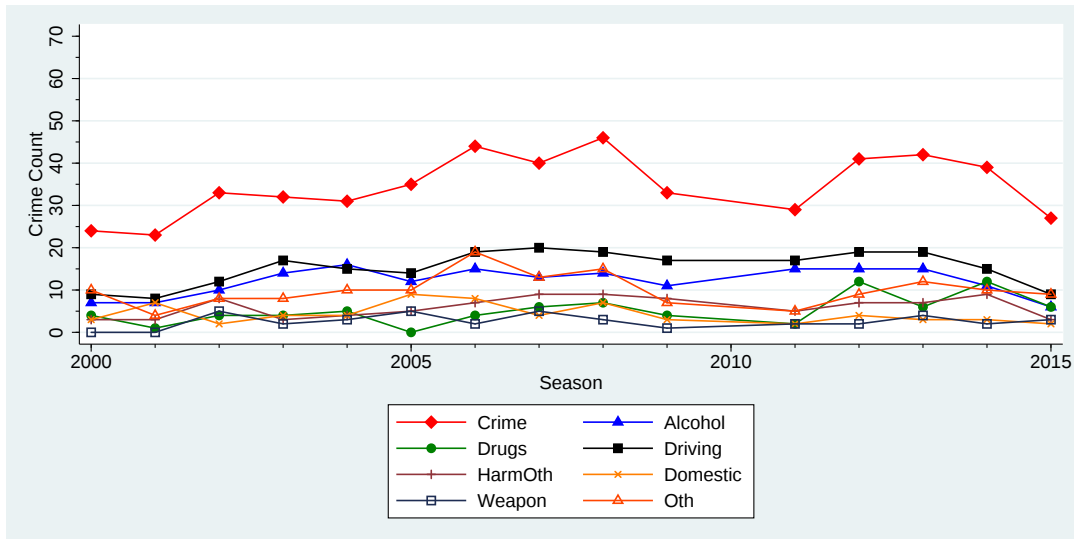


Figure 1: NFL Incidents By Year: 2000-2015, omit 2010

Looking at crime type, we reestimate Equation 2. We substitute the *Arrest* variables with the crime types. The results are displayed in 4. The control variables are consistent in terms of sign and significance as reported in Table 3. Controlling for these factors such as experience, team success, free agency, and on-field incidents, we do find some interesting results as it relates to crime types. As it relates to base salary, we find that an alcohol incident in the current season results in a 22.5% decrease in base salary. However, we do not see any lasting influence when looking at the the two lagged variables. A driving incident results in a 22.5% increase in base salary in the current season. In addition, a driving incident in the previous season results in an 18.5% increase in base salary. We also find negative and significant lagged effects as it relates to crimes labeled as Harm to Others and Weapons.

Looking at real total salary, we find that criminal effects are significant for many of the lagged variables. However, we do not find any significant effects when we look at incidents in the current time period. We also find different results compared to the results examining base salary. For

example, an alcohol incident in the current time period does not have any impact on total salary, however, there is a reduction of 23.6% in total salary of an alcohol incident in the previous season. We also find negative and significant effects for drugs (previous season) and weapons (previous two seasons). Positive effects are found for a driving incident two seasons prior to the observed season.

Table 4: Regression Results: Crime Type

	(1)		(2)		(3)	
	Ln Base		Ln Total		Ln Cap	
	β	Std. Err.	β	Std. Err.	β	Std. Err.
DraftPick	-0.002***	(0.000)	-0.004***	(0.000)	-0.004***	(0.000)
Exp	0.115***	(0.007)	0.074***	(0.008)	0.096***	(0.008)
FA(t-1)	0.657***	(0.031)	0.786***	(0.038)	0.716***	(0.037)
Winpct(t-1)	-0.049	(0.047)	0.115	(0.059)	0.090	(0.057)
FldInc(t-1)	0.238***	(0.046)	0.412***	(0.056)	0.424***	(0.054)
FldInc(t-2)	0.210***	(0.053)	0.288***	(0.058)	0.290***	(0.060)
Alcohol	-0.225*	(0.107)	-0.144	(0.120)	-0.132	(0.114)
Alcohol(t-1)	-0.158	(0.087)	-0.236*	(0.112)	-0.271**	(0.104)
Alcohol(t-2)	-0.088	(0.118)	-0.188	(0.137)	-0.168	(0.131)
Drugs	-0.081	(0.106)	-0.215	(0.122)	-0.078	(0.116)
Drugs(t-1)	-0.155	(0.109)	-0.257*	(0.131)	-0.235	(0.123)
Drugs(t-2)	-0.218	(0.113)	-0.209	(0.136)	-0.229	(0.131)
Driving	0.225*	(0.091)	0.076	(0.105)	0.132	(0.100)
Driving(t-1)	0.185*	(0.083)	0.188	(0.105)	0.251**	(0.095)
Driving(t-2)	0.095	(0.114)	0.245*	(0.122)	0.205	(0.118)
HarmOth	-0.110	(0.123)	-0.048	(0.119)	-0.011	(0.108)
HarmOth(t-1)	0.056	(0.085)	-0.018	(0.115)	-0.005	(0.110)
HarmOth(t-2)	-0.234*	(0.118)	-0.267	(0.162)	-0.247	(0.154)
Domestic	0.073	(0.080)	0.098	(0.116)	0.052	(0.114)
Domestic(t-1)	-0.188	(0.118)	0.004	(0.153)	-0.092	(0.141)

Domestic(t-2)	0.056	(0.103)	-0.032	(0.144)	0.035	(0.135)
Weapon	-0.018	(0.117)	-0.064	(0.139)	0.001	(0.126)
Weapon(t-1)	-0.120	(0.118)	-0.379**	(0.140)	-0.243	(0.148)
Weapon(t-2)	-0.270*	(0.111)	-0.448**	(0.171)	-0.457**	(0.167)
OthrCrime	0.123*	(0.060)	0.131	(0.085)	0.099	(0.076)
OthrCrime(t-1)	0.051	(0.064)	0.094	(0.088)	0.089	(0.081)
OthrCrime(t-2)	0.077	(0.096)	-0.019	(0.120)	-0.002	(0.115)
DL	0.001	(0.037)	0.075	(0.050)	0.076	(0.051)
LB	-0.018	(0.037)	0.005	(0.052)	-0.002	(0.052)
OL	-0.048	(0.039)	-0.049	(0.055)	-0.046	(0.056)
P/K	0.012	(0.063)	0.027	(0.083)	0.037	(0.086)
QB	0.280***	(0.081)	0.507***	(0.103)	0.492***	(0.108)
RB	-0.078	(0.041)	-0.056	(0.058)	-0.079	(0.058)
TE	-0.143**	(0.050)	-0.201**	(0.062)	-0.191**	(0.063)
WR	0.039	(0.042)	0.082	(0.058)	0.067	(0.060)
Constant	13.438***	(0.084)	14.079***	(0.101)	14.079***	(0.100)
Observations	8522		8522		8522	
R^2	0.436		0.416		0.442	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As it relates to the effects that types of crimes has on a player's cap value, we find an alcohol incident in the previous season and a weapon incident two seasons prior lowers a player's cap value by 27.1% and 45.7% respectively. An incident involving driving in the previous season increases a player's cap value by 25.1%. Overall, we see that different types of incidents does impact our three compensation types. The one surprise finding is as it relates to domestic incidents. Over the past few seasons, there have been numerous incidents as it relates to domestic violence and the league has been criticized by the media, politicians, and other stakeholders about the lack of punishment to players who are involved in domestic incidents. The most notable incident was Baltimore Ravens Running Back Ray Rice in 2014 (Withers, 2015). Our results find that domestic incidents in the

current or previous seasons do not impact player compensation.

Overall, the results for different crime types may be surprising to some given not only the increased emphasis on player misconduct by the NFL but also because the arrests may lead to consequences such as suspension and bad public relations in the local market for teams. The positive impact on compensation based on different incidents may be explained using risk preference in the model by Prendergast (1999). In this model, workers are risk averse. Less risk averse workers earn more. Players involved on off-field incidents, which can be viewed as risky behaviors, would be expected to earn more based on the model developed by Prendergast (1999). Another possible explanation for the results on Table 4 is similar to the explanation provided by Nagin and Waldfogel (1998), who observed that young males convicted of a crime are still acquiring human capital. This acquisition of human capital can offset the negative effects of conviction. In this case, many of these individuals were not incarcerated. In addition, they were participating in football activities while events surrounding these incidents played out in the legal system. Thus, it is plausible the acquisition of human capital may play a role in explaining the findings in the current study. In addition, riskiness may also apply to GMs who hire troublesome (arrested) players in the belief that franchise personnel can tame the player's risky behaviors (i.e., worth putting up with recklessness so long as performance on-field is sustained).

4 Conclusions

Building on the empirical analysis of Grogger (1995), who examined the average earnings of male subjects in the National Longitudinal Survey of Youth (NLSY) between 1980 and 1984 who had been arrested before 1980, the present research examines off-field incidents and their effect on NFL player compensation over the period 2000-2015, omitting 2010. We find that incidents in the current and previous seasons do not impact compensation as defined by base salary, total salary, and cap value. Looking at specific incident types in the current and previous two seasons, we do find that different types of criminal incidents impact compensation.

The results from the present research can speak to policies governing conduct by organizations. As Waldfogel (1994) commented, if convictions can limit opportunities and the wages of past criminals, a market sanction is applied. Thus, market sanctions can be considered part of an

individual's overall punishment and is potentially part of the deterrence effect to commit crimes. However, the findings in the present research do not find a market sanction, rather there is a premium for criminal behavior. Thus, if the organization (i.e., the NFL and its member clubs) are interested in deterring crime and other off-field misbehavior, applying an automatic monetary sanctions may have some appeal. This rationale is consistent with Waldfogel (1994) looks into the criminal justice system.

The findings also contribute to the growing literature on crime and misconduct in sport. Most previous research examined the impact of in-game misconduct on earnings and team performance. The current study focuses exclusively on off-field player misconduct (while controlling for on-field misconduct), providing new insight into the effects of off-field behavior on compensation.

Future research could examine what Allen (2005) referred to as "cultures of illegality". Allen (2005) analyzed intersection between individual illegal activity and team illegal activity in the NHL. He found that both individual-specific factors and broader team-related factors influence the determinants of penalties in NHL games. Future research could examine the role that broader cultural factors play in not only the determining player compensation in the NFL, but also how total team off-field incidents impact individual player compensation and team revenues.

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