



The impact of salary dispersion and performance bonuses in NFL organizations

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Abstract

Purpose – This paper aims to evaluate the effects of both salary dispersion and incentive pay on team performance using data compiled from the National Football League over the years 2000-2007.

Design/methodology/approach – The authors consider the effect of pay structure on both in terms of on-field and financial performance. Salary disparity and its subsequent consequences has been a topic of economic research on corporate pay structure and also professional team sport organizations. Analysis of pay structures incorporating the effects of incentive pay on performance is also recurrent in the literature. The paper uses regression analysis and incorporates both fixed and random effects models.

Findings – A relationship between improved on-field performance and increased payroll, lower levels of salary dispersion, and increased incentive payments is found. However, when employing team revenue production as the measure of performance, a positive relationship with salary dispersion is found.

Research limitations/implications – The findings are of particular interest because a conflict of objectives is seen. When financial incentives are primary, hierarchical pay structure is optimal. It is shown that more compressed pay structures improve on-field performance.

Practical implications – This study is unique in addressing how salary dispersion in combination with incentive pay correlates to team success as measured by both winning and revenue production. While the authors used the NFL as the organization of interest, this type of analysis could be applied to other professional sport leagues incorporating some type of salary cap. In addition, future research could also involve a mixed methods approach to help gain an additional understanding of the decision making of those in managerial positions of influence within sport and non-sport organizations.

Originality/value – The study is unique in that most previous empirical work analyzing payroll structure in sport organizations does not consider disparity in conjunction alternative methods of improving performance through structure of compensation.

Keywords Decision making, Economics, Football, United States of America, Incentive schemes, Team performance

Paper type Research paper

Introduction

Managerial decisions determining pay distributions are fundamental to firm and individual employee performance. Specifically, a key challenge facing organizational managers is whether their payrolls should be more hierarchical or compressed for their firms' employees. The first category, hierarchical pay distribution is characterized when a larger portion of pay is concentrated on fewer individual employees. Bloom (1999) provides a thorough review of the theoretical literature and empirical work on compressed versus hierarchical pay allocation from both economic and management



perspectives. He explains the intent of hierarchical pay distributions are to foster higher employee performance as they create a meritocracy where accomplishments are rewarded monetarily. However, empirical work has found hierarchical pay distributions often create disincentives for cooperation, promote employee dissatisfaction, and diminish productivity. Under this type of wage distribution, lower level employees matter significantly less, which can sabotage the commitment levels of the employees. DeBrock *et al.* (2004) argued from an economic perspective the effectiveness of hierarchical pay distributions is grounded in efficiency wage theory, establishing that firms must pay premium wages to attract and maintain the best workers. The implication to hierarchical pay structure is that efficiency wages are most effective when awarded to the firm's most productive employees.

Comparatively, a compressed pay allocation is one with minimal dispersion in compensation levels across the firm. From a management perspective, compressed compensation models offer several benefits to the organization including a workforce that is not constantly evaluating whether they are compensated appropriately. Formal economic models developed by Lazear (1989, 1991) indicate less variation in employees' pay is efficient if it improves teamwork between workers, and will more likely occur when teamwork is more important than individual performance to firm objectives. Bloom (1999) contends that given utilization of a compressed compensation pay scale, employees are less likely to attempt renegotiation of their salaries.

Empirical tests of the effects of pay dispersion on firm performance have been extensively examined in corporations (e.g. Jensen and Murphy, 1990; Cowherd and Levine, 1992). Included in the empirical analyses of the question are several studies on the effects of pay dispersion in professional team sport leagues. Depken (2000) used data from Major League Baseball (MLB) and found increased salary dispersion had a negative impact on team performance. DeBrock *et al.* (2004), also using MLB data, found evidence that higher levels of imbalance negatively affect team performance and attendance. However, they cautioned that using unconditional estimators of dispersion overstated the effects of inequality and found the effects of dispersion existent but mitigated when using a conditioned regression model. Both studies found a strong correlation between total payroll and team success supporting the efficiency wage hypothesis, that higher levels of overall pay improve performance. Bloom (1999) also examined the pay distribution to performance relationship in MLB and found that compensation dispersion had strong implications for both individual player performance and team success. He asserted, contrary to the other MLB studies, across virtually every measure of player and team performance there was a negative relationship with hierarchical pay dispersion. Baker (2002) found support for the hypothesis that wage compression improves performance, using data from the National Football League (NFL). However, rather than calculating payroll dispersion directly, he made estimates on the basis of the dispersion of unjustified pay, meaning the difference in his model's predicted pay for a player and his actual salary. Berri and Jewell (2004) examined National Basketball Association (NBA) franchises and found salary dispersion was not a significant determinant of team performance. Frick *et al.* examined each of the four North American major leagues including the National Hockey League (NHL). Calculating team Gini coefficients to indicate dispersion, they found, like Berri and Jewell, that salary compression worsens team performance in the NBA. Consistent with other studies, they revealed less dispersion is correlated with

better team performance in MLB and the NFL, though their NFL coefficient falls just short of statistical significance. They found no relationship between salary compression and team performance in the NHL.

In addition to allocating salaries across their rosters, sport organizations must also address how they are going to pay individual players using a combination of guaranteed and incentive type pay. In the NFL, incentive bonuses now account for about 25 per cent of player compensation. The use of incentive-based pay not only influences individual and team performance directly, but also may alter payroll dispersion and the perception of fairness. The effects of output based pay and performance theory are detailed in the extensive agency theory literature from economics. Gibbons (1998) provides a thorough review of the economics literature as it applies to performance incentives within firms. Generally, tying compensation to output is an efficient and effective method of motivating employees. However in theory, there may be inefficiencies when individual and group performance cannot be easily distinguished (Gibbons, 1998), determination of the bonuses conflicts with overall firm objectives (Baker, 2002), or the bonus relies on subjective evaluation. While team bonuses may overcome some of these problems, they are susceptible to the free rider problem (Holmstrom, 1982). Principal-agent issues in professional team sports are addressed primarily in a substantial literature on shirking. This literature almost exclusively focuses on individual player as opposed to team performance, and is summarized effectively by Berri and Krautmann (2006). Maxcy *et al.* (2002) asserted incentive pay, among other deterrents to shirking, was effective in MLB because there was little evidence that players shirk.

In this paper, we include variations in incentive pay with respect to team performance. NFL player salaries include a combination of guaranteed income, determined in large by signing bonuses, annual salaries stipulated by contracts that are not guaranteed if the player is released from the team roster prior to the expiration of his contract, and individual and team incentive bonuses. The NFL provides an ideal laboratory to analyze decisions about the equality of pay distributions and incentive pay. From a managerial perspective regarding pay dispersion, questions to consider are such: Were Brett Favre's contributions to the success of the Green Bay Packer's in 2007 worth \$4.1 million more than the next highest paid player, Nick Barnett? Was the \$17.25 million in contracted incentive bonuses instrumental to the New England Patriots' undefeated regular season in 2007? The current literature indicates that contemporary pay distribution models provide mixed evidence of how pay levels should be distributed and how these various distributions will ultimately impact organizational performance. Additionally, NFL teams are constrained by a hard payroll cap and floor. Management's decision is how to best allocate talent and payroll within those limits. The paper proceeds as follows. In the next section, we describe the salary cap and other factors influencing an NFL manager's decision. The data and methodology are described in the third section and discussion of the results and recommendations for further research complete the paper.

Salary and payroll determination in the NFL

Currently, only the NFL and NHL currently operate with a "hard" salary cap. A salary cap is a league mandated maximum dollar amount an individual team can spend on total player's salaries, and serves as a mechanism to limit the available dollars each

franchise may use to compensate their players. According to the Collective Bargaining Agreement, salary means all compensation paid to a player, including money, property, investments, loans or anything else of value. Thus, the significant non-salaried benefits not accounted for by the salary cap are players' geographic location preferences. Under the NFL's hard cap system all player contracts are sent to the league's central office for approval and those violating the cap are prohibited. Teams found in violation *ex post* face severe sanctions in the form of fines and forfeited draft choices. Hypothetically, this mechanism attempts to restrict teams with the most financial resources from dominating their respective leagues by consistently accumulating better talent. The NBA and MLB employ less draconian measures to restrain team payrolls by employing a "soft" salary cap, which may be exceeded under defined circumstances, and a luxury tax on payrolls, respectively.

The salary cap is justified on two primary grounds. First, it provides management with a high degree of input cost certainty. In professional sports, player salaries are the greatest input cost. With the predetermined payroll cap set well in advance of the off-season signing periods, and based on a set percentage of league revenues, teams are able to forecast costs accurately and thus face less market risk. Second, the salary cap promotes competitive balance. The cap constrains the highest revenue teams from dominating the talent markets and theoretically creates a relatively equal distribution of talent across league members. The salary cap's companion salary floor, which sets minimum team payrolls at approximately 85 per cent of the team cap value each year, further reduces payroll variation across teams. Although there are other factors involved, the NFL has reached unprecedented levels in terms of revenues, attendance, and overall fan interest since the initial implementation of the salary cap in 1994. The effects of the salary cap on league competitive balance and finances have been examined in several studies (e.g. Maxcy and Mondello, 2006; Quirk and Fort, 1992; Schmidt and Berri, 2001). However, there has been inadequate attention paid to the effect of the salary cap on individual team decisions and performance, which is the focus of this work.

The NFL's salary cap dates to the 1993 collective bargaining agreement between the NFL and the leagues players union (NFLPA). Negotiations resulted in an agreement where players earned the right to free agency while the owners implemented a salary cap (Quinn *et al.*, 2007). Determination of the NFL's salary cap for each season is detailed in Article 24 of the amended Collective Bargaining Agreement (NFLPA, 2006) and described thoroughly by Katz (2008). Principally, the NFL computes the league-wide cap as a percentage of the league's projected total revenues (Defined Gross Revenue or DGR) less projected benefits for the season divided by the number of teams in the league. Over the years analyzed in this study (2000-2007), the percentage of DGR directed to players' salaries is greater than 60 per cent of total revenues. However, there was a significant change as a result of an amendment to the CBA beginning with the 2006 season. DGR was expanded to include additional stadium revenues, most notably revenue from luxury box and premium seating sales and including parking and concession revenues. Prior to 2006, these revenue sources were removed from the between-teams revenue sharing plan. However, now some of these revenues are included in a pool that reallocates funds from the highest to lowest revenue producing teams. The 2006 changes resulted in the players' salary share dropping to lower percentage (approximately

57.5 per cent) of a larger pool, with the magnitude of the latter greater and to the benefit of the players. The team salary cap for 2006 jumped from \$94.5 million to \$102 million after recalculation with the new formula (Lackner, 2008). Additionally, the NFL entered into a new television contract beginning with the 2006 season increasing total league revenues by more than 1.5 billion annually.

Although a fundamental purpose of the salary cap is to produce less payroll dispersion among teams, there are examples where the amount of a player's salary counted against the cap substantially fluctuates from his actual pay in any given season. Therefore, managerial decisions involving player salaries and, more specifically, how that money is allocated over time, plays a key role in how teams adhere to the obligatory cap. NFL players are paid by some combination of three methods (Heubeck and Scheuer, 2003):

- (1) Signing bonuses – up front payments are rewarded to players for signing a contract or extending a previous one.
- (2) Fixed payments – previously agreed on amounts paid annually and count against a team's salary cap total, but are not guaranteed over successive years.
- (3) Performance bonuses – incentive payments based on various individual and team accomplishments. If performance bonuses are classified as "likely to be earned" (LTBE) they count toward this year's cap. If a bonus is earned but not classified as LTBE, it counts against the next year's cap. If a LTBE bonus is not earned, the team receives a credit toward the next years cap.

Payroll decisions may not be immediately evident, but rather become more apparent in subsequent seasons because individual contracts often include deferred compensation in the form of signing bonuses. For example, the CBA rules concerning signing bonuses and renegotiation rights allow total club expenditures to exceed the cap in any season. The reason for this peculiarity is because under CBA rules, all signing bonuses are allocated equally over the years of the player's contract. To illustrate, suppose a player signed a four-year contract in 2007 calling for \$1 million per year in annual salary plus a \$2 million signing bonus. In this widespread example, even though the player received \$3 million in the first year (\$2 million signing bonus plus \$1 million in salary), only \$1.5 million is actually counted against the cap in 2007. The signing bonus is prorated so that \$0.5 million is added to the players base salary and performance bonuses to determine the player's cap value for each additional year of the contract through 2010. If the player is traded, waived, or released from the team's roster before the completion of his contract, the entire remaining prorated bonus is accelerated and counted against the cap in either the current season (leaving the roster before June 1) or the next year – sometimes two – if released after 1 June. Consequently, the salary cap charge for players no longer on the roster is known as "dead money" and may present teams with significant problems when attempting to field competitive teams. For 2006-2007, dead money averaged 10 per cent of cap value per team (Kowalski, 2008). However, some teams have dealt with significantly higher dead money values. For example, the San Francisco 49ers were forced to apportion their \$80.6 million salary cap in 2004 to include \$28 million of dead money (Miller, 2004).

The NFL CBA (NFLPA, 2006) has several provisions specifying how performance bonuses are divided into team and individual incentives. Examples of both of these incentives are shown below:

(1) Team incentives include:

- Winning games, conference championships, or the Super Bowl.
- Total points scored, yards accumulated, and team rankings in several statistical categories.
- Touchdowns yielded, number of yards allowed, or sacks registered.

(2) Individual incentives include:

- Statistical accomplishments, e.g. touchdowns scored, touchdowns caught.
- Physical conditioning benchmarks including weight limits.
- Rankings compared to other position players.

Collectively, as of 2002, about 70 per cent of all NFL players receive payments, which are based on some type of individual accomplishment and these payments represented about 5 per cent of the total salary of all players (Heubeck and Scheuer, 2003). Our data shows that by 2006, incentive bonus payments have increased and now account for about one fourth of total players' salaries, league wide. Table I shows the league's average incentive bonuses as a per cent of payroll. A major jump is indicated after the CBA was amended in 2006, as in 2004 and 2005 incentive bonuses were less than 10 per cent of total salaries. Similar to signing bonuses, there is also a dynamic aspect to performance bonuses. When a team is simply under the salary cap in a given season it has no bearing on the next season's cap value. However, unpaid LTBE bonus counting against the current year's cap is credited back to the team and increases the following season's cap by that amount. Therefore, a common practice for mid-season signings is thus to classify a player's bonus as LTBE, even though there is no realistic chance of the bonus being earned. For example, bonuses for special teams play must be classified LTBE, so teams will include a significant special-teams-play bonus for a player and never use him in that capacity (Katz, 2008). In 2008, 24 of the 32 teams received an upward adjustment to their salary caps for unpaid LTBE from 2007, while only six were adjusted downward for additional bonus payments in 2007. Upward adjustments were as high as an additional \$18 million for the Minnesota Vikings and nine other teams received adjustments of more than \$10 million (Frank, 2008). Anecdotal evidence suggests this practice dates back a decade, but remains unclear when it became widespread.

Year	NFL total incentive bonuses \times \$1m	Incentive bonuses per team \times \$1m	Incentive bonus per cent of total payroll
2007	\$ 707.86	\$ 22.12	23.93
2006	\$ 794.81	\$ 24.84	27.82
2005	\$ 217.16	\$ 6.79	9.04
2004	\$ 176.10	\$ 5.50	7.55
2003	\$ 130.37	\$ 4.07	6.18
2002	\$ 110.70	\$ 3.46	6.11
2001	\$ 73.44	\$ 2.37	4.29
2000	\$ 94.05	\$ 3.03	5.58

Table I.
Increase in incentive
bonus payments and
incentive bonus
payments as a percentage
of players' pay, over time

Theoretically, if incentive bonuses are prepared superficially, they may not be expected to have a meaningful connection to individual or team performance.

While there is clearly evidence suggesting payroll allocations are tied to league economics and competitive balance, our approach here is to focus on managerial decisions given the payroll constraint. That is, does an NFL team's on-the-field and financial performance correlate with the team payroll dispersions? Moreover, what specific payroll philosophy adopted from a managerial perspective appears to produce the best results across a given time period for NFL organizations? Furthermore, is there a relationship between on-the-field success and compensation philosophies as related to both guaranteed and incentive driven money? This study attempts to assess these managerial decisions by utilizing an observable measure of success – yearly changes in franchise win per cent and team revenues. We examine players' salaries in terms of how they are structured in the overall team salary cap. Our question of interest examines whether successful teams are able to structure their teams' payroll to be heavily dependent on bonuses compared to guaranteed salaries, or are they better off luring the very top talent with offers of large amounts of guaranteed money through substantial signing bonuses? The use of signing bonuses may not only be risky in terms of increasing dead cap money in future years, but could also increase team salary dispersion.

Methodology

We attempt to analyze the manager's decision for talent acquisition and payroll dispersion. To attract or retain the highest quality free agents, team general managers face a competitive market and subsequently must match or better offers that include significant signing bonuses. The acquisition of the best talent undoubtedly has a positive effect on production, but at what cost? As additional salary cap money is allocated toward superstars, fewer dollars are available for mid-tier free agents and a team may be forced to substitute with lowest tier players to meet salary cap constraints. Because of the imposed cap constraint, salary dispersion may not be a fairness issue, but rather have a negative effect on within-team talent allocation. Although the effect on the salary cap is mitigated, there is risk of losing dead money cap space in future years. Second, although contracts where paid salary is appreciably determined by incentive bonuses may be attractive to management, the players assume more performance risk and those with the least negotiating power may be most likely to sign such contracts, and view them as unfair. If performance bonus money is viewed as spurious because players are not allowed to earn the bonus there may be a further negative impact.

We do not presume to imply that managers have anywhere near absolute control of the talent variation on their rosters. Unexpected injuries, retirements, interference from unapprised ownership and even respect to the natural flow of rebuilding cycles are all factors affecting talent and salary dispersion in a given year that may be beyond the manager's control. Notwithstanding our objective here is to analyze the correlation between a teams' performances given changes in bonus payments and salary dispersion.

Our data set examines a total of 254 club-year observations from NFL teams over the period 2000-2007. Salary and payroll data were obtained from the *USA Today's* (2008) NFL Salary database. Team revenue data were obtained from *Forbes.com* (2008). The sample contains the full eight seasons for all 32 teams except the Houston

Texans, who began play in the 2002 season. Statistics selected to reflect management choices and capacity to improve team win per cent have been compiled for each team. Although NFL financial and payroll data is available for several years prior to 2000, the breakdown between signing and performance bonuses, necessary for this analysis was not published until then.

The decision variables include payroll and bonus payments, which are adjusted as a percentage of that year's salary cap. *USA Today* reports players' salaries categorically including signing bonus, other bonuses, and cap value, which adjust total salary based on the prorated signing bonuses. For our purposes, we use cap value as the measurement of player salaries and other bonuses to measure incentive pay. Salary dispersion is measured with the coefficient of variation. In addition, dummy variables representing head coaching changes, which may reflect a management decision toward improvement, conference affiliation (AFC, NFC), and the years covered by the amended CBA (2006, 2007) are also included. Furthermore, a variable for roster size measuring the total number of players on the team's payroll in a given season and counting towards the cap as reported in the USA Today database is included. The rosters do not include players traded or released prior to the season and representing dead money. Nonetheless, despite rosters being limited to 53 players, roster sizes in our sample ranged from 53 to 70 players. High roster numbers may be attributed to bad luck-high injury rates, forcing teams to add players, or poor managerial decisions involving the initial roster selection. Summary statistics are shown in Table II.

To accomplish the analysis empirically we utilize a two factor fixed effects model described in Green (1997), and offer a standard ordinary least squares specification (OLS) for the purpose of comparison. Fixed effects models have the feature of controlling for all stable characteristics of the individual teams, whether measured or not. This is accomplished by using only within-individual variation to estimate the regression coefficients and allows for the discerning of both, a group effect across teams and a time effect for each year included in the sample. The fixed effects model computes a group specific constant for each team, thus each individual team is its own control. Compared to the standard OLS method, which taken together, forces us to make comparisons between unobserved characteristics across teams, we are comparing each team-year observation to its group mean. Specifically, we are

Variable	Observations	Mean	Standard deviation
WPCT	254	0.500	0.192
PAYROLL per TEAM (× \$1M)	254	\$ 69.33	15.416
Incen. BONUS per TEAM (× \$1M)	254	\$ 9.07	1.055
PAYROLL to CAP	254	0.849	0.085
BONUS TO CAP	254	0.098	0.099
CV	254	1.236	0.195
WPCT _{t-1}	254	0.500	0.189
REVENUE _{t-1} (× \$1M)	254	\$ 161.37	38.184
REVENUE (× \$1M)	224	\$ 167.70	35.758
ROSTER	254	60.724	4.391
NEW COACH	254	0.189	0.392
CONFERENCE	254	0.504	0.501
AmCBA	254	0.252	0.435

Table II.
Descriptive statistics

comparing a team's performance in a given year to the average as contained in the sample and adjusting for annual changes in NFL averages over the sample period.

The empirical specification is as follows:

$$\begin{aligned} WP_{it} = & \alpha_0 + \beta_1 PAYROLL_{it} + \beta_2 BONUS_{it} + \beta_3 CV_{it} + \beta_4 WP_{it-1} + \\ & \beta_5 REVENUE_{it-1} + \beta_6 ROSTER_{it} + \beta_7 NEWCOACH_{it} + \\ & \beta_8 CONFERENCE_{it} + \beta_9 ACBA + \varepsilon_{it}. \end{aligned} \quad (1)$$

The variables are defined as:

WP_{it}	Team i 's win per cent in year t .
$PAYROLL_{it}$	The ratio of team i 's payroll to the league salary cap in year t .
$BONUS_{it}$	The ratio of team i 's incentive bonus payments to the league salary cap in year t .
CV_{it}	The coefficient of variation in team i 's payroll in year t .
WP_{t-1}	Team i 's win per cent in year $t-1$.
$REVENUE_{it-1}(\text{x\$1M})$	Team i 's total revenue in from the preceding year.
$ROSTER_{it}$	The number of players on Team i 's paid roster in year t .
$NEWCOACH_{it}$	Dummy variable = 1 if team i changed head coaches to start year t .
$CONFERENCE_{it}$	Dummy variable = 1 if team i is a member of the NFC conference in year t .
$ACBA$	Dummy variable = 1 for the years 2006 and 2007. the years following the amendment to the CBA.

Additionally, we consider that team management is motivated by financial incentives as well as winning. In this case, we substitute $REVENUE_{it}$, the team's total earnings in the current year, as the dependent variable indicating team performance. Because national television broadcast contracts are fixed for multiple years and distributed evenly across teams, revenue variation is a function of variation in local, primarily stadium related, revenue. The revenue sources include the home team's share of gate receipts, luxury box rentals, premium seating sales, concessions, parking, signage, etc. We again employ OLS, and fixed effects comparisons to gauge whether the team's payroll choices impact revenue accumulation.

The empirical model is as follows.

$$\begin{aligned} REVENUE_{it} = & \alpha_0 + \beta_1 PAYROLL_{it} + \beta_2 BONUS_{it} + \beta_3 CV_{it} + \beta_4 WP_{it} + \beta_5 \\ & WP_{it-1} + \beta_6 ROSTER_{it} + \beta_7 NEWCOACH_{it} + \beta_8 CONFERENCE_{it} + \beta_9 \\ & ACBA + \varepsilon_{it}. \end{aligned} \quad (2)$$

Variable definitions are consistent with equation 1 except we are using total revenue earned in the current season as the dependent variable. Excluding the revenue figures

for 2007, which were not available at the time of analysis, we examined 224 team-year observations.

The impact of salary dispersion

119

Results and discussion

The results for win per cent are reported in Table III. Each of the three specifications indicates that, consistent with theory and other work on pay dispersion, increases in payroll improve winning percentage. It is also evident that increased roster size, whether due to injury or poor decision making has a negative impact on winning. Incentive bonuses and team revenue from the prior year have a positive relationship with winning, but the estimates fall short of statistical significance in all three specifications. In the case of revenue, the coefficient estimate indicates that when team resources increase they are able to improve on-field performance even within the cap limitations. Again, the estimate is not significant at the 0.9 level. The results for incentive bonuses are consistent with agency theory. However, the relative weakness of these estimates implies some inefficiency in their administration. Interestingly, the seasons since the CBA amendment indicate a negative correlation with winning *ceteris paribus*. The most significant finding is the strong negative relationship between payroll dispersion as measured by the coefficient of variation, and on-field performance in the fixed effects model. The implication is that across all teams there is little connection between dispersion and winning. However, when a given team's dispersion

	Coefficient	<i>t</i> -ratio	<i>p</i> -value
<i>3a. OLS</i>			
Constant	0.516 ^b	2.599	0.010
PAYROLL	0.367 ^b	2.500	0.013
BONUS	0.217	1.220	0.224
CV	-0.005	-0.075	0.940
WPCT t-1	0.198 ^a	3.014	0.003
REVENUE	0.001	1.366	0.173
ROSTER	-0.008 ^a	-2.781	0.006
NEW COACH	-0.015	-0.479	0.632
CONFERENCE	0.021	0.894	0.372
AmCBA	-0.085 ^c	-1.890	0.060
Adjusted <i>R</i> -squared = 0.107			
<i>3b. Fixed effects</i>			
PAYROLL	0.452 ^a	2.925	0.004
BONUS	0.237	1.179	0.240
CV	-0.192 ^b	-2.541	0.012
WPCT t-1	-0.048	-0.676	0.499
REVENUE	0.001	1.062	0.289
ROSTER	-0.006 ^c	-1.866	0.063
NEW COACH	0.004	0.138	0.890
CONFERENCE	-0.128	-0.910	0.364
AmCBA	-0.097 ^b	-2.015	0.045
Adjusted <i>R</i> -squared = 0.216			
Likelihood ratio	67.537 ^a	F-test	2.092 ^b

Notes: ^a Significant at the 0.01 level; ^b significant at the 0.05 level; ^c significant at the 0.1 level

Table III.
Model 1: dependent
variable = WPCT

increases (decreases) relative to their on-field performance significantly decreases (increases). Confidence in this finding is sustained by the statistical tests of the OLS versus fixed and effects models (F-tests and Likelihood Ratios), which clearly reveal the fixed effects model is superior to OLS.

The revenue model results are reported in Table IV. The fixed effects model is revealed considerably superior to the OLS specification. Revenue shows a sharp increase in 2006, most likely due to the new TV contract and not necessarily positively correlated to the CBA changes. Revenue positively correlates with winning, but not payroll. Head coaching changes and membership in the National Football Conference (NFC) appear to be detrimental to revenue production. The results central to our thesis provide some surprises. Increases in incentive bonuses carry a positive relationship with revenue, perhaps indicating that more bonuses are paid in a “good” year, independent of winning. Bonuses are awarded in part for consistent play; LTBE bonuses are often based on playing time achievements and the previous year’s accomplishments. Perhaps customers like consistency and this explains the negative relationship to revenue when the head coach is replaced. Surprisingly, salary dispersion and revenue are positively correlated. This may indicate that fans prefer to see teams spending significant dollars on a few superstars, to a less glamorous team that actually wins more often. The tenet may be that superstars attract fans to fill seats and the risk involved with large salaries and signing bonuses pays off on the bottom line.

	Coefficient	<i>t</i> -ratio	<i>p</i> -value
<i>4a. OLS</i>			
Constant	− 33.32	− 0.99	0.32
PAYROLL	− 36.84	− 1.47	0.14
BONUS	41.33	1.20	0.23
CV	5.31	0.48	0.63
WPCT	17.28	1.53	0.13
WPCT t-1	9.99	0.87	0.39
ROSTER	3.35 ^a	6.76	0.00
NEW COACH	− 4.45	− 0.81	0.42
CONFERENCE	− 2.94	− 0.74	0.46
AmCBA	42.37 ^a	4.96	0.00
Adjusted <i>R</i> -squared	0.333		
<i>4b. Fixed effects</i>			
PAYROLL	− 14.524	− 0.707	0.480
BONUS	81.267 ^a	2.657	0.008
CV	23.541 ^b	2.295	0.023
WPCT	16.143 ^c	1.754	0.081
WPCT t-1	5.576	0.590	0.556
ROSTER	2.694 ^a	6.874	0.000
NEW COACH	− 8.222 ^c	− 1.965	0.051
CONFERENCE	− 35.779 ^b	− 2.025	0.044
AmCBA	32.903 ^a	4.738	0.000
Adjusted <i>R</i> -squared	0.663		
Likelihood ratio	186.63 ^a	F-test	7.695 ^a

Table IV.
Model 2: dependent
variable = Revenue_{*t*}

Notes: ^a Significant at the 0.01 level, ^b significant at the 0.05 level, ^c significant at the 0.1 level

In conclusion, salary dispersion appears to significantly affect on-field team performance. Teams are shown to exhibit on-field improvement as salary dispersion moderates, consistent with advocates of compressed compensation structures. Paradoxically, when revenue used to gauge team's performance, a hierarchical salary structure appears more efficient, even though winning and revenue are revealed to be positively related. An explanation is that fans respond to the acquisitions of high salaried superstars by purchasing more season tickets, premium seating, luxury suite rentals etc. Incentive bonuses appear to positively affect both on-field and financial performance. While it is not surprising to see their use become more prevalent, it remains unclear if they are used as efficiently as possible.

Recommendations for future research

This study is unique in addressing how salary dispersion in combination with incentive pay correlates to team success as measured by both winning and revenue production. While we used the NFL as our organization of interest, this type of analysis could be applied to other professional sport leagues incorporating some type of salary cap. In addition, future research could also involve a mixed methods approach to help gain an additional understanding of the decision making of those in managerial positions within sport and non-sport organizations. For example, additional work might include conducting in depth interview with team general managers to gain additional insights into how they make personnel decisions. That is, are personnel choices made independently, by consensus, or some other combination? These interviews could potentially add insight to compliment the existing quantitative work examining similar managerial decisions. Additionally, temporal risk issues could be examined in more detail. For example, what are the parameters defining benefit to cost functions for the trade-off between signing superstars to hefty salaries and signing bonuses to future dead money issues? This could be examined in terms of on-field and team financial performance. Again, discussion with actual decision makers may provide valuable insights.

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The impact of salary dispersion

123

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