The Payoff to Consistency in Performance

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Abstract: In this paper, we investigate whether firms are willing to pay higher wages to workers that demonstrate consistent performance than to those whose performance is more volatile. We first develop a formal model, which assumes a production technology that witnesses the "law of diminishing marginal product". Due to this law a more consistent worker produces higher expected output and is therefore offered a higher wage. We test the model using data from the *National Basketball Association*. The empirical data support our model: Players whose performances are more consistent than the performances of other players receive higher wages on average.

Keywords: wage determinants, consistency in performance, National Basketball Association

JEL-Codes: D41, J31, M52

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1. Introduction

A key assumption in modern portfolio theory is that investors seek a portfolio of investments that offers the most favorable risk-expected return profile (Markowitz, 1952). Assuming that investors are risk averse, it is natural that they aim for a portfolio with the best return-risk ratio. Stated differently, if an investor could choose between two different portfolios that promise exactly the same expected return, he would be less willing to invest in the riskier portfolio. There is thus a deduction for risk.

Hiring decisions within firms have similar features as investment decisions on financial assets. After all, the firm pays the worker a salary and it demands some service in return. Because of informational asymmetries (Akerlof, 1970), the payoff to the firm from hiring a worker is uncertain. The worker may exceed all expectations, in which case the firm may receive a very high payoff. However, the worker may also turn out to be overpriced, and the firm may regret having hired the worker in the first place. Since hiring a worker is a kind of risky investment, an obvious question is whether risk-expected return profiles are important for hiring decisions and whether firms are willing to offer higher wages to workers who promise consistent performance than to those with higher performance volatility.

There is a large body of literature that has investigated the effect of a worker's expected performance on his wage. In many studies, a worker's level of education is used as a proxy for his expected ability, which in turn is assumed to positively influence the worker's expected performance. Unsurprisingly, studies typically observe that workers with a higher level of education receive higher wages on average.[5] To a large part, the human capital theory originated by Becker (1964) is based on this observation: workers

[5] See e.g. Mincer (1974). For a recent overview of the literature see Waldman (2013).

are only willing to invest in their human capital and to acquire skills if the investment is rewarded by a higher wage payment.

The effect of consistency in performance on wages, instead, has received very little attention in the literature. One likely obstacle to such an analysis is a lack of suitable data. As indicated before, studies investigating the determinants of worker wages have often used a worker's level of education as a proxy for his expected performance. The level of education for a given worker, however, is constant, so it cannot be used to infer the consistency in the worker's performance. Besides this, previous performance might help to anticipate the rate of consistency, but this performance is often unobservable.

In principle, one can distinguish two types of consistency in a worker's performance, *ex ante consistency* and *ex post consistency*. Ex ante consistency refers to the performances one can expect from a worker at the time the worker enters the labor market. Some type of worker may be riskier than another in the sense that some workers of the former type turn out to perform extremely well, whereas others perform extremely poorly. After the firm has observed the worker for some time and information about the worker's characteristics has been gathered (Jovanovic, 1979), however, the firm knows exactly what to expect from the worker. In the literature, ex ante inconsistent workers are also called *risky* (Lazear, 1998). In contrast, ex post consistency refers to workers who have entered the labor market some time ago and about whom substantial performance information is already available. Even then a worker's performance may be subject to fluctuations, and we call a worker ex post inconsistent if this is the case, i.e. if he performs quite well on one day, but poorly on another day.

There exist a few papers that investigate the effect of ex ante consistency on the inclination of firms to hire the worker and, therefore, the worker's wage. Lazear (1998) demonstrates that firms benefit from hiring ex ante inconsistent or risky workers. In his model, employment of a risky worker entails a kind of option value for the firm. If the worker turns out to be of high ability, the firm can retain him, whereas it can lay off the worker in case he proves to be of low ability. The possibility to lay off workers provides the firm with insurance against downside risk, while the firm benefits from a risky worker's upside potential. Firms are therefore willing to offer higher wages to risky than to relatively safe workers. Investigating contract choices from professional baseball, Bollinger and Hotchkiss (2003) find some support for Lazear's model. They investigate the determinants of salaries of professional baseball players in the first years of their major league careers. A measure of the variance of a player's performance is constructed. In line with Lazear's model, it is found that there is a positive correlation between a player's salary and the variance in his performance.

While Lazear (1998) and Bollinger and Hotchkiss (2003) have focused on very young workers and, thus, on the effects of ex ante consistency in performance on wages, the current paper aims to understand the effects of *ex post consistency* in performance on workers' wages. The analysis is divided into a theoretical and an empirical part. In the theoretical model, we assume that a firm can hire a worker whose ability is subject to fluctuations. The output that the worker produces for the firm (his performance) depends on his ability and, hence, is subject to fluctuations as well. The labor market is competitive so that firms are willing to pay the worker a wage equal to the value of his expected output. The final assumption is that the "law of diminishing marginal product" holds; output is therefore an increasing and concave function of the worker's ability. A consequence of this latter assumption is that a positive deviation of ability from its mean by x units increases output less than a negative deviation of ability from its mean by x units decreases it. Inconsistency in performance therefore reduces expected output, and the firm is willing to offer a higher wage to ex post consistent workers. The model delivers some other results as well. For instance, it is shown that a worker's wage is increasing in his expected ability.

In the empirical part, we use data from the *National Basketball Association* (*NBA*) to test the model's predictions. As indicated before, datasets which include the information that is needed to address our research question are rare; in particular information about the variance of workers' performances is hard to come up with. Professional sport overcomes these measurement problems, as salary information, individual characteristics and especially continual capturing of performance is on hand (Kahn, 2000; Rosen and Sanderson, 2001). Our data includes information from the 2007/08 to 2010/11 NBA seasons and contains game-by-game statistics for 259 different players and totals in 22,520 individual performance observations. To measure ex post consistency in performance, we exclude all rookies from the investigation and focus on those players that have been in the NBA for a considerable amount of time. For these players we construct two performance measures, one related to scoring activities and another one related to non-scoring activities. Ex post consistency in performance is captured by the variance in the two performance measures. The empirical study strongly supports the findings from the theoretical model. We find that players with better performance measures receive higher wages on average. In addition, we observe a negative correlation between variance in the performance measures and a player's wage. Coming back to the beginning of the introduction, we can conclude that risk-expected return profiles play an important role in hiring decisions and that firms reward consistent performance in terms of higher wage payments.

In addition to the literature mentioned so far, the paper is related to the literature on determinants of professional basketball players' remuneration (e.g. Kahn and Sherer, 1988; Koch and Vander Hill, 1988; Wallace, 1988; Brown et al., 1991; Jenkins, 1996; Dey, 1997; Hamilton, 1997; Bodvarsson and Brastow, 1998; Gius and Johnson, 1998; Eschker et al., 2004; Hill, 2004; Prinz, 2005). The studies unanimously agree that player wages are a function of a player's ability/potential (as measured by his draft position, his years of experience, and his previous performances) and a player's "fan appeal" (as measured by his number of all-star appearances). Perhaps surprisingly, to our knowledge only one empirical work is concerned with players' consistency.[6] Bodvarsson and Brastow (1998) develop a model of worker remuneration, in which monitoring of workers is costly. It is assumed that the corresponding monitoring costs are higher for less consistent workers, so that these workers receive a lower wage. Bodvarsson and Brastow test the predictions of their model analyzing a subgroup of the NBA players' population but only for the early 1990s. While the empirical results indicate that employers prefer consistency by their employees for some performance criteria, the league underwent a drastic change ever since. While the average payroll has been 12.5 million per year, it increased to around 70 million per year for our observation period. At the same time the importance of statistical analysis grew and led to an implementation of analytic departments for all teams. Equivalent to salary discrimination, results from two decades ago cannot be taken for granted for the exact same reason (Hill, 2004). Furthermore observing consecutive seasons allows us to control for player

[6] Using subjective rather than objective performance measures Deutscher and Büschemann (2014) study the effect of consistency of performance on the players' estimated market values in soccer. They find a negative correlation between performance consistency and market values.

characteristics while quantile regression shed light on the impact of consistency for different parts of the salary distribution.

The remainder of the paper is organized as follows: In the next section we present a theoretical model investigating the determinants of workers' wages. Empirical results are shown in Section 3. Our paper ends with a discussion of the empirical results and an outlook on future research in Section 4.

2. The model

A firm decides to hire a worker i. The worker produces output y_i for the firm, the value (or price) of one unit of output is given by $p > 0$. The amount of output that the worker produces is a strictly increasing and strictly concave function of the worker's ability $t_i \in R_+$, i.e. $y_i = f(t_i)$, with $f: R_+ \to R_+$ satisfying $f'(\cdot) > 0$ and $f''(\cdot) < 0$, that is the "law of diminishing marginal product" applies. Ability t_i is a random variable that is distributed according to the cumulative distribution function G_i and whose realization is unknown to both firm and worker. The labor market is competitive so that the firm faces a zero-profit constraint. Denote the wage payment from firm to worker by w_i. Obviously, the wage payment from firm to worker is equal to the value of the worker's expected output, i.e. $w_i = p \int f(t_i) dG_i$.

We begin by investigating the effect of the value of one unit of output (p) and the worker's expected ability on the worker's compensation, keeping all other variables constant. To study the latter effect, we replace t_i by $t_i + k$, and we analyze how the worker's compensation changes with changes in the constant k. The following proposition reports the corresponding results:

Proposition 1: The worker's wage is increasing both in p (the value of the worker's output) and in the worker's expected ability.

Proof: The worker's wage equals $w_i = p \int f(t_i + k) dG_i$. We obtain

$$\frac{\partial w_i}{\partial p} = \int f(t_i + k) dG_i > 0 \text{ and}$$

$$\frac{\partial w_i}{\partial k} = p \int f'(t_i + k) dG_i > 0. \blacksquare$$

Obviously, the higher the value of the worker's output or the more output the worker produces in expectation, the firm is willing to pay a higher wage to hire the worker. Proposition 1 formalizes this result.

The paper focuses on whether the firm rewards consistency in performance (i.e. output production). We therefore introduce a measure of consistency.

Definition 1: For any ability distributions G_i and G_j, G_i is a mean-preserving spread of G_j if and only if $t_i = t_j + \varepsilon$ such that $E\left[\varepsilon \middle| t_j\right] = 0$ for all t_j.

Definition 2: Worker *j* is called more consistent than worker *i* if G_i is a mean-preserving spread of G_j.

A simple proof establishes the following result:

Proposition 2: If worker *j* is more consistent than worker *i*, he receives a higher wage, i.e. $w_j > w_i$.

Proof: Let G_i be a mean-preserving spread of G_j. Then we can write

$$w_i = p \int f(t_i) dG_i = p \int E_\varepsilon\left[f\left(t_j + \varepsilon\right)\middle|\varepsilon\right] dG_j$$

$$< p \int f(E_\varepsilon\left[t_j + \varepsilon\middle|\varepsilon\right]) dG_j = p \int f(t_j) dG_j = w_j,$$

where the inequality follows from Jensen's inequality, given strict concavity of f. $\blacksquare$

Proposition 2 demonstrates that the firm values consistency in performance and is willing to pay a higher wage to a more consistent worker than to a less consistent one. This result is very intuitive. If a worker is less consistent than another one, his ability realization is more likely to be very high, but also more likely to be very low. Because of strict concavity of the production function, the increase in output if ability is above the mean ability is lower than the decrease in output if ability is below the mean (by the same amount). Hence, a less consistent worker produces lower expected output and, since the labor market is competitive, receives a lower wage.

Note that we have assumed the firm to be risk neutral. If, instead, the firm were risk averse, our results could be strengthened further. Then, a more consistent worker would receive a higher wage relative to a less consistent one, both because he were more productive in expectation and because hiring the more consistent worker would be less risky for the firm than hiring the less consistent one.

To sum up, we can derive three hypotheses from our model that we are going to test using data from the NBA.

Hypothesis 1: The higher the value of a worker's performance, the higher is his wage.

Hypothesis 2: The higher the worker's expected ability and hence his expected performance, the higher is his wage.

Hypothesis 3: A more consistent worker receives a higher wage than a less consistent one.

3. Data, Estimation, and Findings

A comprehensive database on average player performance, variance in players' performance and salary compensation in the National Basketball Association (NBA) has been compiled. The NBA serves well for studying the effect of consistent performance on salary as pay levels are available to the public and performance measures are published as well. Individual player statistics were drawn from the official website of the NBA while player salaries were obtained from the USA Today website.

Our data set includes individual game-by-game statistics for all non-rookies who appeared on a roster in the National Basketball Association (NBA) anytime between the 2007/2008 season and the 2010/2011 season and who have signed a new contract during this time period. This delimitation is important for the following reasons: First, players new to the league are most often signed to contracts predetermined by the regulation of the collective bargaining agreement between the teams and the players' union. Here, salary levels are directly related to the position a player was selected at during the draft. Hence it is necessary to exclude players under rookie contracts because the remuneration is not the result of a bargaining process. Second, we only included the salary in the first year of the contract and rely on performance indicators from the season immediately prior to the signing. Since most of the contracts are multi-year duration we otherwise would misidentify performance as a driver for running contracts that were determined years ago. Players were eliminated if salary information was unavailable.

During the period under study the NBA was not subject to any lockout or shortened season, resulting in constant number of teams (30) and games per season (82). Overall the data set covers 259 different players and 330 player-year-observations. To calculate the variance of performance for the individual player, single game performance statistics were considered, totaling in over 22,520 performance logs for the relevant period.

The natural logarithm of the annual salary (LnSalary) serves as the dependent variable for the analysis to follow. In the NBA salaries are basically guaranteed and only rarely subject to individual performance related bonuses. Given an average of 4,488,456$ individual player salaries range between 202,134$ to 25,244,493$ per season and do not significantly change across the seasons observed. Salary distributions for all four seasons under study are presented in Figure 1.

- Figure 1 about here-

Determining Salaries for the NBA

To estimate salaries in the NBA and to test the hypotheses derived from our theoretical model, we turn to the following salary model to determine salary for player *i* in season *t* as

$$
\begin{aligned}
LnSalary_{i,t} = {} & a_0 + a_1 Exp_{i,t} + a_2\, Exp_{i,t}{}^2 + a_3\, Draft_i + a_4\, Draft_i{}^2 + a_5\, All\ Star_{i,t-1} \\
& + a_6\, All\ Star_{i,t-1}{}^2 + a_7\, Scoring_{i,t-1} + a_8\, Non-Scoring_{i,t-1} \\
& + a_9\, Variance\ Scoring_{i,t-1} + a_{10}\, Variance\ Non-Scoring_{i,t-1} + a_{11}\, Position \\
& + a_{12}\, Season + a_{13}\, Team + \varepsilon_{i,t}
\end{aligned}
$$

While it is beyond dispute that performance and salaries are related, the precise nature of this relation can be argued. Guided by our theoretical model and the existing literature we rely on numerous control variables to account for salary determining factors.

3.1 Measuring a player's value for his team

Ticket and merchandise sales account for revenues to the respective team. Consequently, fan appeal can add to the value of a player (Hausman and Leonard, 1997) and can even increase attendance for teams hosting an opponent possessing a superstar (Berri and Schmidt, 2006). To display the league's most popular players, the NBA All-Star Game serves as a showcase in the middle of the season where the participating starters for both teams are selected by the fans via ballots in the arenas and online. Equivalent to high popularity we analyze the number of all-star game appearances prior to the signing of a contract and their impact on player salary (All-Star) assuming diminishing returns to all-star game appearances (All-Star²).

3.2 Measuring a player's expected performance

Over time, players are expected to enhance their abilities when learning how to be successful on the court. We therefore expect players' expected performance to increase over time and include in the regression the number of seasons played in the NBA prior to the respective season to display players' experience (Exp). As physical ability declines with age (Fair, 1994) we expect marginal returns to experience to decrease over time. To account for this, we also consider the variable Exp² in the regression. Individual expected talent is measured by the position a player has been selected during the annual amateur draft (Draft). Here each club is allowed to select twice in reverse order of previous seasons winning record for a total of 60 players to be selected during the draft.[7] Lower draft numbers indicate higher expected talent due to the earlier selection during the annual recruiting event (Prinz et al., 2012; Gius and Johnson, 1998; Wallace, 1988; Hill, 2004). Talent is not expected to be distributed linearly throughout the play-

[7] Since there are 30 teams in the NBA and each team has two picks, the highest possible draft number is 60. Players who were not selected during a draft and appeared in our sample, were coded as draft number 99.

ers eligible to be drafted. We suggest differences in talent to decline for the later selections in the draft and control for this non-linear effect (Draft²) (Koch and Vander Hill, 1988; Prinz, 2005).

A player's expected performance should clearly depend on how well the player has performed in the past. We distinguish between scoring performance und non-scoring performance. While scoring performance displays accomplishments on the offense, non-scoring performance accounts for less "glamorous" statistics. Both are measured as performance per minute resulting in points per minutes as our indicator for offensive performance (Scoring). Non-scoring performance is calculated as the sum of outputs not directly connected to offensive success. We compute it as the sum of rebounds, assists, blocks and steals, again measured on a per minute basis (Non-Scoring). Based on our theoretical model and previous research (Berri et al., 2007) we assume both performance measures to positively impact player salary.

3.3 Measuring a player's consistency in performance

Our main explanatory variables concern the consistency in performance. To determine a measure for consistency a game-by-game analysis is necessary. For this purpose, the variance of our performance measures *Scoring* and *Non-Scoring* has been computed individually for every player and season (Variance Scoring, Variance Non-Scoring). Minimum value for games a player has had to appear in was set to 41, or half the regular season games.

Finally, we account for further player and team related variables by including dummy variables for the playing positions, seasons and teams. The ability to occupy a certain position might also affect players' salaries. Hence we control for the positions point guard, shooting guard, small forward, power forward and center. Season dummies account for the discontinuous salary history within the league, as team dummies depict prevailing differences in financial power. Table 1 contains the descriptive statistics for all 330 observations (259 different players) in the sample.

-Table 1 about here-

3.4 Estimation Techniques

Due to the panel character of our data we apply random effects models as well as conventional OLS models. The random effects model accounts for unobservable factors which might influence the given individual effects.[8] Since our talent indicator *Draft* is constant over time we abstain from applying a fixed effects model. One might argue for a possibly unclear direction of causality between the dependent and the independent variables, especially between pay and performance indicators. This was met by the introduction of a time lag of one season. While salary information is obtained from season t, ulterior indicators indicating performance and position obtained on the field were drawn from the respective previous season t-1.

3.5 Regression Results

Results for the two alternative specifications are presented in Table 2.

-Table 2 about here-

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[8] See Mátyás / Sevestre (1996, p. 94).

The impact of our control variables on salary is predominantly as expected. In line with **Hypothesis 1** the number of All-Star Game appearances positively influence player salary while diminishing returns are also supported by the data.

Similarly, the estimation results strongly support our **Hypothesis 2**. In line with our previous argumentation both scoring and non-scoring performance per minute positively impact player remuneration with the coefficients remaining highly significant over both estimations. Accordingly, players receive higher salaries as their *average performance* in the preceding season on offense or on defense improves. While Exp and Draft have the predicted sign, the corresponding coefficients are not statistically significant from zero.

In order to test **Hypothesis 3** from our model we now turn our attention to the impact of *performance volatility* on remuneration. As an initial effort to empirically assess performance consistency we include the variance in scoring and non-scoring performance in our basic salary analysis. Given our theoretical model in Section 2 we expect salaries to rise with increasing consistency. Controlling for average performance and in line with our model, the estimations support the expectation that performance consistency is rewarded monetarily. Negative coefficients power the idea that salaries significantly decline as variance in performance increases for scoring as well as non-scoring. Given these first strong results, the distribution of salaries asks for a more in depth analysis due to the distribution of salaries throughout the league.

3.6 Estimating Quantile Regressions

Figure 1 clearly illustrates the right skewed distribution of salaries in the NBA, motivating a more fine grained analysis. The particular advantage of quantile regression analysis is that it facilitates examination of salary returns to characteristics and performance measures for different ranges of the salary distribution (Koenker 2005) exposing possible differences over the quantiles. In comparison ordinary least square estimates constrain marginal effects of covariates to be the same at the mean and elsewhere. But especially in sports the average salary exceeds the median due to excess kurtosis of the distribution. Marginal effects at the median are not necessarily identical to those at the mean or anywhere else in the distribution. The presence of salary outliers may well cause marginal effects of covariates, especially consistency in performance, to differ over the distribution. Hence we re-estimate Model 2, now relying on quantile regression analysis. Results are reported in Table 3 and reveal that both *average* performance in scoring and non-scoring as well as *volatility* in performance are equally important throughout all quantiles. Except for *variance scoring* in 0.75, all coefficients are significantly different from zero and have the predicted sign. Hence, regardless of a player's position in the salary distribution, less consistent performance is punished via a reduction in compensation.

-Table 3 about here-

4. Concluding remarks

Is it just expected performance or also the variance in performance which accounts for salary determination? Apparently, this question can be quite clearly answered with regard to the results presented above. As it shows, consistency in performance is monetarily rewarded in the market for professional basketball players. Given game-by-game information for the course of four seasons, our paper offers theoretical motivation and empirical support suggesting that general managers not only reward high expected performance, but also consistency in performance.

While these results shed light on the evaluation of players' performance consistency for professional sports they allow for different research strings to follow. First, our work neglects the importance of individual (consistency in) performance for team success. From a managerial standpoint the composition of a team could ideally suggest to include very inconsistent workers (players) into the production process. Assuming that performance is easily observable it would allow replacing workers who are temporary performing badly. This directly relates to professional basketball as coaches are able to substitute arbitrarily which might allow having players displaying high volatility on the roster.

Second, we neglect opponent quality or any game dynamics which might lead to strategic composition of the teams on the floor. Future work might also take these factors into account.

References

Akerlof, G.A., 1970, “The Market for "Lemons": Quality Uncertainty and the Market Mechanism”, *Quarterly Journal of Economics*, 84, 488-500.

Becker, G., 1964, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, Chicago, University of Chicago Press.

Berri, D., S. Brook, and M. Schmidt, 2007, “Does one simply need to score to score?”, *International Journal of Sport Finance*, 2, 190-205.

Berri, D. and M. Schmidt, 2006, “On the Road with the National Basketball Association's Superstar Externality”, *Journal of Sports Economics*, 7, 347-358.

Bodvarsson, Ö. and T. Brastow, 1998, “Do Employers Pay for Consistent Performance?: Evidence from the NBA”, *Economic Inquiry*, 36, 145-160.

Bollinger, C.R. and J.L. Hotchkiss, 2003, “The Upside Potential of Hiring Risky Workers: Evidence from the Baseball Industry”, *Journal of Labor Economics*, 21, 923-944.

Brown, E., R. Spiro and D. Keenan, 1991, “Wage and Nonwage Discrimination in Professional Basketball. Do Fans Affect It?”, *American Journal of Economics and Sociology*, 50, 333-345.

Deutscher, C. and A. Büschemann, 2014, “Does Performance Consistency Pay Off Financially for Players? Evidence From the Bundesliga”, *Journal of Sports Economics*, forthcoming.

Dey, M.S. ,1997, “Racial Differences in National Basketball Association Players’ Salaries: A New Look”, *The American Economists*, 41, 84-90.

Eschker, E., S.J. Perez and M.V. Siegler, 2004, “The NBA and the Influx of International Basketball Players”, *Applied Economics*, 36, 1009-1020.

Fair, R., 1994, “How Fast do Old Men Slow Down?”, *Review of Economics and Statistics*, 76, 103-118.

Gius, M. and D. Johnson, 1998, “An Empirical Investigation of Wage Discrimination in Professional Basketball”, *Applied Economics Letters*, 5, 703-705.

Hamilton, B.H., 1997, “Racial Discrimination and Basketball Salaries in the 1990s”, *Applied Economics*, 29, 287-296.

Hausman, J. and G. Leonard, 1997, “Superstars in the National Basketball Association: Economic Value and Policy”, *Journal of Labor Economics*, 15, 586-624.

Hill, J.R., 2004, “Pay Discrimination in the NBA Revisited”, *Quarterly Journal of Business and Economics*, 43, 81-92.

Jenkins, J.A., 1996, “A Reexamination of Salary Discrimination in Professional Basketball”, *Social Science Quarterly*, 77, 594-608.

Jovanovic, B., 1979, “Job Matching and the Theory of Turnover”, *Journal of Political Economy*, 87, 972-990.

Kahn, L.M., 2000, “The Sports Business as a Labor Market Laboratory”, *Journal of Economic Perspectives*, 14, 75-94.

Kahn, L.M. and P.D. Sherer, 1988, “Racial Differences in Professional Basketball Players’ Compensation”, *Journal of Labor Economics*, 6, 40-61.

Koch, J.V. and C.W. Vander Hill, 1988, “Is there “Discrimination” in the “Black Man’s Game”?”, *Social Science Quarterly*, 69, 83-94.

Koenker, R., 2005, *Quantile Regression*, Cambridge: Cambridge University Press.

Lazear, E. P. “Hiring Risky Workers.” I. Ohashi and T. Tachibanaki, ed., *Internal Labour Market, Incentives, and Employment*: New York: St. Martin’s, 1998.

Markowitz, H.M., 1952, “Portfolio selection”, *Journal of Finance*, 7, 77-91.

Mátyás, L. and P. Sevestre, 1996, *The Econometrics of Panel Data*. Dordrecht / Boston / London: Springer.

Mincer, J., 1974, *Schooling, Experience, and Earnings*, New York: Columbia University Press for the National Bureau of Economic Research.

Prinz, J., D. Weimar and C. Deutscher, 2012, “Popularity Kills the Talentstar? Determinants of Star-Salaries in the NBA”, *Zeitschrift für Betriebswirtschaft*, 82, 789-806.

Prinz, J., 2005, “Why Are Wages Upward Sloping with Tenure?”: Munich and Mering: Hampp.

Rosen, S. and A. Sanderson, 2001, “Labour Markets in Professional Sports”, *Economic Journal*, 111, 47-68.

Waldman, Michael, 2013, “Theory and Evidence in Internal Labor Markets” R. Gibbons and J. Roberts, ed., *The Handbook of Organizational Economics*, 520-571.

Wallace, M., 1988, “Labor Market Structure and Salary Determination among Professional Basketball Players”, *Work and Occupations*, 15, 294-312.

Figure 1
Density Estimation of Players' Salary

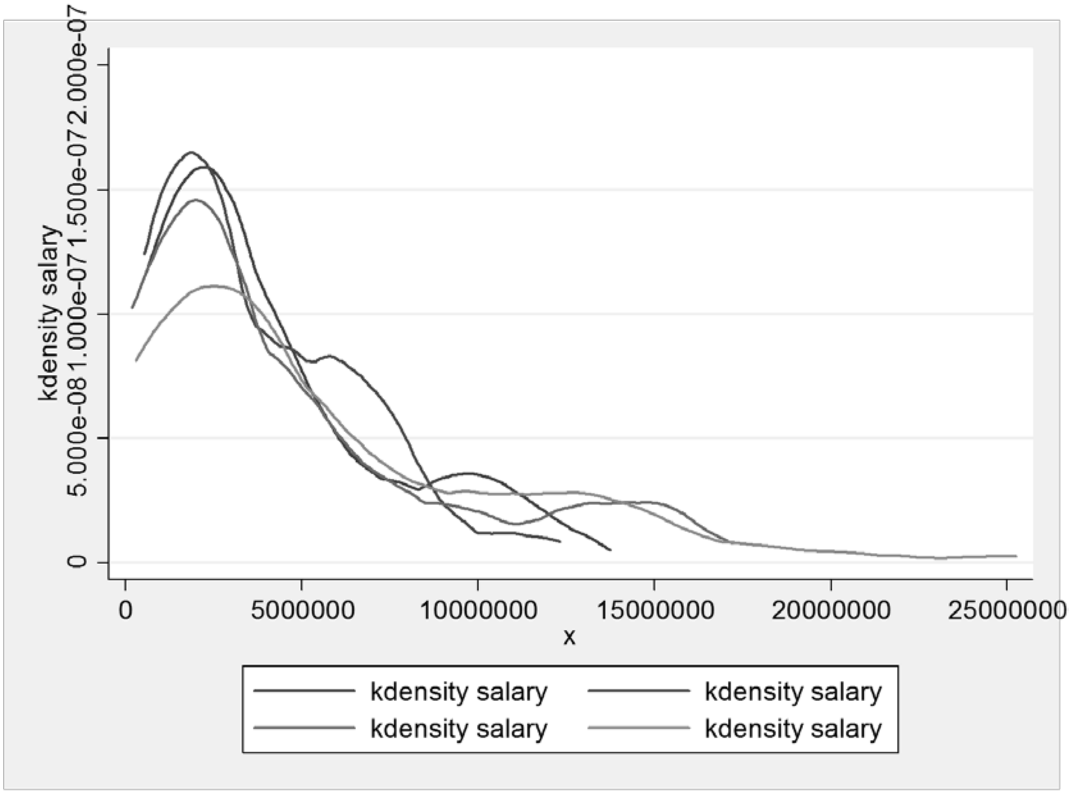

Table 1
Descriptive Statistics

Sample Period: 2007-2011
Sample Size: 330

Variable	Explanation	Mean	SD	Min	Max
LnSalary	Natural Log of Player Salary	14.91	0.94	12.22	17.04
Exp	Number of Seasons in the NBA	5.85	3.75	0	17
Exp^2	Squared Number of Seasons	48.22	55.95	0	289
Draft	Position Selected in the Draft	33.53	31.84	1	99
$Draft^2$	Squared Position	2135	3435	1	9801
All Star	Appearances in All Star Games	0.59	1.88	0	15
All $Star^2$	Squared Number of Appearances	3.87	18.40	0	225
Scoring	Points Scored per Minute	0.36	0.12	0.12	0.76
Non-Scoring	Non Scoring per Minute	0.30	0.08	0.15	0.56
Variance Scoring	Variance in Scoring	0.05	0.03	0.01	0.19
Variance Non-Scoring	Variance in Non-Scoring	0.02	0.02	0.01	0.09

Table 2
NBA Salary Regression 2007/08-2010/2011

	OLS	RE
Exp	0.057	0.061
	(1.40)+	(1.43)+
Exp^2	-0.006	-0.006
	(-2.00)**	(-1.93)*
Draft	-0.004	-0.004
	(-0.75)+	(-0.68)+
$Draft^2$	0.000	0.000
	(0.36)+	(0.26)+
All Star	0.145	0.128
	(2.53)**	(2.15)**
All $Star^2$	-0.012	-0.011
	(-2.29)**	(-1.98)**
Scoring	3.472	3.483
	(7.80)***	(7.54)***
Non-Scoring	3.381	3.462
	(4.99)***	(4.96)***
Variance Scoring	-4.643	-3.670
	(-2.84)***	(-2.26)**
Variance Non-Scoring	-14.863	-14.322
	(-4.02)***	(-3.82)***
Team Effects	Yes	Yes
Position Effects	Yes	Yes
Season Effects	Yes	Yes
R^2	0.59	0.58
Observations	330	330

Notes: t-statistics are presented in parentheses below the coefficient estimates
***, **, and * denote 10%, 5%, and 1% statistical significance levels respectively.

Table 3
The Impact of Consistent Performance on Salary (Quantile Regressions)

Variable	0.1	0.25	0.5	0.75	0.9
Exp	0.058	0.056	0.067	0.028	0.003
	(0.68)+	(1.01)+	(1.54)+	(0.58)+	(0.07)+
Exp^2	-0.006	-0.006	-0.006	-0.003	-0.001
	(-0.96)+	(-1.57)+	(-1.89)+	(-0.92)+	(-0.42)+
Draft	-0.013	-0.003	-0.001	-0.003	0.003
	(-1.19)+	(-0.45)+	(-0.17)+	(-0.42)+	(0.49)+
$Draft^2$	0.000	0.000	-0.000	-0.000	-0.000
	(1.19)+	(0.20)+	(-0.47)+	(-0.11)+	(-1.16)+
All Star	-0.041	-0.009	0.165	0.151	0.114
	(-0.33)+	(-0.11)+	(2.69)***	(2.22)**	(1.92)*
All $Star^2$	0.000	-0.002	-0.015	-0.011	-0.007
	(0.03)+	(-0.34)+	(-2.68)***	(-1.69)+	(-1.21)+
Scoring	4.277	3.941	3.319	3.342	3.376
	(4.51)***	(6.52)***	(6.97)***	(6.31)***	(7.34)***
Non-Scoring	4.365	4.190	3.561	3.985	2.889
	(3.03)***	(4.55)***	(4.91)***	(4.94)***	(4.13)***
Variance Scoring	-6.444	-5.829	-3.066	-2.108	-3.026
	(-1.85)*	(-2.62)***	(-1.75)*	(-1.08)+	(-1.79)*
Variance Non-Scoring	-18.504	-18.549	-21.344	-15.223	-8.512
	(-4.79)***	(-3.70)***	(-5.40)***	(-3.46)***	(-2.23)***
Team Effects	Yes	Yes	Yes	Yes	Yes
Position Effects	Yes	Yes	Yes	Yes	Yes
Season Effects	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.343	0.388	0.451	0.466	0.482

Notes: t-statistics are presented in parentheses below the coefficient estimates
***, **, and * denote 10%, 5%, and 1% statistical significance levels respectively.