DOES AN ALL-STAR PREMIUM EXIST IN THE NBA?

AN ECONOMETRIC ANALYSIS OF NBA

PLAYER SALARIES FROM 1999-2006

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

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DOES AN ALL-STAR PREMIUM EXIST IN THE NBA? AN ECONOMETRIC ANALYSIS OF NBA PLAYER SALARIES FROM 1999-2006

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James Russell Hayles, son of James Otis Hayles Jr. and Myna Corman Hayles, was born on January 15, 1982, in Auburn, Alabama. He attended elementary and high school at Escambia Academy in Atmore, Alabama and graduated in 2000. He attended Presbyterian College and Auburn University and received his degree of Bachelor of Science (Economics) from Auburn University in May 2005. He entered graduate school at Auburn University in August 2005. He is engaged to be married to Sara Michelle Webster in June of 2007.

THESIS ABSTRACT

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This thesis is a salary determination model for NBA players. It presents a review of previously published literature as well as discusses background information on the structure of the NBA's labor market. It uses the human capital approach to wage determination to create an estimating equation. It finds that for the period tested an all-star premium does exist. Lastly the findings are evaluated in terms of the NBA as it exists today in an effort to offer some insight into the implications of the results on the future performance of that industry.

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CHAPTER 1: INTRODUCTION

In the world of professional sports perhaps no market is more critical to a franchise's success both on the field and in the books than the market for experienced free agents. As the popularity of professional sports has risen dramatically in the last few decades so too have the players' salaries. As a result teams are often faced with the dilemma of attempting to sign available free agents without overpaying for them. Because of the possibility of overpaying, the team that is able to sign the desired free agent is often stuck with a winners curse.   Winners curse is a scenario in which a franchise or firm, attempting to acquire rights to some agent, unknowingly overpays for that agent and is then stuck with it for the length of the contract[1]. In correlation to this, the winner's curse is a major problem in professional sports because of the size of player contracts and the amount of money a team could potentially lose if they overpay for a player. In spite of this, NBA franchises are more than willing to take chances on available free agents because of the profitability of acquiring the right players. Because of the extremely limited supply of qualified players for the NBA, the price players are able to demand is potentially extraordinarily high. In addition, extremely popular or talented players could potentially demand even higher compensation. It is not uncommon for the best players in the NBA to be paid as much as 25 million dollars a year for their services[2]. Thus NBA franchises must be very careful in evaluating

[1] Eschker et al. (2004)
[2] Player salary information taken from www.nba.com and Bender, Particia. (2006).

potentially elite athletes because overestimating a contract of that size could cripple the franchise for years into the future. The main goal of this paper is to developing a working model for predicting NBA player salaries using the human capital approach to wage determination, and to use this model to test if there existed at the time of this research a statistically significant salary premium for the elite or extremely popular players.

Chapter 2 provides the information regarding the structure of the NBA free agent market, and also discusses any idiosyncrasies that exist because of its unique structure. In order to develop a model to predict salaries of NBA free agents, we must first understand the structure of the NBA's labor market. The structure of the NBA is governed by a Collective Bargaining Agreement (CBA) that is agreed upon by both the Players Association and the owners of all the teams. The CBA does everything from setting the salary cap each year to developing a scale of salaries for drafted rookies. The CBA also sets the minimum and maximum salaries for players, depending on their years of experience in the NBA, and it defines to specific exemptions to the salary cap that allow teams to exceed the cap. For these reasons, understanding the CBA and in particular the salary cap, is a vital step in developing a model such as this.

When developing a salary determination model for professional sports it has generally been found that the human capital approach is the most popular and most effective method. The human capital approach to wage determination was first popularized by Gary Becker in his book *Human Capital* (1975). Chapter 3 of this paper uses the foundations laid by Becker, and others, to develop a model that is adapted specifically to fit the free agent market of the NBA. The human capital approach uses individuals' specific abilities or traits, known as human capital characteristics, to predict what that person might demand as compensation for employment. These abilities or traits are called human capital because like physical capital, individuals can generally invest time and or money into them in order to demand potentially higher wages. Perhaps the most popular and most researched of these traits is education. Individuals can invest time and money into their education in order to better understand the field of employment they hope to enter and in return receive higher wages. In the case of professional basketball, these attributes generally deal with a player's accumulation of certain basketball related statistics measuring that player's abilities to compete at the extremely high level of competition that is experienced in the NBA.

The remaining sections of this thesis provide the information and methods used to arrive at my final conclusion. Chapter 4 gives a review of relevant literature, discusses their findings, and explains the relevance to the topic discussed in this paper. Chapter 5 gives a description of the data and methodology used. Chapter 6 gives the results of the tests performed, and lastly Chapter 7 presents my conclusions and discusses how they relate to NBA as it exists today.

CHAPTER 2: STUCTURE OF THE NBA FREE AGENT MARKET

The market for free agents in the NBA is very different from most other labor markets. Because of the special nature of this labor market it is essential to understand how the NBA works in regards to the movement of players from team to team in the League. The NBA's Collective Bargaining Agreement (CBA) is essentially the constitution of the NBA. It sets everything from the salary cap for all the teams to the structure of the pay scale for rookies. Therefore, to fully understand the market in which the NBA is operating we must first understand how that labor market is structured.

The CBA is a contract that is agreed upon by both the Players Association (PA) and the owners (League). The PA is the players' union of the NBA. Like almost all other labor unions, its purpose is to give the players more negotiating power with the league than they would have if they worked separately. The CBA "defines the salary cap, the procedures for determining how it is set, the minimum and maximum salaries, the rules for trades, the procedures for the NBA draft, and hundreds of other things that need to be defined in order for a league like the NBA to function[3]." In other words the CBA lays the boundaries for what both the players and owners are allowed to do. It should also be noted that the CBA is what keeps the NBA from being in violation of the Sherman Act. The Sherman Act prohibits the existence of things such as a draft or salary

[3] Coon, Larry et al. (2005)."

cap; however, because these things are agreed upon through a collective bargaining procedure they do not violate the Sherman Act[4].

For this paper, the most important aspect of the CBA is the salary cap. First it must be understood exactly what a salary cap is, and how that might affect wages. A salary cap is essentially a limit to a team's total payroll. In most professional sports leagues it is set as a percentage of projected total revenues (or some measure of projected earnings) for the league divided by the number of teams. Once the salary cap has been defined, teams are not allowed to have their yearly payroll exceed that number without facing some sort of harsh monetary penalty. In general, the league has to set the penalties in such a way as to make them costly enough to prevent every team from exceeding the cap, and thus rendering it irrelevant, but not so harsh as to cripple a franchise that is facing the penalty. Usually, this type of strict salary cap structure is called a "hard cap". The basic goal of a salary cap is to level the playing field for small and large market franchises. Without a salary cap, the teams that have the most money to spend could simply buy up the best players in the league, and therefore ruin the competitive balance of the league. "The evidence bears this out: For the 2001-02 NBA season, the correlation between team payroll and regular season wins was about 0.13. In other words, there is nearly no correlation between salary and wins. By comparison, MLB (with no salary cap) had a much stronger correlation of 0.43 for its 2002 season[5]." Clearly, the salary cap employed by the NBA allows for a much more level playing field for all franchises in the league. Also, the existence of a cap will almost certainly have some effect on the salary that players receive. Generally speaking, only those teams whose salary cap

[4] Coon, Larry et al. (2005).
[5] Coon, Larry et al. (2005).

position allows them the freedom to pay higher level free agents the money they demand, will be able to win those free agents. Therefore in a league that employs this type of "hard cap", a player's salary will almost certainly be affected by the team's salary cap position. It thus follows that to estimate an earnings equation in a professional sports league with a salary cap would require knowledge of the salary cap position of every team at the time they signed every player.

Interestingly, the NBA has a soft cap and not a hard cap like the one mentioned above. A soft cap is one in which there are exceptions and teams are allowed to go over the cap for certain reasons. There are several different types of exceptions for NBA franchises to employ when they are signing free agents. In general most of these exceptions deal with teams being able to resign their own free agents without having that salary count against their cap limit. In order to limit the potential for rampant abuse there are some restrictions on how a team can use these exceptions, what players they are allowed to use them on, and how many times each season they are allowed to use them. The main reason that the NBA employs a soft cap is for the fans. No one likes to see a player who has played with a team his entire career be forced into playing for another team simply because his present team doesn't have the salary cap room to sign him.

Undoubtedly, the effect a soft cap will have on individual players' salaries is different from the effect that a hard cap will have. Certainly a salary cap of any kind affects the total payroll of teams in the league. Studies done on the NFL and the NBA have shown that the overall effect of salary caps for teams is significant, but a cap's effect on individual players' salaries, especially the top echelon players, has not been as pronounced. It is generally believed by those who study and follow the business of the

NBA, that it's salary cap does not affect players as much as the salary cap in other leagues. The main reason for this is because it is a soft cap with several loop holes. Generally speaking, if a team wants to sign a free agent, but does not currently have the cap room, they still go after that free agent. To sign available free agents that would generally put the over the cap, a team has two easily accessible options. The first is that they can readjust an existing player's contract and structure it in such a way as to allow the total team payroll to be under the cap. The second is to employ one of the several free agent exemptions to the salary cap set forth in the CBA. Because a team can go over the cap using the exceptions to the salary cap set forth in the CBA to sign their own free agents, if a team really wants another free agent, they can get them and pay them whatever is necessary. The best evidence of this is the fact that nearly 2/3's of the teams in the NBA are over the cap every year. Therefore, while the salary cap probably does have some effect on salaries of some players, because this paper deals with all-star players that make more than $5 million per year, its effect on the types of players analyzed in this paper may be generally considered to be negligible.

Clearly understanding the framework of the free agent market in the NBA is vital in establishing a salary determination model. Generally speaking a salary cap would certainly have some effect on player salaries, but because the NBA employs a "soft cap", which allows teams to exceed or maneuver around the cap with relatively little effort, its effect is most likely insignificant. Now that an understanding of the structure of the free agent market has been established, the next step in the process of setting up a salary determination model is to discuss the implementation of an established theory in the field of salary determination.

CHAPTER 3: THE HUMAN CAPITAL APPROACH

Wage determination has been a topic of much interest and analysis for many years, and its application to the field of professional athletics has grown more popular in the last decade. One of the most popular and respected methods of wage determination has been the human capital approach. The human capital approach uses an individual's attributes, skills, and talents in addition to other market based measures as a method of determining that individual's appropriate wage for a certain occupation. In the field of professional sports these characteristics can generally be easily measured and applied. For this reason, the human capital method is the preferred method of salary determination in professional sports models. It follows that to understand fully a model such as the one employed in this paper, we must outline the human capital approach, and analyze how it applies to the field of professional sports in general, and how it applies to professional basketball in particular.

The field of labor economics, and the subfield of salary determination, is of great interest to not only economists, but also the general public. Generally speaking this is because its tenets are to almost everyone in the world. One of the most popular approaches to salary determination is the human capital approach. While physical capital consists of things such as land, property, bonds, etc; human capital consists of personal attributes that an individual has that makes him more appealing for employment. These attributes could be age, education, physical abilities, job specific training, experience, and other attributes, job specific and general, that make him more appealing in the eyes of his potential employers.

Applying the concept to the everyday business world is quite simple. Firms want to hire the most able individuals they can while not overpaying for the job they want done. Simply put, profit maximizers are unwilling to pay someone more than their value to the firm. It follows that a good way for firms to decide who to hire is to analyze each individuals stock of human capital, and chose the one whose qualifications best fits the job they want filled. A profit maximizing employer would be in equilibrium by hiring labor up the point the point where the marginal revenue product of the last laborer hired equal the wage paid to all laborers of that type.

$$W = MRP$$

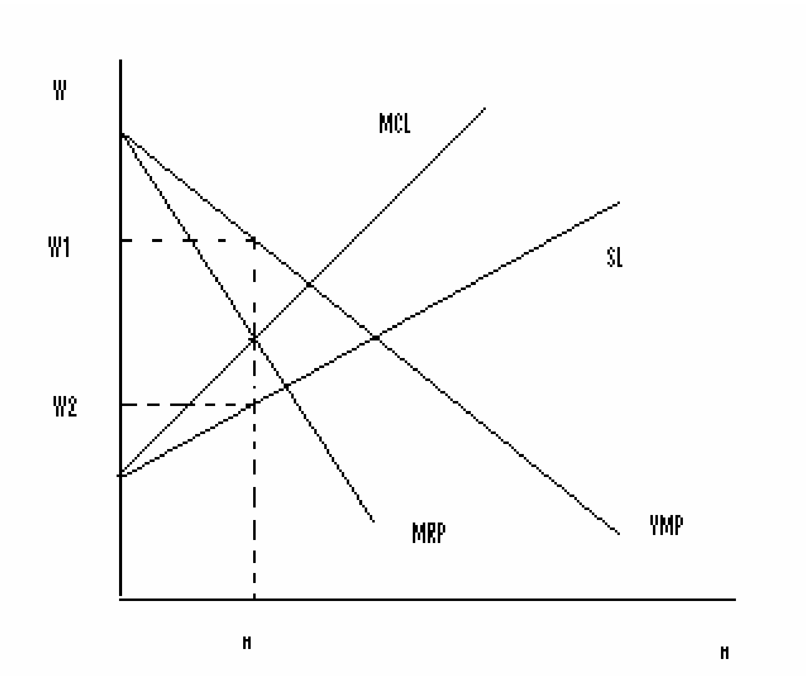
Thus it follows that the higher an individual's human capital, the higher his MRP, and hence the higher potential wage he can demand. Lastly, it must be understood that to invest in one's human capital is to spend current earnings or wealth in such a way as to increase your human capital and therefore your expectation of future earnings. The best example of this is college education. Individuals in college are spending current wealth or earnings to increase their education level, which will hopefully result in higher future earnings and thus increased future wealth. In other words, they are investing in their stock of human capital now, in order to receive higher returns in the future.

Expanding upon this concept, it can be seen how such a method is appealing to salary determination in the world of professional sports. Much like firms in real world, franchises do not want to overpay for players and be stuck with a winners curse, but even more so because of the length and value of the contracts. Likewise, they do not want to offer free agent acquisitions too little and lose them to other competitors in the market. One of the best ways for teams to analyze potential free agent acquisitions is to refer to their stock of “athletic” human capital. By evaluating each player’s stock of “athletic” human capital a franchise can determine what they believe that player’s worth to be by comparing him to other players in the league that have a similar stock, and observing what they are paid. By doing so, they can limit the possibility of overpaying for players, and being stuck with a winners curse.

For simplification reasons, models of a perfectly competitive world generally have a firm setting wage equal to some amount and then hiring workers up to the point where the marginal revenue product of the last person hired is exactly equal to the marginal revenue product the company receives for hiring that worker. However, the world of professional sports does not work this way at all.

First, the markets of most professional sports are not generally perfectly competitive markets. There are only a few teams that demand the players’ services, and there are only few athletes that meet the ability levels required to compete on such a level. This results in a market for labor that is very different from the one seen in other instances. Unlike in most other labor markets, teams negotiate with each player separately to determine what that player in particular will be paid. High profile, upper talent level players can generally demand higher wages because they are unique, and there are very few, or no, other players like them available to teams. Conversely, players who are new, or relatively unproven, may not receive as high a salary as they could in a completely competitive market because the teams in the market know that there are relatively few other places for the players to go to prove their abilities. For this reason, some newer players may end up being paid significantly more or less than the marginal revenue product they provide to the team. However, player contracts are limited to a certain number of years (7 is the max), and after that point teams will better know that player's true value[6].

This is the case of a bilateral monopoly. In this case, the players are the only suppliers of the labor to which the franchises are the only demanders. The graph below is a representation of the case of bilateral monopoly in a non-perfectly competitive market. Wage rate is on the vertical axis and employment is on the horizontal axis. In the graph, MCL is the marginal cost of labor curve, SL is the supply of labor curve, and VMP is the value of marginal product or demand for labor, and MRP is the Marginal Revenue product curve.



[6] It must also be noted that in the case of the NBA there is uncertainty in the outcome of signing a player. This will generally lower a player's prospective salary because the team incurs the risk of signing the player and having him be injured or simply not play to his potential.

In the graph above, the area between W_1 and W_2 is sometimes referred to as the "contract zone." This is the area of potential negotiation in the instance of a bilateral monopoly. Applying this graph to the situation of the NBA is quite simple. Players will ask for a salary of W_1 and the teams will offer a bid of W_2. The two sides will then negotiate to some point between W_1 and W_2. The more power the player or players have over the market, the closer the final salary will be to W_1. Likewise, the more power the franchises have in the free agent market, the closer the final salary will be to W_2. It can be seen that a situation such as this could possibly be the reason we have such wide descrepencies between players salaries. Some players have more market power than other players, and are thus able to earn even higher wages. Lastly, it should also be noted that because the players are unionized, they do have an added advantage in the market[7].

Because teams do not set a single wage like firms in the real world, but instead negotiate with each player individually, it follows that a team's decision to sign a player is done individually as well. A player will be signed as long as the marginal revenue product the team receives from signing him is greater than or equal to value of the contract. In other words, they will be willing to offer up to the amount of the marginal revenue product as the value of the contract.

$S_i \leq MRP_i$

Where S_i equals the salary of the ith player and MRP_i is the marginal revenue product of the ith player. It is also generally the goal of the player to receive the most money he can for his services. This generally results in a bargaining process between the team and the player. Because of this bargaining process, teams sometimes overpay for players in

[7] Reynolds et al (1991, pp.440)

terms of their monetary value to the franchise. It must also be remembered that unlike firms (workers) in the real world, professional sports teams (players) may not always act as profit (wage) maximizing entities. The main reason for this because they are also concerned with winning, which does not necessarily go hand in hand with short run profit (wage) maximization. Sometimes teams will knowingly overpay for very high profile players, and try to compensate by paying other players less than their true worth, or they will simply view overpaying for players as the price of winning. Likewise, players will sometimes take less money to play for a team they think has a better chance of winning. In other words, winning is included in the short run marginal revenue product not just the monetary value. So, while teams may knowingly monetarily overpay for a player, they will not knowingly overpay the total value they place on that player (including intrinsic values) over many periods.

Clearly, NBA teams must be careful with how much they pay players. In an era such as today, where upper echelon player can make upwards of 25 million dollars per year, overpaying for such players can cripple a franchise for years. As stated earlier, one of the best ways for teams to analyze veteran free agents is to examine players' stocks of "athletic" human capital. Certainly teams examine player's physical attributes, such as height, weight, strength, overall physical fitness, but they must also analyze how those attributes are utilized on the basketball court. While a player that is 7'4" is appealing to most NBA franchises, if that player can not move up and down the court in a timely fashion there is no use for him on the basketball court. Other examples of the player's "athletic" human capital may be age, career statistics, and intangible basketball attributes like desire, hard work, or clutch playing. Most of these are things a player can invest time, effort, and money on, in order to raise his future salary. Obviously each team will analyze a given player differently, and this is why some teams are willing to pay more for certain players, while other teams or not. Teams may not necessarily investigate every attribute a player has, but they are certainly aware of what they feel that player's basketball abilities are, and how they fit or do not fit with their team. In doing so, they are analyzing what they feel that players stock of "athletic" human capital is, and what it is worth to them.

CHAPTER 4: LITERATURE REVIEW

While the issue of salary determination in normal labor markets is not a new issue, its application to the world of professional sports is a relatively new and untapped field of research compared to other more conventional fields of economics. There are a few papers that have been written on topics similar, but not the same as the one discussed in this paper. Because this area of econometric analysis is fairly new, using the knowledge and findings of the few published papers dealing with issues similar to this paper's is an integral part of understanding and developing a working model for the issue at hand. In addition to the articles dealing with salary determination in professional sports, some other works were utilized for back ground information regarding the human capital approach to salary determination.

Perhaps the most influential piece of economic literature on the human capital approach to wage determination is Gary Becker's *Human Capital*. Becker won the Nobel Prize in 1992 for his work on the human capital approach to wage determination and is still considered today to be the foremost authority in this field of economic analysis. Becker accomplished two major feats with this work. The first was to lay many of the theoretical foundations for the human capital approach to wage determination, and the second was to analyze the effect of education on earnings. Becker's findings were as important then as they are today and have been one of the major catalysts for the increasing interest in labor economics, and wage determination in particular.

While Becker's original purpose had been to estimate the money rate of return on college and high-school education, in the end he also established the theoretical framework for investment in human capital and its effects on wages. He found that his analysis offered important insight into a wide array of empirical phenomena which had, before this point, been virtually unexplained. Three of these phenomena that are of particular importance to this model are:

> "(1) Earnings typically increase with age at a decreasing rate. Both the rate of increase and the rate of retardation tend to positively related to the level of skill. (2) Unemployment rates tend to be inversely related to level of skill… (6) Abler persons receive more education and other kinds of training than others[8]."

These and other findings of Becker's answered many previously unanswered or unexplained findings in previous economic analyses. Becker also used the first section of his book to analyze the effects of three different types of training, on-the-job, general, and job-specific as well as schooling, other knowledge, and increased productivity, on wages. Becker also used this section to cover the relationship between earnings, costs and rates of return for different persons. Lastly, Becker used the first section to analyze various incentives to invest in human capital as well as some of the effects of human capital. In the end, this section gave critical insight into how certain aspects of a player, like age, experience, previous output, and so forth might affect a player's salary.

While the first part of Becker's book deals with the theoretical framework of investment in human capital, the second part is purely an econometric analysis focusing on the effects of education on wages. This section provided an excellent example of an in-depth econometric analysis of a real world problem that has stood the test of time. For

[8] Becker (1975, p.16)

example, Becker found that the rate of return on a college education was about 10 to 12% per year, and that this had remained surprisingly constant through the years[9]. Becker also found that other factors of individual's human capital had an affect on their wages as well. Attributes such as intelligence, physical condition, race, sex, age, skill level all had vital effects on the earnings profiles of individuals. In short, Becker's *Human Capital* provided an excellent understanding of the human capital approach to wage determination, and provided a basis for how this theory might be adapted to fit the issue at hand.

In addition to Becker's work on the human capital approach to salary determination, three papers in particular were vital in understanding the nature and processes of testing a model of the NBA: Eshcker's et al (2004), Matthew Dey's (1997), and Kahn and Shah's (2005). In addition to these three papers, three other papers on salary determination in Major League Baseball were also important to our study. The primary usefulness of these papers was background information on sports economics in general, and information on how factors such as age and experience might affect salary. In total, these papers provided and excellent foundation for the model and employed in this paper and its application to the world of professional sports, and the NBA in particular.

Almost all the literature on salary determination in the NBA revolves around testing for racial discrepancies in the salaries of white versus non-white players. For example, Hill (2004), Kanazawa (2001), McCormick (2001), and Jenkins (1996) all focused on racial discrimination in professional basketball. Generally speaking, almost

[9] Becker (1975, p. 232)

all of these papers found that in the period during the 80's there existed some discrepancies in salaries for black versus white players. However, almost all the papers have found that this discrimination has all but dissipated during the mid 1990's and into today.

Also, almost all the literature in this genre uses the human capital approach to wage determination. Nearly every paper uses basketball related statistics along with other player attributes to estimate a model. Other commonly used variables are age, position variables, all-star or superstar variable, and, as mentioned above, race. These variables are then analyzed to measure their effect on salaries and results have generally been fairly consistent, with only a few exceptions. Thus it can be seen the human capital approach to wage determination is very popular for models regarding professional sports.

In Eshcker's et al (2004), the main purpose is to determine if there exists a statistically significant difference between salaries of foreign players compared to American players. Similar to the current study, Eshcker uses the human capital approach to analyze the existence of an international player premium in the NBA, but instead of individual data pooled across years, he uses yearly data to analyze his question. Like this paper, Eshcker's model also uses on-court characteristics, off-court characteristics, and other measures of the players' human capital. Eshcker found that there was a premium for international players in the first few years of his data, but that it disappeared after a few years. He believed the main reason for this was because NBA franchises better learned how to scout and analyze international talent. In doing so, they reduced the number of international players they overpaid, and the premium disappeared. Eshcker also found that the four on-court characteristics used in this paper were significant for almost every year in his data. However, he found no evidence to support the existence of an all-star premium, which is something that will be tested in this paper.

Similarly, Dey (1997) also used the human capital approach to test his hypothesis. Dey's main question was the issue of race and how it affected the salaries of players with basically the same ability levels but different races. Dey's model also used the on-court characteristics and off-court characteristics to measure each player's level of human capital and allow him to test for differences in the salaries of players with similar stocks, but different races. Like Eshcker, Dey also used an all-star variable to capture the premium for elite players, but unlike Eshcker he found it to be significant. Dey also found that although there might have existed some discrepancy between the salaries of similarly able white and black players before the late 1980's, that this had dissipated by early 1990's. He pointed to mass fan acceptance of non-white players after the mid 1980's as the reason teams were more comfortable paying non-white players comparable salaries. The NBA is and always will be, a fan oriented sport, and right or wrong, the owners will generally succumb to the desires of the fans.

Lastly, in Kahn and Shah's (2005) the major focus was again to test for discrepancies between white and non-white players' salaries. Again, they employed a human capital type model to test their query. Like Eshcker and Dey, they also used basketball statistics to measure each players stock of human capital as well as other off-court measures. They used these variables to test if their significance levels changed when they were applied to players of different races. They found little to no evidence to support the existence of a racial discrepancy for players under the rookie salary scale or free agents. They did however find that there was some evidence to support the existence of a racial inequality between marginal white and non-white players.

In total these articles on the NBA were invaluable in providing real world examples of how the human capital approach to wage determination should be applied to the NBA. In general the articles supported on some level each others findings about the effects of different skills or attributes on player's salaries. However, the variable of primary interest in this paper, all-star, was found to have differing levels of significance between the papers.

CHAPTER 5: DATA AND METHODOLOGY

The model chosen in this paper to determine NBA players' salaries is a simple ordinary least squares (OLS) salary determination model. The empirical model is based upon the application of the human capital approach to wage determination to the NBA, and also upon the literature. In the model, log of average per year salary is the dependent variable with four on-court characteristic variables: points per minutes (PPM), rebounds per minutes (RPM), assists per minutes (APM), and blocks per minutes (BPM), four interaction variables of the on court characteristics variables with a dummy variable for post player (POSTPPM, POSTRPM, POSTAPM, POSTBPM), as well as one variable to measure a player's experience level in the big game (PLAYOFFM), the player's age (AGE) and age squared (AGE2) and lastly a dummy variable all-star (ALL-STAR). The general form of the model is thus:

$$\text{Log Salary} = B_0+B_1(PPM)+B_2(RPM)+B_3(APM)+B_4(BPM)+B_5(AGE)+B_6(ALLSTAR))+ B_7(PLAYOFFM)+B_8(AGE2)+B_9(POSTPPM)+B_{10}(POSTRPM)+B_{11}(POSTAPM) +B_{12}(POSTBPM)+\varepsilon_t.$$

For the model chosen, average per year salary has been selected as the dependent variable. In actuality most contracts signed today in the NBA have different specifications that allow teams and players to negotiate on a total value and length of a contract as well as the yearly payout. In general there are two major types of contract structuring, back loading and front loading. Back loading is when a team makes the last few years of a contract worth more than the first years, and this is primarily done for salary cap reasons. An example of a back-loaded contract might be, a player signs a 40 million dollar four year contract and does not receive 10 million dollar per year, but instead receive 5 million the first year, 5 million the second year, and 15 million per year for the remaining two years. Front-loading is much more favorable for the players because they receive more money sooner, and is often a request of elite players. Clearly this presents a problem in salary determination because a player's contract is generally not evenly weighted throughout the length of the contract. Thus for the purposes of this paper, salary will be computed as total contract value divided by the number of years for the contract[10].

Because this paper focuses on the elite players in the NBA, the population of the model consists of every player whose average per year salary is worth at least 5 million dollars per year. The main reason for this limit to the dependent variable is that NBA franchises are most concerned with those players that they sign to large contracts because those players represent a much more significant financial investment than the lower level players. From this population, a random sample of 79 players was chosen and a model was regressed. To compress the scale, the log of salary was used. This is generally found to be how most salary determination models are specified and it seemed to fit the data in this case. It also makes interpretation of the coefficients of the explanatory variables more easily interpretable.

Next, the four on court characteristic variables used in the model measure a provide insight into each players stock of "athletic" human capital, as it applies to

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[10] Contract values are not published. These values were taken from www.nationwide.net/~patricia/ and www.nba.com.

basketball. It was found by Dey (1997) and Eschker et al (2004) that these variables where the best judge of a players on-court abilities and talents. All on-court variables were calculated for the player's career up until the year his most recent contract was signed. For this reason, only veteran players where chosen because calculating rookie on-court statistics would be impossible because they would not have any statistics from the NBA. To calculate rookie contracts would require a different model all together. In other words, franchises would be required to use clairvoyance to form an expectation about a rookie's potential instead of using prior experience as they can with veteran players. These four variables will be tested for individual significance and joint significance at the five percent level. Generally these four statistics are kept per game so that a player's points per game or rebounds per game is what is most commonly kept. However for this model, it was found that many of the players in the data set had played in large numbers of games, but very few minutes, as is common with young players with only a few years experience. Thus the statistics were converted to a per minute basis to get a truer measure of the player's prior on court abilities.

Points per minutes is calculated by summing all points scored by a player throughout his career in the NBA and dividing it by the total number of minutes played. This is the most popular of all on court statistics and is generally thought of as the best determination of a player's offensive abilities. Because there is an interaction term between this variable and a dummy variable for post, this variable can be interpreted as PPM effect on salary for guards only[11]. Because scoring is always considered an

[11] Post dummy is a 1 for all centers and forwards, and a 0 for all gaurds.

important part of an upper echelon player's abilities, especially for guards, this variable is expected to have positive effect on salary.

Rebounds per minute is calculated by summing all rebounds gathered by a player throughout his NBA career and dividing it by the number of minutes played. Again, because there is an interaction term between this variable and a dummy variable for post, this variable can be interpreted as RPM affect on salary for guards only. Because the variable only measures the effects of rebounds on the salary of guards, and rebounding is not generally expected from guards, it is expected have only a minor positive effect on salary of guards.

Assists per minute is calculated by summing all assists by a player throughout his NBA career and dividing it by the number of minutes played. Because there is an interaction term between this variable and a dummy variable for post, this variable can be interpreted as APM affect on salary for guards only. Passing is almost always considered a vital part of a guard's abilities, and it is therefore expected to have a positive effect on salary for guards.

Lastly, blocks per minute is calculated by summing all blocks by a player throughout his NBA career and dividing it by the number of minutes played. Because there is an interaction term between this variable and a dummy variable for post, this variable can be interpreted as BPM affect on salary for guards only. Guards are generally shorter than post players, and are not expected to get many, nor do they get many, blocks. It follows that although blocks would usually be expected to have a positive effect on salary, in this instance where it is only for guards, the sign could be positive or negative.

Next are the interaction variables. These variables are included to show how different types of players are paid to do different things on the basketball court. In general, a point guard is not counted on to rebound. He is counted on to distribute the basketball, and provide scoring when needed. Therefore, you would not expect to find that rebounding is a highly significant factor in the determining of a point guard's salary, but that assists would be.

The variable POSTPPM is equal to points per minute multiplied by a dummy variable for post. The dummy variable is a one for a post player, and a zero for a guard. Therefore this variable tests for the affect of PPM on salary for post players only. While offense may not always be expected of every post player, it is generally expected that every player on the court can score points if needed. Thus, this variable is expected to a have a positive, significant effect on a post player's salary.

Next, the variable POSTRPM is equal to rebounds per minute multiplied by a dummy variable for post. As before, the dummy variable is a one for a post player, and a zero for a guard. Therefore this variable tests for the affect of RPM on salary for post players only. Because almost every post player is expected to rebound, this variable is expected to be positive.

Next, the variable POSTAPM is equal to assists per minute multiplied by a dummy variable for post. Again, dummy variable is a one for a post player, and a zero for a guard. Therefore this variable tests for the affect of APM on salary for post players only. The expected sign of this variable is not determinable. While assists may not be expected of most post players, it is not absurd to think that post players who pass the ball well get paid more than those who do not.

Lastly, the final post interaction variable is POSTBPM, and it is equal to blocks per minute multiplied by a dummy variable for post. Again, dummy variable is a one for a post player, and a zero for a guard. Therefore this variable tests for the effect of BPM on salary for post players only. Blocks are generally considered to be the best measure of a player's defensive abilities, especially for post players. Therefore, this variable is expected to have a positive effect on salary.

The two general characteristics of AGE and AGE2 are the next variables in the model. The first, AGE, is the player's age at the time the contract was signed. The second is simple the square of AGE. Often it is the case in salary determination models that age takes a parabolic shape; therefore, age squared is used. Both these variables are considered to be vital variables in any salary determination model. The two variables will be tested for joint significance at the five percent level. In most salary determination models, it is expected that salary increases in the first part of ones career, reaches a peak, and then decreases from that point on.

Lastly, the special variables, Playoff minutes played and All-star were included in the model. They were included to capture those aspects of player's abilities or attributes that are not necessarily captured by the player's statistics. These variables will be tested for individual significance at the five percent level.

The variable PLAYOFFM is equal to the total number of minutes the player has played in the playoffs for his career. This variable will capture the experience factor that is often associated with tenure in other salary determination models. It is also likely to capture some of the intangible factors such as clutch performance or winning attitude that is so often talked about. To understand this, it must be understood that the final goal of every franchise is to win an NBA title and to do this requires teams to play well in the playoffs. It seems obvious that teams would be highly interested in a player's experience level in this type of high pressure situation. Thus it follows that this variable is also expected to have positive effect on the player's salary.

Finally, ALL-STAR is a dummy variable noting if a player has been an NBA all-star in the five years prior to his contract signing. It is only taken back to five years before the contract because if a player's was an all-star in his second year in the league and he has not been one in the last 6 years, teams will generally not consider him an all-star caliber player. This variable is used to set apart those players that are considered to be the best players each year in the NBA. Although results have been mixed in the past, the all-star variable is expected to be significant and positive for the time period collected.

Applying the human capital approach to the world of professional basketball through using different basketball related statistics and characteristics has brought us to this point. Next, a model will be regressed using the empirical form set forth in this section and the results will be analyzed.

TABLE 1
VARIABLE DESCRIPTIONS AND SUMMARY STATISTICS

Variable	**Definition**	**Mean**	**Standard Deviation**
Log Salary	Log of the player's average per year salary	15.948	.393393
PPM	Total career points/total minutes played	.4225	.099558
RPM	Total career rebounds/ total minutes played	.2031	.071747
APM	Total career assists/total minutes played	.07882	.052886
BPM	Total career blocks/total minutes played	.02964	.023319
AGE	Players age at time of contract signing	26.39	3.023
ALLSTAR	Denotes if player was an All-star in the last 5 years	.2532	.4376
PLAYOFFM	Total number of Playoff minutes played	1116.14	1248.21
AGE2	Players age at time of contract signing squared	705.59	168.90
POSTPPM	Total career points/total minutes played*Dummy variable for post player	.2588	.215108
POSTRPM	Total career rebounds/ total minutes played*Dummy variable for post player	.1520	.123721
POSTAPM	Total career assists/total minutes played*Dummy variable for post player	.3395	.031712
POSTBPM	Total career blocks/total minutes played*Dummy variable for post player	.2521	.026144

CHAPTER 6: RESULTS

I estimated the previously specified model in LIMDEP using OLS. The results have been recorded in TABLE 2(A) on page 33. The overall model was found to fit the fairly well with and R^2 of .65 and an adjusted R^2 of .58. This suggests that 65% of the variation in player salaries is explained by the model. The data has a total of 79 observations which results in the model having 66 degrees of freedom which is more than enough for confident results. Also, the F statistic for the whole model is 10.30, which is higher than the critical value of 2.45, suggesting all the variables are jointly different from zero. In general the model had the expected signs and significance levels for almost all of the variables.

Also the model was tested for the presence of potential problem such as multicollinearity, heteroskedasticity, and specification or omitted variables error. Because the model does not use time-series data, there is no potential problem of auto-correlation. The existence of multicollinearity in a model such as this is expected because there is an inter-relationship between some variables. This can easily be seen by considering the case of rebounds and blocks. It is likely that players who get a high number of blocks also get a high number of rebounds, hence there will be multicollinearity between these two variables. Despite this it is at worst near-extreme multicollinearity which only affects the efficiency of the estimates. Thus the existence of multicollinearity actually results in larger variance and smaller t-statistics. This model has a fairly high R^2 but more than half of the variables are significant which is generally not the case with high multicollinearity. Therefore it is a non-issue for the model[12]. Second, heteroskedasticity was tested for using the Breusch-Pagan test. The X^2 statistic for the Breusch-Pagan test for the model is 8.84 which is well below the critical value of 21.03[13]. Therefore, it can be concluded that heteroskedasticity is not a problem in the model. In spite of this, the program for White corrected standard errors was applied to the model to test if it provided more accurate results. If no heteroskedasticity exists in the model then the white standard errors will be the same as the normal standard errors. In this case, the adjusted standard errors were different which suggests there was some small level of heteroskedasticity. Therefore the model is regressed using the White Standard errors.

Lastly, specification error and omitted variables bias was tested for using the Ramsey RESET test. The F-test for the Ramsey RESET was calculated to be .34 which is well below the critical value of approximately 2.70. Also, the for the RESET test, the lower your F-statistic is, the more certain you can be that specification error or omitted variables test is not a problem. Therefore, we can be highly certain that these problems cannot be proven to exist in the model.

The results of the tests for the on court characteristics were generally as expected. As stated in the variable description section, the four on court characteristics are the effects of those variables for guards only. Therefore, an increase in one unit of PPM can be expected to increase salary by 147%. While this seems high, it must be remembered

[12] The existence of Multicollinearity was analyzed using the correlation matrix in Appendix 2.
[13] Bruesch-Pagan test is only asymptotically justified, however the value of 8.84 is well below the critical value.

that an increase of one unit in PPM would mean increasing point per minute by 1, and the largest value this variable took on in the data was .67. Therefore increasing the persons PPM by one unit would mean increasing this to 1.67 PPM which would be extremely high. Therefore it is probably best to consider this variable is to say an increase in .1 units of PPM, which would mean increasing PPM by .1, would result in increasing salary by 14.7% for a guard. Likewise, APM was also found to be significant, and positive. From the model it can be interpreted that a .1 unit increase in APM would increase salary of salary for a guard of 15.7%. Also, BPM was found to be significant and negative. At first it seems odd that increasing blocks per minute would decrease salary, but it must be remembered that this coefficient is for guards only. A guard's main purpose on the court is to score and distribute the basketball. Hence guards that get a large number of blocks are very rare and therefore this result is inflated because of the low number of blocks for guards in the data. In general it would not be expected that blocks would be a significant statistic that a team would look at when negotiating a contract with a free agent guard. On a related note, RPM was not found to be significant, but this was expected for guards, as their main purpose on the court is to score and distribute the basketball. Lastly all four variables were tested for joint significance using the F-test and were found to an F-value of approximately 3.65 which is greater than the 99% critical value of 3.60. Therefore we can be 99% certain that these four coefficients are jointly different from zero.

On the contrary, the results of the post interaction variables were fairly weak. Only one of the post interaction variables was found to be individually significant. This is somewhat surprising, but not entirely. POSTBPM was found to be significant at the 1% level, and it was positive. It can thus be interpreted that a .01 unit increase in BPM (scaled down more because its values were very low) can be expected to raise a post player's salary by 18.3%. Also, the four variables were tested for joint significance, and were not found to be jointly significant with an F-value of 1.88 which is less than the critical value of 2.40. However, it was found that removing the variables resulted in a slight omitted variables bias, so the variables were left in the model. This correlated with the fact there is generally a position or position interaction term in most other models found in the literatures led to the inclusion of these variables in the model[14].

In contrast to the post interaction variables, both general variables were found to be individually significant, but the signs were somewhat counter-intuitive. AGE had a negative sign, and AGE2 had a positive sign which seems to be opposite of what would be expected in a general salary determination model. However, this model is special because it deals with athletes and professional sports. AGE is downward sloping because the model only includes players who have played at least a few years in the league, thus the early years of a players career are not included. Therefore data for the age variable generally starts at a player's peak age, and decreases from there. AGE2 seems to include what could be called the Shaq effect. Shaquille O'neal is the second highest paid player in the data set, with perhaps the best overall stats, and is also one of the oldest. Likewise, several of the higher paid players are older which results in having an upward sloping tail to the end of the data. These two variables were also tested for joint significance using the F-test and were found to have an F-value of 8.90, which is significantly higher than the 99% critical value of 4.63.

[14] Because of the lack in joint significance of the post interaction variables, a second regression was run that does not include them. The results of this regression can be seen in TABLE 2(B) on page 34.

Likewise, the two special variables included in the model were highly significant. The dummy variable all-star was found to be statistically significant at the 1% level with a t-value of 4.121. Although this result was different from the results found by Eschker et al (2004) in his model, it is not completely unexpected. In addition to this the coefficient for the All-star variable was .3696. A simple interpretation of this would suggest that being an all-star increases a player's salary by approximately 36.96%. Therefore it can be seen that being an All-star has a significant positive effect on that player's salary. This is an important finding and its implications, as can be seen in the following chapters, can be quite interesting[15].

Also, the variable for playoff minutes was also a positive and significant at the 1% level. It can be interpreted from the coefficient that a 100 unit increase in playoff minutes (100 minutes played) would result in a .7% increase in salary. Although the effect is somewhat small it must be remembered that several players have 5000 or more playoff minutes in their career. Therefore it can be seen that this can be a large factor in player salaries for the more experienced veteran players.

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[15] To assure that the result found for all-star was correct a Chow Test was run on the model. The unrestricted model was set as the complete model minus the post interaction terms, and plus 7 interaction terms for each of the other explanatory variables multiplied by ALLSTAR. The restricted model was this model above without the 7 ALLSTAR interaction terms. A Chow test was performed and the F-value found was .80 which is lower than the critical value of approximately 2.95. Thus we can be fairly certain the effect of ALLSTAR is its own individual significance and not caused by its correlation to other variables in the model.

TABLE 2(A)
OLS RESULTS

Independent Variables	Coefficient (Standard Error)
***PPM	1.4689 (.44953)
RPM	1.91452 (1.36897)
**APM	1.57819 (.54814)
**BPM	-13.51896 (6.03295)
***AGE	-.410700 (.12769)
***ALLSTAR	.36962 (.08968)
***PLAYOFFM	.00007081 (.0000253)
***AGE2	.006788 (.002292)
POSTPPM	-.682765 (.615240)
POSTRPM	-1.49284 (1.338907)
POSTAPM	1.97220 (2.29282)
***POSTBPM	18.32113 (6.506644)
***CONSTANT	20.96965 (1.73149)
OBSERVATIONS R2	79 .65184

***1% Confidence Level, **5% Confidence Level, *10%Confidence level

TABLE 2(B)
OLS RESULTS

Independent Variables	Coefficient (Standard Error)
***PPM	.87883542 (.36602443)
RPM	-.25639820 (.59783453)
***APM	1.64305616 (.69774396)
*BPM	2.48818139 (1.41169020)
***AGE	-.31073562 (.11650264)
***AGE2	.00491279 (.00205509)
***ALLSTAR	.44329138 (.09203425)
***PLAYOFFM	.0000722014 (.0000257155)
***CONSTANT	19.9680805 (1.63914682)
OBSERVATIONS R^2	79 .60867

CHAPTER 7: FAILED VARIABLES

This section gives a discussion of some of the variables that were tried in the model, but failed for one reason or another. In total, more than 50 variables were attempted in the model, but in the end, only the twelve variables used added some significant predictive power to the model.

The first variable that was removed from the model was years in league (YIL). YIL is calculated by totaling the total number of years a player has been in the league at the time his contract was signed. This type of experience variable is almost always seen in salary determination models. However, in this model it was found to present a major problem, while simultaneously not adding much predictive power. It was found to be highly correlated with AGE and AGE2, and this near perfect multicolinearity presented a problem for the model. In the end, the significance level lost on other variables in the model when YIL was included, was too high, and thus it was dropped to provide more efficient predictions. Also, dropping the AGE variables and substituting in YIL was also tried. However, it was not a better fit than AGE for the model, and thus AGE was included but not YIL.

Likewise, height was also a failed variable for much the same reason. It was highly correlated with both rebounds and blocks and this prevented any of these variables from being statistically significant. Also, it added little to the model in terms of predictive power and was therefore dropped.

Next, dummy variables for the year of contract signing were also attempted in the model. Their purpose was to catch any time trend that may exist in the data. While this is not generally a problem with pooled data, such as is used in this model, this paper deals with a period of eight years and testing for a trend is a vital part of finding reliable results. Therefore, it was tested to see if any trend existed. When added, none of the dummies were found to be individually significant. In addition to this, they were not found to be jointly significant either. Thus, these variables were dropped because they added little to the model.

After this, a set of variables that included only the player's previous season's statistics was included in the model. This was intended to test if teams pay more attention to a player's entire stock of statistics, or if they focus instead on their most recent performance. Therefore, these statistics were gathered for approximately 40 of the 79 observations in the model and the variables were included in the original regression. None of these variables were found to be individually significant, and they were also found to not be jointly significant either. It follows, that the evidence suggests that teams focus more on a player's entire career, rather than their most recent accolades. Clearly this is the safest route for a team to take. As stated earlier, teams do not want to be stuck with a winner's curse, and this is probably one of the best ways for them to reduce the likelihood of it happening.

Next, a dummy variable for a player re-signing with his previous team was included. This was included to see if the result found for all-star was truly significant. It was believed that perhaps the all-star variable was capturing this effect, and thus, its significance was artificially inflated. However, when the variable was included in the model, the significance of all-star was not affected. Also, the dummy variable for re-signing was not individually significant and thus it was dropped from the model[16].

Lastly, a variable for perennial all-star was included in the model as well. It is a dummy variable for players' having more than three all-star selections to their name. Undoubtedly, if there exists a premium for one time all stars in general, then there might also exist a premium for perennial all-stars, since they will certainly be the most popular of all players. Once the variable was gathered, it was then multiplied by each of the other explanatory variables in the model to test if a perennial all-star player's salary is determined differently from other players. Unfortunately for this model, there were only nine perennial all-stars and this presented a major problem. There were simply not enough observations of the perennial all-star variable to establish a reliable result, and thus this variable was dropped as well.

As it can be seen, potential variables in a model such as this are not hard to come by. However, it is vital that we include only those variables that fit the data best and provide confident results, while using previous literature to guide us as well.

[16] This dummy variable was also attempted in the reduced version of the model found in TABLE 2(B). When the post interaction variables are left out and this variable is included, this dummy becomes individually significant. However, it is not found to affect the significance of the ALLSTAR variable even in this instance thus the conclusion regarding this result is valid even in the reduced model.

CHAPTER 8: CRITIQUE AND CONCLUSION

As is always the case with econometric studies, variables have certainly been left out[17]. In a case as complicated as that of professional player salaries there are several other possible variables that were left out or omitted in this model. One of the major variables that might have been left out of the model is player popularity. This variable seems like it could potentially be a big factor in some player's salaries. In spite of this, the all-star variable is actually a popularity rating of sorts because some of the all-stars (starters) are selected by the fans[18]. The second reason this variable was left out, is because it would be very difficult to measure. Another factor that might have some effect on player salaries is the franchise's salary cap room. This means that teams who have more cap room would be more willing to offer more money to players than those teams without the cap room. However, it is likely that this effect will be quite small, because as discussed in Chapter 2, the NBA has a soft cap, and the exceptions allow for teams to pay players practically whatever they desire. Lastly, another variable that was potentially left out of the analysis was a preference variable on the part of the athletes themselves. It is sometimes the case that a player prefers to stay in a certain city or area of the country, for reasons such as family, and is willing to take less money to stay in those areas. This

[17] However none of the omissions were significant enough to be found using the RESET test.
[18] A ballot of 120 players, 60 from each league, is established by an expert panel of basketball media members. Fans are then allowed to vote for 2 gaurds, 2 forwards, and 1 center from each league. The top 5 vote getters (2 highest guards, 2 highest forwards, and the highest center) from each conference are then declared the starters for the All-star Game. Next, all the coaches in each conference are given seven votes. They are not allowed to vote for players from their own team. The seven players from each league that receive the highest number of votes are then selected for the All-star team as reserves.

might mean that this player is worth more to the local franchise; however, this is still debatable. It might also be the case the player mentionedwishes to play for a certain coach or with a certain player and that those factors affect the salary that is accepted. In addition to these variables, other variables were tried in the model, to see if they expanded its predicting abilities but were found to be insignificant. The main variable that was tested and left out was years in league. It was found to not increase the predictive power of the model, and simply added more multicolinearity to the model. After dropping the YIL variable the model was tested for omitted variables bias using the RESET test, and passed. Therefore, there is no reason to include the variable.

In conclusion, the human capital model that was chosen was the model that best fit the data, and was the best, linear, unbiased, estimator of player salaries of all the models tested. In addition to this, the model's predictive power was as great as any other model dealing with player salary determination researched. The null hypothesis that the All-star variable was not significant was rejected. It thus follows that there did exist a premium in the NBA for all-star players during this time period. The model has shown that the fact that a player is an all-star increases his salary over other players by 36.96% ceteris paribus. Conversely, in Eschker's et al (2004) paper, he found that this was not the case. Eschker's et al (2004) paper was based on contracts signed from 1996 to 2002. However, Dey's (1997) model which was based on contracts signed between 1987-1993, found that the all-star variable was significant. It is the opinion of the author that the change in significance of the all-star variable occurred because of a shift in how the NBA advertises and the type of players that were present in the league at the time the study was performed. At the time Dey's (1997) test was performed, the NBA was in the its prime with Michael Jordan, Larry Bird, and Magic Johnson being the center of focus for fans and franchises alike. These players were extremely exciting, and the unique basketball style they played was something fans were drawn to. Thus teams in this period were paying the upper echelon players, they hoped might one day become a superstar, the “big bucks” hoping they too might draw the crowds like Michael and Magic did. In contrast, at the time Eschker wrote his paper, the NBA had just recently come out of a nasty labor dispute. Fans were fed up with superstar athletes complaining about how much they made, and wanted to see teams that played together and won. Seemingly cyclical, in recent years it seems as though the NBA has focused on individual players (Kobe Bryant, Shaquille O’Neal, and LeBron James, to name a few) and this is perhaps why the all-star variable has become significant once again. Yet again, fans have in recent years have become more drawn by players that are exciting, than by teams that win. In the most recent time period it seems as though teams have shifted their focus to getting those players that are most exciting to the fans as opposed to finding those players that will make them better. Admittedly, these are sometimes one in the same, but oftentimes they are not. This change in focus by fans and franchises alike has caused the all-star variable to become significant in the last few years. Thus, it follows that significance of the all-star variable is most likely influenced greatly by the attitude of fans towards the NBA and its players as well as how the NBA advertises.

BIBLIOGRAPHY

Becker, Gary S. *Human Capital*. Second edition. National Bureau of Economic Research. Chicago: The University of Chicago Press. 1975.

Bender, Patricia. "Patricia's Various Basketball Stuff". http://www.nationwide.net /patricia/. 2006.

Bowles, Samuel et al. "The Determinants of Earnings: A Behavioral Approach". *Journal Of Economic Literature*. December 2001. v. 39, iss. 4, pp. 1137-76.

Burger, John D and Stephen JK Walters. "Market Size, Pay, and Performance: A General Model and Application to Major League Baseball". Journal of Sports Economics. vol. 4. no. 2. 2003.

Coon, Larry et al. "NBA Salary Cap FAQ". http://members.cox.net/lmcoon/ salarycap.htm.November 2005.

Dey, Matthew S. "Racial Difference in National Basketball Association Players' Salaries: A New Look". *The American Economist*. Fall 1997. vol. 41. iss. 2. pp. 84-90.

Eschker, Erick et al. "The NBA and the Influx of International Basketball Players". *Applied Economics*. vol. 36. 2004.

Faurot, David J. "Equilibrium Explanation of Bargaining and Arbitration Major League Baseball". *Journal of Sports Economics*. vol. 2, no. 1. 2001.

Hamilton, Jean Catherine. *Salary Determination in Professional Sports*. Dissertation. The University of California Berkley. 1995.

Hill, James Richard. "Pay Discrimination in the NBA Revisited". *Quarterly Journal of Business and Economics*. Winter-Spring 2004, v. 43, iss. 1-2. pp.81-92.

Jenkins, Jeffery A. "A Reexamination of Salary Discrimination in Professional Basketball". *Social Science Quarterly*. September 1996, v.77, iss. 3. pp. 594-608.

Jewell, R Todd et al. "Testing the Determinants of Income Distribution in Major League Baseball". *Economic Inquiry*. vol. 42, no.3. July 2004.

Kahn, Lawrence M and Malav Shah. "Race, Compensation, and Contract Length in the NBA: 2001-2002". *Industrial Relations*. Vol. 44, no.3. July 2005.

Kanazawa, Mark T and Jonas P. Funk. "Racial Discrimination in Professional Basketball: Evidence from Nielsen Ratings". *Economic Inquiry*. October 2001, v. 71, iss. 6. pp.599-608.

Long, James E. et al. "Salary Vs. Marginal Revenue Product Under Monopsony and Competition: The Case of Professional Basketball. *Atlantic Economic Journal*. vol. XII. September 1985. 50-59.

McCormick, Robert E. and Tollison, Robert D. "Why Do Black Players Work More for Less Money?". *Journal of Economic Behavior and Organization*. February 2001, v. 44, iss.2. pp.201-19.

Reynolds, Lloyd G. et al. *Labor Economics and Labor Relations*. 10th ed. Prentice Hall. New Jersey. 1991.

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APPENDIX 1: DATA

PLAYER	AVG Per year Salary	Year Signed	PPG	RPG	APG	BPG
Abdur-Rahim	5860000	2005	19.84821429	8.145833333	2.748511905	0.82738095
Allen	16000000	2005	20.87057011	4.708782743	3.987673344	0.17873651
Artest	7000000	2002	12.31527094	4.300492611	2.743842365	0.6059113
Battie	5500000	2006	6.539473684	5.67481203	0.706766917	1.06390977
Bender	6800000	2002	5.211180124	2.105590062	0.602484472	0.5093167
Bibby	11500000	2002	14.45918367	3.292517007	7.068027211	0.15986394
Billups	5616666	2002	11.34343434	2.37037037	4.161616162	0.16161616
Blount	6416667	2004	5.852398524	4.47601476	0.638376384	0.99261992
Boozer	11666667	2004	12.64102564	9.397435897	1.628205128	0.67307692
Brown	8333333	2005	7.699604743	5.454545455	0.996047431	0.68379446
Brown	8500000	2003	9.181102362	7.900262467	1.54855643	1.15879265
Bryant	19485714	2004	21.77361854	5.021390374	4.260249554	0.62032085
Cassell	5666666	2002	15.27739726	3.186643836	6.200342466	0.15753424
Cato	7000000	1999	3.700854701	3.435897436	0.358974359	1.28205128
Chandler	10666667	2005	7.586206897	7.287356322	0.835249042	1.4674329
Collins	5900000	2004	5.389830508	4.529661017	1.360169492	0.62288135
Crawford	7920000	2004	11.21721311	2.422131148	3.831967213	0.29918032
Currie	10000000	2005	11.81314879	4.892733564	0.577854671	0.88581314
Daniels	6000000	2005	7.78330373	1.785079929	3.269982238	0.11545293
Davis	12000000	2005	10.27357392	7.621653085	1.159487776	1.02328288
Davis	5783333	2002	7.797814208	2.278688525	1.68852459	0.21857923
Duncan	17429672	2003	22.89135255	12.30155211	3.208425721	2.50332594
Dunleavy	9000000	2004	8.554140127	4.178343949	2.076433121	0.20382165
Fisher	6100000	2004	7.404411765	2.058823529	2.974264706	0.08088235
Fortson	5428571	2000	9.648648649	7.540540541	0.740540541	0.30810810
Foster	5000000	2002	4.412790698	5.680232558	0.627906977	0.38953488
Francis	14166666	2002	19.68691589	6.369158879	6.476635514	0.39719626
Gadzurick	6000000	2005	6.273170732	5.936585366	0.326829268	1.28292682
Ginobili	8666667	2004	10.35616438	3.45890411	2.938356164	0.22602739
Hamilton	8857142	2003	16.7414966	3.06462585	2.418367347	0.14625850
Hardaway	12382142	1999	19.01897019	4.74796748	5.536585366	0.51761517
Harrington	6000000	2001	6.436241611	3.88590604	1.161073826	0.19463087
Haywood	5000000	2004	6.15	5.059090909	0.459090909	1.40909090
Horn	12166667	1999	20.52884615	7.365384615	1.644230769	0.75
Howard	6150000	2003	17.89522342	7.454545455	3.1201849	0.37904468
Hughes	12000000	2005	15.20045045	4.673423423	3.286036036	0.36486486
James	6000000	2005	4.914179104	3.492537313	0.384328358	1.28731343
Jaric	6666667	2005	8.494252874	2.850574713	4.465517241	0.27586206

PLAYER	AVG Per year Salary	Year Signed	PPG	RPG	APG	BPG
Jones	13268571	2000	16.19951923	3.956730769	3.319711538	0.71394230
Kidd	17262000	2003	14.77989822	6.454198473	9.291348601	0.29770992
Kirilenko	14333333	2004	13.02916667	6.045833333	1.983333333	2.2875
Lafrentz	9996250	2002	12.97590361	6.899598394	1.208835341	2.47389558
Lewis	9285714	2002	11.84169884	5.405405405	1.243243243	0.47104247
Maggette	7500000	2003	11.45054945	4.201465201	1.384615385	0.25641025
Magliore	6750000	2003	7.894957983	6.218487395	0.613445378	1.15546218
Marion	13166667	2002	16.28436019	9.398104265	1.853080569	1.17061611
Marshall	5500000	2005	12.37634409	8.259408602	1.577956989	0.99865591
Martin	13000000	2004	15.08480565	7.586572438	2.360424028	1.36395759
Mason	7233333	2003	10.9055794	4.819742489	1.416309013	0.33905579
McDyess	5625000	2004	17.60180995	8.696832579	1.56561086	1.67194570
McGrady	21000000	2004	21.3963039	6.396303901	4.121149897	1.17043121
Miles	8000000	2004	9.770226537	5.346278317	2.009708738	1.15857605
Miller	8500000	2003	14.25538462	4.107692308	7.852307692	0.27692307
Miller	9571428	2003	10.5451505	6.866220736	1.735785953	0.58528428
Nash	11000000	2004	12.34608379	2.551912568	6.045537341	0.05828779
Nesterovic	7000000	2003	7.452531646	5.414556962	1.037974684	1.18037974
Nowitzki	13216666	2001	17.08056872	6.862559242	2.004739336	0.92890995
Okur	8333333	2004	8.223776224	5.286713287	0.979020979	0.71328671
Olowakandi	5408700	2003	9.941176471	7.978328173	0.761609907	1.63157894
Oneal	18084000	2003	10.96825397	6.798185941	0.968253968	1.6439909
Oneal	20000000	2005	26.73582766	11.95124717	2.878684807	2.57709750
Paterson	5672500	2001	11.02209945	4.320441989	1.596685083	0.48618784
Pollard	5116666	2000	7.064	4.48	0.448	0.696
Prince	9600000	2005	10.60194175	6.650485437	2.242718447	0.74757281
Redd	15016667	2005	17.69230769	4.224358974	1.814102564	0.10897435
Richardson	7250000	2004	11.96441281	4.932384342	1.355871886	0.20284697
Rose	13268571	2000	10.7716895	3.0456621	3.668949772	0.35844748
Rose	6000000	2002	6.561307902	4.280653951	0.643051771	0.49046321
Simmons	9400000	2005	9.634517766	4.248730964	1.715736041	0.20812182
Smith	5672500	2001	14.17169374	7.415313225	1.236658933	1.09512761
Stojacovic	7500000	2000	10.48360656	3.43442623	1.459016393	0.11475409
Swift	6000000	2005	9.011363636	4.96875	0.579545455	1.44602272
Szcerbiac	10833333	2005	15.00502513	4.376884422	2.708542714	0.29145728
Terry	7500000	2003	16.07142857	3.055900621	5.568322981	0.15217391
Walker	8833333	2005	21.27947598	8.679767103	4.11790393	0.60262008
Wallace	5000000	2000	3.99122807	6.276315789	0.460526316	1.10964912
Watson	5800000	2005	5.720394737	1.9375	3.654605263	0.1875
Williamson	5250000	2001	11.96551724	4.194581281	1.369458128	0.37931034
Wright	6000000	1999	7.74742268	7.412371134	0.706185567	0.94329896

PLAYER	AVG Per year Salary	PPM	RPM	APM	BPM
Abdur-Rahim	5860000	0.536632	0.220237	0.074311	0.02237
Allen	16000000	0.55608	0.125462	0.106248	0.004762
Artest	7000000	0.400449	0.139837	0.08922	0.019702
Battie	5500000	0.293562	0.254746	0.031727	0.04776
Bender	6800000	0.356869	0.144194	0.041259	0.034879
Bibby	11500000	0.395001	0.089946	0.193087	0.004367
Billups	5616666	0.413171	0.086338	0.151582	0.005887
Blount	6416667	0.298232	0.228093	0.032531	0.050583
Boozer	11666667	0.424908	0.31588	0.05473	0.022624
Brown	8333333	0.33955	0.240544	0.043925	0.030155
Brown	8500000	0.288995	0.248678	0.048744	0.036476
Bryant	19485714	0.633788	0.146163	0.124008	0.018056
Cassell	5666666	0.59272	0.318521	0.083075	0.064818
Cato	7000000	0.278995	0.259021	0.027062	0.096649
Chandler	10666667	0.320026	0.307419	0.035235	0.061904
Collins	5900000	0.230143	0.193414	0.058079	0.026597
Crawford	7920000	0.432112	0.093306	0.147616	0.011525
Currie	10000000	0.510848	0.211582	0.024989	0.038306
Daniels	6000000	0.353102	0.080983	0.148348	0.005238
Davis	12000000	0.33885	0.251382	0.038243	0.033751
Davis	5783333	0.452872	0.132339	0.098064	0.012694
Duncan	17429672	0.582421	0.312987	0.081632	0.063692
Dunleavy	9000000	0.368855	0.18017	0.089536	0.008789
Fisher	6100000	0.312345	0.086849	0.125465	0.003412
Fortson	5428571	0.437071	0.341577	0.033546	0.013957
Foster	5000000	0.250992	0.323082	0.035714	0.022156
Francis	14166666	0.506797	0.16396	0.166727	0.010225
Gadzurick	6000000	0.338154	0.320011	0.017618	0.069156
Ginobili	8666667	0.409645	0.136819	0.116229	0.008941
Hamilton	8857142	0.56348	0.103148	0.081397	0.004923
Hardaway	12382142	0.511479	0.127687	0.148896	0.01392
Harrington	6000000	0.330007	0.199243	0.059532	0.009979
Haywood	5000000	0.289103	0.237821	0.021581	0.066239
Horn	12166667	0.547296	0.19636	0.043835	0.019995
Howard	6150000	0.479858	0.199893	0.083667	0.010164
Hughes	12000000	0.490373	0.150767	0.106009	0.011771
James	6000000	0.323032	0.229581	0.025264	0.084621
Jaric	6666667	0.308238	0.103441	0.162044	0.01001
Jones	13268571	0.456541	0.11151	0.093557	0.020121
Kidd	17262000	0.394398	0.172229	0.247938	0.007944
Kirilenko	14333333	0.430776	0.19989	0.065574	0.07563
Lafrentz	9996250	0.417766	0.222136	0.038919	0.079648
Lewis	9285714	0.436584	0.199288	0.045836	0.017367
Maggette	7500000	0.492283	0.18063	0.059528	0.011024
Magliore	6750000	0.369373	0.290938	0.028701	0.054059
Marion	13166667	0.475505	0.274426	0.05411	0.034182
Marshall	5500000	0.438247	0.292466	0.055875	0.035362

PLAYER	AVG Per year Salary	PPM	RPM	APM	BPM
Martin	13000000	0.442109	0.222349	0.06918	0.039975
Mason	7233333	0.378971	0.167487	0.049217	0.011782
McDyess	5625000	0.52882	0.261283	0.047036	0.050231
McGrady	21000000	0.636336	0.190229	0.122565	0.034809
Miles	8000000	0.357405	0.195572	0.073517	0.042382
Miller	8500000	0.425945	0.122736	0.234624	0.008274
Miller	9571428	0.426254	0.277545	0.070164	0.023658
Nash	11000000	0.43183	0.089258	0.211455	0.002039
Nesterovic	7000000	0.312293	0.226893	0.043496	0.049463
Nowitzki	13216666	0.513317	0.206238	0.060248	0.027916
Okur	8333333	0.399185	0.256619	0.047522	0.034623
Olowakandi	5408700	0.326454	0.261997	0.02501	0.053579
Oneal	18084000	0.454264	0.281555	0.040101	0.068088
Oneal	20000000	0.714901	0.31957	0.076974	0.06891
Paterson	5672500	0.463953	0.18186	0.067209	0.020465
Pollard	5116666	0.46182	0.292887	0.029289	0.045502
Prince	9600000	0.353684	0.221862	0.074818	0.024939
Redd	15016667	0.572792	0.136765	0.058732	0.003528
Richardson	7250000	0.465909	0.192073	0.052799	0.007899
Rose	13268571	0.427278	0.120811	0.145535	0.014218
Rose	6000000	0.411835	0.268685	0.040363	0.030785
Simmons	9400000	0.387663	0.170956	0.069036	0.008374
Smith	5672500	0.449614	0.235259	0.039234	0.034744
Stojacovic	7500000	0.461067	0.151045	0.064167	0.005047
Swift	6000000	0.428533	0.236287	0.02756	0.068765
Szcerbiac	10833333	0.453799	0.132371	0.081915	0.008815
Terry	7500000	0.469388	0.089252	0.16263	0.004444
Walker	8833333	0.549132	0.223988	0.106265	0.015551
Wallace	5000000	0.201729	0.317225	0.023276	0.056085
Watson	5800000	0.299466	0.101429	0.191321	0.009816
Williamson	5250000	0.476882	0.167174	0.054579	0.015117
Wright	6000000	0.292526	0.279875	0.026664	0.035617

PLAYER	AVG Per year Salary	MPG	AGE	YIL	ALLSTAR	Minutes	Height
Abdur-Rahim	5860000	36.98660714	27	9	1	24855	81
Allen	16000000	37.53158706	30	9	1	24358	77
Artest	7000000	30.75369458	23	3	0	6243	79
Battie	5500000	22.27631579	30	8	0	11851	83
Bender	6800000	14.60248447	21	3	0	2351	84
Bibby	11500000	36.60544218	24	4	0	10762	74
Billups	5616666	27.45454545	26	5	0	8154	75
Blount	6416667	19.62361624	29	4	0	5318	84
Boozer	11666667	29.75	23	2	0	4641	81
Brown	8333333	22.67588933	23	4	0	5737	83
Brown	8500000	31.76902887	34	10	0	24208	83
Bryant	19485714	34.35472371	26	8	1	19273	78
Cassell	5666666	38.62084257	33	9	0	17418	75
Cato	7000000	13.26495726	25	2	0	1552	83
Chandler	10666667	23.70498084	23	4	0	6187	85
Collins	5900000	23.41949153	26	3	0	5527	84
Crawford	7920000	25.95901639	24	4	0	6334	77
Currie	10000000	23.12456747	23	4	0	6683	83
Daniels	6000000	22.04262877	30	8	0	12410	76
Davis	12000000	30.31897555	37	12	1	26044	81
Davis	5783333	17.21857923	23	4	0	3151	79
Duncan	17429672	39.3037694	27	6	1	17726	83
Dunleavy	9000000	23.1910828	24	2	0	3641	81
Fisher	6100000	23.70588235	30	8	0	12896	73
Fortson	5428571	22.07567568	24	3	0	4084	80
Foster	5000000	17.58139535	25	3	0	3024	83
Francis	14166666	38.84579439	25	3	1	8313	75
Gadzurick	6000000	18.55121951	27	3	0	3803	83
Ginobili	8666667	25.28082192	27	2	0	3691	78
Hamilton	8857142	29.71088435	25	4	0	8735	79
Hardaway	12382142	37.18428184	28	6	1	13721	79
Harrington	6000000	19.5033557	21	3	0	2906	81
Haywood	5000000	21.27272727	25	3	0	4680	84
Horn	12166667	37.50961538	24	2	0	3901	82
Howard	6150000	37.29275809	30	9	0	24203	81
Hughes	12000000	30.99774775	26	7	0	13763	77
James	6000000	15.21268657	30	5	0	4077	85
Jaric	6666667	27.55747126	27	3	0	4795	79
Jones	13268571	35.48317308	29	6	1	14761	78
Kidd	17262000	37.47455471	32	11	1	29455	76
Kirilenko	14333333	30.24583333	23	3	1	7259	81
Lafrentz	9996250	31.06024096	26	4	0	7734	83
Lewis	9285714	27.12355212	23	4	0	7025	82
Maggette	7500000	23.26007326	24	4	0	6350	78
Magliore	6750000	21.37394958	25	3	0	5087	83
Marion	13166667	34.2464455	24	3	0	7226	79

PLAYER	AVG Per year Salary	MPG	AGE	YIL	ALLSTAR	Minutes	Height
Marshall	5500000	28.2405914	32	11	0	21011	81
Martin	13000000	34.12014134	27	4	1	9656	81
Mason	7233333	28.77682403	26	3	0	6705	77
McDyess	5625000	33.28506787	28	7	1	14712	81
McGrady	21000000	33.62422998	25	7	1	16375	80
Miles	8000000	27.33656958	23	4	0	8447	81
Miller	8500000	33.46769231	27	4	0	10877	74
Miller	9571428	24.73913043	27	5	1	7397	84
Nash	11000000	28.59016393	30	8	1	15696	75
Nesterovic	7000000	23.86392405	27	5	0	7541	84
Nowitzki	13216666	33.27488152	23	3	0	7021	84
Okur	8333333	20.6013986	25	2	0	2946	83
Olowakandi	5408700	30.45201238	28	5	0	9836	84
Oneal	18084000	24.14512472	25	7	1	10648	83
Oneal	20000000	37.39795918	33	13	1	32985	85
Paterson	5672500	23.75690608	26	3	0	4300	77
Pollard	5116666	15.296	25	3	0	1912	83
Prince	9600000	29.97572816	25	3	0	6175	81
Redd	15016667	30.88782051	26	5	1	9637	78
Richardson	7250000	25.6797153	24	4	0	7216	78
Rose	13268571	25.21004566	27	6	0	11042	80
Rose	6000000	15.93188011	28	6	0	5847	79
Simmons	9400000	24.85279188	25	4	0	4896	78
Smith	5672500	31.51972158	26	6	0	13585	82
Stojacovic	7500000	22.73770492	23	2	0	2774	82
Swift	6000000	21.02840909	26	5	0	7402	81
Szcerbiac	10833333	33.06532663	28	6	1	13160	79
Terry	7500000	34.23913043	26	4	0	11025	74
Walker	8833333	38.7510917	29	9	1	26622	81
Wallace	5000000	19.78508772	26	4	0	4511	81
Watson	5800000	19.10197368	26	4	0	5807	73
Williamson	5250000	25.091133	28	6	0	10187	79
Wright	6000000	26.48453608	24	3	0	5138	83

PLAYER	AVG Per year Salary	Playoff Games	Playoff Minutes	Perennial All-star	post
Abdur-Rahim	5860000	0	0	0	1
Allen	16000000	37	1510	1	0
Artest	7000000	26	1003	0	1
Battie	5500000	26	656	0	1
Bender	6800000	34	304	0	1
Bibby	11500000	45	1762	0	0
Billups	5616666	68	2511	0	0
Blount	6416667	22	371	0	1
Boozer	11666667	0	0	0	1
Brown	8333333	3	60	0	1
Brown	8500000	71	2314	0	1
Bryant	19485714	119	4556	1	0
Cassell	5666666	103	2871	0	0
Cato	7000000	17	249	0	1
Chandler	10666667	6	172	0	1
Collins	5900000	52	1150	0	1
Crawford	7920000	0	0	0	0
Currie	10000000	0	0	0	1
Daniels	6000000	59	1247	0	0
Davis	12000000	93	2647	0	0
Davis	5783333	11	363	0	1
Duncan	17429672	105	4308	1	1
Dunleavy	9000000	0	0	0	1
Fisher	6100000	117	3028	0	0
Fortson	5428571	11	105	0	1
Foster	5000000	44	720	0	1
Francis	14166666	5	222	0	0
Gadzurick	6000000	1	9	0	1
Ginobili	8666667	57	1712	0	0
Hamilton	8857142	65	2662	0	0
Hardaway	12382142	63	2640	1	0
Harrington	6000000	25	570	0	1
Haywood	5000000	10	296	0	1
Horn	12166667	43	1292	0	1
Howard	6150000	13	520	0	1
Hughes	12000000	18	599	0	0
James	6000000	17	369	0	1
Jaric	6666667	0	0	0	0
Jones	13268571	71	2558	0	0
Kidd	17262000	77	3210	1	0
Kirilenko	14333333	9	267	0	1
Lafrentz	9996250	35	921	0	1
Lewis	9285714	16	548	0	1
Maggette	7500000	0	0	0	0
Magliore	6750000	31	705	0	1
Marion	13166667	34	1337	0	1

PLAYER	AVG Per year Salary	Playoff Games	Playoff Minutes	Perennial All-star	post
Marshall	5500000	9	284	0	1
Martin	13000000	56	23	0	1
Mason	7233333	16	607	0	0
McDyess	5625000	29	641	0	1
McGrady	21000000	25	1076	1	1
Miles	8000000	0	0	0	1
Miller	8500000	10	358	0	0
Miller	9571428	32	882	0	1
Nash	11000000	66	2295	0	0
Nesterovic	7000000	45	840	0	1
Nowitzki	13216666	53	2241	0	1
Okur	8333333	39	575	0	1
Olowakandi	5408700	15	224	0	1
Oneal	18084000	64	1801	1	1
Oneal	20000000	171	6813	1	1
Paterson	5672500	18	309	0	0
Pollard	5116666	53	649	0	1
Prince	9600000	63	2200	0	1
Redd	15016667	1	15	0	0
Richardson	7250000	15	564	0	0
Rose	13268571	58	1875	0	0
Rose	6000000	18	1432	0	1
Simmons	9400000	0	0	0	0
Smith	5672500	21	457	0	1
Stojacovic	7500000	57	2088	0	1
Swift	6000000	7	122	0	1
Szcerbiac	10833333	29	918	0	0
Terry	7500000	13	501	0	0
Walker	8833333	37	1507	1	1
Wallace	5000000	75	3033	0	1
Watson	5800000	8	136	0	0
Williamson	5250000	63	1088	0	1
Wright	6000000	11	277	0	1

APPENDIX 2

Correlation Matrix

	PPM	RPM	APM	BPM	AGE	ALL*	PLAY	AGE2
PPM	1.0000	-.10041	.19313	-.16190	.06325	.50223	.36154	.05699
RPM	-.10041	1.0000	-.69204	.67150	.06554	-.03895	-.01113	.07746
APM	.19313	-.69204	1.00000	-.57954	.17080	.25204	.24375	.15574
BPM	-.16190	.67150	-.57954	1.00000	.07905	-.00854	.00973	.08238
AGE	.06325	.06554	.17080	.07905	1.00000	.33097	.44528	.99681
ALL*	.50223	-.03895	.25204	-.00854	.33097	1.00000	.36536	.32546
PLAY	.36154	-.01113	.24375	.00973	.44528	.36536	1.00000	.45129
AGE2	.05699	.07746	.15574	.08238	.99681	.32546	.45129	1.00000

	PPM	RPM	APM	BPM	AGE	ALL*	PLAY	AGE2
POSTPPM	.15624	.61058	-.54087	.48672	-.19986	.01711	-.05609	-.19044
POSTRPM	-.19542	.83864	-.68427	.63969	-.15957	-.12571	-.12319	-.15523
POSTAPM	.12921	.38804	-.31320	.24464	-.19807	.08763	-.03272	-.18584
POSTBPM	-.22178	.65286	-.60929	.93544	-.06755	-.04623	-.08112	-.06968

	POSTPPM	POSTRPM	POSTAPM	POSTBPM
POSTPPM	1.00000	.85702	.86090	.64081
POSTRPM	.85702	1.00000	.65934	.78166
POSTAPM	.86090	.65934	1.00000	.39669
POSTBPM	.64081	.78166	.39669	1.00000