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The Relationship Between Selected Pre-Career Statistical Variables and Career Longevity of NBA Players: Developing a Predictor Model

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THE RELATIONSHIP BETWEEN SELECTED PRE-CAREER STATISTICAL VARIABLES AND CAREER LONGEVITY OF NBA PLAYERS: DEVELOPING A PREDICTOR MODEL

BY

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Abstract

Given the change in the business nature of the NBA, the player evaluation process has become increasingly important. The methods in this article go to aid general managers and owners in the player acquisition process by providing them with another technique to evaluate talent. The purpose of the study was to identify the relationship between pre-career statistical variables and career longevity. Data from the 1988-2002 collegiate basketball seasons were analyzed. Participants consisted of 329 NBA guards, forwards, and centers who entered the NBA in 1988 and ended their careers on or before the 2002 NBA season. Eleven independent variables including points, rebounds, assists, steals, blocks, fouls, turnovers, minutes played, free throw percentage, field goal percentage, three point percentage and one dependent variable, career longevity were used. Data analysis included the use of multiple regression tests to determine the relationship between the independent variables and the dependent variable. The multiple regression tests revealed that there was a relationship between pre-career statistical variables and career longevity for guards and forwards. However, there was no relationship among centers.

CHAPTER I

Introduction

Background of the Problem

Basketball is truly a business now and no longer a game that was just played for fun at the local YMCA. The value of team franchises have sky rocketed since David Stern took over as the league commissioner in 1984. In 1984, the average team value was around $15 million dollars (Smith, 2003) Today, the cost for a new franchise to enter the league is around $300 million dollars (Smith, 2003).

All the increased revenues in the game have led to the rise in player salaries which have placed more pressures on the individual players to perform. The business nature of basketball has put a premium on player selection and the process that goes into that imprecise science. General managers, and owners are desiring to operate their teams more on corporate models by controlling these escalating salaries and the risks of making a bad draft pick or paying too much for a free agent (Sandavol, 2003). Of all the good things that have come from the evolution of the game of basketball one problem still exists for team owners and general managers. Given the financial structure and business nature of the game, how do general managers and owners evaluate/measure a player's potential for success? More importantly, how do they make personnel decisions in a league where the stakes are so high and one bad decision can make for disaster in the form of millions of dollars lost? Therefore, the evaluation and draft selection process these general managers use is paramount.

Every National Basketball Association, (NBA) owner and general manager watches as the NBA season comes to an end and has viewed how the NBA champion's general manager has built his championship team (Amico, 2001). As all NBA coaches, players, and general managers are currently males, the male gender will be used throughout this text.

It is widely understood in the NBA that the most important aspect in building a championship team is how one constructs the team roster (Staw & Hoang, 1995). Further, it is expected that a general manager would attempt to acquire the most talented players when building a team (Staw & Hoang, 1995). "How does one measure the potential success of an individual participating in a team sport"? (Berri, 1999). This is the problem that owners and general managers have faced for decades. Berri (1999) stated that, "without an answer, one is unable to ascertain who should play, what free agents should be pursued, or what trades should be consummated" (p. 411).

In this new era of professional basketball, where the average player salary has increased to $4.9 million dollars, owners want to operate their businesses more efficiently by controlling costs and risks (Sandavol, 2003). The goal is to reduce the number of bad draft picks or playing the least productive players (Sandavol, 2003).

The evaluation of playing talent is difficult (Berri & Brook, 1999). Measuring a player's potential success through selected statistical variables is considered an important part of the player evaluation process in professional basketball (Berri & Brook, 1999). Assembling enough players that statistically produce at high levels may ultimately

improve one's team (Berri, 1999). Berri (1999) identified a link between player statistics and team wins.

NBA general managers evaluate players through scouting and other methods to determine the potential success of prospective players (Player Evaluation, 2005). These scouting departments attempt to determine the success of prospective players by looking at the traditional statistical basketball categories and such non-basketball areas as player confidence, comfort level and poise under pressure (Player Evaluation, 2005).

The NBA draft is the primary method of acquiring NBA talent (Staw & Hoang, 1995). In the study by Staw & Hoang (1995) the order in which players were drafted affected the playing time and career length. Also they suggested that players that perform at statistically high levels and have the potential to have long NBA careers are important considerations for NBA general manager when deciding to draft a potential NBA prospect.

Currently there is no known research that looks at pre-career statistical data to determine the longevity of prospective NBA players. The studies that have been published did not look at the relationship between predictor variables and career longevity. According to Oliver, assessing the value of individual NBA players can be done through the analysis of traditional statistical categories (Oliver, 2004). These studies looked at the athlete's statistics while playing in the NBA (Ballard, 2005). The studies were created to identify alternative methods to evaluate talent (Ballard, 2005). The success of these NBA player's was measured by the traditional statistical categories; points rebounds, field goals made and attempted, etc. (Ballard, 2005). Most of these studies looked at traditional player statistics but did not look at the relationship between

these traditional player statistics and career longevity of NBA players. Thus, NBA experts view career longevity in the NBA as an important factor when evaluating collegiate prospects in the draft (Amico, 2001). Research indicates that there is a positive relationship between traditional player statistics and career length among NBA players (Staw & Hoang, 1995).

Owners and general managers could be better informed if they added a statistical model to their traditional scouting and player evaluation methods. The statistical model would permit general managers to identify skill sets related to career longevity. Once general managers are able to better gauge a player's potential success, they may be able to more efficiently put together their NBA rosters.

Purpose of the Study

The purpose of the study was to identify the relationship between selected pre-career statistical variables and career longevity of NBA players. A multiple regression equation was used to identify NBA player statistics related to career longevity.

Statement of the Problem

The problem in this study was to assess the relationship between pre-career statistical variables and career longevity. Using a multiple linear regression analysis, the independent variables were the predictor/statistics of total minutes played, rebounds, points, steals, blocks, turnovers, fouls and assists. Percentages rather then statistical totals were used for the categories of field goals, free throws, and three pointers due to the fact

that the percentages provided better analysis of shooting accuracy. The dependent variable was career longevity.

Research Questions

The researcher answered the following two questions:

1. Can one or more of the eleven traditional player statistics for the year preceeding a players' entry into the NBA, be used to predict career longevity for players that play the positions of guard, forward, and center in the NBA?
2. Can one or more of the eleven traditional player two year statistics preceding a players' entry into the NBA, be used to predict career longevity for players that play the positions of guard, forward, and center in the NBA?

Definitions

The following operational definitions will be used in this study:

Assist

A statistic for which a player receives credit when he passes the ball to a teammate and the teammate then scores immediately. Thus the player who throws the pass "assists" in the scoring play (Phelps, 2000).

Blocked shot

When a defensive player bats an opponent's shot attempt (Phelps, 2000).

Career longevity

Number of years played in the NBA (i.e. Success).

Field Goal Percentage

The ratio of field goals made to field goals attempted (Wikipedia, 2006).

Fouls

A violation, committed by an active player, that involves illegal contact with an opponent while the ball is live (Phelps, 2000).

Free Throw Percentage

The ratio of field throws made to free throws attempted.

Minutes Per game

Total playing time during the game by a player (Phelps, 2000).

Rebound

Retrieval of a missed shot, which may hit the court first (Phelps, 2000).

Steals

Taking the ball away from an opponent who had control (Phelps, 2000).

Three Point Percentage

The ratio of three pointers made to three pointers attempted.

Total Points

Total number of field goals and free throws made (Phelps, 2000).

Turnovers

On offense, to lose the ball to the defense without taking a shot. Examples include losing the ball out of bounds, violations such as traveling or double dribbling, or the defense intercepting an errant pass (Phelps, 2000).

Assumptions

The following assumptions are recognized in this research study:

1. The statistics from 1988 to 2002 that are being used are official, accurate and available.

Limitations

The following limitations are recognized in this research study:

1. The study will involve only Division I, II, and III college players drafted by NBA teams in the 1987-88 season and whose careers ended on or before the 2001-02 season.
2. Other influences, such as coaching talent and a player's characteristics, which may affect the statistical data retrieved.
3. The influence of team chemistry, strategy, strength of schedule, players playing out of position and players playing different roles.
4. The influence of player's playing poorly and producing statistically low numbers due to negative feelings about coaches or other external or internal factors that are outside the control of the researcher.
5. The influence of the impact of injuries.
6. The study will only involve college players.

Delimitations of the study

1. The study will only involve players who entered the NBA during or after 1988 and ended their playing careers in 2001-02 or earlier excluding players who entered the NBA straight out of high school and Europe.
2. The study is limited to players who played at Division I, II, and III NCAA member institutions.
3. The study will use 11 traditional basketball statistics as independent variables.
4. The study will include players who have played at least one game in the NBA.

Significance of the Study

The significance of the study lies in the results obtained from the data. The results will assist owners and general managers by identifying which traditional player statistics (i.e. skill sets) are related to career longevity. This study has the potential to give general managers a statistical method to evaluate future NBA talent. Currently, there is no method that uses statistics to determine the future success of NBA players. Coaches, general managers and owners may benefit from the results as they combine them with their own methods and strategies to build their teams.

CHAPTER II

Review of Literature

The purpose of this chapter is to present a review of the literature related to the various aspects of this study. The review is presented in six sections to include: (a) NBA Draft; (b) NBA Pre-Draft camp; (c) Pre-Draft workouts; (d) Scouting/player evaluation; (e) Predictor models in other sports and (f) The background of the predictor statistics.

NBA draft

Conducted the last week of June at the end of every NBA season, the NBA draft is the primary method for losing teams to improve their rosters by acquiring college, high school and European talent after a losing season (Staw & Hoang, 1995). The order in which teams make draft selections are based in the rules implemented by the NBA (Staw & Hoang, 1995). Historically, the NBA granted the first pick in the draft by a coin toss between teams with the worst win-loss records from the Eastern and Western Conferences. (Staw & Hoang, 1995). The remainder of the teams in the league made their selections based on the order of their finish during the regular season as determined by their teams win-loss record (Staw & Hoang, 1995). Thus, the team with the best win-loss record selected last in each round of the draft. In 1985, the NBA went to the lottery format, which was done to prevent teams from deliberately losing games to receive the top pick (Staw & Hoang, 1995). The lottery is made up of the teams who did not make the playoffs. The teams each have a certain number of balls in the lottery depending on the number of wins they had during the season. In theory, the lottery is supposed to give an equal chance to the teams that did not make the playoffs of getting the number one

pick (Staw & Hoang, 1995). In 1989, the NBA decreased its draft to two rounds (Staw & Hoang, 1995). The downsizing of the draft has made the process more difficult, somewhat of a big gamble for scouts and player personnel types (Amico, 2001).

The most important asset to any NBA franchise is the roster of its players (Staw & Hoang, 1995). The NBA draft is the primary method through which players are acquired from the collegiate level to the NBA (Staw & Hoang, 1995). According to NBA rules, each team is allowed one draft selection for each of the two rounds of the NBA draft unless there are any traded picks (Staw & Hoang, 1995). The order in which players are selected in the draft represents a financial expense teams are willing to make to obtain a particular player's services (Staw & Hoang, 1995). The NBA and the NBA Players Association collectively bargained for the implementation of "rookie scale contracts" (NBA Collective Bargaining Agreement, 2005-06). There are 30 picks in the first round of the NBA draft (NBA Collective Bargaining Agreement, 2005-06). General managers extend rookie scale contracts to players drafted in the first round that are guaranteed for two seasons with two separate team option years in the third and fourth seasons and a qualifying offer in the fifth season (NBA Collective Bargaining Agreement, 2005-06). A team may sign a player for 80% or 120% of the scale salary figure (NBA Collective Bargaining Agreement 2005-06). For example, the 1st year salary for the #1 overall pick drafted in 2006, starts at $3,751,000 (NBA Collective Bargaining Agreement 2005-06). Therefore, a team can sign that player to a contract worth 80% or 120% of that scale figure (NBA Collective Bargaining Agreement 2005-06). In most cases, the contract that is signed is for the maximum 120% figure (Coon, 2005). The salary figures for players drafted 1-30, continue to decrease the lower a

player is drafted (NBA Collective Bargaining Agreement, 2005-06). Thus, the draft represents an important investment and financial cost to NBA teams (Popper, 2004). The importance of the draft is maximized even more when one takes into consideration that the draft also represents a set of lost opportunities (Staw & Hoang, 1995). By selecting any particular player, a team may be passing over the next future all-star or superstar player (Staw & Hoang, 1995). The NBA draft is very risky (Amico, 2001). History has shown that the projection of player development is not a precise science and that teams may be in need of other evaluative methods when scouting talent (Amico, 2001). The most widely known case of the risky nature of the draft was seen in 1984, when the Portland Trail Blazers thought it was more beneficial to take Sam Bowie than Michael Jordan. And in the same draft Dallas decided to select Sam Perkins and Terrance Stansbury instead of Auburn's Charles Barkley and Gonzaga's John Stockton (Staw & Hoang, 1995). The 1985 NBA draft saw the New York Knicks select Patrick Ewing as their top pick, who was followed by Wayman Tisdale, Benoit Benjamin, Xavier McDaniel, Jon Koncak and Joe Kleine, passing over Chris Mullin, Karl Malone and Joe Dumars. There is an importance to the selection of players through the NBA draft (Staw & Hoang, 1995).

The NBA draft used to be a process that required relatively little work and resources (Shouler, Ryan, Koppett, Bellotti, 2003). Teams used to have small scouting staffs that evaluated college player's and by the time the draft came around, every team knew who the best players were and whom they wanted to draft and the selections were made (Shouler et al., 2003). As basketball became more of a business, general managers, owners, and team presidents had to change their approach. The goal has always been the

same, however the process has been changed (Popper, 2004). The philosophy is to improve the team through selecting the most valuable player/best player available at the time of team selection (Popper, 2004). Today, teams no longer have small scouting staffs nor do they just look at college talent. Scouts search the globe evaluating talent from every continent to different high schools across the United States. Scouts now compile detailed data on individual athletes and leave it up to the general manager to decide how to assess a player's potential for success (Shouler, et al., 2003). General managers' jobs are even more difficult (Shouler, et al., 2003). They must compare high school talent, college talent, and foreign talent (Popper, 2004). The window for mistakes has narrowed and one poor selection can adversely affect the franchise for years to come (Popper, 2004).

The risky nature of the draft has made teams prepare for the draft in very precise manners. Former Atlanta Hawks general manager Pete Babcock once stated that, "we have a big board that lists the names of every potential draft pick" (Amico, 2001). Babcock and the Hawks list the players by position on the board. The list consists of players at each position who the organization believes will be the top 10-20 players at those positions depending on the strength of the position for that given draft year. All five positions are listed in the order in which the team likes a particular player (Amico, 2001). The team then employs another board in which they list players in order of preference (Amico, 2001). This list is not position specific but by overall talent (Amico, 2001). Prior to the draft front office executives discuss talent vs. need for the individual franchise and the common NBA draft term of "best available athlete" when deciding to make their pick. The Hawks go through all sixty picks ranking the players from one to

sixty on whom they would select at each draft number if they had all sixty picks (Amico, 2001). The owner, general manager, director of player personnel, and coaches all review the board discussing, debating and getting feed back from one another on each draft player (Amico, 2001). Whichever player is at the top of the board when the team is up for selection, is the player that will be selected (Amico, 2001). As each team in the draft makes a selection, the Hawks remove those players from their board (Amico, 2001). The player that remains on the Hawks board after the other teams have made their selections will be their pick (Amico, 2001). Celtics general manager, Chris Wallace stated that the purpose of the draft boards is to simplify things (Amico, 2001). The goal is to make the compiling of potential draft picks as orderly as possible, eliminating confusion (Amico, 2001). NBA front offices try to guess what teams drafting ahead of them will do (Amico, 2001). The draft boards give NBA teams a good idea on how the draft will unfold (Amico, 2001). General managers and personnel directors from every team talk to each other for the purpose of figuring out where players will be drafted (Amcio, 2001).

The NBA draft has evolved as the nature of the sport has become increasingly more like a big business. Despite the complexity of selection, the methods used by general managers today, is at most a gamble (Popper, 2004). Executives cross their fingers in hopes that the players they select will pan out for their franchise down the road (Popper, 2004). Given the fact that the draft is being comprised more and more of younger players, the odds that a general manager is making a choice that will benefit his franchise may be suspect (Popper, 2004). Individuals who are coming out of high school, for example, just don't have sufficient game experience (Popper, 2004). Therefore, given the lack of college playing experience and fundamental skill development, these drafts

have become examples of who can draft the player with the most potential rather than drafting the player with the best talent and skill (Popper, 2004).

The general manager is making a pick aware that his own contract is at stake. The problem lies in projecting objectively the player's potential for success (Popper, 2004). The draft has turned into more of a guessing game and the evaluation process has become more and more imprecise as the years go on (Popper, 2004). General managers are gambling on the unknown. A player that is coming out of high school or who has played professionally in Europe both have been exposed to considerably lower levels of competition and often lack the skill sets to compete in the NBA immediately if drafted (Popper, 2004). Detroit Pistons general manager Joe Dumars stated that the toughest part of being a general manager is, "trying to figure out what young guys are going to be like in a few years. You can see the talent, do the background checks, but you don't know what they will turn into when they get the money and the accolades"(McCallum, 2004). This is a problem that a number of general managers face. Houston Rockets general manager Carroll Dawson stated that, "I think one of the hardest sciences is learning how to draft the right player for your team. It takes a lot of research to figure out how quickly players pick up on what the coaches are trying to teach. You also want to learn what type of person they are and how they respond to a pro basketball environment. All that stuff goes into it, and there's a lot to being a general manager or scout. Truth is, I've been doing this a long time and I still haven't completely figured it out." (Amico, 2001). Dumars and Dawson amongst other general managers realize the imprecise nature of selecting players for the draft.

Owners are reluctant in making a commitment to a developing player who is drafted young given the rise in the business nature of the sport (Popper 2004). The large amounts of money invested calls for players who can perform immediately after joining the team. What needs to be understood is that it just doesn't happen overnight (Popper, 2004). The reality of the situation is that in the NBA, coaches and executives may be replaced quickly (Popper, 2004). Teams need players they can use at the time of selection not later (Popper, 2004). Patience is not a virtue for those who are losing and need improvement. Patience may need to be a consideration since, players who enter the league are not always mature physically, mentally or emotionally to make an instant impact. The reality of the draft is that it is more form than substance (Popper, 2004). Unless a team has one of the top five picks, it may have to wait for the player to develop (Popper, 2004). The draft is important to the longevity and future of the organization but it's highly unlikely today that one player is going to turn a franchise around from an unsuccessful season to a championship contender (Popper, 2004). But what can be agreed upon among those in the industry, is as John Nash former general manager for the Portland Trail blazers states, "it's about sound judgments and good decisions across the board to build the type of franchise you want" (Popper, 2004, p. 20). To see how much of an impact the NBA draft actually makes on the court, experts say that you can tell how good a draft was once the players selected have been in the league three to five years (Amico, 2001). The 1996 draft was considered one of the best of the decade (Wikipedia, 2006). This draft produced Kobe Bryant, Allen Iverson, Ray Allen, Steve Nash and Jermaine O'Neal. (Wikipedia, 2006). Most experts say you cannot tell how good a draft is until players selected in it have been in the league for three to five years (Amico,

2001). Thus, a successful career for a player in the NBA is largely measured by the number of years he is able to play in the league (Amico, 2001). Players in the NBA who are not able to compile all-star like numbers but are able to sustain longevity in the league may be as valuable as those all-star players. The important aspect about using non-traditional methods to evaluate talent is it provides another tool for front office personnel.

NBA Pre-Draft Camp

Each summer prior to the NBA draft, the NBA holds its annual week long pre-draft camp where about sixty five former college players gather together from high schools, colleges and foreign ranks and showcase their talents for the 30 NBA team scouts, coaches and executives. This is the final chance for prospects to make an impression for NBA front office executives before the draft (Amico, 2001). Most of the players at this camp are not lottery picks but are mid-first round picks and early second round picks. The Chicago camp, run by NBA executives, features college underclassmen (Amico, 2001). All the drills are drills the athletes will see in the NBA (Amico, 2001).

The benefit of the camp is that general managers and scouts observe players response to NBA conditions. The camp offers general managers an opportunity to workout each player individually (Amico, 2001). General managers incorporate seven to nine physical tests such as bench press and exercise bike to evaluate the athlete's physical attributes. The camp is the final chance for the NBA teams to look at the talent they have been observing for months or, at times years, before the big draft day arrives three weeks later. The structure of the camp goes a long way in telling general managers where a player might be selected in the draft (Amico, 2001).

Determining a potential success in the NBA begins long before the draft approaches. Scouts attend colleges and high schools in hopes that they can discover a little known player that may have slipped past the eyes of other teams. A particular player may be the next superstar athlete that leads their team to the promise land of basketball (Amico, 2001). General managers and scouts try to find out as much personal information as they can concerning an individual player by "performing back ground checks, by talking to everyone from the player's college coach to old high school coaches to old trainers to professors, friends, uncles, other players who have played against the athlete and media that covered the team" (Amico, 2001, p. 21). Players are often given a written exam that provides the team with a "mental picture" of the athlete prior to the draft (Amico, 2001, p. 21). Teams customarily hire outside securities firms that find out things that may not be found in an interview (Amico, 2001). "A guy can have all the talent in the world, but if he doesn't have the personality….Look, a big part of being successful in this league boils down to character," according to Pete Babcock, former general manager of the Atlanta Hawks (Amico, 2001, p. 22). All these tests, workouts, and game evaluations are done to minimize the margin of error and make their picks as precise as possible.

Pre-Draft Workouts

Prior to the NBA draft, each NBA team that has a first round draft pick conducts individual workouts for players that they are interested in drafting (Amico, 2001). All 30 teams run similar evaluations for players with very minimal differences. When potential draft picks are brought in for an individual workout, the first step in the process is to hold

a formal interview with the player. The goal is for the player to meet the front office staff and to create a family type of atmosphere (Amico, 2001). Next, the player performs a number of shooting drills, and if the player is a power forward or center, the team is looking at the low post moves of the prospective draft pick. The drills are position specific. If the player was a shooting guard in college, he is put through drills that an NBA point guard would have to perform (Amico, 2001). The players then are given a number of strength and durability tests in the weight room and on an exercise bike (Amico, 2001). During some of the workouts the prospective draft pick may work out with a player who is currently on the team (Amico, 2001). This is done to find out how much of a competitor the athlete is (Amico, 2001). The workouts are designed to find out the mindset the player has and how he responds to different challenges (Amico, 2001).

Scouting/Player Evaluation

The role of an NBA scout is to identify players that have pro-level proficiency in many facets of their game (Miami Heat, 2005). An NBA teams player personnel staff spends most of their time searching the less obvious candidates for the draft (Wolff, 2001). The scouts select players for the draft by attending games, film analysis or both. NBA teams attempt to make 25% or less of their decisions from videotape (Wolff, 2001). One NBA scout stated, “in person you can see if a guy looks away when the coach talks during a timeout, or pouts when he’s taken out of the game. You also get a better idea of a guy’s concept of team defense, and the mechanics of his talent (Wolff, 2001). When NBA scouts see these players in person, they use an evaluation form that lists the player’s class, current position, his projected pro position, height, and weight (Wolff, 2001). The

form has a “projected NBA draft position” column where the scout can list where the player is projected to be selected (Wolff, 2001) The areas are lottery, first round, second round, and undrafted free agent (Wolff, 2001). Another column lists the players potential, whether the player being scouted is an NBA, CBA/Europe or cannot play type of talent (Wolff, 2001). The evaluation also lists whether the player is a starter, rotation or roster player (Wolff, 2001).

The form allows scouts to detail information in the following eight basketball areas, physical and mental, ball skills, offense, rebounding, defense, knowledge, strengths, and weaknesses (Wolff, 2001). A scout can add comments such as, “looks like the player is thinking too much when he shoots from the perimeter…… takes him awhile to get his shot off…….he veers off from the elbow instead of taking it down the middle” (Wolff, 2001). NBA scouts tend to believe that the difference between good and great players are the little things (Wolff, 2001). The scouts evaluation is then cross checked against those of other scouts, and together they reach a consensus on the players potential success in the NBA (Wolff, 2001).

All scouts struggle with how to assess a player who is playing out of position; an individual called a “tweener” in NBA scouting circles (Wolff, 2001). There are “tweeners” in size, the players whose height and weight suggest that they are too slight to play a position or big enough to play a position by not mobile enough. There are also position “tweeners.” These are players whose skills don’t exactly match those of any position. There are also double “tweeners.” These prospects are the ultimate misfits in the NBA; the players do not fit a position in size or skill (Wolff, 2001). Assessing a “tweener” is extremely difficult (Wolff, 2001). Scouts also realize that if a player is

coming from a rigid collegiate program like North Carolina or Kansas, that the system may not have permitted the player to showcase all his skills. “Tweeners” require a great deal of imagination and detective work (Wolff, 2001).

Scouts also look at whether the prospect has an NBA body; bulk and weight are very important in the NBA (Wolff, 2001). If a player’s strength was a problem in college it will be more of a deficiency in the NBA. Scouts look at whether the player gets pushed around too much and the shape of the shoulders and body frame to determine if the athlete can get bigger (Wolff, 2001). Scouts also look at the bone structure to see if the player has narrow shoulders or if there is a potential to gain a lot of weight (Wolff, 2001). Footwork is taken into consideration; if a player has good footwork, he can learn many things (Wolff, 2001).

Scouts believe that any player can get better at any skill (Wolff, 2001). Scouts like to see a player in person two to three times in addition to watching tape on the player before they render a judgment on that player’s potential in the NBA (Wolff, 2001). If there is a negative judgment made on the report, the scout revisits the comment because scouting is not a perfect science. When looking at the skill sets of prospective NBA players, all the skill sets have an outcome on the game that is being played (Zak, Huang, Sigfried, 1979). Scouts look at the skill sets to determine how successful prospective athletes will be.

When scouts look at the different skill sets there is an understanding of the positive and negative impacts they can have. For example, with field goal percentage and free throw percentage, it is understood that these skill sets have an important contribution to team output and an impact on the game (Zak et al., 1979). With every thing else being

held equal, the better a team shoots relative to their opponent, the larger the output (Zak et al., 1979). Field goal percentages reflect how efficiently a team shoots the ball more accurately than does the total number of shots (Zak et al., 1979). Field goal attempts represent a change in possession and the tempo of a game (Berri & Brook, 1999). If one team decides to increase the tempo they will take more shots and their opponent will take more shots as well possibly scoring more points (Berri & Brook, 1999).

Rebounding is important to scouts because it also has an impact on the game as well as the individual player (Zak et al., 1979). If a team out rebounds their opponent, they gain a possession and increase their chances of victory increase as well (Zak et al., 1979). In the case of defensive rebounding, it indicates the frequency in which an opponent fails to convert a possession (Berri & Brook, 1999). Assists highlight those aspects of ball handling and teamwork and have a positive contribution to output as well (Zak et al., 1979). Steals and blocked shots reflect aspects of defense that do not appear in reduced shot percentages and they add a great deal to output (Zak et al., 1979). Steals are a measure of the opponent's ball handling and like turnovers, represent a change in possession (Berri & Brook, 1999). Turnovers are the opposite of assists; they measure the lack of continuity of a team during a game, a loss of possession without a shot attempt and the positive aspects of an opponent's defense (Zak et al., 1979). Personal fouls have a positive and negative impact on team defense and can signal that a team is playing defense aggressively (Berri & Brook, 1999). When a team commits a personal foul, the team allows their opponent to shoot more free throws (Zak et al., 1979). A personal foul can also be a strategy to send a poor shooter to the foul line as an alternative to a team taking a field goal attempt (Berri & Brook, 1999). Thus the impact of each of these

individual player skills is important to not only the potential success of the player but these skills sets have an effect the game as well from a team standpoint (Berri & Brook, 1999).

The scouting process for the Heat has three phases. Director of Player Personnel is responsible for the line of evaluating talent and identifying the landscape of talent that is available in terms of who is out there (Player Evaluation, 2005). The Director of Player Personnel uses basketball contacts as well as different scouting services that provide insight on national and international players. Heat scouts then work with the general manager to decide which scouts will go where (Player Evaluation, 2005). The regions and areas that are covered can range from Mobile, Alabama to Madrid, Spain (Player Evaluation, 2005). Heat scouts look for a number of things. First, they are looking for outstanding talent (Player Evaluation, 2005). This is talent that heat scouts say is seen when a player rises above his peers in skill and capability (Player Evaluation, 2005). Miami Heat General manager Randy Pfund states that some players will excel in specific areas such as three-point shooting or rebounding (Player Evaluation, 2005). Some may demonstrate pro-level proficiency in many facets of their game (Player Evaluation, 2005). Heat scouts are looking at size, quickness, athleticism, NBA player comparisons and an overall evaluation of player performance in the particular game viewed by the scout (Player Evaluation, 2005). Statistical analysis and notes are taken on the player's confidence, comfort levels and poise under pressure (Player Evaluation, 2005).

The second phase of the Heat evaluation process begins when the basketball season ends and the competitive tournaments begin (Player Evaluation, 2005).

Evaluating top players in annual competitions like the Portsmouth invitational, EA Sports Round ball Classic, McDonald's All-American Game and the Chicago Pre-Draft camp (Player Evaluation, 2005). The Heat scouts take final notes and comments reporting back to the general manager, and Heat Head coach/President Pat Riley (Player Evaluation, 2005).

The third and final phase of the Heat scouting/evaluation process is that the players that the Heat player personnel staff are interested in are brought to Miami by invitation for interviews and personal workouts with the Heat coaching staff (Player Evaluation, 2005). Senior Vice President of Basketball Operations and other front office staff get involved by using resources inside and outside of the organization to find out as much as possible on their prospective acquisitions (Player Evaluation, 2005). This ranges from medical records, background information, and international player NBA eligibility (Player Evaluation, 2005). Carroll Dawson, general manager of the Houston Rockets stated, "In scouting, the more you know about a player, the less chance there is that you will make a mistake." (Amico, 2001).

Predictor Models in Other Sports

Major League Baseball was the first league to experiment with statistical predictor models. More specifically, the Oakland Athletics general manager evaluated talent primarily by looking at player statistics (Lewis, 2003). The Oakland Athletics, based their drafting and acquisition of free agents on non-traditional methods (Lewis, 2003). This method of evaluation became known as the "money ball" theory due to its ability to discover productive players at below market value who through traditional scouting methods were not seen as commodities (Lewis, 2003). This method has been proven to be successful for the Oakland Athletics and another team that uses statistical methods to evaluate talent, the Boston Red Sox.

The reasoning behind the use of player statistics in baseball was based in the idea that college players had meaningful stats (Lewis, 2003). College players play more games and the level of competition with which they play against is greater than that of high school (Lewis, 2003). The sample size of their statistics was large enough, giving a more accurate picture of the underlying reality (Lewis, 2003). For this reason it is easier to project the potential success of college players over high school players (Lewis, 2003). The statistics garnered from college players enabled baseball executives and scouts to look past all kinds of visual scouting prejudices (Lewis, 2003). The belief by those who use predictor statistics in baseball is that a player is not what he looks like or what he might become, but what he has done (Lewis, 2003). This view runs counter to the traditional baseball scouts view that a player is what you can envision him doing in the scout's own mind (Lewis, 2003). It is argued that what's most important about a baseball player is not only the players character, but what his statistics may reveal (Lewis, 2003).

The concept of using statistics to analyze talent in baseball was done to make baseball more efficient (Lewis, 2003). Boston Red Sox consultant and author of the Bill James, concluded that if owners are going to pay these players millions of dollars, executives and scouts should at least know how good they are, which means knowing how much they produced at bat and in the field from a statistical point (Lewis, 2003). A larger question that James did not ask was: If one could grossly miscalculate a person's value on the baseball field, before thousands of fans and millions of television viewers, what did that say about the measurement of performance in other lines of work? If professional baseball players could be over or under valued, who couldn't? Lewis (2003) stated that, "the statistics used to evaluate baseball players were probably far more accurate than anything used to measure the value of people who didn't play baseball for a living" (Lewis, 2003).

Background of the Predictor Statistics

The background behind the predictor statistics is based in the 1949 merger between the National Basketball league (NBL) and the Basketball Association of America (BAA). The merger formed the NBA. The NBL was the first league to recognize the value of statistics (Lahman, 2003). Until 1939, the only statistics that were recorded were the number of free throws, field goals made and points scored by each player (Lahman, 2003). During the 1939 season, the NBL began to record the number of shots attempted, which gave free throw and field goal percentage as an analytical measure (Lahman, 2003). The NBL also began to record personal fouls committed by players (Lahman, 2003). The concept of recording assists was introduced by the BAA in

1946 and was then became an official statistic of the NBA by 1949 (Lahman, 2003). In 1950, the NBA began recording rebounds and then minutes played in 1951 (Lahman, 2003). In 1967, the American Basketball Association (ABA) introduced the three point shot and the NBA later adopted the shot in 1979 (Lahman, 2003). The ABA then invented two more statistics in 1972, steals and blocked shots (Lahman, 2003). The NBA then began to record these statistics in 1973 (Lahman, 2003). The NBA added offensive rebounds in 1973 and in 1977 began counting turnovers (Lahman, 2003). Thus, the predictor variables in this study are deeply rooted in the history of basketball and through statistics the game is analyzed (Lahman, 2003).

Summary

As stated throughout the literature, player evaluation is a very important process for general managers when looking to build a championship team. Traditional methods of player evaluation in the NBA have proven to be an imprecise science. Drafting players from the college ranks has become more and more of a gamble over the years. Today, in order to get rid of the risky nature of the draft, general managers and owners are looking for alternative methods to improve their current evaluation processes and these alternatives include statistical analysis.

CHAPTER III

Methodology

This chapter outlines the procedures the researcher used to analyze the relationship between selected pre-career statistical variables and career longevity of NBA players. The methodology is presented in the following four sections (1) Participants; (2) Instrumentation; (3) Procedures; and (4) Design and Analysis.

The purpose of the study was to identify the relationship between pre-career statistical variables and career longevity. The researcher separated the sample of 329 NBA players into their NBA positions of guard, forward, and center. Six multiple regressions were used to determine what NBA player statistics were related to career longevity. Three regressions were run on two years of college statistics of guards, forwards, and centers preceding entry into the NBA. Another three regressions were run on the one-year collegiate statistics of guards, forwards, and centers preceding entry into the NBA. The one and two year collegiate statistics were used because they are better indicators of NBA player potential because players who enter the NBA after playing one or two years in college statistically have their best collegiate seasons in those years.

Participants

329 College players who played in the NBA from 1987-1988 to 2001-2002 served as participants in this study. The criteria that were used in selecting the participants included the following: (a) The players entered the NBA in the 1987-88 season or later and ended their careers after the end of the 2001-2002 season or before the

2001-2002 season; (b) Players that entered the NBA straight from Europe, Junior college and high school were not included in the study; (c) The players had to play in a minimum of one game to be included in the study; (d) The players college statistics of the last year prior to entry into the NBA were used; (e) The players who entered in the 1987-1988 were the most relevant sample because of the change in NBA style of play and the change in the draft structure in the 1987-1988 season which made the draft strategy for NBA general mangers different then in years past.

The participants were chosen based on their status as college players. Participants played at least one-year of college basketball at an NCAA member institution. The statistical categories of points, rebounds, assists, steals, blocks, turnovers, field percentage, free throw percentage, minutes played, fouls, three point percentage will be obtained from the data base found on website at http://www.databasebasketball.com.

Data

One resource was used to gather information on the college basketball players in this study. 1. Database Basketball website

Database Basketball website.

Database Basketball is the primary Internet resource for gathering historical college basketball player statistical data (Sonics Play Moneyball, 2005). This website houses information regarding all college players that played in the NBA and those that

were drafted into the NBA. From this website the researcher obtained the total number of players that played in the NBA from 1987-88 to 2001-02.

For this study, the researcher took the eleven following college basketball statistics of points, rebounds, assists, steals, blocks, field goal percentage, free throw percentage, fouls, three point percentage, minutes played, and turnovers. The researcher used the totals of each statistical category except for the categories of field goal percentage, free throw percentage and three point percentage where the raw percentages were used instead of totals. This was done because it was thought the percentages provide better analysis of a player's shooting accuracy.

Furthermore, the category of minutes played was chosen over games played because the use of both of these are linearly correlated and added together do not provide any better information than minutes played. The choice for the use of these statistics is based in the history of the use of the statistics. Historically, dating back to the 1949 merger between the BAA and NBL, which formed the NBA, the use of traditional player statistics was the primary method to analyze the game (Lahman, 2003). Thus, this study will use those statistics to acquire the requisite data.

The time frame of 1987-88 to 2001-02 was chosen because it is recent enough to be relevant to the present. The time period is also long enough to obtain a large sample of players for the study. The statistical categories that were tested for each position were different for each position. The statistics that were tested in the multiple regression were based on the history of the statistical production of the players at the positions of guard, forward and center. Each player in these positions over the history of basketball produced proficiently in the chosen statistical areas. Therefore, the categories that were chosen for

each position were based in the history of guard, forward and center statistical production in those statistical areas. The categories to be analyzed per position are:

GUARD POSITON: Points, Minutes played, Steals, Field goal percentage, Three point Percentage, Turnovers, Personal fouls, Free throw percentage, and Assists.

FORWARD POSITON: Rebounds, Three point percentage, Points, Free throw percentage, Steals, Blocks, Field goal percentage, Turnovers, Personal fouls, Assists and Minutes played

CENTER POSITION: Rebounds, Free throw percentage, Field goal percentage, Blocks, Personal fouls, Turnovers, Points and Minutes played.

Procedures

Data collection consisted of retrieving the necessary information from the database of basketball statistics. From the database of basketball statistics the researcher collected the statistical data for each college player that entered the NBA in 1988 and ended their career in 2002. The information for these years was retrieved from the database basketball website and was accessed via the Internet at http://www.databasebasketball.com. The statistical categories that were contained on the web site were minutes played, field goal percentage, three point percentage, free throw percentage, rebounds, fouls, assists, turnovers, blocks, steals and points.

The procedures for the multiple linear regression analysis were that of the two-variable regression model Y= a + bX however, the only difference is that there is more than one X variable (independent variable) (Miles & Shevlin, 2001). The multiple regression prediction equation identifies which combination of independent variables best

predicts NBA player success. The multiple correlation coefficient (*R*) indicates the relationship between the dependent variable and the predictor variables (independent variables) (Thomas & Nelson, 2001). Thus, R^2 represents the proportion of the variance of the dependent variable that can be explained or accounted for by variation in the independent variables. The researcher ran the multiple regression tests six times. Each multiple regression test was run based on player position. The positions that were tested were guards, forwards and centers. These positions were the positions that the drafted players played in the NBA. The variables that were tested for each position were different depending on how important the statistical area was to that position. The six regression tests reflected analyzed the NBA players one year and two year collegiate statistics prior to their entry into the NBA.

Design and Analysis

The tool that was used to analyze the data for career longevity is the Statistical Package for the Social Sciences (SPSS Version, 14.0). The tests that were used in SPSS were the multiple linear regression analysis. The multiple linear regression analysis involves the dependent variable (career longevity) and two or more predictor variables (independent variables). Thomas & Nelson (2001, p.127) stated that the "multiple correlation coefficient (*R*) indicates the relationship between the criterion and a weighed sum of the predictor variables." Thus, R^2 represents the proportion of variance of the criterion that can be explained or accounted for by the combined predictors.

In a multiple regression, the amount of association is between one variable (the criterion) and a combination of independent variables (predictor variables) to identify

which combination of independent variables best predicts team success. The process of using more than one predictor variable is that the equation will increase the accuracy of the prediction, making the test more reliable (Thomas & Nelson, 2001). Therefore, the multiple regression equation finds the best combination of variables that gives the most accurate prediction of NBA career longevity (Thomas & Nelson, 2001). Multiple regression makes it possible to combine many variables to produce optimal predictions of the dependent variable (Allison, 1999). Multiple regression separates the effects of independent variables on the dependent variable so that one can examine the unique contribution of each variable (Allison, 1999). Multiple regression is designed to make errors of prediction as small as possible (Allison, 1999). One of the major uses of multiple regression is prediction (Allison, 1999).

The correlations between the dependent variable career longevity and each of the independent variables were analyzed using SPSS. The independent variables in this study were minutes played, field goal percentage, three point percentage, free throw percentage, rebounds fouls, assists, turnovers, blocks, steals and points.

Multiple regression equation found the best combination of variables that gives the most accurate prediction of the criterion. This was done by using the prediction equation resulting from multiple regression, $Y = a + bX$. The X variables were assists, minutes played, fouls, turnovers, steals, rebounds, blocked shots, points, free throw percentage, field goal percentage, and three point percentage. The information gained from the two data analysis systems identified what factors were associated with career longevity.

CHAPTER IV

Results

The purpose of this study was to identify relationships between pre-career statistical variables and career longevity. To satisfy the purpose of this study, the researcher asked two questions:

1. Can one or more of the eleven traditional player statistics for the year preceeding a players' entry into the NBA, be used to predict career longevity for players that play the positions of guard, forward, and center in the NBA?
2. Can one or more of the eleven traditional player two year statistics preceding a players' entry into the NBA, be used to predict career longevity for players that play the positions of guard, forward, and center in the NBA?

The researcher organized the sample of 329 NBA players' by position of guard, forward, and center that each of the 329 players played while they were in the NBA. Six multiple regressions were calculated to predict the relationship between pre-career statistical variables and career longevity. All six of the regression tests were run based on player position. The guard, forward, and center positions were each analyzed. The regressions analyzed the two-year collegiate player statistics and the one- year statistics of preceding entry into the NBA.

A significant regression equation was found for the guards and forwards for the year preceding entry into the NBA. For the guards, a significant regression equation was found (F (9,123)= 3.218, p<.001), with an R of .437 and an R^2 of .131. The guards regression equation was a linear function of the following explanatory variables: Assists,

turnovers, points, field goal percentage, free throw percentage, three point percentage, steals, personal fouls and minutes. Assists, turnovers and points were significant predictors of career longevity amongst guards the year before they entered the NBA (Appendix B, Table 3).

Furthermore, a significant regression equation was also found for those collegiate players who played the position of forward for the statistics one year prior to entry into the NBA. The significant regression equation was found at ($F(11,110)= 2.531$, $p < .001$), with an R of .449 and an R^2 of .202. Forwards regression equation was a linear function of the following explanatory variables: Field goal percentage, free throw percentage, assists, points, turnovers, steals, three point percentage, personal fouls, minutes, blocks and rebounds. Field goal percentage, free throw percentage and assists were significant predictors of career longevity (Appendix B, Table 4). For the one-year totals for the center position, no significance was found (Appendix B, Table 5).

Three multiple regression tests were run for the combined totals of the last two years of collegiate player statistics prior to the players entry into the NBA. A significant regression equation was found at ($F(9, 123)= 3.706$, $p<.001$), with an R of .462 and an R^2 of .213 for the players that played the guard position. Guards regression equation for career longevity for two year collegiate statistical totals was a linear function of the following explanatory variables: Assists, steals, turnovers, points, field goal percentage, three point percentage, free throw percentage, personal fouls and minutes.

Though the regression equation was found to be significant, only assists, steals, turnovers and points were significant predictors of career longevity amongst guards (Appendix B, Table 6). Though a significant regression equation was not found for

forwards, field goal percentage, free throw percentage and assists were significant predictors of career longevity amongst all the other predictors (Appendix B, Table 7). The center position revealed no significant data for the two-year totals of college statistics prior to entering the NBA (Appendix B, Table 8).

CHAPTER V

Discussion

The purpose of this study was to identify the relationship between selected pre-career statistical variables and career longevity of NBA players.

Among guards, a significant regression equation was found at F =(3.218, p<.001), with an R of .437 and an R^2 of .131. The guards regression equation for the one year statistics prior to entry into the NBA was a linear function of the following explanatory variables: Assists, turnovers, points, field goal percentage, free throw percentage, three point percentage, steals, personal fouls and minutes. Assists, turnovers and points were significant predictors of career longevity amongst guards the year before they entered the NBA.

The analysis of forwards collegiate statistics also revealed a significant regression equation for those collegiate players who played the position of forward one year prior to entry into the NBA. The significant regression equation was found at F= (2.531, p < .001), with an R of .449 and an R^2 of .202. Forwards regression equation was a linear function of the following explanatory variables: Field goal percentage, free throw percentage, assists, points, turnovers, steals, three point percentage, personal fouls, minutes, blocks and rebounds. Field goal percentage, free throw percentage and assists were significant predictors of career longevity. There was no significance found for players that played the center position.

The findings of this study with respect to the first research question of: Can one or more of the eleven traditional player statistics for the year preceeding a players' entry into the NBA, be used to predict career longevity for players that play the positions of

guard, forward, and center in the NBA? Displayed that the skills of assists, points and turnovers helped guards have long careers in the NBA. Furthermore, skills such as shooting high field goal percentages, free throw percentages and assists helped forwards maintain long careers in the NBA. The results of this study are consistent with the NBA evaluation process for guards and forwards (Wolff, 2001). Guards are players that control the tempo of the game, protect the basketball and run the offense for teams. Thus, the regression revealed that assists and turnovers are important predictors among these players at the guard position. Scoring was also deemed as important among college guards who had long careers in the NBA. Turnovers are important for guards because guards control the basketball on offense thus turnovers measure the lack of continuity of a team during a game which can largely be attributed to those who control the basketball (Zak et al., 1979).

The "quarterback" aspect of the point guard position was shown by the significance of this predictor. The data revealed that every possession is important in basketball and guards are in control of the ball. Moreover, assists were significant as well and this can be attributed to the fact that guards run the offense and distribute the basketball creating scoring opportunities for teammates. Assists highlight aspects of ball handling and teamwork and a positive contribution to output as well (Zak et al., 1979).

Among guards, turnovers and assists were expected to be significant indicators of career longevity. Points were also a statistical category that was significant. The reasoning behind this category can be based in the fact that shooting guards on most NBA teams are scoring threats.

The regression analysis for guards showed that there was a total correlation of 43.7% between all the independent variables and the dependent variable. The R^2 was 19.1%, represents the total amount of variance accounted for in the dependent variable by the independent variables.

Amongst forwards, the regression revealed an *R* of 44.9%. Thus, the multiple correlation or the coefficient of determination represented among forwards that the total correlation between all the independent variables and career longevity. The R^2 of 20.2%, represents the total amount of variance accounted for in the dependent variable by the independent variables.

When looking at forwards, the categories of field goal percentage, free throw percentage, and assists were criteria that were significant. The reasoning for these findings can be based in the fact that there are forwards that play with their backs to the basket (power forwards) and forwards that play more like guards (small forwards). Thus the data that revealed field goal percentage, free throw percentage, and, assists as significant display that forwards must be very versatile players. Forwards should shoot with accuracy, play aggressively by getting to the free throw line, which in turn puts the other team in foul trouble, along with passing the basketball and getting other teammates involved as if they were guards. Thus, forwards play an integral role from a statistical standpoint.

Shooting high field goal percentages and free throw percentages, provides an important contribution to team output and an impact on the game (Zak et al., 1979). With every thing else being held equal, the better a team shoots relative to their opponent, the larger the output (Zak et al., 1979). Field goal percentages reflect how efficiently a team

shoots the ball (Zak et al., 1979). Thus forwards should be very efficient and accurate players according to the data in the study. When looking at forwards and assists, small forwards are to be versatile thus they should have some of the same skill sets as guards and must be "playmakers" at times. Assists highlight aspects of ball handling and teamwork (Zak et al., 1979). Forwards are sometimes asked to do many things on the basketball court and this is why assists are significant indicators of career longevity.

On the other hand, regression analysis for centers produced no significant results. That may be attributed to the number of subjects in the study. The number of centers in the NBA has decreased over the years (Luft, 2001). This study reflected that by the low number of centers in this study (54). The other positions had about double the number of centers and that may have played a part in the results that were obtained. Moreover, numerical data may not be as important for this position.

The findings of this study, concerning the second research question: Can one or more of the eleven traditional player two year statistics preceding a players' entry into the NBA, be used to predict career longevity for players that play the positions of guard, forward, and center in the NBA? Indicates that there are statistical categories that are predictors of NBA career longevity when looking at the two-year totals of collegiate player statistics. A significant regression equation was found at F= (3.706, p<.001), with an R of .462 and an R^2 of .213 for the players that played the guard position. Guard regression equation for career longevity for two year collegiate statistical totals was a linear function of the following explanatory variables: Assists, steals, turnovers, points, field goal percentage, three point percentage, free throw percentage, personal fouls and minutes.

What the regression revealed for guards was that there was a total correlation of 46.2% between all the independent variables and the dependent variable. The R^2 was 21.3%, which means that 21.3% of the variation in career longevity can be explained by the differences in points, assists, turnovers and steals. When another year of collegiate statistics were added, the category of steals became significant. Steals are a measure of the opponent's ball handling and, represent a change in possession (Berri & Brook, 1999).

Steals is another category that amongst guards that would be expected to be statistically relevant. Guards play the passing lanes on defense and put on ball pressure on the perimeter. Therefore, it was understandable that this statistic was significant among guards.

Among forwards, the overall regression model was not significant however, two statistical categories were significant when two-year collegiate statistics were analyzed. Assists and rebounds were predictors of NBA career longevity among forwards. This was very interesting because the category of rebounds was found to be significant when analyzing the two-year totals. Rebounding is important to scouts because it also has an impact on the game as well as the individual player (Zak et al., 1979). If a team out-rebounds their opponent, the chances of victory increase as well (Zak et al., 1979). Every rebound obtained by a team represents a gain of possession (Berri & Brook, 1999). In the case of defensive rebounding, it indicates the frequency in which an opponent fails to convert a possession (Berri & Brook, 1999). Assists, as stated above in the previous research question, highlight those aspects of ball handling and teamwork (Zak et al., 1979). Assists have a positive contribution to output (Zak et al., 1979).

When looking at players that played the center position, there were no statistics that were significant neither was there any significance with respect to the overall regression model when two-year statistics were analyzed. This can be attributed to the sample size of players as stated with the one-year statistical regression data.

However, when analyzing the three positions of guard, forward and center, it is important to explain why it is believed the results were so different among the three groups. First, it is believed that the reason why assists, steals, turnover, points were significant indicators for success because the guard position lends itself to being a position that is more statistically based. Guards are very agile, quick, versatile, athletic players with extremely high basketball IQs. Thus guards find themselves involved in many aspects of a basketball game from a statistical standpoint. Thus, guards are able to be proficient in a number of categories due to the nature of their position. What guards do on the floor is easily visible by fans, scouts, coaches and commentators. The impact guards have on the game appears to be able to be quantified and measured by statistics.

Forwards are probably the most difficult position from which to retrieve statistical data because there are two forward positions. Small forwards and power forwards produce different numbers from a statistical standpoint because small forwards play like guards and power forwards play like centers. Thus it is very difficult to gauge their longevity for this reason. Forwards are asked to play dual roles in the NBA. Forwards are the “do all” players on a basketball court. Forwards are broken down into small and power forwards. Small forwards must be fundamentally sound offensive and defensive players who possess some of the same skills that point guards and shooting guards possess. Small forwards must be able to pass the basketball setting up teammates for

scores as well as being able to handle the basketball and score. On the other hand, power forwards are asked to play more like centers in that they are the "muscle" of the team. They must play strong inside the paint, rebound, play defense and fundamentally sound rather than relying on quickness and athletic ability.

Thus, the results among forwards in this study are very difficult to assess however the results that were obtained can be explained from a basketball standpoint. Furthermore, centers are probably the only group of the three that do not lend themselves to being measured by statistics. The reasons for this, is because a lot of the things centers do are found in the intangibles of the game. Good centers make the game easier for guards and forwards. Centers that demand a lot of attention from an opposing defense allows the center to set up others. This cannot always be measured by statistics because a center can set up a teammate without having the basketball. Good big men also make defenses play honest not allowing teams to over extend on the perimeter and force double teams which allow centers to create for others as well. Centers have to be multi skill players just as forwards and guards. Centers are usually proficient in blocked shots, rebounds, field goal percentage and points. Centers that can face up opposing defenses and play with their backs to the basket create numerous problems for defenses that cannot be measured in mere statistics. Successful centers are physical, obtain good position while boxing out, and have good footwork. All these are things that cannot be measure by statistics but are essential to any team's success. Moreover, the intimidation factor of a seven-foot player who alters opponents shots but may not block them does not show up in the box scores but is very important to success at the center position.

From 1983 to 1987 there were a number of elite centers that came form the college ranks to the NBA (Luft, 2001). These elite players were Ralph Sampson (1983), Hakeem Olajuwon (’84), Patrick Ewing (‘85), Brad Daugherty (‘86), and David Robinson (‘87) (Luft, 2001). These centers were the elite group drafted into the NBA in the 80’s. Since the 80’s the only centers taken with the top pick were Shaquille O’Neal (‘92), Michael Olowokandi (‘98) and Yao Ming (’02) (Luft, 2001). The reason for the changing nature of the position in the NBA and what may account for the inability to measure them from a statistical standpoint in this study is that there are not that many true centers in the NBA anymore (Luft, 2001). This lack of traditional centers can be based in the fact that today’s athletes have become more versatile, quicker and athletic, allowing these would be centers to play power forward, leaving the center position with a small group of statistically non-productive players who cannot be measured (Luft, 2001).

Implications for General Managers

From the results of this study, it has been shown that some of the predictor statistical categories can be used to predict career longevity among guards and forwards. The statistics for position of center proved not to be predictive when it comes to career longevity. However, from the data that was received, the statistical analysis can be used hand-in-hand with the videotape analysis scouts use, which will give scouts a good idea of how a player may be able to succeed. Scouts typically prefer to see the athlete in person, allowing the scout to get a better feel for the athlete’s game as well as the physical aspects of the athlete that cannot necessarily be seen on tape or from statistics. But the fact that a player can go hot or cold on any given night when a scout may come to

view him makes statistical analysis extremely important. The importance of this study is that general managers and scouts need to gather as much information as possible to make decisions regarding acquiring talent. As long as statistical analysis is kept in the right perspective, as a tool and not the final answer, it can serve as a great tool that decreases bad decisions on draft day.

By gathering as much information about a player as one can, it allows a scout or a general manager to make an informed decision using statistics rather than making a decision based on emotion or subjective criteria. The NBA draft has become a huge gamble as personnel types have explained, and statistical analysis will close the gap in that window of uncertainty. Using statistics is essential to finding undervalued skill sets among players at certain positions and player evaluation strategies that can ultimately be used to acquire players with the most efficient use of money and salary-cap space.

Conclusions

As described in the review of literature the scouting and player evaluation process for the NBA draft are very difficult processes that could benefit from more information in the form of statistical analysis. The data in this study found that there is a relationship between collegiate player statistical categories and career longevity in the NBA. Based on the results of the study:

1. Assists, turnovers and points among Guards who played one year of college basketball before they entered the NBA can be used to predict NBA career longevity.

2. Assists, steals, turnovers, and points for Guards who played two years of college basketball before they enter the NBA can be used to predict NBA career longevity.
3. Field goal percentage, free throw percentage and assists for Forwards who played one year of college basketball before they entered the NBA can be used to predict career longevity in the NBA.
4. Assists and rebounds for Forwards who played two years of college basketball before they entered the NBA can be used to predict career longevity in the NBA.
5. There was no predictive value in any of the 11 statistical categories for Centers who player one or two years of college basketball before they entered the NBA.

Recommendations

The results of this study have shown an important relationship between statistical categories and career longevity. This study sought to determine what exactly the relationship was and how the relationship was associated with career longevity. In order to establish a historical and future perspective of the importance of the predictor statistics, future studies should attempt to secure data that dates back before 1987-88 draft and after the 2001-2002 seasons to determine if there are trends or differences between the years before and after this study.

With a better understanding of the relationship of statistical categories and career longevity, researchers may develop strategies that will provide general managers with

more information. Once this information becomes readily available to general managers and scouts, they can better make decisions when it comes to drafting player from the collegiate ranks with more certainty than in years past.

APPENDIX A

Table 1. *Summary of Regression Analysis for one-year statistics preceding guards, for wards and centers entry into the NBA*

Model Summary/Analysis of Variance

	R	*R²*	*Adjusted R²*	*Std. Error the Estimate*	*df*	*F*	*p*
Guards	.437	.191	.131	3.482	9, 123	3.218	.002*
Forwards	.449	.202	.122	3.462	11, 110	2.531	.007*
Centers	.425	.180	.035	3.709	8, 45	1.237	.300

*p <.05

Table 2. Summary of Regression Analysis for two-year statistics preceding guards, for wards and centers entry into the NBA.

Model Summary/Analysis of Variance

	R	R^2	*Adjusted* R^2	*Std. Error the Estimate*	*df*	*F*	*p*
Guards	.462	.213	.156	3.433	9, 123	3.706	.000*
Forwards	.364	.133	.050	3.596	11, 115	1.600	.108
Centers	.458	.209	.069	3.643	8, 45	1.490	.188

*p <.05

APPENDIX B

Table 3. *Summary of Regression Analysis for one-year statistics for guards prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable (X)	*B (Coefficient, b)*	*SE B (Standard Error)*	*β (Βετα)*	*p*
(Constant)	4.106	4.266		.338
FGP	-.703	.935	-.063	.454
TPP	1.188	.018	.195	.846
FTHP	-6.033	5.113	-1.180	.240
ASST	2.151E-02**	.008	.362	.007
STEAL	2.025E-02	.017	.124	.235
TURN	-3.933E-02*	.019	-.237	.040
POINT	9.410E-03**	.003	.386	.001
PF	-1.436E-02	.020	-.065	.477
MIN	-6.548E-05	.000	-.015	.856

*p<.05

**p <.01

***p<.10

Table 4. *Summary of Regression Analysis for one-year statistics for forwards prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable	*B*	*SE B*	*β*	*p*
(Constant)	-12.424	4.971		.014
REB	6.540E-03	.006	.130	.275
TPP	1.954	1.347	.136	.150
POINT	-4.532E-04	.001	-.069	.448
FTHP	7.629***	4.227	.169	.074
STEAL	3.883E-02	.025	.174	.116
BLOCK	6.794E-03	.013	.050	.614
FGP	20.291**	6.800	.300	.004
TURN	-1.215E-02	.020	-.073	.544
PF	-6.445E-03	.021	-0.33	.754
ASST	3.073E-02*	.014	.270	.027
MIN	-2.766E-03	.002	-.143	.255

*p<.05

**p <.01

***p<.10

Table 5. *Summary of Regression Analysis for one-year statistics for Centers prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable	*B*	*SE B*	*β*	*p*
(Constant)	-6.729	7.619		.382
REB	2.570E-03	.018	.042	.884
POINT	7.655E-03	.007	.281	.274
FTHP	1.799	6.830	.039	.794
BLOCK	3.032E-02	.021	.221	.156
FGP	17.811	10.640	.255	.101
TURN	-5.431E-02	.039	-.304	.172
PF	-8.912E-03	.035	-.043	.800
MIN	-8.885E-04	.005	-.045	.872

*p<.05

**p <.01

***p<.10

Table 6. *Summary of Regression Analysis for two-year statistics for guards prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable	*B*	*SE B*	*β*	*p*
(Constant)	-3.726	5.370		.489
FGP	10.914	6.844	.140	.113
TPP	-2.54	7.073	-.004	.971
FTHP	-4.098	5.764	-.070	.478
ASST	1.140E-02*	.005	.340	.021
STEAL	1.725E-02***	.010	.193	.076
TURN	-2.513E-02*	.012	-.255	.047
POINT	4.940E-03**	.002	.351	.005
PF	1.047E-03	.011	.009	.925
MIN	1.264E-04	.000	.031	.722

*p<.05

**p <.01

***p<.10

Table 7. *Summary of Regression Analysis for two-year statistics for forwards prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable	*B*	*SE B*	*β*	*p*
(Constant)	1.216	2.703		.654
REB	7.322E-03*	.004	.257	.039
TPP	3.400	2.531	.137	.182
POINT	-2.758E-04	.001	-.045	.643
FTHP	-3.481E-02	.109	-.028	.751
STEAL	2.473E-03	.014	.020	.855
BLOCK	3.627E-03	.008	.044	.646
FGP	.795	2.140	.033	.711
TURN	-1.922E-02	.012	-.196	.116
PF	-2.314E-03	.012	-.020	.843
ASST	2113E-02**	.008	.346	.009
MIN	-1.758E-03	.002	-.015	.912

*p<.05

**p <.01

***p<.10

Table 8. *Summary of Regression Analysis for two-year statistics for Centers prior to entry into the NBA.*

Regression equation: $Y=a + b_1X_1 + b_2X_2 + b_3X_3$

Coefficients Table

Variable	*B*	*SE B*	*β*	*p*
(Constant)	-12.324	9.412		.197
REB	5.560E-03	.010	.158	.593
POINT	2.877E-03	.004	.199	.453
FTHP	7.717	7.777	.146	.326
BLOCK	1.332E-02	.010	.192	.209
FGP	14.425	12.675	.175	.261
TURN	-2.745E-02	.020	-.259	.170
PF	4.446E-03	.020	.034	.827
MIN	2.797E-04	.003	.025	.932

*p<.05

**p <.01

***p<.10

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