

THE INTRICACIES OF COLLEGE BASKETBALL COACHING:  
WHAT MAKES COLLEGE BASKETBALL COACHES SUCCESSFUL?

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**Abstract**

This study investigates the effects of men's college basketball coach's abilities on their team's success. Previous research has been limited, but has shown that at the professional level, the abilities of a coach have very little effect on the outcome of their team's games. This suggests that the most important aspect of team success, and thus, coaching success comes from having the best players on the court rather than having the best strategy as a team. The present study divides the various aspects of college basketball coaching into three separate categories, recruiting ability, in game coaching ability and the pedigree in which a coach has earned through past experiences. This study uses three separate regression analyses in order to most accurately describe the various phases of a college basketball season: the regular season, the conference tournament and the NCAA tournament. Controlling for a wide variety of variables that affect the outcome of a basketball game, this study finds that when measuring a coach's success during the regular season, a coach's pedigree is the most important aspect of his success. However, when measuring a coach's success in the NCAA tournament, where the top programs in the country are matched against one another, it is a coach's ability to recruit top level talent that most determines the success of that coach's team, and in turn that coach himself.

KEYWORDS: (Coaching Success, Pedigree, Recruiting)

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## Chapter I

### Introduction

Economists have constantly strived to explain what makes teams and individual players successful for decades. Ranging from basketball to football to baseball, economists continuously look to explain the intricacies of each sport. By modeling their research of individual aspects of each sport against the broader data of wins and losses, economists can find meaning in the plethora of statistics. Specifically within the examination of basketball, economists have looked to explain how the team dynamic is shifted by the inevitable realities of differing skill levels and talents among the five players on a court and the twelve players on a team. While research has been done to help dictate the various nuances that exist within a basketball game, ranging from the shot distribution of the team's best player to the most important position on the court, far less research has been done on the coach's influence on wins and losses. While some research has been conducted focusing on the influence of a top level coach versus that of a generic, average coach<sup>1</sup>, few studies have challenged themselves to go deeper into the realm of coaching in order to see what truly makes coaches successful.

College basketball offers an extremely interesting arena to view a coach's ability to succeed. Not only do coaches have to prepare their team to succeed on the court, but the ability to recruit talent to play within a program often dictates the ability of a team to

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<sup>1</sup> David Berri, Michael Leeds, Eva Marikova Leeds and Michael Mondello, "The Role of Managers in Team Performance," *International Journal of Sport Finance*, volume 4, 2009: 75-93

produce on the court before the game is even played<sup>2</sup>. Furthermore, the diversity of college coaches along with the extremely large sample size to choose from offers the ability to factor in a coach's past experiences, or pedigree, prior to becoming a head coach into the argument. While the NBA is typically considered a players league, where individual star players generally remain on the same team for extended periods of time, the constant turnover due to only four years of eligibility along with the enticing option for star collegiate athletes to enter the NBA draft forces college coaches to constantly rebuild and restock their talent pool. This fact is enhanced by the top collegiate programs willingness to market their team not based on their players, but rather, on their head coach. It is the names like Coach K, Jim Boeheim, Tom Izzo and John Wooden that resonate with college basketball fans far more than the collegiate careers of their players. While these coaches are obviously successful, the question of what makes them successful is the central topic of this thesis. Is it their ability to recruit, their playing style or their pedigree that brings them the consistent success they enjoy?

### Importance of this study

There have been very few economic inquiries on the determinants of success within the field of college basketball coaching. Furthermore, this limited research has provided minimal input to the most important aspects of the coaching profession within college basketball. While coaches believe they know what the most important aspects of their jobs are, no studies have ever contributed significant evidence to support these

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<sup>2</sup>J. Treme, R. Burrus and B. Sherrick, "The Impact of Recruiting on NCAA Basketball Success," *Applied Economics Letters*, volume 18, June 2011: 795-798

assumptions. Many coaches vary in what they believe to be the most important aspect of their career, whether it is game plans, practice preparation or simply the ability to secure top-level talent. Through this thesis, the most important aspect of coaching success will be highlighted and brought to the forefront of which individual aspects breed coaching success.

### Overview of the Present Study

This study will take annual data from the 2004-2005 college basketball season through the 2009-2010 season, focusing on the BCS conferences of the Big East, Big 12, Big Ten, Pac 10, Southeastern Conference (SEC) and the Atlantic Coast Conference (ACC) as well as six smaller conferences, including the America East Conference, the Ivy League, the Atlantic 10 Conference, the Atlantic Sun Conference, the Big Sky Conference and the West Coast Conference (WCC). The next chapter will survey the literature on the various aspects that contribute to college basketball coaching success, ranging from recruiting to on the court game plans to a coach's pedigree that enhance or hinder their ability to succeed. This chapter will focus primarily on the works of David Berri with accompanying articles from various other sports economists. Chapter III will then expand upon the economic theories that pertain to the various aspects of college basketball coaching. Chapter IV will discuss the data used in order to successfully run a series of regression analysis models in order to accurately characterize the intricacies of coaching success. Chapter V will then discuss the results of these regressions, while also characterizing which aspects of coaching tend to be the most important to their team's success. The principal conclusion of this regression analysis is that while coaching

pedigree is significant to a team's regular season winning percentage, it has very little to do with a team's postseason success. While regular season success is important, it is ultimately a coach's postseason success in which he is judged on. In addition to this fact, it is shown that fan attendance and the amount of berths in the NCAA tournament per conference are the most significant aspects of coaching when discussing a coach's success in the NCAA tournament. This shows that recruiting ability and not a coach's pedigree is ultimately the most important aspect of being a successful college basketball coach. Following the results section, Chapter V will open the door to further research by discussing various ways to expand upon the research in this thesis.

## Chapter II

### Literature Review

This chapter will review the literature on a coach's playing style, recruiting ability and pedigree. It will begin by dissecting the literature that pertains to both a coach and player's success during a game. It will then proceed to dissect the literature that pertains to a coach's ability to recruit and a coach's pedigree. In doing so, this chapter will convey the primary theories that have been researched that apply to each specific category that is relevant to a coach's success.

#### Playing Style and On Court Team Productivity

This section will focus on the literature surrounding the effects of a coach and individual player's impact during a basketball game. By focusing on the previous research on this subject, this thesis is able to account for the intricacies that exist within individual games that are consistent to the entire sport of basketball. Furthermore, by examining the literature pertaining to a player's impact on the outcome of individual games, this thesis is able to expand upon these ideas and in turn focus on a coach's decision-making preferences.

David Berri modernizes historical statistical categorizations of NBA player's effectiveness on the court. Berri argues that past models have failed to incorporate the modern realities of the game, and in doing so are unable to realize the true essence of the

statistics they are trying to analyze; “Each of these 'computer' models theorizes that the proper measure of a player is the summation of his positive statistics less the summation of his negative statistics. Without any supporting statistical evidence, the authors of these methods assert the value of any additional statistic is identical, regardless of the specific statistic examined (i.e. points, rebounds, assist, etc.). Certainly, the value of these statistics should best be ascertained via the application of statistical analysis, not via an arbitrary assumption”<sup>3</sup>. Berri continues to create a more modernized model that is based upon the notion of an existing hierarchy of statistics and lacks the “arbitrary” assumptions that plague previous models<sup>4</sup>.

Furthermore, Berri incorporates the various coaching strategies that allow less effective players to put up more gaudy statistical performances due to the playing styles that their teams use. In Berri’s model, “a team playing at a faster tempo will have more opportunities, therefore, players from these teams will accumulate greater numbers of statistics. By weighting each player's production by the tempo the team played, this bias is mitigated”<sup>5</sup>. Finally, Berri is able to further analyze player’s performance based on team’s defensive abilities that inevitably change a game plan and create altered opportunities for individual player’s to score the ball<sup>6</sup>. Berri’s modernized player analysis model allows statisticians to truly convey a player’s effectiveness on the court, without the falsities that exist in past models where not only unreliable assumptions were

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<sup>3</sup> David Berri, “Who is 'Most Valuable'? Measuring the Player's Production of Wins in the National Basketball Association,” *Managerial and Decision Economics*, volume 20, 1999:411-427\

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

included in the model, but also where teams playing styles and intangible defensive statistics were not included in the analysis.

Young Hoon Lee and David Berri further build upon the modernized statistical analysis that Berri previously introduced. Lee and Berri come to the realization that individual player's performances are forcibly altered by the position they play, "specifically, although centers and power forwards play similar roles, the production characteristics of these players differ from guards and small forwards. In other words, they are different kinds of workers. Consequently, a well-defined production function in basketball needs to include different measures for each type of worker employed"<sup>7</sup>. With the incorporation of varied performance measures based on position, Lee and Berri continue to analyze the production function of player's statistical success. Through their analysis, Lee and Berri are able to quantify not only how statistical readings are used to determine player's success regardless of position, but they are further able to determine how each individual position contributes in their own unique playing style<sup>8</sup>.

Lee and Berri conclude that while all players are essential to a team's overall ability to win, not every position is equally important throughout the scheme of the game. Lee and Berri create a hierarchy of importance to the players on the court, "first, our findings suggest, consistent with popular perception, big men have a greater impact on team wins than small forwards or Guards. Such a result lends credence to the general

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<sup>7</sup> Young Hoon Lee and David Berri, "A Re-Examination of Production Functions and Efficiency Estimates for the National Basketball Association," *Scottish Journal of Political Economy*, volume 55, February 2008:51-66

<sup>8</sup> Ibid.

perception that frontcourt players offer greater value to a team”<sup>9</sup>. By quantifying the importance of each position, Lee and Berri build upon the perspectives of how the game of basketball is viewed, and in turn, marginalize the other positions on the court that have been deemed to be less important.

Berri, Brook, Frick, Fenn and Mayoral analyze competitive balance in basketball, a sport that requires supreme amounts of height that is rare within society. This article begins by citing the inability for teams to consistently be competitive due to the height requirements of the sport, “Consequently, for basketball, a sport that suffers from a short supply of the tall people necessary to play the game, competitive imbalance persists despite the efforts of the individuals who manage the NBA”<sup>10</sup>. As this paper analyzes competitive balance, it becomes apparent that the world’s lack of people who are close to seven feet tall creates an issue where a smaller sample size makes it nearly impossible for a majority of teams throughout the NBA to employ not only a seven footer, but an effective player who can compete on the most talented stage.

This article concludes by highlighting the stark reality the NBA faces, and in turn, the bleak future of competitive inequality that undoubtedly disappoints fans and league executives due to the simple fact that people rarely grow to be seven feet tall; “the NBA could also attack the problem by restricting the labor supply to players who are six feet three or smaller. Barring such a dramatic step, though, the analysis offered herein suggests that altering institutions will not result in a level of competitive balance

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<sup>9</sup> Ibid.

<sup>10</sup> David Berri, Stacey Brooke, Bernd Frick, Aju Fenn and Roberto Vicente-Mayoral, “The Short Supply of Tall People: Competitive Imbalance and the National Basketball Association,” *Journal of Economic Issues*, Volume 39, December 2005: 1029-1041

equivalent to those achieved in soccer. The persistent short supply of tall people will likely continue to derail league efforts to solve the NBA's problem of competitive imbalance"<sup>11</sup>. This article builds on the ideas of Lee and Berri that forwards in basketball are the most important position in the game, and in turn, show how the success of big men in basketball is what truly effects the competitive balance the most.

In a piece on officiating bias, Anderson and Pierce examine how foul calls not only change the dynamic of a basketball game, but also how many off court factors effect a referees decision to call a foul<sup>12</sup>. Anderson and Pierce convey how the decision to call a foul often extends past the basketball rulebook:

“as one NCAA coach remarked, ‘We’ll play against a team that comes in and blatantly pushes our post players, and grabs and holds on defense, and the officials will call it the first time, and maybe the second. But eventually, they stop calling it and by the end of the game, we have just as many fouls even though they are the far more physical team’. If an officiating crew shows a consistent bias towards keeping the number of fouls equal, coaches may encourage their teams to play more aggressively. An unintended consequence is that as all coaches consistently pursue this strategy, the overall aggressiveness and physical nature of the sport may increase”<sup>13</sup>.

While Anderson and Pierce show how the letter of the law is not always carried out by on court officials, they continue to dissect the variances in foul calls by highlighting the off court pressures that officials face that inevitably affect their decisions on the court, “this

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<sup>11</sup> Ibid.

<sup>12</sup> Kyle Anderson and David Pierce, “Officiating bias: The effect of foul differential on foul calls in NCAA basketball,” *Journal of Sports Sciences*, Volume 27, May 2009: 687-694

<sup>13</sup> Ibid.

pressure may come from the home crowd (Glamser, 1990; Greer, 1983; Lehman & Reifman, 1987; Nevill, et al., 2002; Wright & House, 1989), network television (Thu et al., 2002), coaches and players (Askins, 1979; Smith, 1982), and may also be internal (Askins, 1979). According to Askins (1978, p.18), contrary to what most officials claim publicly, the various audiences have an impact upon their work. . . . To suggest that officials are not influenced by audiences is to suggest they are not aware of their presence and this is not the case”<sup>14</sup>.

Anderson and Pierce conclude that while the variables that effect officials’ decision making process are involuntary and seemingly random, this is in reality not the case at all, and a clear pattern exists throughout the process of a game. This existence of an officiating pattern often shows how teams face an unfair disadvantage due to the subconscious realities of human error, “the results show a clear pattern of an increased probability of a foul on the team with fewer fouls, the visiting team, and the team that is leading... When the home team is leading, the probability of the next foul being called on them is about 6.3 percentage points higher than when the home team is trailing”<sup>15</sup>.

Anderson and Pierce prove that officiating, no matter how exact it is believed to be, is constantly inaccurate and in turn negatively affects the ability for the true and honest outcome of the game to be achieved. With this reality, coaches are forced to change their own strategy to match the inconsistencies that exist within the duration of a basketball game.

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<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

## Recruiting

This section will focus on the literature that pertains to a coach's ability to recruit talent to a school. It will include recruiting theories from other major sports, and will also focus on the reality of illegal recruiting at the college level. The use of past research pertaining to recruiting allows this thesis to expand upon the ideas previously researched by other economists.

Over the past twenty years, since the decisions to forego playing college basketball and jump directly into the NBA by Kevin Garnett and Kobe Bryant, the speculation of young talent among the ranks of successful college basketball programs has been tantamount to the subsequent success of college basketball teams. Tremme, Burrus and Sherrick convey this theory through the examination of top level talent choosing to play for larger, more prestigious basketball institutions rather than smaller, mid-major programs. They examine the debate over the importance of young talent in comparison to senior experience that often comes with smaller, less talented programs.

While it is impossible to deny that top-level talent sometimes slips through the cracks of the major recruiting pipelines, this article focuses on the constantly evolving recruiting craze within college basketball. This focus on enhanced recruiting services has led to more players being evaluated from an earlier age<sup>16</sup>. This has led to a more accurate evaluation of talent, and in turn, the top-level talent being chosen by big time programs rather than smaller, less dignified basketball institutions. However, through their empirical data results, the authors found that "the results suggest that highly regarded

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<sup>16</sup> J. Treme, R. Burrus and B. Sherrick, "The Impact of Recruiting on NCAA Basketball Success," *Applied Economics Letters*, volume 18, June 2011: 795-798

freshman guards increase the number of wins whereas freshman players at other positions do not have a significant impact”<sup>17</sup>. This realization within college basketball freshman goes against the ideas of David Berri, where it is believed that within the NBA, forwards are more substantial in determining a team’s overall success. However, even with the influx of superiorly talented freshman at the guard position, “even though both experience and incoming talent significantly affect regular season wins, the results imply that experience trumps freshman talent in post-season play in the NCAA tournament”<sup>18</sup>.

While the larger, more prestigious and consistently successful basketball programs are graced with the ability to more frequently secure top level talent, team’s recruiting endeavors are examined in more detail and on a wider scale by Scott Kelly. Kelly looks at the recruiting process in terms of securing talent in various market types<sup>19</sup>. He views basketball recruiting in a far more simplistic and global view, characterizing basketball programs as firms and recruits as the labor force: “The key economic features of a matching market are that two types of participants (e.g., schools and prospective student athletes) seek to ‘match with’ individuals of the other type for an extended period”<sup>20</sup>. In doing so, Kelly is able to concentrate on the mutual economic characteristics that often determine which firms are able to maintain the demand of top level talent while having a large supply of players to choose from, whereas the smaller programs garner a smaller

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<sup>17</sup>Ibid.

<sup>18</sup> ibid.

<sup>19</sup> Kelly Scott, “Redesigning the NCAA Men's Collegiate Basketball Recruiting Market Using Matching Markets,” *University of South Carolina Publications*, 2005

<sup>20</sup> Ibid.

demand from the recruiting pool and thus have a decreased group of players to choose from.

Just as in business, what often creates the ability for top-level programs to maintain consistent success is rooted in their ability to fund their programs from monetary donations to their industry. Humphreys and Mondello create an empirical model to dissect the ability of individual schools to secure the necessary monetary funds in order to reach their desired level of success:

“The empirical model used by Baade and Sundberg (1996) appears to be a good starting point for examining the effect of athletic success on donations. Baade and Sundberg developed a reduced-form model of the determination of giving per alumni. Here, we extend this model to general giving by alumni, foundations, corporations, and others. The empirical model is:

Figure 1:  
Equation Measuring a Schools Monetary Donations

$$G_{ijt} = \alpha_t + \gamma_i + \delta Z_{jt} + \beta X_{it} + e_{ijt}$$

Where  $G_{ijt}$  is the real dollar value of giving to institution  $i$  located in state  $j$  in year  $t$ ,  $X_{it}$  is a vector of characteristics of institution  $i$  in year  $t$ ,  $Z_{jt}$  is a vector of state-specific control variables, and  $e_{ijt}$  is an unobservable equation-error term. The vectors of parameters to be estimated are  $\alpha_t$ ,  $\gamma_i$ ,  $\beta$ , and  $\delta$ . This is a standard two-way fixed-effects model.

$Z_{jt}$  contains a single variable—real per capita income in the state where institution  $i$  is located—to control for variation in the level of income across states and across time.

$X_{it}$  contains a number of variables. The larger the alumni pool, the larger the value of annual donations to the institution, other things being equal”<sup>21</sup>.

Through this model, Humphreys and Mondello are able to quantify that monetary

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<sup>21</sup>Brad Humphreys and Michael Mondello, “Intercollegiate Athletic Success and Donations at NCAA Division I Institutions” *Journal of Sport Management*, volume 21, 2007: 265-280

donations towards a program are not necessarily determined through year-to-year success.

The monetary contributions that attribute to the success of a program's ability to recruit are based upon both the prestige of the program and their consistent success or failure; "our results indicate that only restricted giving changes in response to athletic success. Although variation in unrestricted giving responds to variation in economic conditions and the size of the alumni base at both public and private universities, athletic success does not appear to induce donors to increase their unrestricted contributions in the following year"<sup>22</sup>. These results further compliment the ideas of Tremme, Burrus and Sherrick that dictate that smaller, less dignified programs may enjoy short term success due to the enhanced experience their teams often enjoy accompanied with the outlying talent that has slipped through the recruiting cracks of college basketball, but even with a great year or two, their programs are unable to sustain that success because their programs often do not see an immediate boost in monetary donations.

Stinson and Howard concur with the idea that one great season does not significantly enhance monetary donations and agree that consistent success does have a significant effect on the monetary success of a program<sup>23</sup>. Through the analysis of monetary donations to universities athletic programs based upon the success of their football programs, Stinson and Howard show that it is the athlete's success on the field, rather than in the classroom that enhances monetary donations. This diminishes the idea

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<sup>22</sup> Ibid.

<sup>23</sup> Jeffrey Stinson and Dennis Howard, "Athletic Success and Private Giving to Athletic and Academic Programs at NCAA Institutions," *Journal of Sport Management*, volume 21, 2007: 235-264

of a student-athlete and instead maximizes the importance of just a student's athletic contributions; "football tradition and the winning percentage of the football team both have significant positive influence on giving to athletic programs. It is not surprising that these measures of athletic success have some explanatory power when one analyzes changes in athletic giving"<sup>24</sup>. Stinson and Howard conclude that monetary donations to athletic programs are a major source of monetary sustainability for athletic programs as the business of college athletics has grown over the past decades.

Fizel and Bennett discuss the effects of enhanced television revenue and the subsequent decline of recruiting equity between larger, revenue generating schools and smaller, mid-major programs. They do this through the analysis of college football. Fizel and Bennett use the model for recruiting within college sports as:

Figure 2:

Equation Measuring Recruiting Ability for NCAA Division 1 Football Programs

$$\text{RECRUITS} = a + b (\text{WINPCT}) - c (\text{CONFERENCE}) + d (\text{YEAR}) - e (\text{POWER}) + f (\text{POWERTIME}) + e .$$
<sup>25</sup>

As television revenue increased for the major programs that not only received higher national recognition, but were also able to start their own television stations dedicated to the coverage of their own program, Fizel and Bennett conclude that "the net result of both of these analyses indicated reductions in recruiting equity. The conference 'powers' improved their recruiting after the Supreme Court decision. Finally, a regression analysis was used to determine if the recruiting success of traditional powers in Division I football

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<sup>24</sup> Ibid.

<sup>25</sup> (John Fizel and Randall Bennett, "Telecasts and Recruiting in NCAA Division I Football: The Impact of Altered Property Rights," *Journal of Sports Management*, volume 10, 1996:359-372).

was transformed after the change in telecast property rights. The evidence indicates a statistically significant improvement in recruiting success of traditional powers relative to non-powers. The magnitude of the improvement of 30% for 1985-1991 and 41% for 1988-1991, is substantial.”<sup>26</sup>. As recruiting equity decreases with the increase of major revenue streams for larger programs, the smaller programs are left to rely on the increased experience and recruiting successes of finding disregarded talent that was discussed by Tremme, Burrus and Sherrick.

While monetary factors are a major focus of the recruiting capabilities of college basketball programs, Brown and Jewell explore the idea of racial discrimination within the recruiting decision making process of college basketball teams. While the goal of any college basketball program is to win as many games as possible on the court, Brown and Jewell convey that “economic theory suggests that customer discrimination, unlike hiring and co-worker discrimination, can persist even in the presence of competitive forces”<sup>27</sup>. Furthermore, Brown and Jewell discuss the monetary benefits that programs with more white players enjoy that inevitably impact the future recruiting ability discussed by Humphreys and Mondello:

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<sup>26</sup> *ibid.*

<sup>27</sup> Robert Brown and Todd Jewell, “Is There Customer Discrimination in College Basketball? The Premium Fans Pay for White Players,” *Social Science Quarterly*, volume 75, June 1994: 401-413

“in particular, we estimate the effect of team racial composition on yearly gate revenues using a data set on NCAA Division 1 men’s college basketball teams. The empirical results suggest that fans are willing to pay a premium of over \$100,000 in annual home gate revenues to have an additional white player on the team’s roster. Therefore, basketball programs are faced with a sizable economic incentive to discriminate against recruiting black players, even though the programs themselves may have no discriminatory preferences... The empirical results reported on this paper suggest that customer discrimination exists in college basketball. This discrimination takes the form of white fan’s willingness to pay more to see white players rather than black players”<sup>28</sup>.

This reality of discrimination within college basketball due to increased monetary benefits shows the importance of financial success in order for basketball programs to enjoy subsequent on court success.

In recruiting, there are a plethora of rules mandated by the NCAA in order to try and improve recruiting equity and maintain parity throughout college sports. However, Clark and Batista examine the paradoxical relationship between an increase in recruiting violations and on field success. Clark and Batista designate that within the major conferences, the financial stakes are higher based upon the consistent success of their football programs, as shown through the work of Stinson and Howard<sup>29</sup>. Clark and Batista determine that within larger conferences, where teams are more aptly able to secure top level talent and thus secure a greater ability to succeed on the field, the

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<sup>28</sup> Ibid.

<sup>29</sup> Robert Clarke and Paul Batista, “Do BCS National Championships Lead to Recruiting Violations? A Trend Analysis of NCAA Division 1 (FBS) Infractions,” *Journal of Sport Administration & Supervision*, Volume 1, April 2009: 8-22

increase in NCAA violations is inevitable, but not as negative of a detractor as one might think:

“According to current NCAA Division 1 (FBS) conference alignments, schools from BCS-affiliated conferences are more likely to commit major violations because they are the only ones permitted to win football national championships, and thus the stakes are higher under the Bowl Championship Series structure. BCS- conference schools committed 76.4% of all major recruiting violations from 1987-2007 with the SEC sat the forefront, followed closely by the Big Ten and the Big 12. Paradoxically, the SEC, Big Ten, Big 12 and Pac 10 led the nation in number of Division 1 (FBS) football national championships from 1987-2007. This trend of increase major recruiting violations in conjunction with championships also followed co-national championships in football. In 1990, 1991, 1997, and 2003, seven out of the eight BCS conferences involved in the football national championships had increase major recruiting violations in the year of or the year immediately following the football national championship.”<sup>30</sup>

These violations are always punished, however, the willingness of teams from these larger conferences to commit these violations gives them an extra advantage to secure top level talent in recruiting that is rarely equally reprimanded by the NCAA punishments.

### Coaching Pedigree

This section will explore the literature pertaining to the ideas that are incorporated within the larger study of a coach’s pedigree. It will also include literature that strays from the ideas surrounding organized sports, and instead looks at the literature pertaining to maximizing talent. By including literature that does not focus significantly on sports,

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<sup>30</sup> Ibid.

this thesis is able to recognize the variances in approaches coaches use to maximize the talent on their team.

Berri, Leeds, Leeds and Mondello aim to compare the idea of coaching to a business model dating back to the early days of capitalism and free market enterprise<sup>31</sup>. In doing so, this article examines how managers choose to interact with their team in order to achieve desired results:

“Adam Smith argued managers play an inconsequential role in the performance of a firm. Specifically, Smith separated the role of the entrepreneur from that of the manager. In Smith's view, entrepreneurs provide both the fundamental ideas and capital the organization requires for success. Beneath the entrepreneur is a group of subordinates that oversees daily operations. From Smith's perspective, this group of subordinates does not vary in any significant way from organization to organization. In essence, the managers of daily operations are little more than ‘principal clerks’. This view of managers has persisted in the neoclassical model of the firm in which ‘top managers are homogeneous... inputs into the production process’”<sup>32</sup>.

In order to take advantage of the talent within their team, managers must focus their management styles with an eye towards the rest of the competition, “the most successful managers take advantage of market inefficiencies or find previously undiscovered niches. Such managers thus take on some of the characteristics of entrepreneurs”<sup>33</sup>. While this business model provides a deep insight into the determinants of how a manager can

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<sup>31</sup> David Berri, Michael Leeds, Eva Marikova Leeds and Michael Mondello, “The Role of Managers in Team Performance,” *International Journal of Sport Finance*, volume 4, 2009: 75-93

<sup>32</sup> Ibid.

<sup>33</sup> Ibid.

become successful, it does not singularly explain whether or not managers are actually effective in their own team's success.

While this article describes how within a global business model managers can be successful leaders of a program, it continues to ascertain whether managers reach that level of desired success. It shows that while many people praise certain managers and coaches as great leaders and motivators, in reality, the managers of a team are not as integral in their team's success as many think, "Our most surprising finding was that most of the coaches in our data set did not have a statistically significant impact on player performance relative to a generic coach. Even the most successful coaches by our metric—Jackson, Popovich, and Fitzsimmons— were statistically discernible only from the very worst rated coaches. We therefore find little evidence that most coaches in the NBA are more than the 'principal clerks' that Adam Smith claimed managers were more than 200 years ago"<sup>34</sup>. The realization that even the most esteemed coaches are often less significant to their team's success than the "generic" coaches that are often forgotten offers a bleak and refreshing view of the team dynamic that is constantly analyzed and debated.

Wrisberg, Loberg, Simpson, Withycombe and Reed dissect the use of mental advantages within team sports that have become more commonly used throughout sports. These authors convey how beneficial coaches believe the mental advantage within a game is; "uniformly high percentages of 'favorable' ratings were obtained for making the services of a SPC available for athletes and teams (84.5%) and for adding a SPC to full-time athletic department staff (77.8%). Even higher levels of support were found for

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<sup>34</sup> Ibid.

using a SPC if other conference (88.8%) and NCAA (89.0%) schools were doing so”<sup>35</sup>.

By highlighting the off court pressures of the college sporting world, and in turn, creating an environment where coaches must take measures to help prevent these negative influences to their team’s play, this article creates a solid model of the modern sporting world in comparison to the less studied and ignorant sports environment of past decades.

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<sup>35</sup> Ibid.

## Chapter III

### Theory

This chapter will discuss the economic theories that pertain to the independent variables that describe coaching success. The equation for coaching success can be shown as:

Figure 3:  
Equation Measuring College Basketball Coaching Success  
 $\text{Coaching Success} = f(\text{On Court playing style, Recruiting ability, Pedigree})$

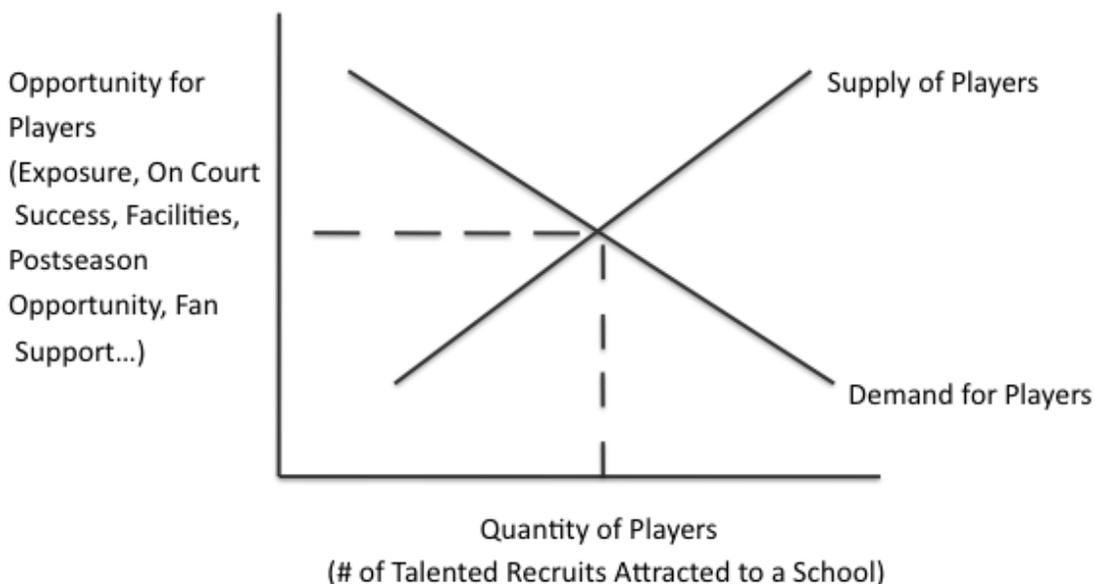
Coaching success is measured in three different values, where regular season win percentage, conference tournament wins and NCAA tournaments wins act as the response variable. This chapter will begin by focusing on the theories that pertain to a coach's ability to recruit, and will then shift to focus on a coach's pedigree and then a coach's in game playing style and team productivity. The theories discussed in this chapter will build upon the literature expressed in the previous chapter that discussed previous studies pertaining to coaching success.

#### Recruiting

This section focuses on the economic theories that relate to a coach's ability to recruit talented players into a program. Through these theories, this thesis aims to quantify the specific abilities a coach must account for when recruiting talent into their program.

In College basketball, recruiting can be conveyed in its simplest form by a basic supply and demand model. Within recruiting, there are dual acting supply and demand function from the standpoint of both college basketball programs and players alike. Supply and demand functions can be described as “when desire for goods increases while the availability decreases, their price raises. On the other hand, if availability of the good increases and the desire for it decreases, the price comes down”<sup>36</sup>. In graphical form, the supply and demand function for college basketball recruits can be conveyed as:

Figure 4:  
Supply and Demand Curve for College Basketball Recruits.



When schools choose a player to recruit, they are forced to abide by the stark realities of college basketball. Smaller school's with a smaller revenue stream<sup>37</sup>, decreased media exposure, a smaller fan base and a less prestigious basketball history are

<sup>36</sup> Hamid Hosseini, “Contributions of Medieval Muslim Scholars to the History of Economics and their Impact: A Refutation of the Schumpeterian Great Gap,” *A Companion to the History of Economic Thought*, December 13, 2007: 28-45

<sup>37</sup> Brad Humphreys and Michael Mondello, “Intercollegiate Athletic Success and Donations at NCAA Division I Institutions” *Journal of Sport Management*, volume 21, 2007: 265-280

forced to cope with the reality that they have a smaller supply of talented players to recruit. In turn, these mid to low major schools garner a smaller demand from top-level talent due to the fact that top-level players want to play for the best basketball programs. The larger basketball schools, such as Duke University and the University of North Carolina, not only have an extremely large supply of talented players to choose from, but also maintain an extremely high level of demand from those talented recruits.

On the reverse side of the spectrum, players also face their own supply and demand model that dictates their choice in schools. The most talented players face a large demand from college basketball programs, with the majority of schools throughout the country desiring their talent on the court. While the most talented players face an increased demand curve, the less talented players have less demand, and in turn, have a smaller quantity of schools to choose from. This is due to a decreased equilibrium level due to the decrease in demand, and when the equilibrium between supply and demand is lower, recruits are faced with the reality that they must play for schools with less revenue, smaller fan bases, a decreased opportunity to play in the NCAA tournament and most importantly from a player's perspective, a decreased opportunity for national exposure which hinders their opportunity to play professionally in the NBA, NBDL (National Basketball Developmental League) or professional leagues overseas.

Within this supply and demand model for both players and schools, there is a fundamental difference between the standard supply and demand models that include price due to the idea of amateurism within college sports that forbids the payment of players. Rather than price, this variable could be labeled as opportunity. Within the school's model, this opportunity includes the opportunity for on court success due to an

increase in talent, along with opportunity for increased revenue through national exposure due to the hype that comes with the signing of big name recruits. From the players side, this opportunity includes the opportunity to play in the NCAA tournament, to play for more experienced coaches with a greater ability to maximize their talent, an increased opportunity to enjoy their college experience due to the fact that they have more choices to find a school that fits each individual's unique academic and social needs and an increased opportunity to receive national exposure that could propel them to professional careers.

In terms of the larger, more prestigious BCS (Bowl Championship Series) basketball schools, the efficiency wage theory effectively describes their advantage over the smaller, less dignified college basketball programs. The efficiency wage theory states that rather than just paying workers the market clearing wage, managers may pay workers increased wages in order to increase their productivity and efficiency, and in turn, this increase in labor production pays for the increased wages<sup>38</sup>. This theory shows itself in larger school's increased ability to provide their players with better facilities, increased budgets for athletic apparel, increased academic aid through tutors and enhanced housing for athletes. This not only allows players to be more productive, but also further increases the demand of talented recruits to choose the larger schools that are more able to provide these increased benefits for student athletes.

When discussing the increased recruiting capacity of smaller, mid-major schools such as Butler University or Gonzaga University, one can look to the economic growth theory. This theory states that as an economy grows, it becomes more readily able to

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<sup>38</sup> Greg Mankiw and David Romer, New Keynesian Economics, Vol. 2: Coordination Failures and Real Rigidities (Boston: MIT Press. April 24, 1991). 161.

provide the goods and services for the members of that economy<sup>39</sup>. This transitions to college basketball by showing that as smaller, less prestigious programs achieve continued success, this in turn makes the program more able to acquire improved talent from recruits in the future and provide the increased win totals that are desired from their school's fan bases. Furthermore, with the increased success on the court, the school receives a greater revenue stream to fund the program, and in turn can provide the student athletes with off the court benefits that increase on-court productivity<sup>40</sup>. While enhanced revenue streams have not been shown to be effected by year to year results, but rather, only positively affected by consistent success<sup>41</sup>, it is incumbent for a program to achieve multiple years of success to the point where they receive consistent national recognition for the economic growth theory to apply.

In college basketball recruiting, fan attendance is a major factor in a recruits demand to attend a specific program. This falls on the opportunity axis on the supply and demand function for college recruiting. Thus, schools with a greater attendance rate will be more able to secure top-level talent. This fact falls within the economic theory of the endowment effect. The endowment effect states that people maintain a greater value from products once their property right has been established. The endowment effect pertains to larger schools, with both a greater student body and a greater alumni base, where more

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<sup>39</sup> John Kendrick, Productivity Trends in the United States (Princeton: Princeton University Press. 1961). 111.

<sup>40</sup> As shown through the efficiency wage theorem that was highlighted by Greg Mankiw and David Romer.

<sup>41</sup> Jeffrey Stinson and Dennis Howard, "Athletic Success and Private Giving to Athletic and Academic Programs at NCAA Institutions," *Journal of sport Management*, Volume 21, 2007: 235-264

fans place higher value in their school's program due to their attendance at that school. By having a larger student body, the endowment effect separates larger schools from smaller schools by giving them another extra advantage in recruiting. Larger schools have a larger fan base to not only attend more games, provide greater fan support and an enhanced basketball culture within the school, but in turn allows schools the ability to create a culture where the school increases its own demand for top level talent and provides an increased budget in order to allow those programs to succeed.

The NCAA has long been considered to act as a cartel, and in doing so, is able to attempt to maintain competitive balance. By structuring itself as a cartel, the NCAA is able to create an explicit agreement between competing schools<sup>42</sup> not to illegally recruit athletes into their programs unfairly altering competitive balance. The ultimate idea that legitimizes this cartel behavior within college sports is the idea of the student athlete; "the prevailing myth that legitimates intercollegiate athletics is that college athletes are amateurs who engage in sport 'solely for the educational, physical, mental, or social benefits derived there from, and to whom sport is nothing more than an avocation' (NCAA 1988a:9). Enforcement of sanctions against rule violators demonstrates the validity of amateur norms around which the NCAA is structured"<sup>43</sup>. While the NCAA acting as a cartel does help inhibit illegal recruiting, its design as a profit maximizing cartel, even with the label as a non-profit agency, unfairly shifts competitive advantages towards school in the BCS conferences: the Atlantic Coast Conference (ACC), the Big

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<sup>42</sup> Simon Bishop and Mike Walker, The Economics of EC Competition Law (London: Sweet and Maxwell. 1999).

<sup>43</sup> Vern Baxter and Charles Lambert, "Competing Rationalities and the Politics of Interorganizational Regulation", *Sociological Perspectives*, vol. 34, no. 3. 1991: 183-203.

East Conference, the Big Ten Conference, the Pacific 12 Conference, and the Southeastern Conference (SEC).

These premier conferences within college basketball are given enhanced ability to create revenue due to national television exposure and broadcasting deals that are created from the structure of the NCAA's cartel behavior. This enhanced national exposure also acts as a benefit for recruits looking to use college as a springboard to the professional leagues. Thus, the NCAA's cartel agreement, while created to try to improve competitive balance by limiting the amount of recruiting violations by schools inadvertently hinders its own goal by putting larger schools with greater national interest and larger fan bases on a pedestal over smaller, less significant programs. Furthermore, through its profit maximizing cartel behavior, the NCAA creates a situation where more teams from the larger conferences are able to make the NCAA tournament, which undoubtedly effects demand from recruits. While every conference is only guaranteed one berth in the NCAA tournament for the conference champion, the increased difficulty of the larger conferences schedules allows them to send far more teams to the tournament each year, with the Big East sending eleven teams to the NCAA tournament in 2011, whereas three smaller conferences, the Ohio Valley Conference, the West Coast Conference and the Horizon League only sent one team to the NCAA tournament.

While the NCAA acts as a cartel in order to limit NCAA recruiting violations by college basketball programs, they are still prevalent within recruiting. While some of these violations are discovered and subsequently punished, many of them go undiscovered and in turn create an environment where many programs are driven to cheat in recruiting, risking punishment from the NCAA. This reality creates the use of game

theory within college basketball recruiting, and in particular, population game theory<sup>44</sup>. Over time, as more teams get caught illegally recruiting, these punishable recruiting violations have a trickledown effect to other programs, where programs either choose to follow or disobey the cartel rules of the NCAA based upon the actions of their competitors.

These decisions by college basketball programs also transcend into the Nash equilibrium. The Nash Equilibrium shows how college programs are faced with a decision whether or not to break NCAA recruiting rules, and many times, this decision is influenced by their main competitor's willingness to break these same rules<sup>45</sup>. If one program cheats and does not get caught, then that team maintains a competitive advantage. Furthermore, the Nash equilibrium dictates which players programs choose to recruit. College basketball teams will constantly recruit a player not necessarily because they have a large interest in that player, but because a rival program is also recruiting him. Thus, if program A recruits a talented center, and program B already has a star center who will occupy many of the minutes of that recruit, program B may recruit that player knowing he will not receive a fair opportunity to succeed in order to negatively impact program A. It is the competitive nature of the college basketball industry that pushes programs into the Nash equilibrium, where recruiting is not based solely in the idea of self-improvement, but also in the basis of hurting the opposition. This idea also pertains to NCAA transfer rules, where a program can choose to restrict one of their players from transferring to a rival competitor.

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<sup>44</sup> Greg Mankiw, The Principles of Microeconomics (Stamford: Cengage Learning, 2006).

<sup>45</sup> Ibid.

These decisions on who to recruit also factor into the economic theory of opportunity cost. A coach must decide which players he wants to give a scholarship to, as each division 1 college basketball program is only allotted thirteen available scholarships per season. Opportunity cost is dictated as the cost of any activity that has been measured in terms of the next best alternative<sup>46</sup>. First, a coach must decide which positions he wants to recruit for. Many times, teams already have successful players at a certain position and in turn choose to ignore that position when searching for new recruits. In this instance, a coach is weighing the cost of trusting that a player he already has will produce more than a potential recruit he could bring in. Next, a coach must decide whether to recruit a player who is more able to perform early in his career versus a player who could potentially perform better later in his career. Here, a coach weighs the immediate productions versus the cost of future production. Finally, a coach must decide whether or not to take a chance on a talented player who has off the court behavioral issues that could jeopardize his playing career. These risky decisions can make or break a team, and it comes down to a coach's view of the cost of on court talent versus off field behavioral issues that can spell success or failure for a program and a coach. These decisions that are based in the theory of opportunity cost effect a team not only for a single season, but also for many years after the decision has been made.

### Coaching Pedigree

This section focuses on the economic theories that contribute to quantifying a coach's level of pedigree. Through these theories, this thesis aims to convey how a

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<sup>46</sup> Ibid.

coach's prior history positively or negatively contributes to his current success rate as a head coach.

When discussing a coach's pedigree, one must only look as far as the economic theory of human capital. Human capital is the ability of a person to maximize their economic efficiency through the acquisition of knowledge, experience and skill<sup>47</sup>; Adam Smith states "The acquisition of such talents, by the maintenance of the acquirer during his education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in his person. Those talents, as they make a part of his fortune, so do they likewise that of the society to which he belongs. The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labor, and which, though it costs a certain expense, repays that expense with a profit"<sup>48</sup>. Coaches must always learn their craft through either years as a player, or more commonly through years of apprenticeship as an assistant coach. As assistant coaches spend season after season honing their skill set by securing increased responsibility within a program and ultimately acquiring the abilities necessary to be a head coach at the highest college basketball level, their success as a head coach can ultimately be traced back to the knowledge gained while playing in college and working as an assistant.

While spending multiple years as an assistant coach does impact a coach's human capital, the program in which they work as an assistant also has an impact on the effect to

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<sup>47</sup> Vern Baxter and Charles Lambert, "Competing Rationalities and the Politics of Interorganizational Regulation", *Sociological Perspectives*, vol. 34, no. 3. 1991: 183-203.

<sup>48</sup> Arthur Pigou, *A Study in Public Finance* (London: Macmillan Publishing. 1928). 29.

their human capital. A coach who coaches at a school that does not win a game is ultimately faced with the reality that their human capital increases by a different amount than an assistant coach at a program which goes undefeated. Furthermore, a coach's human capital faces a different value based upon the school and the coach in which that coach played for, if he even played college basketball at all. In theory, a coach who played for the best coach as a player would gain more human capital towards his coaching career than a coach who played for a losing program or did not play at all. As coaches move through the ranks of college basketball, many of them do not stay at the school where they received their first head-coaching job. This reality creates a situation where coaches who have been a head coach for more time have further opportunities to increase their human capital through firsthand experience as a head coach.

While increased experience through playing and coaching experience has an inevitable effect on human capital, the idea of diminishing marginal returns must also factor into the argument of a coach's ability to succeed. The law of diminishing marginal returns states that the marginal output decreases as a single input increases<sup>49</sup>. In discussing college basketball coaching, the output would reflect a team's win total while the input would focus on a coach's experience. This bleak reality becomes apparent when dealing with older coaches who have many years of experience in coaching, but become unable to effectively lead a team to victories due to their diminished marginal output. While an older coach's knowledge of the game may be highest after many years of coaching experience, there are multitudes of other factors that dictate a coach's ability to

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<sup>49</sup> Greg Mankiw, The Principles of Microeconomics (Stamford: Cengage Learning, 2006).

succeed that inevitably decrease after a certain level of experience and a certain point of their career.

No college basketball player is ever a finished product, and no college player has ever exhausted his vast array of potential. For a coach to maximize this potential and create a situation where that player can most effectively increase his team's chance to win, one must look at the production theory. The production theory when focusing on college basketball coaches discusses how a coach takes the initial level of inputs within his program, in this case player talent and potential, and converts that into the maximum level of output or production on the court<sup>50</sup>. Players are constantly recruited based solely off of potential, especially when discussing smaller, less dignified programs that are forced to dig deeper into the talent pool because the larger programs are able to secure the more polished, accomplished players. If a coach is unable to turn these inputs into significant output, they are doomed to failure. The production theory also applies to the larger, BCS programs. While these programs can secure more game ready talent, it is still the coach's ability to turn good players into great ones that ultimately decides whether those programs succeed or fail against tougher competition.

#### Playing Style and On Court Team Productivity

This section discusses the theories that pertain to a coach's on court playing style and his success rate based off of their in game decision making. These theories allow this thesis to attribute seemingly random decision making choices during the span of a game

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<sup>50</sup> Ibid.

into a discernible representation of the ideas a coach values most.

While the production theory applies to a coach's ability to develop talent, it also contributes to the coach's playing style. Coaches must acquiesce their playing style to fit their personnel, and in doing so, using their given number of inputs to maximize the collective output of a team. If a coach has a team with talent built to play one style, but is unable to recognize this fact or unwilling to change their coaching philosophy, then that coach is damaging his team's ability to maximize its output. This does not solely apply to a coach designating talent on the floor. If a coach is unable to effectively subjugate jobs within his own coaching staff to maximize his assistant coach's talents, than that coach is hindering his team's ability to achieve the most outputs with the inputs given to start the season.

A coach's ability to designate not only which players should play, but in what position and in what role are undeniably major factors in the success of a team. A coach learns these abilities through experience, but it is ultimately a coach's ability to use the economic theory of optimum factor allocation in different game situations that heavily contributes to a team's success or failure<sup>51</sup>. Whether it is through dictating different personnel matchups, dealing with foul or injury issues or simply maximizing a team's talent level through both conventional and unconventional thinking, a coach's ability to optimize his team's production is integral to his team's success. If a coach is unable to do so, he in turn creates an environment where all of his team's resources are not being used, and it becomes impossible for a team to reach its potential and achieve the desired win total for a season.

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<sup>51</sup> Brian Binger and Elizabeth Hoffman, Microeconomics with Calculus (Glenview: Scott Foresman and Co. 1987).

Every team has a different makeup, and every team must decide how to most effectively allocate shots. The allocation of shots between individual players factors into both the theory of optimal factor allocation as well as the theory of opportunity cost. Since there is only one ball in basketball, and thus only one shot opportunity per possession, the decision to shoot the ball becomes a mutually exclusive choice for a player and a team<sup>52</sup>. Sometimes it hurts a team when their best player takes too many shots, however, sometimes the best option for a team is to put the ball in their best player's hand and let him shoot as he pleases. A coach must manage the opportunity cost of these decisions while in turn figuring out the optimal factor allocation in order to maximize his team's output.

In keeping with the idea of optimal factor allocation within a team in terms of shot attempts per player, one must also consider the economic theory of diminishing marginal returns. As a player shoots more, he not only becomes more fatigued, potentially negatively impacting his play, but he also draws more defensive attention and often takes his teammates out of a rhythm that is conducive for offensive success. As David Berri and Martin Schmidt found, "as a player's teammates become more productive, the player becomes less productive"<sup>53</sup>. In turn, as a player becomes more productive, his teammates subsequently become less effective. This decision ultimately falls upon the coach to weigh which situation would produce a maximum level of output for a team, whether it is

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<sup>52</sup> Greg Mankiw, The Principles of Microeconomics (Stamford: Cengage Learning, 2006).

<sup>53</sup> David Berri and Martin Schmidt, Stumbling On Wins: Two Economists Expose the Pitfalls on the Road to Victory in Professional Sports (Upper Saddle River: FT Press, 2010).

having one isolated player having a very high level of productivity, or diminishing that individual's productivity and in turn producing more production from the star player's supporting cast.

While a coach can game plan before the game as much as possible, coaches must still make adjustments during a game. When individual players are playing well, a coach must adjust his ideas on optimal factor allocation and his perception of costs when deciding between the opportunity costs of individual shots. However, the economic theory of the random walk hypothesis dictates that coaches should not be persuaded by past possessions when deciding where to allocate future shot attempts. The random walk hypothesis is a financial theory that describes how the stock market does not fluctuate based on previous trends, but rather proceeds on a random path that cannot be predicted<sup>54</sup>. This theory translates to the game of basketball by stating that future production from a player within individual games cannot be predicted by past production: “psychologists made a detailed study of every shot the Philadelphia 76ers made over one and a half seasons of basketball. The psychologists found no positive correlation between the previous shots and the outcomes of the shots afterwards”<sup>55</sup>. While many coaches feel it is necessary to have a player who has been consistently producing shoot the ball, the random walk hypothesis shows that this is not only a false perception, but also can force coaches to divert from their optimal factor allocation and unjustly change their perceived costs when weighing the opportunity costs of individual player's shots.

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<sup>54</sup> Greg Mankiw, Principles of Macroeconomics (Stamford: Cengage Learning. 2008).

<sup>55</sup> Anne Lindner, Carolin Fischer, Alexandra Félix, Viktoria Scherer and Andreas Warkentin, Market Efficiency Theory (Huelva: Universidad de Huelva Press. 2010). 13.

Beyond the simple allocation of shots between players on a team, the economic theories of opportunity cost and the production theory also dictates offensive playing styles in basketball. The decision making process of coaches and players constantly involves subconscious decisions on opportunity costs as well as deciding the best option to maximize production. For every play that a coach designs for a three point shot, he in turn passes up the opportunity to get a potentially better two point shot. Furthermore, due to the decreased probability of being fouled on a three point shot, that coach is bypassing the increased opportunity of his player being fouled in the act of shooting and compiling points for his team from the free throw line. This decision between shooting more three-point shots or more free throws not only enters into a coach's mind when drawing up an isolated play, but also often dictates entire game plans.

The production theory and the theory of opportunity cost do not apply specifically to the decision on where to shoot the ball, but also when to shoot the ball. Some teams like to play at a faster pace, and in turn, create more possessions throughout the game. While this allows a team more opportunities to score the ball, it also allows for an increased turnover average throughout the game. Furthermore, when teams play at a faster pace, it often gives the opposing defense as well as their own defense less time to set up and play effectively, leading to higher field goal percentages for both teams. It is the coach's decision to weigh these opportunity costs, and in turn, dictate the desired pace of play that would maximize his team's production throughout a game.

Every facet of basketball coaching, from recruiting, to a coach's pedigree and level of human capital, to the style and shot allocation that a coach chooses to employ comes back to the simple formula of a production function. Given every possible input to a

college basketball program, it falls upon the coach to maximize the production function and increase a team's level of output. Encompassing all of the tangible and intangible qualities of a team, a coach must find a way to push his team's production past that of his opponents and in turn, propel his team to a maximum amount of wins throughout the regular season and the postseason.

Table 1 outlines the independent variables measured in the regression equation measuring coaching success:

Table 1

## Variable Definitions with Predicted Signs

Variable	Definition	Predicted Sign
NCAAT	NCAA Tournament Wins +1 for qualification	+
ConfT	Conference Tournament Wins +1 for Qualification	+
Pct	Regular Season Winning Percentage	+
OffFGPCT	Offensive Field Goal Percentage	+
DefFGPCT	Defensive Field Goal Percentage	-
OffRebAVG	Average Offensive Rebounds per Game	+
OppOffRebAVG	Opponents Average Offensive Rebounds per Game	-
TOAVG	Turnovers per Game	-
OppTOAVG	Opponents Turnovers per Game	+
3PTMadeAVG	3 Point Field Goals per Game	+
3PtPCT	Average 3 Point Field Goal Percentage	+
FT	Free Throws per Game	+
FTPCT	Free Throw Percentage	+
OppFT	Opponent Free Throws per Game	-
OppFTPCT	Opponents Free Throw Percentage	-
ConW	Regular Season Conference Wins	+
Att. Size	Average Attendance Size in 2004-05 Season	+
ConfNcaaAPP	Amount of NCAA Tournament Appearances by Teams in that Conference	+
Div1Exp	Division 1 Playing Experience for the Coach	+
Pedigree	Winning Percentage for Coach at Final Assistant Coaching Position	+

## Chapter IV

### Data

This study uses data on NCAA men's college basketball games from the 2004-2005 season through the 2009-2010 season. It focuses on twelve conferences, including the BCS conferences of the Big East, Atlantic Coast Conference (ACC), Big 12, Big Ten, the Southeastern Conference (SEC) and the Pacific 10 Conference (Pac 10) along with six smaller conferences including the Atlantic 10, the Ivy League, the America East Conference, the Atlantic Sun Conference, the Big Sky Conference and the West Coast Conference (WCC). The units of observations are the entire season worth of statistics for 2006-2007 through the 2009-2010 seasons. For the 2004-2005 and 2005-2006 seasons, only statistics measuring recruiting ability were taken, as the analysis for winning was only measured for 2006-2007 through the 2009-2010 seasons. For all recruiting analysis, there were a total of 635 observations, whereas there were only 424 observations taken measuring the analysis for wins by a team through playing style and coaching history. Figures 4,5 and 6 below show the three empirical models used to measure the success rates of men's college basketball teams. Table 2 shows both the explanatory and response variables used throughout the analysis as well as the definitions of each variable.

Figure 5:

Regression Equation Measuring (Pct) as Response Variable

$$\text{Pct} = (\text{Div1Exp} + \text{Pedigree}) + (\text{OffFGPCT} + \text{DefFGPCT} + \text{OffRebAVG} + \text{OppOffRebAvg} + \text{TOAVG} + \text{OppTOAVG} + \text{3PTMadeAVG} + \text{3PtPCT} + \text{FT} + \text{FTPCT} + \text{OppFT} + \text{OppFTPCT}) + (\text{ConW} + \text{ConfT} + \text{ConfNcaaAPP} + \text{NCAAT} + \text{Att. Size})$$

Figure 6:

Regression Equation Measuring (ConfT) as Response Variable

$$\text{ConfT} = (\text{Div1Exp} + \text{Pedigree}) + (\text{OffFGPCT} + \text{DefFGPCT} + \text{OffRebAVG} + \text{OppOffRebAvg} + \text{TOAVG} + \text{OppTOAVG} + \text{3PTMadeAVG} + \text{3PtPCT} + \text{FT} + \text{FTPCT} + \text{OppFT} + \text{OppFTPCT}) + (\text{Pct} + \text{ConfNcaaAPP} + \text{NCAAT} + \text{Att. Size})$$

Figure 7:

Regression Equation Measuring (NCAAT) as Response Variable

$$\text{NCAAT} = (\text{Div1Exp} + \text{Pedigree}) + (\text{OffFGPCT} + \text{DefFGPCT} + \text{OffRebAVG} + \text{OppOffRebAvg} + \text{TOAVG} + \text{OppTOAVG} + \text{3PTMadeAVG} + \text{3PtPCT} + \text{FT} + \text{FTPCT} + \text{OppFT} + \text{OppFTPCT}) + (\text{Pct} + \text{ConfT} + \text{ConfNcaaAPP} + \text{Att. Size})$$

Table 2

## Variable Definitions

Variable	Definition
Div1Exp	Division 1 Playing Experience for the Coach
Pedigree	Winning Percentage for Coach at Final Assistant Coaching Position
OffFGPCT	Offensive Field Goal Percentage
DefFGPCT	Defensive Field Goal Percentage
OffRebAVG	Average Offensive Rebounds per Game
OppOffRebAVG	Opponents Average Offensive Rebounds per Game
TOAVG	Turnovers per Game
OppTOAVG	Opponents Turnovers per Game
3PTMadeAVG	3 Point Field Goals per Game
3PtPCT	Average 3 Point Field Goal Percentage
FT	Free Throws Per Game
FTPCT	Free Throw Percentage
OppFT	Opponents Free Throws per Game
OppFTPCT	Opponents Free Throw Percentage
Pct	Regular Season Winning Percentage
ConW	Regular Season Conference Wins
ConfT	Conference Tournament Wins + 1 for qualification
ConfNcaaApp	Amount of NCAA Tournament Appearances by Teams in That Conference
NCAAT	NCAA Tournament Wins + 1 for qualification
Att. Size	Average Attendance Size in 2004-2005 Season

In the models presented, the response variables are winning percentage (Pct), Conference tournament wins (ConfT) and NCAA tournament wins (NCAAT) in each respective regression equation. In order to successfully quantify all different levels of

coaching success, three different regressions were run due to the reality that many of the teams that succeed in the NCAA tournament and are subsequently viewed as the most successful teams in the country do not enjoy consistent success during the regular season. Also, these regressions were run in order to convey the contrary reality that many teams who do enjoy great success during the regular season do not have that same success during postseason tournaments.

The variable of regular season winning percentage (Pct) is the percentage of a team's wins divided by the total number of games played in the regular season. The Variable of conference tournament wins (ConfT) is measured by adding the amount of wins each year by a team in the conference tournament, and then adding 1 for qualifying for the conference tournament. This is due to the fact that not every team qualifies for its own conference tournament, and if an additional point was not added for qualification to the tournament, teams that lost in the first round of their conference tournament would have the same data as teams that failed to qualify. This would fail to reward teams for qualification to their conference tournament and in turn skew the data in the regression analysis. The variable of NCAA tournament wins (NCAAT) is measured the same way as conference tournament wins (ConfT), where each team is measured by the amount of NCAA tournament wins they have each season as well as an additional point for qualifying for the NCAA tournament. This goes to the same theory as conference tournament qualification; however, since only 65 teams qualify each season for the NCAA tournament, every additional point in this data section is tantamount within this regression analysis.

These three variables were not only used as response variables, but were also included as explanatory variables in the other two regression analysis equations. This is due to the fact that these variables not only help predict the outcome of the response variable that is being measured by showing how successful a team is on the court during that individual season, but they also contribute to recruiting factors that will either enhance or decrease a team's ability to win in the future. The interconnectedness of these three variables is impossible to ignore, and thus, it makes it pertinent to include the success rates of teams in both the regular season and postseason into all three regression analysis models.

In order to effectively quantify coaching success, the explanatory variables were split into three separate categories. These categories were used to measure how prepared a coach is to institute successful coaching practices into his team's daily preparations from past experiences, or more simply his pedigree as a coach, how well a coach can recruit talented players to his school and finally, how well that coach's tactical game plan translates into his team's success or failure. By organizing the explanatory variables into three different categories, these regressions are able to not only show what factors contribute most to a coach's ability to produce successful teams, but they also allow the regression analyses to measure the importance of these categories when comparing larger schools from the BCS conferences to smaller, non BCS schools.

When discussing a coach's preparedness as a coach from his past experiences prior to being hired as a head coach, the variables of whether the coach played division 1 basketball in college (Div1EXP) as well as the coach's pedigree as an assistant coach (Pedigree) were used. Division 1 playing experience was measured by using a dummy

variable of either 0 if the coach did not play basketball at a division 1 school or 1 if they did<sup>56</sup>. The reasoning behind this explanatory variable was the ability to measure how much a coach learned through his playing experiences. It is no secret that a person's experiences and views vastly differ when viewing the game of basketball from either the player's viewpoint or a coach's viewpoint, and this variable was measured to see if playing experiences were a legitimate enhancement in a coach's ability to put a successful product on the court. In order to measure a coach's pedigree, the winning percentage of the coach's team at his last destination as an assistant coach prior to his first division 1 coaching job was measured. This variable was the most problematic to measure because many coaches differ in how long they were at their last assistant coaching job prior to their first head coaching job. If a coach was at the same school for three years or more prior to his first head-coaching job, this variable was measured as an average winning percentage of his last three years as an assistant coach. If the coach was at a school for either two years or only a single season prior to his first division 1 head coaching job, an average of those seasons winning percentages was measured in order to convey a coach's pedigree<sup>57</sup>.

In order to measure a coach's ability to recruit, the explanatory variables of conference wins (ConW) (only in the regression model using (Pct) as a response variable), average attendance size for the 2004-05 season (Att. Size), conference berths to the NCAA tournament (ConfNcaaAPP), regular season winning percentage (Pct) (except when using regular season winning percentage as a response variable), conference

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<sup>56</sup> John Kendrick, Productivity Trends in the United States (Princeton: Princeton University Press. 1961). 111.

<sup>57</sup> Ibid

tournament wins (ConfT) (except when using conference tournament wins as a response variable), and NCAA tournament wins (NCAAT) (except when using NCAA tournament wins as a response variable) were used. While a coach's ability to recruit undoubtedly encompasses more factors than just these measures, it is these explanatory variables that best describe the various areas of recruiting that can be measured through statistics, such as playing for a program with heavy fan support or a team that has exhibited a history of success and playing for a team that can go deep into postseason tournaments<sup>58</sup>.

In the first regression analysis, where regular season winning percentage (Pct) was measured as the response variable, conference wins (ConW) was used as an explanatory variable. This variable was measured by simply taking the amount of wins each team had within their conference each season. This was measured to show how well a team fared within its own conference, where teams often have similar characteristics and fight for the same recruits. This variable was not included in the other two regression analysis due to the fact that while conference wins do help describe a team's ability to recruit, the overall winning percentage (Pct), where out of conference games are included, can more accurately describe a team's ability to secure recruits over conference and non conference opponents alike. In turn, the explanatory variable of regular season winning percentage (Pct) was used in the other two regression analyses measuring conference tournament wins (ConfT) and NCAA tournament wins (NCAAT).

By measuring attendance size (Att. Size), this explanatory variable was able to quantify how much fan support each team maintains. Fan support is a major factor in

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<sup>58</sup> J. Treme, R. Burrus and B. Sherrick, "The Impact of Recruiting on NCAA Basketball Success," *Applied Economics Letters*, volume 18, June 2011: 795-798

recruiting, and the teams who can maintain a higher level of support on campus tend to secure the more talented recruits<sup>59</sup>. This was measured by taking the average fan support for each home game as measured by 2005 National College Basketball Attendance as measured by the NCAA. By taking the average attendance rather than total attendance numbers, this statistic was able to minimize the error that comes from some teams playing more home games than others, as well as the introduction of neutral court games that continues to grow each year and could skew the data. Furthermore, this was able to highlight the discrepancies that exist between both larger and smaller schools and even within schools in the same conference<sup>60</sup>.

By measuring conference tournament wins (ConfT) and NCAA tournament wins (NCAAT) as explanatory variables, these regression models were able to quantify how a team's postseason success contributes to player's desire to play at a school<sup>61</sup>. The final explanatory variable within the recruiting category was NCAA tournament berths by each conference (ConfNcaaAPP). This was measured by taking the amount of teams from each conference that qualified for the NCAA tournament each season. The importance of this explanatory variable is due to the fact that teams who send more teams

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<sup>59</sup> Ibid.

<sup>60</sup> Kelly Scott, "Redesigning the NCAA Men's Collegiate Basketball Recruiting Market Using Matching Markets," *University of South Carolina Publications*, 2005

<sup>61</sup> John Fizel and Randall Bennett, "Telecasts and Recruiting in NCAA Division I Football: The Impact of Altered Property Rights," *Journal of Sports Management*, volume 10, 1996:359-372

to the NCAA tournament not only enjoy more exposure throughout the season due to their success<sup>62</sup>, but also provide increased opportunity for postseason success.

While a coach's division 1 playing experience (Div1EXP) and pedigree (Pedigree) were used to describe a coach's ability to both acquire an increased amount of knowledge prior to his first head coaching job while also acquiring enhanced methods of instituting this knowledge, these explanatory variables also pertain to recruiting. Player's obviously prefer to play for the most equipped coaches, and by exhibiting this through past experiences, these explanatory variables also enable coaches to more successfully recruit top level talent and in turn enable their teams an enhanced opportunity at on court success. All of the explanatory variables that pertain to recruiting were measured for six years, rather than just four years, due the fact that for the two years prior to where on court success was measured, coaches must stock their program with talented players. Thus, the first two years that were measured served only as an explanation to the regression analyses that were measured through each model.

In order to assemble the data to describe on court playing style, the twelve most telling statistics that describe a team's playing style were measured. These statistics included field goal percentage (OffFGPCT), defensive field goal percentage (DefFGPCT), offensive rebounds per game (OffRebAVG), offensive rebounds per game allowed (OppOffRebAVG), average turnovers per game (TOAVG), turnovers forced per game (OppTOAVG), 3 point field goals made per game (3PTMadeAVG), 3 point field goal percentage (3PtPCT), free throws per game (FT), free throw percentage (FTPCT), free throws allowed per game (OppFT) and opponents free throw percentage

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<sup>62</sup> Ibid.

(OppFTPCT)<sup>63</sup>. These statistics describe not only how effective a team is at executing a coach's game plan on the court, but also convey what areas of play a team emphasizes. For example, a team that emphasizes low post play will often shoot more free throws, whereas a team who prefers a more perimeter style will shoot more 3 point field goals. On the defensive side, a team that focuses on pressuring the ball will often force more turnovers, but do to a faster tempo within the game, will often turn the ball over more themselves.

In order to measure both field goal percentage (OffFGPCT) and defensive field goal percentage (DefFGPCT), these statistics were taken directly from the data source. However, for the data measuring the average offensive rebounds (OffRebAVG), average offensive rebounds allowed (OppOffRebAVG), average turnovers (TOAVG), average turnovers forced (OppTOAVG), average 3 point field goals made (3PTmadeAVG), average free throws (FT) and free throws allowed (OppFT), the data was rounded to the nearest whole number. While this does potentially skew the data, the differences that come from rounding these statistics were so minute that they would not significantly affect the data. For the data measuring 3 point field goal percentage (3PtPCT), free throw percentage (FTPCT) and opponent's free throw percentage (OppFTPCT), the data was taken directly from the data source.

Summary statistics for the selected explanatory variables are presented in table 3 below:

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<sup>63</sup> All statistics were taken from Statsheet.com.

Table 3  
Summary Statistics for Explanatory Variables

Variable	Obs	Mean	Std. Dev	Min	Max
log_ncaat	635	0.35	0.56	0	2.07
div1exp	635	0.62	0.48	0	1
pedigree	635	0.63	0.14	0	0.97
offfgpct	424	0.44	0.02	0.35	0.52
deffgpct	424	0.42	0.02	0.36	0.51
offrebavg	424	11.1	1.81	6	17
oppoffrebavg	424	10.98	1.35	7	15
toavg	424	13.39	1.56	8	18
opptoavg	424	13.76	1.73	10	20
ptmadeavg	424	6.03	1.27	3	10
ptpct	424	0.5	2.21	0.26	33.6
ft	424	20.05	2.79	11	26
ftpct	424	0.69	0.03	0.57	0.78
oppft	424	19.09	2.63	12	27
oppftpct	424	0.68	0.02	0.35	0.75
pct	635	0.55	0.17	0.03	0.95
confit	635	2	1.39	0	5
attsize	635	6952.54	5071.35	821	22978
confncaaapp	635	3.72	2.31	1	8

As shown in table 3, the mean for a coach's pedigree is .631, conveying that coaches who are members of successful programs tend to be the ones who are hired as head coaches. Furthermore, the mean for coach's division 1 playing experience is .623, showing that the majority of coaches played division 1 basketball, but also proving that it is by no mean a necessity in order to coach division 1 college basketball. The remaining variables yielded expected results, with miniscule differences in mean within the categories where both the team in focus and their opponents were calculated.

This chapter has presented descriptions of the data for each of the explanatory and response variables used in each of the three regression models that were used. The Ordinary Least Squares (OLS) regression model was used to test the accuracy of the

model in question and in turn the significance of each variable. The results of each regression analysis are provided in the following chapter.

## Chapter V

### Results and Conclusions

This chapter will discuss the results of the regression analyses that were presented in the previous data chapter. The first section of this chapter will focus on the results of all three regression models to depict on court success by college basketball teams and subsequently their coaches. The following section will discuss any errors in the initial regression analyses and how they were corrected. The next section of this chapter will focus on the conclusions that can be drawn from the three regression analyses. The Final section of this chapter will offer avenues for further research of this topic.

#### Results from Three Regression Models

Table 4 displays the regression results from the first regression model which focuses on the response variable of regular season winning percentage (Pct) against the explanatory variables depicting a coach's pedigree, his ability to recruit as well as the effectiveness of his in game playing style.

Table 4

Regressions Results Measuring (Pct) as Response Variable

Pct	Coef.	Std. Err	T
div1exp	1.79E-03	4.77E-03	-0.37
pedigree	5.7E-02	1.56E-02	3.64
offfgpct	1.52	0.13	11.12
deffgpct	-1.56	0.16	-9.78
offrebavg	1.23E-02	1.82E-03	6.74
oppoffrebavg	-1.07E-02	2.23E-03	-4.8
toavg	-1.4E-02	1.83E-03	-8
opptoavg	1.43E-02	1.62E-03	8.82
ptmadeavg	1.11E-02	2.12E-03	5.25
ptpct	2.83E-03	3.28E-03	0.86
ft	5.5E-03	1.12E-03	4.9
ftpct	0.22	7.57E-02	3
oppft	-6.92E-03	1.09E-03	-6.31
oppftpct	-5.86E-02	0.1	-0.54
conw	02.09E-02	1.49E-03	13.96
attsize	7.78E-08	6.51E-07	0.12
confncaaapp	6.08E-03	1.48E-03	4.09
conft	2.78E-03	2.39E-03	1.16
ncaat	2.7E-03	2.29E-03	1.18
_cons	0.12	0.1	1.16

Within this regression model, only two explanatory variables maintain significance at the 5% significance level. These explanatory variables are coaching pedigree (Pedigree) and 3 point field goal percentage (3PtPCT). These two variables fall within every category that determines coaching success. While (Pedigree) is applicable to both the recruiting and coaching education categories, it applies primarily to coaching education. By having significance at the 5% significance level, it is apparent that a coach's past history prior to becoming a head coach is extremely important when discussing his future success. The coefficient outlining (Pedigree) was .057, conveying that for every additional percentage point that a coach's pedigree increased, his regular

season win total as a head coach increased by .057. While the significance of the explanatory variable of (3PtPCT) at the 5% significance level is important, it is by no means surprising. By being able to effectively shoot the 3 point field goal, offenses then force the opposing defense to extend their coverage, in turn opening up opportunities inside the 3 point arc. The coefficient that describes (3PtPCT) was .0028, showing that for every additional percentage point that a team could make 3 point field goals, their regular season win total increased by .0028.

While these two explanatory variables effectively contribute to the argument of the most important sections of coaching and in game strategy, the explanatory variables that relate most closely to these two variables showed no significance at the 5% significance level. While (Pedigree) did prove to be essential to a coach's success in (Pct), it was proven that (Div1EXP) not only showed no significance, but actually maintained a negative coefficient of -.0017. This conveys that coaches who played division 1 basketball not only lacked in increased opportunity for on court success as a coach, they actually faced a decreased opportunity to win games during the regular season. The explanatory variable that related most closely to (3PtPCT) was (3PtMadeAVG). This proved to be insignificant at the 5% significance level. This lack of significance showed that while (3PtPCT) made a viable difference between a team's ability to win and lose in the regular season, the amount of 3 point field goals they ultimately took and made did not affect the outcome of the game. Rather, it was the threat of being able to consistently make the 3 point field goals that the offense chose to shoot that ultimately impacted a team's ability to succeed offensively, and in turn, win more regular season games.

An interesting reality within this model was that neither (ConfT) or (NCAAT) or (ConfNcaaAPP) were significant at the 5% significance level. This proved that within the recruiting aspect of coaching, the ability for a team to succeed in the postseason had very little impact on the decision of talented recruits to choose to come to that particular school. The small coefficients for these three variables of .0027 for (NCAAT), .00278 for (ConfT) and .006 for (ConfNcaaAPP) proves that while many people may consider these explanatory variables as major tools to sell a program to a recruit, they do not realistically affect that team's ability to win during the regular season in the future.

The final explanatory variable that was interesting was (Att. Size). The lack of significance at the 5% significance level for this explanatory variable showed that fan support had very little to do with recruiting success and in turn, future winning percentage in the regular season when describing schools from large and small conferences alike. The coefficient for (Att. Size) was  $7.78 \times 10^{-8}$ . This shows not only that the increase of one fan has virtually no impact on a team's regular season winning percentage, but also that the increase of thousands of fans also has an extremely small impact on a team and coach's ability to win during the regular season. Between (Att. Size), (ConfT), (NCAAT) and (ConfNcaaAPP), the four primary determinants of a coach's ability to recruit successfully, none of them proved to have any significant impact on the ability of a team to secure top level talent.

Table 5 below shows the results of the regression model measuring a coach's ability to win games in the conference tournament using (ConfT) as the response variable.

Table 5  
Regression Results using (ConfT) as Independent Variable

confT	Coef.	Std. Err.	t
div1exp	0.1	0.1	1.01
pedigree	0.19	0.37	0.53
offfgpct	7.56	3.25	2.33
deffgpct	-7.4	3.39	-2.18
offrebavg	3.77E-02	3.95E-02	0.95
oppoffrebavg	3.18E-02	4.66E-02	0.68
toavg	-0.14	4.33E-02	-3.4
opptoavg	-3.67E-03	3.87E-02	-0.09
3ptmadeavg	2.24E-02	4.73E-02	0.48
3ptpct	-1.88E-02	2.35E-02	-0.8
ft	1.79E-02	2.49E-02	0.72
ftpct	-1.72	1.59	-1.08
oppft	-2.28E-02	2.52E-02	-0.91
oppftpct	-2.32	1.88	-1.23
pct	1.92	0.8	2.39
attsize	-5.63E-06	1.45E-05	-0.39
confncaaapp	-4.29E-02	2.97E-02	-1.45
ncaat	0.24	5.28E-02	4.68
_cons	4.59	2.3	2

When discussing the explanatory variables for this regression, only one explanatory variable showed significance at the 5% Significance level. This explanatory variable was (Pct), proving that teams and coaches who had more success in the regular season typically enjoyed increased success in the conference tournament. The coefficient for (Pct) was 1.92, showing that for every percentage point that (Pct) was increased, the

amount of (ConfT) increased by 1.92. However, the lack of any other significant explanatory variables could be attributed to the fact that within conference tournaments, upsets by lower ranked teams are far more common due to the familiarity that exists within teams in the same conference. Every team in each conference plays each other at least once during the regular season, many times with teams playing each other twice. This allows teams to better prepare themselves for each potential matchup, and in turn, decreases the advantages teams may enjoy in either talent or execution.

The only explanatory variable with an interesting coefficient for this model was the variable of (Att. Size). The coefficient for (Att. Size) was  $-5.63 \times 10^{-6}$ , which showed that while miniscule, the more fans that attended games for a team during the regular season actually deterred the team from winning in the conference tournament. While this variable was not significant at the 5% significance level, this coefficient is still extremely hard to explain and may fall within the error term for this regression.

Table 6 below shows the results of the regression model measuring the response variable of a coach's ability to win NCAA tournament games (NCAAT) against all of the explanatory variables.

Table 6

Regression results Measuring (NCAAT) as Response Variable

log_ncaat	Coef.	Std. Err.	t
divlexp	-7.02E-03	3.0E-2	-0.19
pedigree	-8.9E-02	0.11	-0.78
offfgpct	7.73E-03	1.13	0.01
deffgpct	-0.52	1.21	-0.43
offrebavg	9.28E-03	1.0E-2	0.69
oppoffrebavg	-4.66E-02	1.59E-02	-2.93
toavg	-1.65E-02	1.53E-02	-1.08
opptoavg	2.02E-03	1.4E-02	0.14
ptmadeavg	-3.13E-02	1.66E-02	-1.88
ptpct	-1.6E-03	2.32E-03	-0.69
ft	-1.86E-04	8.65E-03	-0.02
ftpct	0.97	0.59	1.62
oppft	1.0E-02	8.56E-03	1.19
oppftpct	-0.64	0.57	-1.13
pct	1.54	0.26	5.75
conft	0.09	1.68E-02	5.6
attsize	1.5E-05	5.76E-06	2.61
confncaaapp	2.64E-02	1.05E-02	2.49
_cons	-0.24	0.76	-0.32

Within this model, two separate explanatory variables were significant at the 5% significance level, (Att. Size) and (ConfNcaaAPP). These two explanatory variables are

extremely important in explaining which coaches are ultimately successful due to the fact that these two variables convey that it is usually the larger schools from bigger conferences that tend to succeed most in the NCAA tournament. Furthermore, these two explanatory variables fall within the category of a coach's ability to recruit talented players, proving that in the NCAA tournament, recruiting is king when discussing success. This can be attributed to the fact that at the highest levels of college basketball, it is the coaches from the biggest conferences that are able to acquire the premier talent that are ultimately able to succeed on college basketball's biggest stage.

The coefficient for (ConfNcaaAPP) was .026, showing that for every team from each conference that qualified for the NCAA tournament, every other team from that conference that qualified for the NCAA tournament maintained a .026 increase in (NCAAT). However, the most telling coefficient was (Att. Size). The coefficient for (Att. Size) was .000015. While this number seems small when discussing a small number of fans, if you figure an increase of thousands of fans between one college to another, it considerably impacts the amount of wins in the NCAA tournament for that team. This coefficient for (Att. Size) was extremely enhanced in this model in comparison to the coefficients for the same explanatory variable in the other regression models. This statistic reiterates the idea that coaches at larger schools are more able to secure the premier talent in the country and in turn win games against the highest level of competition. While these explanatory variables do not necessarily speak to a coach's knowledge of the sport or ability to institute successful game plans, they do speak to top level coaches' ability to use the advantages that their schools enjoy in order to position their teams to be most able to compete against other successful college teams.

Two interesting coefficients among explanatory variables that were not significant at the 5% significance level were (Pedigree), (Div1EXP) and (3PtPCT). Both (Pedigree) and (Div1EXP) maintained negative coefficients of  $-.089$  and  $-.007$  respectively. These negative coefficients show that if a coach played division 1 college basketball or had a higher pedigree as an assistant coach, those coaches were actually less apt to succeed in the NCAA tournament. By proving this fact, this model shows that a coach's prior experiences before their first division 1 head coaching job actually have little to do with their success as a coach on a national stage. By having a negative coefficient of  $-.0016$  for the explanatory variable of (3PtPCT), this model shows that a team's ability to shoot the 3 point field goal in the NCAA tournament does not only fail to enhance a coach's ability to increase (NCAAT), but in fact decreases that coach's ability to win in the NCAA tournament.

#### Corrected Errors

Throughout these regression models, two major problems presented themselves. The first was the issue of heteroskedasticity. This issue was apparent in the third regression model where (NCAAT) was used as the response variable. In order to discover this issue, the White Test was conducted. However, after discovering this issue, the third regression model was run with robustness and the results were barely affected. While this issue of heteroskedasticity was a problem, once the third regression model was run with robustness and the results were barely affected, there was no reason to worry about the integrity of the regression model.

The second problem also existed in the third regression model where (NCAAT) was used as a response variable. This issue showed multicollinearity between (NCAAT) and (ConfT). This was to be expected due to multiple reasons. First, within the smaller conferences where far fewer teams reach the NCAA tournament, it is imperative for those teams to be successful in their respective conference tournaments in order to qualify for the NCAA tournament. Furthermore, some of these conferences are only positioned to place one team in the NCAA tournament due to a weak talent level within the league, and then a direct correlation would exist between (ConfT) and (NCAAT). In order to show this issue of multicollinearity, the adjusted chi squared was measured and revealed a result of 7.86, far above the desired maximum chi squared value of 5.99. In order to correct this, a regression model that did not include (ConfT) as an explanatory variable could be run in order to more effectively show the significance of the explanatory variables when using (NCAAT) as a response variable.

### Conclusions

Within these three regression models, there is an obvious variation in the importance of each regression. While using (ConfT) as a response variable does offer valuable insight into a coach's ability to succeed in the postseason, the small sample size combined with the small field of competition in each individual conference only allows this regression model to offer limited insight into the success factors of coaches in comparison to the regression models measuring (Pct) and (NCAAT). The regression model where (Pct) was used as a response variable more accurately measured a coach's success rate on a fair level, further discounting the top level programs ability to obtain

supreme level talent. Since the smaller conference schools primarily play other small schools, the disparity in talent between smaller programs and college basketball's elite programs was not heavily factored into the regression. On the other hand, the regression model that used (NCAAT) as the response variable measured a coach's ability to succeed on the national stage by comparing only the best programs, and discounting many of the smaller schools that could not qualify for the NCAA tournament. This regression model conveyed what it takes for a coach to succeed regardless of the level of the competition that exists within their conference where many conference opponents occupy the majority of a team's regular season schedule.

The explanatory variables that proved to be significant at the 5% significance level varied widely between model 1 and model 3. In model 1, both (Pedigree) and (3PtPCT) proved to be significant at the 5% significance level. The significance of (Pedigree) showed that a coach's prior knowledge of both how to coach successfully and his ability to impress recruits with his past experiences were major factors in a coach's ability to win during the regular season<sup>64</sup>. Within that coach's playing style, his ability to have his team have a high (3PtPCT) enabled his offense to be more successful and in turn, score more points. However, neither of these factors contributed significantly into a coach's ability to succeed in increasing his team's (NCAAT). Rather, a coach's ability to succeed in increasing his team's (NCAAT) was only effected by the explanatory variables of (Att. Size) and (ConfNcaaAPP) that were significant at the 5% significance level. The reasoning behind this is due to the fact that (Pct) is often measured against

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<sup>64</sup> John Kendrick, Productivity Trends in the United States (Princeton: Princeton University Press. 1961). 111.

lesser and average teams, where a coach's increased knowledge of the game and ability to execute offensive strategy is highlighted more so than their simple ability to recruit talented players.

This idea can be attributed to the growing parity that exists between college basketball teams. In past decades, there has been an influx of more talented players to smaller schools, thus downplaying the advantages some of those programs would enjoy in talent over other similarly sized schools. However, there will always be a disparity between good or very good talent and supreme talent. With a few exceptions, only the top level teams and coaches that are members of an established basketball history within a school's program are able to acquire that supreme level talent. Thus, when discussing the NCAA tournament, where the best teams from every conference match up against each other, it is primarily the coaches and teams who are able to secure this supreme talent through having a high (Att. Size) and playing in conferences that consistently produce high (ConfNcaaAPP) that can compete at the highest level. It is no surprise that the blue blood programs such as Duke, North Carolina, Syracuse, and Michigan State consistently make it to the final four, whereas smaller schools who may be successful during the regular season such as Wichita State, Murray State and Davidson only rarely are able to produce noteworthy levels of (NCAAT).

While both of these regression models are successful in showing how coach's succeed in each respective category, one must decide which is ultimately the most important when deciding what truly makes a coach successful. While regular season winning percentage is very important when determining the success of a coach, on the highest level, it is what a coach does in the NCAA tournament that ultimately dictates his

legacy. When discussing the BCS conferences, which are undoubtedly the premier conferences in America, coaches are measured primarily by their NCAA tournament success. Furthermore, it is these jobs that coaches strive to obtain, as in any profession, people desire to work for the premier companies with the greatest opportunity for success and the largest paychecks. Due to this fact, the regression model measuring (NCAAT) was weighed most heavily in the final conclusions.

As a result of factoring in the regression model measuring (NCAAT) over the other two regression models, it is clear that it is a coach's ability to recruit supreme level talent into a program that ultimately dictates whether a coach is successful or not. Since (Pedigree) is not significant in this regression, it is clear that a coach's past coaching history prior to becoming a head coach does not have a significant effect on how successful that coach becomes. While many of the advantages top level coaches maintain are due to the realities of their program and not so much their own ability as a coach, this does not discount the fact that it is their ability to exploit these advantages that is the determining factor between success and failure. Just being a coach at a top level program does not automatically lead to success. As Billy Gillespie proved at the University of Kentucky, one of, if not the premier program in college basketball, coaches must still be able to effectively use these advantages that are at their disposal or else they are doomed to failure, just as Coach Gillespie was at Kentucky.

#### Further Research

There are many different avenues in which research on this subject can be expanded. When discussing playing style, one could measure the differences between

certain playing styles. The differences between basketball philosophies are an extremely large topic base, but one could measure the effectiveness of coaches who employ zone defense versus those who employ man. Furthermore, one could form a regression analysis on the effectiveness of teams who choose to employ full court pressure versus those who tend to play half court defense. On the reverse side of the ball, there are a multitude of different offenses that coaches employ effectively. An effective economic analysis of college basketball playing styles could also focus on teams who play one style of offense versus another and their subsequent offensive efficiency.

Within the recruiting category, there are also a number of different regression analyses that could benefit this study. An economic analysis on where teams choose to recruit players could serve a large purpose in aiding this study. Many teams generally try to recruit players in their own geographic region, however, a study measuring the success of teams who choose to recruit players on a more national basis versus those who tend to stick to their own geographic region could produce very effective results. Furthermore, factoring in teams who choose to recruit players from junior college could help provide a more detailed analysis on the effectiveness of a coach's decisions on how to choose his players.

When discussing a coach's past experiences in predicting the upcoming success or failure, one could look into the attrition rate of head coaches. More specifically, one could look into the success rates of coaches on their first head coaching job, their second head coaching job and so on, using either (Pct), (ConfT) or (NCAAT) as a response variable, or using any other available measure of a coach's success rate.

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