COMPETITIVE BALANCE IN NCAA DIVISION I MEN'S BASKETBALL AND
THE INTRODUCTION OF ARTICLE X TO THE NBA'S COLLECTIVE
BARGAINING AGREEMENT

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COMPETITIVE BALANCE IN NCAA DIVISION I MEN'S BASKETBALL AND
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Economics

Abstract

In the year 2005 the National Basketball Association (NBA) implemented a new policy to its collective bargaining agreement (CBA). This new policy, Article X, said that a player entering the NBA draft must be at least 19 years old and a calendar year has passed since his graduation from high school for him to be eligible to enter the NBA Draft. This new policy forced many talented high school athletes to attend one year of college before entering the professional game, hence the "one and done rule." This influx of talented freshman into college basketball may have shifted the competitive balance of NCAA Division I men's basketball. A cross sectional time series analysis is used to investigate this claim, that the introduction of Article X affected the competitive balance of college basketball. The deviation of the Herfindahl-Hirschman Index of average conference winning percentage is used as the dependent measure of competitive balance in the regression equation. The main purpose of this study is to discover whether competitive balance in collegiate sports is affected by policies of their professional counterparts.

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CHAPTER I

INTRODUCTION

In the year 2005, the National Basketball Association (NBA) implemented a new policy, Article X, to their collective bargaining agreement (CBA). Article X states that new players entering the NBA draft must be at least 19 years of age during the calendar year in which the Draft is held. Also, at least one NBA season must have elapsed since the player's graduation from high school (or a year after their graduating class graduated).[1] This new policy forced many top High School basketball players prospective to the NBA to attend one year of college before entering the Draft. The slang term for this rule is the "one and done rule." At a first glance, it appears that these new recruits typically choose to attend the large schools in "power conferences." This hypothesis asks whether or not the introduction of Article X to the NBA's CBA in 2005 has changed the competitive balance of the National Collegiate Athletic Association's (NCAA) division 1A men's basketball (college basketball).

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[1] "ARTICLE X - PLAYER ELIGIBILITY AND NBA DRAFT." *National Basketball Player's Association*. Web. 15 Feb. 2011. <http://www.nbpa.org/cba/2005/article-x-player-eligibility-and-nba-draft>.

The NBA introduced Article X to their CBA because the NCAA felt that too many young players passed up an education to be selected in the NBA Draft, as FIGURE 1.1 shows. Also, if the owner's could have more time to scout a player, those franchises would gain a better feel for the athletic potential and personal character of their scouted player. Originally, the NBA's only criteria for entering the NBA Draft, which was established in 1947, was that a player could enter the draft out of High School, but the player must wait until their college class had graduated until he could play in a game. In 1971, this rule changed when Spencer Haywood sued the NBA for denying him entry into the league before his graduation from college. The Supreme Court tried this case and ruled in favor of Haywood. The Court decided that a player could enter the NBA before the graduation of his college class if his family's financial hardships were forcing him to leave college early to earn extra income for his family. In 1975, however, the NBA dropped their financial hardship criteria for early entry to the NBA allowing anyone to leave college before the graduation of their class[2].

From 1976 until 1994, 18.1% of draftees were foreign players and early entrants, or players who entered the NBA draft before they were college juniors, while 79.5% of draftees were college juniors. In 1995, the NBA introduced a three-year rookie pay scale to their CBA. This implementation meant that rookies entering the NBA had set salaries for the first three years of their careers and franchises that drafted them owned their rights and could risk drafting a player

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[2] Groothuis, P. A., J. R. Hill, and T. J. Perri. "Early Entry in the NBA Draft: The Influence of Unraveling, Human Capital, and Option Value." *Journal of Sports Economics* 8.3 (2007): 223-43. Print.

with less experience because the teams had three years to develop their rookies.[3]

Many owners took advantage of the risk cushion that the NBA provided in the form of the rookie pay scale. Because of this change, from 1995 until 1997, 44% of first round draft picks were early entrants or foreign players and only 20% of first round picks were college juniors. Four High School players were also drafted in the first round due to this implementation. These statistics show that the introduction of the three-year rookie pay scale caused the owners and franchises to take chances drafting younger and less developed players.

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[3] Groothuis, P. A., J. R. Hill, and T. J. Perri. "Early Entry in the NBA Draft: The Influence of Unraveling, Human Capital, and Option Value." *Journal of Sports Economics* 8.3 (2007): 223-43. Print.
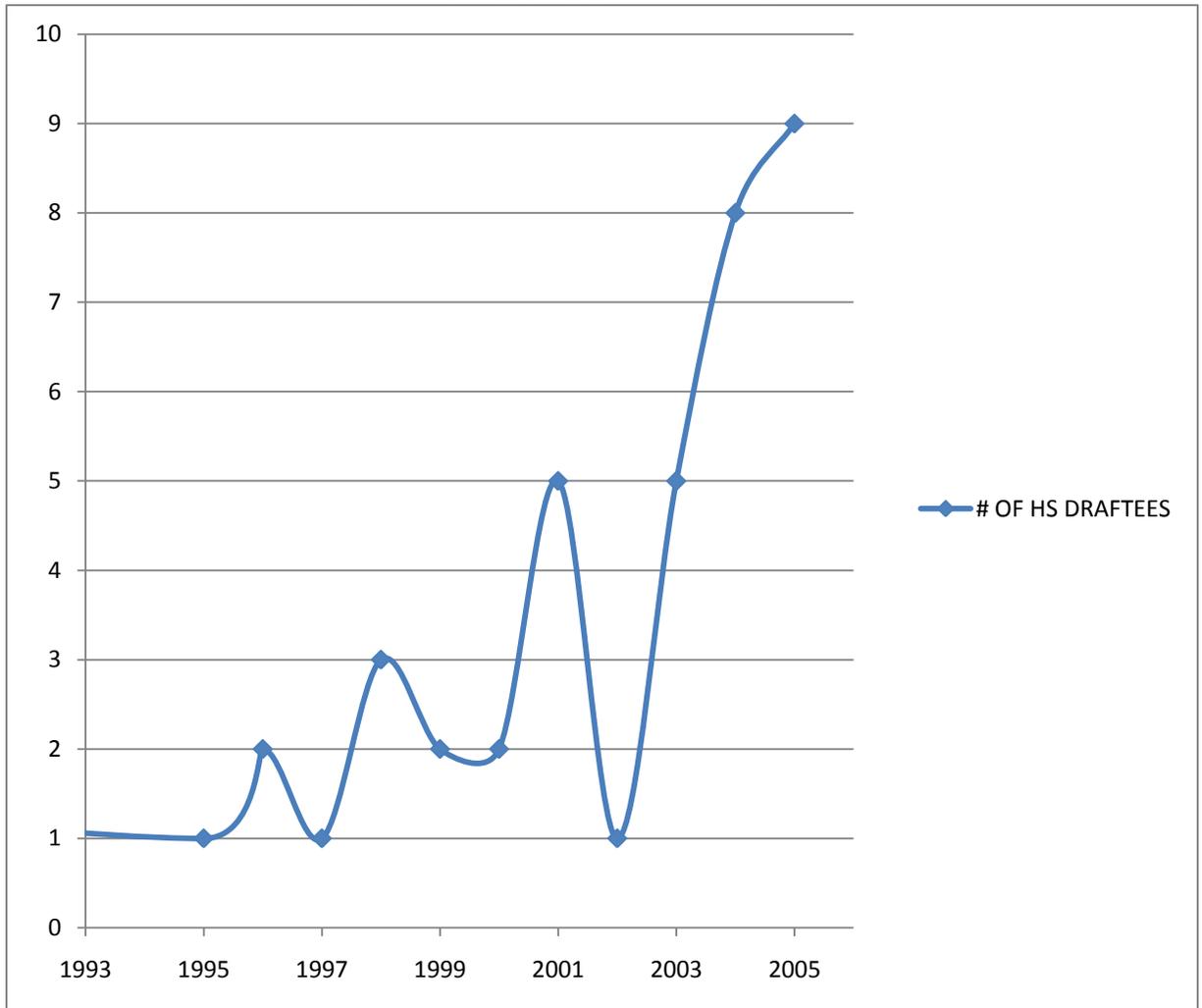
FIGURE 1.1

NUMBER OF HIGH SCHOOL DRATEES IN NBA DRAFT

SOURCE: "NBA High School Draftees." *Wikipedia, the Free Encyclopedia*. Web. 08 Apr. 2011. <http://en.wikipedia.org/wiki/NBA_high_school_draftees>.

The NBA renegotiated the CBA in 1999. In the new version of the CBA, the league lowered the amount of money rookies could receive given their three-year pay scale. The league also added on an optional extension of a fourth year added to the three-year rookie pay scale. Lowering the mandatory three-year

payroll for rookies in the NBA not only caused owners to take more chances on early entrants, but enticed players to enter the NBA earlier in their basketball career.[4] Players strived to join the league earlier because every player had to play three to four years with a set payroll before they could renegotiate their contracts, or become free agents. Therefore, from 1998 until 2004, 74% of first round draft picks were early entrants or foreign players and only 23% of draftees were college juniors. Also, there were three High School athletes drafted in 1998 and by the 2005, nine High School athletes were drafted.[5] This significant increase in the number of early entrants and High School players to the NBA forced the league to rethink their policy on allowing younger athletes to enter the NBA directly out of High School. When the NBA added Article X to their CBA in 2005, top High School prospects were required to attend at least one year at a University before they could become professional basketball players. These top recruits would most likely will leave college and join the NBA after their first year in school, so it would seem that they would choose to attend a school that would best prepare them for the professional game.

This idea about college players preparing for the NBA while in college brings up an interesting question. What prepares a player to play in the NBA? Some economist argue that coaches, teammates, facilities and media coverage all help prepare a collegiate player for the NBA.[6] Others believe that the competitiveness of a program can determine whether or not a top player chooses

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[4] Ibid.

[5] Ibid.

[6] Baird, Katherine. "Dominance in College Football and the Role of Scholarship Restrictions." *Journal of Sports Management*. 18. (2004): 217-35. Print.

to attend that program.   A definition and measurement of competitiveness is crucial to understand why players choose to attend more competitive programs. First, the competitive value of a team is based on how a particular team compares to the rest of the league. The league's measure of competitiveness is called competitive balance. The competitive balance of a sports league is a numeric value that explains the distribution of competitiveness through the league. Winning percentages, number of championships, attendance at games, enrollment in the school, and revenue that is brought in by each program can affect the competitive balance. These demonstrative variables create a measure of competitive balance for the entire league. The competitive balance of a league can be used to predict future fan attendance, monetary success, and what schools are most likely to make the NCAA tournament at the end of the year.

The rest of this paper examines whether or not the introduction of Article X to the NBA's CBA in 2005 has changed competitive balance in college basketball. The next section focuses on literature pertaining to competitive balance, competitive balance in college sports, and policy changes effecting competitive balance. The following section is devoted to the data and variables that explain the competitive balance of college basketball. The fourth and fifth sections outline the regression models used to calculate the change in competitive balance, as well as the results of those regressions. The final section of the paper concludes my analysis and gives suggestions for further research.

CHAPTER II

LITERATURE REVIEW

Introduction 2.1

The purpose of this chapter is to review literature pertaining to
competitive balance in sports.   More specifically, the literature focuses on
competitive balance in men's Division 1 NCAA basketball (college basketball).
The National Basketball Association's (NBA) collective bargaining agreement
(CBA) in the year 2005 added Article X.   Article X states that a player entering
the NBA draft must be at least one year out of high school, or one NBA season
must elapse after the player has graduated from high school.   The introduction of
Article X to the NBA's CBA could have effected the competitive balance in
college basketball.   The literature on competitive balance in professional sports is
abundant and there are many different focuses regarding the topic of those papers.
In the first section of the literature review, competitive balance is observed to
give an overview of what competitive balance is in an industry and how it is
used in professional sports.   In the next section, changes in competitive balance
due to policy changes in professional sports will be examined.   Later, competitive

balance and collegiate sports will be looked at and the literature review will end with changes in competitive balance in collegiate athletics due to a policy change.

COMPETITIVE BALANCE IN SPORTS 2.2

Competitive balance is a widely discussed topic in sports economics. Papers written on the subject range from the measurement of competitive balance to its determination of the success of a sports league. Competitive balance is easily measured in professional sporting leagues because of the vast amount of data that has been collected since these sports started tracking statistics. The methods used to calculate competitive balance in professional sports are consecutively the most accurate. Competitive balance across a sports league is not perfect a majority of the time. There are usually some teams that dominate while others are perennial losers. Rottenberg states, "the nature of the industry is such that competitors must be of approximately equal 'size' if any are to be successful, this seems to be a unique attribute of professional competitive sports,"[7] addressing factors that cause a league to be in competitive balance. When Rottenberg's statement is applied to collegiate athletics, presumably the larger the school, the stronger their athletic programs will be. This is not true, however. In fact, there are many schools whose enrollment is very small, but their endowment quite is large. This occurs because there are stronger traditions of athletics at

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[7] Sanderson, Allen, and John Siegfried. "Thinking about Competitive Balance." *Journal of Sports Economics*. 4.255-279 (2003): 255-279. Print.

these schools in which alumni donate more money and more money is made in sponsorships.

To understand Rottenberg's idea when applied to collegiate athletics, a definition of size is crucial. One definition could refer to the population of the undergraduate student body. Another could refer to the amount of people employed by the college. A third definition could regard the amount of the money that the school spends on athletics. A fourth could relate to the amount of booster alumni from the school. Therefore, Rottenberg says that if every school, program, or professional club had the same resources, all teams would be equally competitive and there would be a perfect competitive balance in their respective leagues.

The geographical variation in potential profit within the league is one reason why sports leagues may not be competitive[8]. Therefore, the more money a geographical area can make through the sports team, the more competitive that sports team will be. Combining Rottenbergs equal size theory and the theory of a sports league will determine that the larger the gross domestic product of an area, the stronger the sports team will be. Also, studies show that the more decentralized a league is, the more competitive imbalance that league will have; the higher revenue teams win more often than the lower revenue teams[9]. The decentralization of the league means that the farther away teams are from the

[8] Fort, Rodney, and Young Hoon Lee. "Structural Change, Competitive Balance, and the Rest of the Major Leagues." *Economic Inquiry*. 45.3 (2007): 519-32. Print.
[9] Fort, Rodney, and James Quirk. "Optimal Competitive Balance in Single-Game Ticket Sports Leagues."*Journal of Sports Economics*. 10.1177 (2010): 1-16. Print.

mean for factors such as revenue, fan base, leaders in statistical categories, and other examples, the more variation there is between the competitiveness of each team.

In a sports league that uses revenue sharing as a tool to increase the competitive balance of the league, three factors can affect the competitive balance of the league. The first factor is the cost functions of talent investments, the next is the clubs' market sizes, and the last is the initial endowments of talent stock[10]. The first factor says that the players drafted or recruited into the league play a large role in how well teams compete during a season. The second factor says that a team's market size can play a role in how competitive that team is in their league because the larger the market size is, the larger the potential profit is for a team and that will increase the programs incentives to win. The third factor says that players already in the league have an effect on the competitive balance of the league; if these players aren't evenly distributed between each team in the league, the league will suffer a decrease in competitive balance. The more concentrated the talent is on a particular team in the league, the less competitive that league will be overall[11]. For example, if one team has the majority of the best offensive players in the league, they will be a much better team than a team with only a few offensive weapons.

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[10] Grossmann, Martin, Helmut Dietl, and Markus Lang. "Revenue Sharing and Competitive Balance in a Dynamic Contest Model." *Spring Science+Business Media, LLC*. 36.10 (2010): 17-36. Print.

[11] Larsen, Andrew, Aju Fenn, and Erin Leanne Spenner. "The Impact of Free Agency and the Salary Cap on Competitive Balance in the National Football League." *Journal of Popular Economics*. 7. (2006): 374-90. Print.

With the information on competitive balance that was previously stated, an optimal level for the competitive balance of a sports league can be boiled down to three elements. The first is the distribution of fans preferences, the next is fan population base, and finally, fan income across host cities[12]. This reference for the optimal level of competitive balance in a sports league can be used to describe what the determinants are for a perfectly competitive league, professional or college.

Major League Baseball (MLB) is the most statistical sport studied in sports economics, and researchers have found that three main factors affect competitive balance in MLB. The first factor is the equalization of population centers, the next is game diffusion on TV, the last is the internationalization of talent pool[13]. Equalization of the population centers reinforces the point stated above that host cities need to be of about equal gross domestic product for them to be competitive. The second factor, game diffusion on TV, says that the more a team is on national television, the more money they will bring in for the program. But, TV contracts also can influence competitive balance by creating incentives. The NFL relies on television contracts for a large section of the revenue for the league. The league has a game of the week, Monday Night Football, and the closer and more competitive the games, the more fans will tune in to watch. Therefore, the NFL's TV contract promotes a more competitive league.

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[12] Zimbalist, Andrew. "Competitive Balance in Sports Leagues: An Introduction." *Journal of Sports Economics*. 3.111 (2002): 111-21. Print.
[13] Fort, Rodney, and Young Hoon Lee. "Structural Change, Competitive Balance, and the Rest of the Major Leagues." *Economic Inquiry*. 45.3 (2007): 519-32. Print.

On the other hand, MLB and the NHL rely on gate receipts and individual broadcasting contracts as a main source of revenue for each team. For example, in MLB the Colorado Rockies have an entire network dedicated to their games and analysis of the Rockies program. No other team in MLB sees the benefits from "F.S.N. Rocky Mountain" (Fox Sports Network Rocky Mountain) other than the Colorado Rockies. This individual team network means that the Rockies are not concerned with the successes or failures of the other teams. When the Rockies have a winning season they will have a stronger following than if they have a losing season. With the incentives introduced by the league's contract with broadcasting rights, the competitive balance in the league will fall[14]. MLB has introduced a game of the week, Sunday Night Baseball, to try to mimic the success of the NFL's strategy, but the teams that play in these games are either divisional leaders or historic rivals. Therefore, the smaller and weaker teams will not receive as much revenue as the larger and stronger teams increasing the competitive imbalance in the sport[15].

When applying this idea of television rights effecting competitive balance to collegiate athletics, teams and programs usually only play on local networks. A major network will then have two or three games on a night between only the top athletic schools that have a large and consistent following. These television rights' effect on competitive balance in collegiate athletics has a similar effect as it does in MLB and the NHL because teams do not automatically get television

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[14] Maxcy, Joel, and Michael Mondello. "The Impact of Free Agency on Competitive Balance in North American Professional Team Sports Leagues." *Journal of Sport Management*. 20. (2006): 345-65. Print.

[15] Fort, Rodney, and Young Hoon Lee. "Structural Change, Competitive Balance, and the Rest of the Major Leagues." *Economic Inquiry*. 45.3 (2007): 519-32. Print.

time; they must earn it by being a top athletic program in the country. Therefore, collegiate teams do not care how other teams in the NCAA are doing because they only see benefit from television when they are a winning program.

TV and other forms of media have increased the world wide popularity of the sport. This increase in popularity throughout the world has caused an increase in the number of people playing the sport worldwide; this occurrence is also known as the internalization of the talent pool, which determines a larger amount of abilities of players. Therefore, the greater number of more talented players will replace the weaker players in the league causing competitive balance to rise. In sports, the talent supply is elastic[16], which means that for every person that leaves the league, there is at least one new prospect entering the league who's skill is greater than or equal to the average skill level of the league. Usually, the new talent entering the league forces the overall talent level to rise. From the points above, it is obvious that as the size of the talent pool increases, the competitive balance of the sport will also increase[17].

As the team sport of basketball has grown in world popularity the NBA should have an increase in competitive balance due to the increase in size of the talent pool. However, this theory is not true because of the short supply of tall people. There are only a very select portion of adult males who are tall enough to play in the NBA. The average height of a NBA player is 6' 6.98" (as of

[16] Grossmann, Martin, Helmut Dietl, and Markus Lang. "Revenue Sharing and Competitive Balance in a Dynamic Contest Model." *Spring Science+Business Media, LLC*. 36.10 (2010): 17-36. Print.
[17] Schmidt, Martin. "The nonlinear behavior of competition: the impact of talent compression on competition." *Journal of Popular Economics*. 22. (2006): 57-74. Print.

2007)[18] while the average adult male is closer to 5' 7". This height deficit poses the problem that there are only a very select number of people who are physically able to play at the highest level, even though basketball is the third most popular team sport in the world. The productivity of an average guard (the average guard's height in the NBA is between 6' and 6'3") in the NBA is less than the standard deviation of the average big man's productivity because more guards play the game than people above 6' 6".

A perfect example is the productivity of one of the greatest centers of all time in the NBA, Shaquille O'Neal (career points per game 24.1), compared to an above average center Vlade Divac (career points per game 11.8)[19]. Vlade Divac had his number (21) retired by the Sacramento Kings.[20] That means that he was one of the greatest players to ever play for that organization, but when his points per game is compared to one of the greatest centers of all time, it is seen that Divac was not even close to as talented as O'Neal. The difference between the productivity, measured in points per game, between Divac and O'Neal shows how size really does count in the NBA and in all levels of basketball.

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[18] "NBA.com - 2007-08 Player Survey: Height." *Where Amazing Happens. | NBA.COM*. Web. 08 Apr. 2011. <http://www.nba.com/news/survey_height_2007.html>.

[19] Berri, David, Stacey Brook, Bernd Frick, Aju Fenn, and Roberto Vincente-Mayoral. "The Short Supply of Tall People: Competitive Imbalance and the National Basketball Association." *Journal of Economic Issues*. 39.4 (2005): 1029-1041. Print.

[20] "Vlade Divac." *Wikipedia, the Free Encyclopedia*. Web. 08 Apr. 2011. <http://en.wikipedia.org/wiki/Vlade_Divac>.

A talented big man has the ability to boost an average team to a great team, but finding one is not that simple because athletic and coordinated people above 6'6" are rare to come by. This lack of resources causes a drop in competitive balance because not all teams can afford, or are even lucky enough, to have a talented big man on their team. In collegiate athletics a talented big man is even rarer to come by because most players of that size are still developing and growing into their bodies at that age. If a team has a talent big man, they have a greater chance of being a much more competitive team. These talented post players in the NCAA would have gone straight to the NBA before the introduction of Article X to the collective bargaining agreement.

Similar to the misconception of some fans and owners in the NBA that height alone wins championships, in MLB, there is a misconception from the fans, managers, owners, and players that in order to win, a team must outspend their opponents. This common misconception is a reflection of the tremendous cost of constructing a decent MLB team. Researchers have studied the relationship between competitive balance and costs in MLB to determine if there is a relationship between the two. At first glance of the data, there seemed to be a statistical relationship between wins and measures of revenue and expenditures. After further analyzing the data, researchers found that there is no consistent relationship between competitive balance and cost or revenues[21]. The results of the New York Mets in recent years demonstrate this last point. The Mets have

[21] Schmidt, Martin, and David Berri. "Competitive Balance and Market Size in Major League Baseball: A Response to Baseball's Blue Ribbon Panel."*Review of Industrial Organization*. 21. (2002): 41-54. Print.

dramatically increased their monetary spending in an attempt to compete as their cross-town rivals, the New York Yankees, have. So far, the Mets have failed to become a more competitive team because of their increased spending. In collegiate athletics, some schools spend a lot more money on commodities that make their players more comfortable such as televisions, locker rooms, tutors, weight rooms and other non-athletic aspects of the school. These commodities, however, do not necessarily translate to the competitiveness of players on the court.

PRO SPORTS AND POLICY CHANGES 2.3

Measuring changes in competitive balance due to a policy change in a sports league has become a new area of study since professional leagues have changed many of their rules and regulations during their collective bargaining agreements. For example, in the late 80's, the Olympic committee changed a rule to say that professional athletes in the United States could compete in the Olympics. This new rule made it possible for European and American hockey players to play in the NHL while still being able to represent their country in the Olympic Games. This influx of European players to the NHL greatly increased competitive balance in the league because the talent pool that the league could draw from increased[22]. This Olympic policy change is very important because it

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[22] Fenn, Aju, Peter Von Allmen, Stacey Brook, and Thomas Preissing. "The Influence of Structural Changes and International Players on Competitive Balance in the NHL." *Atlantic Economic Journal*. 33. (2005): 215-24. Print.

proves that it is possible for a policy change, coming from a source outside a league, can have an effect on the competitive balance of that league.

The NHL experienced a league expansion in the 1967-68 season in which the league added six new franchises. After the introduction of those six new teams, the competitive balance in the NHL fell[23]. The arrival of the new franchises opened up six teams worth of roster spots that needed to be filled with players that were not in the league at the time. These players entering the league were not as good as the current players in the NHL at that point in time because the talent pool for the NHL was not large enough to accommodate the six extra teams. If the talent pool increases, the competitive balance increases along with it, but if the talent pool decreases, or there are more roster spots to fill than the talent pool can handle, then competitive balance decreases. With less skilled players entering the NHL, there became a larger gap between the more talented players and the less talented players, which spread out the talent in a league and caused more competitive imbalance[24]. The talent pool for NCAA basketball is not nearly large enough to support the over three-hundred Division 1 teams. This deficit causes a large amount of competitive imbalance in NCAA Division 1 men's basketball.

Sport leagues have used an amateur draft to try to improve the competitive balance and shorten the turnover rates for the leagues. The amateur draft works

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[23] Ibid.

[24] Larsen, Andrew, Aju Fenn, and Erin Leanne Spenner. "The Impact of Free Agency and the Salary Cap on Competitive Balance in the National Football League." *Journal of Popular Economics*. 7. (2006): 374-90. Print.

by giving teams in a league a draft order, usually reverse order of their end of season standings from the year before, and these teams select amateur players to play for their franchises. MLB introduced their amateur draft in 1965; that policy change is consistent with the improvement in competitive balance of MLB[25]. The NHL introduced the reverse order draft in the 2005-06 season. This policy change had no effect on the competitive balance of the league and that result is consistent with the Coase Theorem[26]. The Coase Theorem states that player movement has no effect on the competitive balance of a sports league. One reason why the amateur draft had no effect on competitive balance in the NHL is because the teams needed time to develop their draftees before they are ready to become impact players for their team[27]. A player entering the NHL does not have the experience and knowledge of the game as a seasoned player. The rookie has to be given a few growing years to become a more successful player. Now, because the incoming players take a few years to develop, there is more pressure on the owners and organization to develop these players faster to gain a competitive advantage over their competitors. Owners do not want the player that they worked so hard to buy, and spent so much money developing, to become a free agent and get signed by their rival team, so owners believe that the players should have less personal rights in their contracts.

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[25] Maxcy, Joel, and Michael Mondello. "The Impact of Free Agency on Competitive Balance in North American Professional Team Sports Leagues." *Journal of Sport Management*. 20. (2006): 345-65. Print.

[26] Fenn, Aju, Peter Von Allmen, Stacey Brook, and Thomas Preissing. "The Influence of Structural Changes and International Players on Competitive Balance in the NHL." *Atlantic Economic Journal*. 33. (2005): 215-24. Print.

[27] Ibid.

Owners think that players should have less personal rights in their contracts for two other reasons. The first is that owners and managers believe that restrictions are necessary for maintaining and enhancing competitive balance in the league. The next reason is that player salaries are kept under control, which helps maintain financial stability for both the league and the teams[28]. The second of those two points clarifies that with more financial stability, the leagues can focus more on how to allocate their resources to improve competitive balance and league efficiency and less on reallocating resources to combat fluctuating costs. This stability will help the league if the league and the teams are willing to play together to create a way to share the saved costs to improve the competitiveness for all of the teams. The first point says that restricting player rights will increase competitive balance directly; that is unproven in the NHL. In collegiate athletics, players have even less rights than they do in the professionals, and the lack of player movements in NCAA basketball suggests that the restrictions for moving from one program to another is more severe than most players are willing to pay.

Free agency is another tool that sport leagues use to try to improve competitive balance. Free agency is a term used to describe a player's employment status when that player's contract ends and he decides not to sign an extension with his original team. When he becomes a free agent, teams are now allowed to bid for his services and the player gets to choose where he would like

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[28] Maxcy, Joel, and Michael Mondello. "The Impact of Free Agency on Competitive Balance in North American Professional Team Sports Leagues." *Journal of Sport Management*. 20. (2006): 345-65. Print.

to go. The NHL added free agency to their collective bargaining agreement in the 2005-06 season and its introduction has had no effect on competitive balance of the league. This result is also in tune with the Coase Theorem because players will play for the team who values their talents the most regardless of that team's location, past success and future promises for success[29]. The NFL, on the other hand, implemented free agency after the 1993 season and due to the new policy, the competitive balance in the league has increased[30].

MLB introduced free agency in the 1970's and since its implementation, there has been a significant improvement in the competitive balance of the league. Competitive balance peaked in the 1980's for MLB, but even though it has fallen since then, competitive balance in MLB is still higher than it was before MLB added free agency to their collective bargaining agreement in the 1970s[31]. This rise in competitive balance could possibly relate to other factors such as the internalization of the talent pool or the implementation of the amateur draft. Another group of researchers found a different result when assessing the impact of free agency on the competitive balance of MLB. These researchers looked at both leagues in MLB, the American League and National League, separately and they found that the implementation of free agency had an overall negative impact on competitive balance in the American League, while there was no change in

[29] Fenn, Aju, Peter Von Allmen, Stacey Brook, and Thomas Preissing. "The Influence of Structural Changes and International Players on Competitive Balance in the NHL." *Atlantic Economic Journal*. 33. (2005): 215-24. Print.
[30] Larsen, Andrew, Aju Fenn, and Erin Leanne Spenner. "The Impact of Free Agency and the Salary Cap on Competitive Balance in the National Football League." *Journal of Popular Economics*. 7. (2006): 374-90. Print.
[31] Maxcy, Joel, and Michael Mondello. "The Impact of Free Agency on Competitive Balance in North American Professional Team Sports Leagues." *Journal of Sport Management*. 20. (2006): 345-65. Print.

the National League[32].   The different results between the two leagues may be effected by different strategies of separate leagues. In the American League, more teams bought the best talent, such as the New York Yankees. To compete, other teams, such as the Boston Red Sox, were forced to increase their payroll which left behind the smaller market teams behind. Major League Baseball's lack of a salary cap allows for the wealthier, larger market, teams to outspend their competitors in the bidding war for the top free agents in the league. If a team in MLB is unable to generate enough revenue to hold on to its star player, then that player will usually choose to go to the team that pays him the most for his talent. Similar to professional sports, collegiate sports have a free agency, but teams aren't allowed to bid for players like they do in professional sports. Players are still allowed to move freely between teams as long as they sit out of their respective sport for one year in between each new school.

Salary caps were implemented as a way to prevent rich teams from out bidding poorer teams for their star players. Salary caps are another policy change that sports leagues use to help increase competitive balance in the league.   The salary cap for a sports league sets the maximum amount a team can spend on specific goods. Salary caps can be hard, meaning if a team overspends then they are severely punished, and soft, little or no punishment for overspending. The NFL implemented a salary cap after the 1993 season and there is little evidence

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[32] Depken, Craig. "Free-Agency and the Competitiveness of Major League Baseball." *Review of Industrial Organization*. 14. (1999): 205-17. Print.

that it had any effect on the increase in competitive balance of that league[33]. The NBA introduced salary caps after the 1984-85 season and this policy change provided no change in competitive balance in the league. The NBA uses a system that each individual player has a salary cap. The amount is determined by how long the player has been in the league. The longer the player is in the league, the more money he has the potential of making. Therefore, if a player has a choice between team A, who is a perennial loser, and team B, who is a perennial winner, and both teams are offering that player his maximum contract for how long he has been in the league, the player is obviously going to choose team A. Players choose to be with the winning programs when money is not a factor in their decision[34]. So, if a player in the NBA chooses to play for a winning program when money is a non-factor, then kids who are going to college would choose to be on a winning program over a losing program because both schools offered him a full athletic scholarship. The player will typically choose to go to the power house school.

The NBA has not experienced a change in their competitive balance due to any sort of policy change, but a policy implemented by the league could cause the competitive imbalance to continue. The NBA has introduced free agency, a reverse order amateur draft, and salary caps as ways to improve the competitive balance, yet the competitive imbalance remains. There is one rule that could cause this continued competitive imbalance. This rule allows teams to surpass the salary

[33] Larsen, Andrew, Aju Fenn, and Erin Leanne Spenner. "The Impact of Free Agency and the Salary Cap on Competitive Balance in the National Football League." *Journal of Popular Economics*. 7. (2006): 374-90. Print.

[34] Sanderson, Allen, and John Siegfried. "Thinking about Competitive Balance." *Journal of Sports Economics*. 4.255-279 (2003): 255-279. Print.

cap limit in order to resign a free agent from their team. This so called "Larry Bird Rule" (named and implemented after the Boston Celtics resigned Larry Bird, their star player, in the 1970's and 80's) allows the good teams to keep all of their high end players which makes for a slower turnover in league standings. Up until recently with the uncovering of the referee scandal in the NBA, the NBA has been effective in monitoring cheating, such as giving players unfair benefits and drug testing. For teams to gain an advantage, they must invest in coaching, scouting and other forms of player development[35]. These aspects that teams invest in cause current and future stars to want to play there.

Revenue sharing is the last policy change that is supposed to help increase the competitive balance of a sports league. The NFL introduced revenue sharing in the early 1960s and there has been a great debate about whether or not revenue sharing is actually positive for the competitive balance of the league. Studies found that revenue sharing is actually slowing down the speed of the conversion of winning percentages[36]. This could be because the stronger teams are taking money from the weaker teams and it is slowing down the turnover rate of the league. Therefore, in the NFL the winning percentages of organizations are slowly converging toward 0.500 but the use of revenue sharing is slowing down the convergence.

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[35] Maxcy, Joel, and Michael Mondello. "The Impact of Free Agency on Competitive Balance in North American Professional Team Sports Leagues." *Journal of Sport Management*. 20. (2006): 345-65. Print.
[36] Grossmann, Martin, Helmut Dietl, and Markus Lang. "Revenue Sharing and Competitive Balance in a Dynamic Contest Model." *Spring Science+Business Media, LLC*. 36.10 (2010): 17-36. Print.

In NCAA basketball, teams who make it to the tournament at the end of that year share a part of the revenues for the tournament; the farther a team goes in the tournament, the more money that team receives from the NCAA. This is similar to revenue sharing in the NFL because, with the exception of a few mid major schools, the same teams from the larger power conferences make it as well and go deep into the tourney. With the larger power-house schools receiving extra revenue from the NCAA tournament, they are just becoming even stronger and better known to recruits.

COMPETITIVE BALANCE IN COLLEGIATE SPORTS 2.4

The ideas about competitive balance are the same from professional sports to college sports. The only difference is that players in college do not get "paid" to play. These schools invest in their players not by paying them money, but by providing them with the best coaches, facilities, training, tutoring, recruitment and other factors[37]. Just like in the professionals, the student athletes are interested in playing with the best players and being on the best team. When the average basketball game is decided by one additional offensive rebound or one less turnover, it is easy to see why these schools fight so hard for these high caliber athletes[38]. The schools fight for these athletes by spending more money on things that they are allowed to spend extra money on, such as coaches,

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[37] Baird, Katherine. "Dominance in College Football and the Role of Scholarship Restrictions." *Journal of Sports Management*. 18. (2004): 217-35. Print.
[38] Rimler, Michael, Seongho Song, and David Yi. "Estimating Production Efficiency in Men's NCAA College Basketball: A Bayesian Approach." *Journal of Sports Economics*. 11. (2009): 287-315. Print.

facilities and even academics, campus life or activities, and travel arrangements. Other aspects of college life can also be improved and used as recruiting tools. When looking at factors solely related to athletics, if a school has the best coaches and facilities, the best players would most likely want to play for that school. Attractive new college basketball and football recruits tend to gravitate toward perennial winners in order to enjoy greater prospects for on field success, to play with more talented teammates and to gain more media exposure[39]. These coaches, facilities, trainers, bring in better teammates, which cause more media coverage for that program and helps improve a players chance of making it in the NBA[40]. For these reasons listed above, it is obvious that a top recruit would choose the school that they believe will prepare them best for the professional game.

There is a distinct difference in the average competitiveness between the quality of top and bottom athletic schools in the NCAA. Some factors that promote or enhance this difference are:

1. Larger and wealthier fan base

2. Larger capacity stadium

3. Stronger tradition

4. Fewer close substitutes

[39] Sanderson, Allen, and John Siegfried. "Thinking about Competitive Balance." *Journal of Sports Economics*. 4.255-279 (2003): 255-279. Print.
[40] Baird, Katherine. "Dominance in College Football and the Role of Scholarship Restrictions." *Journal of Sports Management*. 18. (2004): 217-35. Print.

5. Better local television contracts [41]

What is interesting about the five factors is that four of them do not change over time. With the exception of television contracts, which can change from year to year, none of them change over time. With only one factor changing over time, the competitiveness of the league will only change a small amount because the other four factors promote no change. Television contracts can bring in some money for a program, but it isn't nearly enough to make up for the other factors, which are stacked against schools that are not in the power conferences. The television contracts are the one changing factor. If a struggling program has had a television contract, the network is likely to take it away, and vise-versa. These television contracts extend a team's fan base to people that aren't able to go to the stadium every weekend. Also, these television contracts bring in even more money for the school, which they can reinvest in their programs.

A recruit assessing probable schools is aware of which conference each school is in and the level of competition in that conference. Some college basketball athletic conferences are more competitive than others in terms of the skill level of the top teams in those conferences. These typically larger conferences have an advantage for their teams to make the NCAA tournament at the end of the season. For example, the Pac 10 is about 10,000 times more likely

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[41] Rhoads, Thomas. "Competitive Balance and Conference Realignment in the NCAA: The Case of the Western Athletic and Mountain West Conferences." *Southern Economic Association Annual Meating*. (2004): 1-19. Print.

to recieve an at large bid to the NCAA tournament over a minor conference[42]. A player recognizes this statistic, even if they have not seen the exact number, and knows that if they make it to the NCAA tournament with their team, they will receive much more media coverage and press than if they do not make it. This extra media coverage will help them with recruitment into the NBA. Therefore, a player will choose to attend a school in a power conference, such as the Pac 10, to receive all of the extra benefits from making the NCAA tournament with his team.

COMP. BALANCE AND POLICY CHANGES IN COLLEGE SPORTS 2.5

The literature pertaining to rule change effecting college sports mainly focuses on college football, but college basketball reacts very similarly to rule changes. It is found that in college football, as the number of NCAA restrictions on athlete compensation increase, the competitive balance of the NCAA increases as well. Along the same lines, it is found that as the severity of the punishments increase, the competitive balance of NCAA football decreases[43]. This result shows that collegiate sports are not immune to changes in competitive balance due to rule changes from within the NCAA. Another interesting point is the severity of punishments and how they effect NCAA competitive balance. When the severity of punishments increases, the competitive balance decreases because the

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[42] Coleman, Jay, Michael Dumond, and Allen Lynch. "Evidence of Bias in NCAA Tournament Selection and Seeding." *Managerial and Decision Economics*. (2010): 1-22. Print.

[43] Depken, Craig, and Dennis Wilson. "NCAA Enforcement and Competitive Balance in College Football."*Souther Economic Journal*. 72.4 (2006): 826-45. Print.

punishments have a greater effect on the smaller revenue schools than they do on the larger programs. Smaller schools are more effected by punishments than larger schools because the smaller schools do not have the extreme boosters that the larger programs do, which causes the punishment to be placed more on the school and less on the boosters of the programs. When punishments and restrictions are more strictly enforced, the competitive balance of most college football conferences actually rises, but the NCAA seems to act as a cartel to protect its premier programs[44]. Changes meant to improve competitive balance in the NCAA have actually made it seem as if the NCAA is protecting the rents for the major college football programs[45]. This deception can be applied to college basketball as well because even though there are not any teams winning the NCAA tournament every year, there are teams that consistantly rank in the top of their conferences and contend for a championships on a year to year basis.

Scholarship limits were introduced with hope to help competitive balance because so that the smaller, less wealthy schools would have the same number of scholarships to give out as the larger revenue programs. In reality, these limitations actually reduced competitive balance of the NCAA. The athletic powers have benefited the most from the greater restrictions on paying athletes because the smaller, lesser known schools are not able to compete with the tradition and pride associated with the larger schools[46]. Restrictions and

[44] Ibid.

[45] Rhoads, Thomas. "Competitive Balance and Conference Realignment in the NCAA: The Case of the Western Athletic and Mountain West Conferences."*Southern Economic Association Annual Meating*. (2004): 1-19. Print.

[46] Ibid.

regulations to scholarships and recruiting are argued to improve competitive balance, maintain amateur nature of college sports, provide needed funds for schools athletic programs, and provide insight to the coaches for the academic potential of recruits[47]. While these restrictions do maintain the amateur nature of the sport while saving the schools money, it is difficult to decipher if the competitive balance of the NCAA has increased due to these policy changes. There has been no statistically significant change in competitive balance in college football since greater restrictions to over paying athletes have been introduced[48].

Conclusion 2.6

The literature presented in this chapter shows how competitive balance in sports can be affected by player movement, policy changes, team revenue, and many other factors. The literature about changes in the competitive balance of college basketball is thin, but there are connections to be made between college football and basketball. First, it is found that a policy changes such as increasing athlete compensation restrictions has a positive effect on competitive balance. This point proves that the NCAA is not immune to changes in competitive balance due to rule changes. Also, there are certain conferences that maintain a higher level of competition, and players entering the NCAA are aware of which conferences have the best competition. The following chapter will examine the

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[47] Baird, Katherine. "Dominance in College Football and the Role of Scholarship Restrictions." *Journal of Sports Management*. 18. (2004): 217-35. Print.
[48] Ibid.

theory that the introduction of Article X to the NBA collective bargaining agreement has decreased the competitive balance of college basketball.

CHAPTER III

DATA and ESTIMATION STRATEGY

Data collected from the years 2001 through 2010 are necessary to measure competitive balance in NCAA division one men's basketball. 2001 denotes the first year of data because it allows for five years of information before the introduction of Article X to the NBA's collective bargaining agreement. Similarly, the last year of data is collected from 2010 because it allows for five years of data after the introduction of Article X. Variables that are used to calculate competitive balance in this regression are as follows: average winning percent for each conference per year, total point differentials for each conference per year, number of teams per conference to make the NCAA tournament per year, yearly RPI ratings, which will be elaborated later in the section, the number of freshman drafted in the first round of the NBA Draft from each conference per year, and the number of top ten high school recruits each conference brings in per year. This regression uses conference statistics instead of individual team statistics because top college prospects choose to attend schools that typically are in a select few power conferences.

The Herfindahl-Hirschman Index (HHI) captures the competitive balance of the NCAA. The HHI is the quadratic summation of each firm's, market share in an industry. In this study the firms are the Division I men's basketball conferences in the NCAA and the industry is Division I men's college basketball as a whole. The equation measures HHI:

$$HHI = \sum_{i=1}^{N} (MS_i)$$

where HHI is measured on a scale of 0 to 1. A perfectly competitive industry has an HHI amount of 1 and an industry with zero competitive balance has an HHI of 0. The market share of the HHI for this regression is calculated by:

$$MS_i = \frac{total \ \# \ of \ wins \ of \ conference_i}{total \ \# \ of \ games \ played \ in \ conference_i}$$

Where MS_i, or the market share of the ith firm in an industry, is calculated using the number of wins a conference has at the end of the season divided by the total number of games played by the teams in that conference. This measure of the market share of the ith conference is also known as the average winning percentage for $conference_i$. The HHI can be alternatively calculated using the number of teams a conference sends to the NCAA tournament at the end of the year instead of the average winning percentage of a conference. A problem with using the HHI for a measure of competitive balance is that a changing number of firms in an industry can skew the value of HHI. If this occurs, expansions in the

number of teams in a sports league can artificially cause the *HHI* to decrease when competitive balance actually holds constant.

This problem of a changing number of firms can be accounted for by using the deviation of the *HHI*, also known as the normalized *HHI*, which can control the changes in the number of firms in an industry. The normalized *HHI* is calculated using:

$$dHHI = HHI - \frac{1}{N}$$

Theoretically, the ideal competitive balance is achieved when each team has an equal number of wins or tournament appearances causing the *HHI* to equal $\frac{1}{N}$ in which *N* is equal to the number of firms, or conferences, in an industry. Therefore, the equation above determines that perfect competitive balance is achieved when the *dHHI* is equal to 0 because when the actual competitive balance equals the ideal competitive balance, they will cancel each other out to equal zero. Also, since the ideal competitive balance is $\frac{1}{N}$, the ideal competitive balance for each industry will change depending on the number of firms in that industry. This means that the numeric value of zero competitive balance, which equals $1 - \frac{1}{N}$ is not a constant.

When comparing the actual *HHI* to the ideal *HHI*, distortions to the measure of the *HHI* caused by a changing number of firms in an industry can be eliminated. One weakness of the *dHHI* is the possibility that an exogenous variable can influence the *dHHI*. For example, the *dHHI* accounts for changes in

the number of firms in the industry, but it does not account for changes in firms'
success over time. Lagging the $dHHI$ one period, or one year, can help explain a
firm's change in competitiveness over time. The lagged $dHHI$ does not perfectly
measure a firm's change in competitiveness over multiple periods, but it does
provide a better measure for past success than the non-lagged $dHHI$.

The equation below is regressed using a cross sectional time series format
with fixed effects. This equation must use a time series regression combined
with a panel, or group variable for each conference. Fixed effects are necessary to
use to group the data into separate years. The numeric values of the beta's (β's),
which explain the relationships between the independent variables and   the
dependent variable, which is competitive balance measured by average conference
winning percentage, will be skewed without fixed effects. This study uses the
$dHHI$ of average conference winning percentage ($dHHI_w$) as the dependent
variable measuring competitive balance in the regression:

$$dHHI_w = \ \beta_0 + \beta_1 l.dHHI_w + \beta_2 dHHI_t + \beta_3 RPI + \beta_4 SD_{PD} + \beta_5 ATT + \beta_6 draft$$
$$+ \beta_7 topten + \beta_8 D06$$

The $dHHI_w$ is used for the dependent variable because it provides the best
significance through the t-statistics for the independent variables. The first
independent variable is a lagged measure of the $dHHI$ of winning percentages in
the league ($l.dHHI_w$). This lagged variable is used to explain how the $dHHI_w$ is
changing over time. As previously mentioned, the normalized HHI cannot
determine the changes in the competitive balance of the league as time elapses,

therefore, the $l.dHHI_w$ explains the changes in competitive balance between seasons. The normalized *HHI* of the number of teams per conference that made the NCAA tournament in a specific year ($dHHI_t$) is the last independent variable that uses the *dHHI* to determine competitive balance. By measuring how many teams make the post season per conference, the $dHHI_t$ is another comprehensive measure of each conference's competitiveness.

A conference's ratings percentage index (RPI) is the next exogenous variable used. The RPI comprises a team's winning percentage (25% of RPI), the opponents' winning percentage (50% of RPI), and the winning percentage of the opponents' opponents (25% of RPI) to measure the strength of each conference in comparison to one another. The opponents' winning percentage and the winning percentage, of those opponents' opponents, comprise the strength of schedule. A conference's strength of schedule is a measure of the difficulty of a conference's schedule compared to other conference's schedules. For example, if conference A and conference B have the same number of wins and losses, and conference A's strength of schedule is more difficult than conference B's strength of schedule, then conference A will be ranked in front of conference B[1]. Thus, the strength of schedule accounts for 75% of the RPI calculation, which is calculated by multiplying 2/3 of all opponents' winning percentages with 1/3 of those opponents' opponents' winning percentage[2]. This index is not a perfect measure of

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[1] Annis, David H. "Basketball Schedule Strength." *SportsQuant*. 25 Oct. 2009. Web. 08 Apr. 2011. <http://www.sportsquant.com/cbbsos.htm>.

[2] "Ratings Percentage Index." *Wikipedia, the Free Encyclopedia*. Web. 08 Apr. 2011. <http://en.wikipedia.org/wiki/Ratings_Percentage_Index>.

conference rankings, but it does provide a way to compare the strength of each conference to other conferences.

The standard deviation of point differentials for every conference in the NCAA (SD_{PD}) is another independent measure of competitive balance used in the regression. Point differential is calculated using the summation of the total points scored by teams in a conference and subtracting that sum by the sum of the total points scored against teams in that conference.

$$PD_i = total\ points\ scored\ by\ teams\ in\ conference_i$$
$$-\ total\ points\ scored\ against\ teams\ in\ conference_i$$

Where PD_i equals the combined point differential for all teams in the ith conference in NCAA Division I men's basketball. Point differential is used in this regression to show the competitiveness of conferences within games; this variable is undetermined by winning percentages and post season success. Point differential gives a more detailed description on how conferences competed during the games they played, compared to their final winning percentage of the season, which is unable to represent the competitiveness of single games. The standard deviation of the total point differential for the ith conference in the league is calculated by:

$$SD_{PD} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(PD_i - \overline{PD})^2}$$

Where $\overline{PD}$ equals the average point differential for the entire NCAA[3].

The average attendance per conference for men's basketball games (ATT) from the year 2001 until 2010 is the next exogenous variable in the regression. The average attendance used in the regression equation shows how the average attendance at basketball games in each conference affects the competitive balance of the NCAA. As stated earlier, Rottenberg argues that the size of the institution is the factor that drives the competitive balance, therefore, the larger the size of the institution, the more competitive they are[4]. Average attendance of a conference can describe a conference's size because the larger the attendances for a conference's basketball games means a higher number of supporters that conference has; those supporters determine the size of the program.

The next two exogenous variables measure the incoming freshman talent and their effect on the competitive balance of the NCAA. The first of these variables ($draft$) counts the number of freshman that were drafted in the first round of the NBA Draft from each conference. The variable $draft$ is calculated by giving a point to a conference if a freshman player from that conference

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[3] Kalla, Siddharth (2009). Calculate Standard Deviation. Retrieved [Date of Retrieval] from Experiment Resources: http://www.experiment-resources.com/calculate-standard-deviation.html

[4] Sanderson, Allen, and John Siegfried. "Thinking about Competitive Balance." *Journal of Sports Economics*. 4.255-279 (2003): 255-279. Print.

leaves after his first year in college and is selected as a first round draft pick in the NBA. These freshman draftees are used as a variable because they represent the best freshman talent at the end of the season. The second of the variables that measures incoming talent (*topten*) describes the freshman talent at the beginning of the season. The second variable (*topten*) is calculated by giving a point to a conference if they are able to bring in one of the top ten basketball prospects, which were decided by www.rivals.com. These variables will show how the top freshmen athletes affect the competitive balance of the NCAA.

The last independent variable used in the regression is a dummy variable, which will show if there was a change in competitive balance after the 2005 season. The dummy variable (*D*06) is equal to 0 if the year that is being studied is between 2001 to 2005. *D*06 is equal to 1 if the year is greater than or equal to 2006. The dummy variable is crucial for the equation because it will show the expected shift in competitive balance due to the introduction of the NBA's new policy, Article X, to their CBA in 2005.

The next section of the study examines the results from the cross sectional time series regression that is outlined above.

CHAPTER IV

EMPIRICAL RESULTS

This chapter of the study discusses the results from the multivariable time series regression pertaining to competitive balance in NCAA basketball before and after the introduction of Article X. This chapter is broken up into two sections. The first section examines the coefficients and significance of all of the independent variables and how each affects the competitive balance of NCAA basketball. The second section of this chapter investigates the causality of the direction and significance of each independent variable.

The results from the regression of equation 1 appear in Table 4.1. The independent variables in equation 1 are split with four of the eight having significance and the other four having no significance. The variables that have the best significance are the lagged $dHHI$ of average conference winning percentage ($l.dHHI_w$) and RPI; both have percent values of the t-statistic, also known as p-values, equal to 0.00. For a p-value to be significant, it must be lower than 0.5, therefore, a p-value equaling 0.00 demonstrates that the variable has perfect significance. The exogenous variables that have the largest absolute value of their coefficients, and are significant, include the lagged $dHHI$ of

average conference winning percent and the $dHHI$ of number of teams to make the NCAA tournament per conference each year. The last variable that is significant is the average attendance at basketball games per conference. The four independent variables that are not significant in the regression are the standard deviation of conference point differential (SD_{PD}), first round draftees in the NBA Draft who drafted after their freshman year ($draft$), the top ten high school recruits and the conference they attended for their schooling ($topten$), and the dummy variable ($D06$) was supposed to show the change in competitive balance in the year 2006, which is after the introduction of Article X to the NBA's CBA in the year 2005. Standard deviation of point differential does not need to be discussed in further detail because it does not provide any explanations to the endogenous variable's measure of competitive balance. The variables: $topten$, $draft$, and $D06$, are still important to the results of the regression because by not being significant, they provide important answers.

TABLE 4.1

INDEPENDENT VARIABLE COEFFICIENTS AND SIGNIFICANCE LEVELS

Variable	Coefficient	Standard Error	P-Value
$l.dHHI_w$	1.011826	.007376	0.000
$dHHI_t$	1.407236	.627821	0.026
RPI	-.0049044	.0003466	0.000
SD_{PD}	-.0002176	.0004765	0.648
ATT	5.24e-06	2.27e-06	0.022
$draft$	-.0027262	.0033996	0.423
$topten$	.0037559	.0035753	0.295
$D06$	.0029785	.0020808	0.154

The coefficient of the lagged variable ($l.dHHI_w$) is positive and larger than one, which means that the previous season's measure of competitive balance causes the current season's competitive balance to be much worse than the last season. As previously stated, the competitive balance will decrease because as the numeric amount of the $dHHI$ increases, the competitive balance of the league decreases. Again, this decrease in competitive balance occurs because perfect competitive balance has a $dHHI$ equal to zero. The $l.dHHI_w$ has a very high significance, or a very low p-value, which means that the lagged $dHHI$ of average conference winning percent explains the current $dHHI$ of average conference winning percent perfectly. The next variable ($dHHI_t$) in the equation

represents the number of teams to make the NCAA tournament in a conference. The $dHHI$ of tournament appearances has the largest numeric value of any coefficient in the regression. Its coefficient is positive and greater than one, like the coefficient for the lagged $dHHI_w$, but the coefficient for the $dHHI$ of tournament appearances is nearly 72 percent larger than the lagged $dHHI_w$. The size of $dHHI_t$'s coefficient means that the more teams a conference sends to the NCAA tournament, the less the predicted amount of competitive balance there will be in the NCAA. However, the significance of $dHHI_t$ is not as comprehensive as the lagged $dHHI_w$'s significance. The lower significance level of $dHHI_t$ can be seen by looking at its large standard error, which could cause its coefficient to be greater than 2 or less than 0.2. The large standard error causes the size of the coefficient to become insignificant, while the direction remains constant.

RPI is the next independent variable that is significant in the regression. The ratings percentage index's coefficient has a perfect significance level of 0.000, but the coefficient itself is small and negative. The negative sign of this coefficient means that the RPI of the NCAA has a positive effect on the competitive balance of the NCAA, unlike the two $dHHI$ independent variables. Also, the numeric value of RPI's coefficient is much smaller than $l.dHHI_w$'s coefficient and $dHHI_t$'s coefficient, which means that RPI does not have as great of an effect on the dependent variable as the lagged $dHHI_w$ and the $dHHI$ of NCAA tournament appearances per conference. The last significant variable in the regression is the average attendance at basketball games per conference in each year (ATT). The coefficient for the average attendance is much smaller than the

coefficient for the previous variable (*RPI*). *ATT*'s coefficient is so small it can be taken as zero. The near-zero coefficient of the average attendance variable suggests that it can be treated as a variable that is not significant for the regression, even though the p-value is below the significantly accepted p-value score of 0.05.

The explanatory variables that have p-values, which are not significant, still provide useful information to the study, as previously mentioned. The insignificance of the variables $draft$ and $topten$ in the regression shows that the top few freshmen in the NCAA have no effect on the competitive balance of the league. This contradicts the initial hypothesis that competitive balance would decrease due to the influx of freshman basketball players with NBA talent because of the introduction of Article X. The other independent variable that does not have significance is the dummy variable for the year 2006 (*D*06). The p-value insignificance of the dummy variable explains that there was no shift in competitive balance in the year 2006. Again, the insignificance of the dummy variable is contradictory to the initial hypothesis that Article X would cause a negative shift in competitive balance of the NCAA.

From the results of the cross sectional time series regression, half of the exogenous variables are significant while the other half's coefficients are not significant. The regression determined that the top few players entering the NCAA, after the introduction of Article X in 2005, do not have an effect on the competitive balance of the league. Also, the dummy variable's high p-value indicates that there is no shift in competitive balance in the year 2006. On the

other hand, the exogenous variables that had significant p-values were split between two that had large, positive coefficients and two that had small coefficients that were close to 0. The two $dHHI$ variables, $l.dHHI_w$ and $dHHI_t$, have a distinct negative influence the competitive balance of the league while RPI had a much smaller positive effect on competitive balance. The last significant variable, ATT, has a coefficient that is so close to zero it can be treated as a variable with low significance because its effect on competitive balance is very limited. The next chapter will discuss the limitations of this study and will suggest any further avenues for research.

CHAPTER V

CONCLUSION

A few different ideas are discussed in the final chapter of this study. First, there are explanations for why each independent variable received the numeric values of coefficients and p-values, determined by the regression, along with a few problems and inefficiencies in the regression. Finally, there are suggestions for further research to conclude this study.

There are many possible different reasons for why the regression produced the coefficients, standard errors, and p-values that it did. One plausible explanation for why the coefficients of the two $dHHI$ variables, $l.dHHI_w$ and $dHHI_t$ are so large could be because both are directly explaining competitive balance of NCAA basketball. The correlation of $dHHI_w$ and $dHHI_t$ measure nearly the same aspect of a specific conference's success at the end of a season compared to the rest of the NCAA. The only difference between the two variables is that one uses average winning percentages and the other uses the number of teams that made the NCAA tournament per conference.

Other independent variables in the regression equation, such as average attendances at basketball games and RPI for conferences, have smaller values of coefficients. Their smaller numeric value of coefficients might be caused by the fact that they are part of a larger group of variables that help explain competitive balance in college basketball. As stated earlier in the study, exogenous variables that are not specified in the regression equation can affect the *dHHI*. Such exogenous variables for this study can include: average enrollment per conference, average revenue from basketball per conference, sponsorship amount per conference, average coach's ability per conference, academic standards per conference, ect. If these exogenous variables were included in the regression equation, the value of some t-statistics and coefficients could change. It should be noted that these variables were not included in this study's regression because the data for each of them was insufficient. The size and direction of this possible change is unknown, as well as what variables will experience the effect of the change.

The last independent variables used in this regression measure the change in competitive balance that the introduction of Article X to the NBA's collective bargaining agreement brought to college basketball. This change in competitive balance was expected to decrease the competitive balance of the NCAA because the top recruits would choose to go to a winning program; but, the regressed data suggests that there is no change in competitive balance due to these insignificant variables. The top ten high school basketball prospects entering the NCAA had no effect on competitive balance, nor did the top freshman leaving college basketball

to play professionally in the NBA. These two variables could be influenced by the size of the data set for each variable. For example, increasing or decreasing the number of premier high school recruits per year included in the study could change the numeric values of that variable's coefficient and p-value. The dummy variable's insignificance shows there is no change in competitive balance in the year 2006. This absence of a change in competitive balance could occur because the affects from the introduction of Article X are delayed and have yet to become apparent. This lack of change could also be due to the missing exogenous variables, and it is possible that Article X has had no influence on the competitive balance of NCAA men's basketball.

In conclusion the regression results suggest that only variables that can be defined as dependent measures of competitive balance are significant in this regression. These variables include the lagged *dHHI* of average conference winning percentage, the *dHHI* of the number of teams per conference to make the NCAA tournament, RPI, and average attendance at basketball games per conference. Obviously, the higher a conference's average winning percentage and the more teams make the NCAA tournament from that conference influence the competitiveness of the conference. The RPI measures the strength of a conference at the end of a season compared to the rest of the conferences in college basketball. A conference's strength is comparable to the competitiveness of that conference because the stronger a conference is, the more games that conference wins and the more competitive it becomes. Average attendance at basketball games in each conference correlates with the success and competitiveness of each

conference because a successful and competitive team will draw attention from more people to watch their games.

The variables that are not significant in this regression include: the standard deviation of point differentials per conference, the number of top ten high school recruits per conference, and the number of first round freshmen draftees in the NBA Draft per conference. The insignificant variables of this regression prove that the top few high school prospects and college freshman have no effect on competitive balance. Also, because the dummy variable for the year 2006 is insignificant, there is no shift in competitive balance due to the introduction of Article X in the NBA in the year 2006.

Some suggestions to improve the study would be to include and collect the rest of the data for the exogenous variables that were left out due to their insufficient data. Including these variables might add some significance to the other exogenous variables. Another idea for improvement would be to add more years of data before and after the introduction of Article X to improve the quality of the data set. Also, this will allow a few extra years to see if the expected shift in competitive balance, due to Article X, occurs after the last year of data, 2010, used in this study.

Another suggestion would be to lag the *dHHI* of conference winning percent one more period, so there would be two lagged variables in the equation. Lagging this variable one additional period might help explain more clearly the changes in competitive balance overtime and a shift in competitive balance might

become clearer. Lastly, to improve and expand this study, it would be beneficial to use different measures of competitive balance as the endogenous variable. Even though there are many different ways to expand this study, the results are intriguing because they suggest that competitive balance in NCAA sports is not affected by policy changes in their professional counterparts.

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