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The Amateur Draft, Competitive Balance, and Tanking in the National Basketball Association

by

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Abstract

This dissertation explores the NBA Draft. Throughout North American sports leagues, league executives state that the amateur draft is necessary to improve or maintain league-wide competitive balance. For the NBA, the amateur draft has caused a separate, but interrelated issue. The issue is that the presence of an amateur draft provides the incentive for NBA teams who are eliminated from playoff contention to tank (intentionally lose games) late in the regular season to improve their draft position and receive a better chance of getting a top draft pick. A top draft pick benefits a team both on and off the court (Price, et al 2010). In an attempt to deter tanking but maintain competitive balance, NBA executives have changed the draft format four times in the last 30 seasons. However, continuous debate still occurs regarding whether NBA executives should modify the draft process again. This dissertation explores three distinct research questions regarding the NBA draft format changes. The first paper examines the NBA point-spread betting market to see whether bookmakers believe that tanking is present in the league. If tanking is occurring, how much does the spread adjust for tanking? The second paper examines the potential tanking behavior of teams in conference and nonconference games under all four NBA draft formats. Finally, the third paper explores the impact the various NBA draft formats have on league-wide competitive balance.

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Chapter 1

Introduction[1]

Professional sports teams and leagues are high-profile businesses that provide entertainment for consumers and compete for the same discretionary income with such leisure activities as museums, recreation facilities, and movies. Sport is a unique entertainment product (Roberts 2003) and "one of the most significant branches of the entertainment industry, measured by the amount of time that consumers devote to following [sports]" (Szymanski 2003, p. 1137). According to *Forbes Magazine* estimates for the 2010 season of each of the "Big Four" professional sports leagues in North America (NHL, NBA, MLB, and NFL), the teams had a combined operating income of $1,973,000,000.

Sports leagues sell competition—a practice that manifests itself in terms of the uncertainty of game outcomes. Thus, what makes a sporting contest different from other forms of entertainment is that both the producer and the consumer do not know—and the leagues do not control—the exact set of actions that will occur on the playing field and the outcome of the contest. Teams and leagues package this as part of an entertainment experience that also includes atmosphere, comfort, and association with the team or league, which can be experienced in person or through such media as television, radio, and the Internet.

Sporting events center on competition. Competition is defined by Neale (1964) as

[1] A version of this chapter has been published. Soebbing & Mason 2009. Team Performance Management. 15: 141-157.

two teams coming together to play a game in which the outcome is uncertain. Low commercial appeal for one-time games involving professional teams in the late 1800s led to the formation of leagues (Scully 1995). Leagues are a collection of teams that play each other under an agreed-upon set of rules (Neale 1964). League executives enforce these rules, which are set by all league members. With the formation of professional sports leagues came a principal-agent relationship between the league and its member clubs (Atkinson, Stanley, and Tschirhart 1988). The league attempts to design a contest (individual game and playoffs) to elicit the maximum effort to win a game (Szymanski 2003). Thus, a win should be and is designed by the league to be the optimal strategy for an individual professional team (Preston and Szymanski 2003). From this core product, two broader uncertainties emerge. The first is the uncertainty spanning one season, commonly called championship or playoff uncertainty. The second is the uncertainty spanning consecutive seasons (Fort 2006) because it may be undesirable to have one team dominate the league over consecutive seasons (Cairns 1987). The compensation given to teams who elicit the desired league response of maximizing their effort to win games includes an increase in revenue in the current season from hosting playoff games. In addition, a team that makes the playoffs in the previous season receives greater revenue from higher attendance attributable to the previous season's participation in the playoffs (Paul 2003, Soebbing 2008). For example, Soebbing (2008) found that a team making the MLB playoffs in the previous season showed an increase of 5,340 fans per game in the following regular season. In addition, by making the playoffs, a team has the chance to win the league championship which would bring other tangible and intangible benefits (Baade and Dye 1988).

What happens, though, when teams are eliminated from playoff contention? In some professional sports leagues, there may be times when not putting forth maximum effort is a better strategy for an individual team. As a result, a team might act in its own self interest and not in the best interest of the league or other teams in the league. The debate in the academic literature as well as in the popular press regarding this behavior begins when a team is eliminated from participation in postseason play. Specifically examining North American professional sports leagues, the issue of teams eliminated from playoff contention not putting forth effort to win a regular season game centers on the financial benefits a team can gain from having a higher selection in the amateur draft.[2] The amateur draft is a mechanism North American sports leagues use to promote competitive balance and to keep player costs at a minimum by giving a single team exclusive negotiating rights with a newly drafted player (Fort and Quirk 1995). Not putting forth effort to maximize the number of team wins over the regular season for a financial gain is called tanking. Even though tanking might be a good strategy for an individual team, it is a problem for the overall league, which attempts to maintain the integrity of individual games and league-wide competitive balance.

This dissertation explores the issues of tanking and competitive balance surrounding four different National Basketball Association (NBA) draft formats. The NBA was the first North American professional sports league to move away from the traditional reverse-order amateur draft used in North American professional sports since the National Football League (NFL) introduced the first amateur draft in 1936 (Fort and Quirk 1995). Initially, the NBA moved away from the reverse-order draft because of the belief that some teams were tanking late in the regular season (Taylor and Trogdon 2002, Soebbing and Mason 2009). However, recent changes to its draft format show a separate but related concern that the NBA believes the amateur draft is a mechanism that North American leagues use to promote competitive balance throughout the league (El-Hodiri and Quirk 1971). This is a concern for league executives because they believe that, without the amateur draft, the same teams will constantly win each season. The result is the league

[2]The reason that this phenomenon is unique to North American professional sports is due to the fact that European sports leagues do not have a playoff system or an amateur draft.

will suffer in terms of fan attendance, corporate sponsorships, and media revenue. Historically, the NBA has been the most competitively imbalanced league of the four North American professional sports leagues (Berri, Schmidt, and Brook 2006, Fort 2006, Maxcy and Mondello 2006). Therefore, the expectation is that the NBA aggressively attempt to balance concerns about tanking by individual teams and league-wide competitive balance.

To fulfill the three-paper dissertation format set forth by the Faculty of Physical Education and in accordance with the Faculty of Graduate Studies and Research, this dissertation explores three separate research questions to further understanding of the strategic behavior of the NBA, its member teams, and the interaction between the two with regard to tanking and the amateur draft. The remaining sections of Chapter 1 present background information on the structure of North American sports leagues and the importance of the uncertainty of game outcome and competitive balance. Chapter 1 also details the early history of the NBA, the introduction of various league policies that could affect the strategic behavior of NBA teams, and a history of the amateur draft in the NBA. Chapters 2, 3, and 4 present the three related research papers. Chapter 2 examines the relationship between tanking late in the regular season and point-spreads of regular season NBA games to determine whether the betting public perceives that tanking is occurring. If bookmakers perceive tanking, how does this perception influence the point-spread of the games? In Chapter 3, the research examines tanking behavior of NBA teams in conference and nonconference games under the various NBA amateur draft formats. Focusing on the amateur draft formats, Chapter 4 examines the second related issue that the NBA faces with the amateur draft: its perceived effect on competitive balance. Finally, Chapter 5 offers some implications for practitioners and researchers as well as suggestions for future research on the subject of tanking in sports.

1.1 An Overview of North American Professional Sports Leagues

Since the late 19th century, professional sports have been a prominent component of leisure behavior in North America. The four major professional sports leagues in North America—the National Football League (NFL), Major League Baseball (MLB), the National Hockey League (NHL), and the NBA—have emerged as the elite sports league of their respective sports (Leifer 2000). While challenges from rival leagues have occurred throughout the 20th century, the likelihood of new leagues emerging to challenge any of the "Big Four" is unlikely (Mauws, Mason, and Foster 2003). These leagues have leveraged their monopoly positions and unique treatment through United States anti-trust laws to increase public subsidies for the facilities they play in and negotiate pooled television rights to broadcast games, among other purposes (Rosentraub 1999). While teams are independently owned and operated franchises, leagues themselves are nonprofit entities (Lentze 1995). The leader of each league is called a commissioner and he or she acts as a de facto CEO (Noll 2003); however, league power rests with the clubs, which has a representative on the league's board of governors (Jones 1969). The board of governors is the equivalent of a corporation's board of directors. Thus, commissioners have to manage the interests of the different team owners and must not risk alienating powerful and influential owners so as to retain their leadership of the league.

A league can be defined as a collection of teams that agree to play games under a specified set of rules (Leeds and von Allmen 2005). Under this definition, the league is the principal while the member teams are the agents. The primary objective of a professional sport league is to maximize the joint profits of all the teams within the league (Scully 1995). League executives believe they can accomplish this goal by maximizing the uncertainty of the outcome for each game (Jones 1969). Uncertainty of outcome is defined as "a situation where a given contest within a league structure has a degree of unpredictability about the result and, by extension, that the competition as a whole does not have a predetermined winner at the outset of competition" (Forrest and Simmons 2002, p. 229). The uncertainty of game outcome is what makes sport unique compared to other consumer options in the entertainment industry (Roberts 2003). The uniqueness of the sport product requires a sports league to increase, maintain, or preserve the uncertainty of game outcome. By doing so, a league can feature games between competitively balanced teams. Competitive balance is defined as "a league structure which has relatively equal playing strength between league members" (Forrest and Simmons 2002, p. 229). Thus, sports leagues are in a unique situation in which, to make their environment more stable and predictable (thereby reducing uncertainty), leagues must ensure the uncertainty of the outcome of individual games and league-wide competition for a league championship. In other words, encouraging uncertainty and a balanced overall structure with regards to the product will reduce environmental uncertainty for the league as a whole in terms of external stakeholders such as sponsors, fans, and media companies.

Szymanski (2003) observed that an organizer of a sports contest (or a sports league) has the objective to elicit effort from the participants (the teams within a league) in their attempt to win a prize. The big prize within a sports league is making the playoffs and the opportunity to win the league championship. However, it should be noted that each agent or team is also assumed to be maximizing its own individual profit.[3] Unfortunately, the league-wide strategy of increasing and preserving uncertainty of outcome to maximize the joint profits of the league does not always align with the interests of individual teams. For each individual team, the goal is assumed to be to obtain a profit-maximizing winning percentage (El-Hodiri and Quirk 1971). El-Hodiri and Quirk (1971) developed a model that illustrated the relationship be-

[3]It is generally accepted that teams in North American professional sports leagues are profit maximizers and teams in European professional leagues attempt to maximize wins instead of profits (Késenne 2006). However, "this is not to say that there are some owners [within the league] with different ambitions" (Fort 2000, p. 440).

tween win percent and revenues, referred to as gate receipts. Thus, high uncertainty of outcome is not as important for each individual team, which would prefer to win more than lose, in a professional sports league in comparison to the overall league's interest (Jones 1984).

Not only is the uncertainty of game outcome important to a sports league, but also is, by extension, is the competitive balance of the entire league. To promote competitive balance, leagues do not want the same teams winning and losing all of the time, although leagues might prefer that clubs with larger market win slightly more often that those with smaller markets to increase the value of national television contracts that the league collectively negotiates as well as the proportion of each team's gate revenue, which is shared amongst league members. As a result, each team has a vested interest in the financial and competitive success of other league teams. Thus, leagues do not want franchises to be economic competitors; rather, they want consumers to view teams as competing with one another on a game-by-game basis and for a league championship (Neale 1964). As explained by the Dallas Cowboys' Tex Schramm: "Competition within a league must be contrived, not natural. To compete on an equal basis you need to make that contrivance possible" (Harris 1986, p. 598). Because the league product relates to two teams' competing with one another on the field of play, promoting the notion of competition is paramount. Thus, teams will compete for player, coaching, and management talent to improve their on-the-field performance. Not having this competition would erode consumer interest in the product (Rottenberg 1956) and potentially the viability of the league (Jones 1984).

To promote the viability of the member teams and the overall league, "leagues and teams must devise alternative compensatory demand increasing strategies to promote attendance" (Jones 1984, p. 54). These strategies include setting on-field rules; modifying revenue sharing arrangements; and creating rules regarding the salary cap or luxury tax, free agency, amateur draft, scheduling, and playoff design. Some of these policies are discussed in depth in Section 1.3. The adjustment of these policies by the league may cause some teams to change how they act in their own self-interest, possibly harming overall league interest (Atkinson, Stanley, and Tschirhart 1988). This action by teams presents an agency problem for the league under the principal-agent relationship discussed earlier.

1.2 NBA History and Structure

The National Basketball Association began as the Basketball Association of America in 1946, with eleven teams located on the East Coast of the United States (Rascher 2008). In 1949, the Basketball Association of America merged with a rival league, the National Basketball League, whose members were located in the US midwest. The name of the newly formed league was the National Basketball Association. At that time, the NBA was composed of 17 teams in three divisions (Leifer 2000). The early history of the league witnessed teams either dissolving or leaving the NBA to join more geographically concentrated rival leagues. Scully (1995) commented that the average regular season team attendance in the early years of the league was similar to that of the leagues it replaced. However, the league started to grow in terms of average attendance as it expanded into major metropolitan areas.[4] In 1967-1968, the American Basketball Association (ABA) formed as a rival league to the NBA. The growth of the ABA, coupled with rising player salaries due to the ABA's competition with the NBA (Alyluia 1972), eventually led to the merger of the two leagues in 1976 (Scully 1995). The league has since grown and established itself as one of the major professional sports leagues in North America (Leifer 2000). According to *Forbes* Magazine, the average value of an NBA franchise was 367 million US dollars for the 2009-2010 season.

The league currently is under the leadership of David Stern, who has been commissioner since 1984. His tenure as commissioner is an important element of this dissertation because the changes in the draft format have occurred while he has been

[4]See Scully (1995) for a table presenting the shift in teams in the early history of the NBA.

commissioner. Currently, the NBA has 30 teams in the United States and Canada. These teams are split into two conferences (Eastern and Western). Within each conference, teams are separated into three divisions of five teams each. Teams are divided according to the conferences with subsequent divisions by geography.

The eight teams from each conference with the best win-loss records make the playoffs. A team can clinch a playoff berth in one of two ways. The first is to finish with the best regular season record in its division. If a team does not win its division, it can still make the playoffs by finishing with one of the five best regular-season records among non-division-winning teams in its conference.

1.2.1 NBA Team Revenue and Expenses

According to Leeds and von Allmen (2005), professional sports teams generate regular season revenues from four main sources: ticket sales, national and local broadcasting rights agreements, licensing, and other stadium-related sources. These other stadium-related sources can include concessions, parking, luxury boxes, and naming rights. All of the North American professional sports leagues have a revenue sharing system in place. Currently in the NBA, the revenue received from national broadcasting rights fees and the NBA's digital revenues are distributed equally among all teams. Local broadcast revenue generated outside of a 75 mile radius of a team's location is shared as well (Berger 2009). Another source of shared revenue is the luxury tax, which is defined below. This money is shared among the teams that did not exceed the luxury tax threshold, but the amount of money a team receives depends on how close to the luxury tax threshold it is (Kaplan 2004).

The most significant expense incurred by professional sports teams is player salaries (Leeds and von Allmen 2005). However, due to the monopsony power of sports leagues, players who have not yet obtained free agency are usually paid less than their marginal revenue product (Scully 1974). This practice results in a surplus, defined as the revenue generated by a player for the team after accounting for the player expense. In the NBA, Krautmann, von Allmen, and Berri (2009) found that the median surplus of an NBA player from the 2000-2001 season through the 2005-2006 season was approximately $732,000. However, one would expect the surplus a team generates from a player to differ if that player were a starter or a reserve. Krautmann et al. (2009) examined this distinction and found that the median surplus generated from a starter was $2,700,000, and the median surplus generated from a reserve was $564,000. Hausman and Leonard (1997) found that superstar players—players who are the elite of their respective sport—generate sizeable revenues for their own teams, the league (in terms of TV ratings), and opposing teams (in terms of attendance, broadcast ratings, etc). These revenues are much higher than the median surpluses as reported in the later research of Krautmann et al's (2009).

Postseason revenues and expenses are different from regular season revenues and expenses. According to Noll (1991), making the postseason is important for an NBA franchise to earn additional profit. Noll observed:

> In any given season NBA teams divide into three categories. At the bottom are the teams that do not make the playoffs, usually do poorly at the gate, and roughly break even or experience small losses. Eight teams have mediocre records and make the playoffs but lose in the first or second round. These teams make a small profit. The remaining eight teams are the elite. They draw well during the regular season, appear frequently on television, and benefit from several home playoff games. These teams are quite profitable, some of them highly so. (Noll 1991, p. 25)

An NBA team will increase revenues by clinching a spot in the postseason tournament, which determines the league champion. Currently, each playoff series has a best-of-seven format; that is, a team must win four of the seven games to advance to the next round. The higher seeded team has the home court advantage in the playoff series: It hosts four of the possible seven games that could be played in the series.

In a playoff series, each team is the home team for two of the first four games in the series. Over the course of the postseason, a team could host as many as sixteen home playoff games if each series a team plays in goes to the maximum of seven games and the team has the home court advantage in each series. Teams participating in the postseason do not pay players additional salary for competing in playoff games, so teams who make the playoffs keep most of the revenues generated by hosting playoff games.[5]

The further a team advances in the playoffs, the more revenues generated by the teams. These revenues can be the difference in whether an NBA team earns a profit for the season according to some reports (Noll 1991, Windhorst 2010). Therefore, one would expect that all teams at the beginning of the season have the goal of clinching a spot in the playoffs. This team goal aligns with the NBA's objective of high uncertainty of game outcome and competitive balance (Szymanski 2003), which should increase game attendance according to the uncertainty of outcome hypothesis originally proposed by Rottenberg (1956). However, once a team is eliminated from playoff contention, a new tournament to determine the order of selection in the amateur draft can arise, presenting a problem for the league. This "losing to win" tournament has been a focus of the NBA since the early 1980s.

In summary, a league's goal, as principal, is to maximize the joint profits of all the teams (agents). To do so, the league must ensure that teams are putting forth a level of effort that maximizes the overall number of team wins. In addition, the league must ensure that certain teams are not dominating the league year after year. If such domination occurs, the league may have to adjust its policies to maintain competitive balance. In its history, NBA executives have implemented and modified rules such as salary cap, luxury tax, rookie salary scale, and the amateur draft to improve competitive balance. An individual team's goal is to maximize its profits. The team

[5]There are, of course, costs associated with every home game played such as utility bills and paying such employees as ushers and concession employees. However, these costs are minimal compared to the costs of player salaries.

can do so by clinching a playoff berth in the postseason tournament (Noll 1991). However, if the team is eliminated from playoff contention, additional wins may not be the optimal strategy for an NBA team. It may be in an eliminated team's best financial interest to tank late in the regular season in order to gain a higher draft position. This higher draft position may result in hiring a star player, an outcome that can turnaround both the financial and on-court successes of the team.

1.3 NBA Policies

The NBA has evolved since the mid 1940s. Changes have occurred in the form of rules to manage play on the court (examples include the introduction of a shot clock and three point line) and business conducted off the court (examples include expansion, relocation, and salary cap). This dissertation focuses only on off-the-court changes because these policies have a direct impact on a team's decision to tank late in the regular season and on the financial reward from tanking. The financial incentive for teams to tank will be explored in depth later in this chapter (Section 1.4). The policies that have a direct impact on a team's decision to tank include the type of schedule (balanced or unbalanced), salary caps, luxury tax, and the amateur draft. Furthermore, policies described below have been touted by commissioners of sports leagues as necessary for league-wide competitive balance (El-Hodiri and Quirk 1971).

1.3.1 Unbalanced Schedule

NBA teams play eighty-two regular season games each season, with half played in a team's home arena and the other half are played on the road. Under the unbalanced schedule, NBA teams play two games against teams in the other conference, with one game taking place in each team's home facility. Within each conference, a team plays other teams three or four times depending on the rotation of the schedule. As mentioned in the previous section, teams reach the postseason by finishing in the top eight of their conference. Playing more games against conference opponents increases the direct competition for playoff spots. Weiss (1986) examined the effect of unbalanced schedules in professional sports and concluded that, due to the unbalanced schedule, strong teams in the league do not win as much as they would if the schedule were balanced and teams played each other the same number of times. Using an unbalanced schedule results in more competitive balance than that of a league that uses a balanced schedule and should increase consumer demand for games according to the uncertainty of outcome hypothesis first proposed by Rottenberg (1956) and Neale (1964).

The type of schedule (balanced or unbalanced) North American professional sport league executives decide to use is important. Some league executives believe that when an unbalanced schedule is used, games against conference opponents should be scheduled more at the end of the season than at the beginning. The reason stated by league executives is that it will preserve the uncertainty of game outcome and provide more exciting playoff races, thus increasing fan attendance. For example, the National Football League (NFL) altered its regular season schedule starting with the 2010-2011 season to have more divisional games at the end of season causing most of the nonconference games to occur early in the season (*Sports Business Daily* 2010). The concern in prior seasons was that playoff positions were determined with several weeks remaining in the season, resulting in the last few regular season games' being "meaningless" with playoff-bound teams resting their starters. Playing more divisional games late in the season should increase playoff uncertainty (Fort 2006). This uncertainty, league executives believe, should increase consumer interest and demand over the last few weeks of the regular season (*Sports Business Daily* 2010).

The unbalanced schedule may influence a team's decision to tank once it has been eliminated. In terms of the draft policy and the unbalanced schedule, by playing and losing to conference teams, an eliminated team may be able to move down in the standings and further increase its chance of receiving the top overall draft pick. Chapter 3 examines the unbalanced schedule and how it relates to tanking and develops hypotheses about the behavior of eliminated NBA teams under these circumstances.

1.3.2 Salary Caps and Luxury Tax

Salary caps are applied to individual players' salaries as well as to team payrolls with the details varying by league. In 1983, the NBA was the first North American professional sports league to adopt a team salary cap (Kaplan 2004, Leeds 2008). The team salary cap figure is determined by taking a percentage (currently 51 percent) of what the league terms "basketball related income" and subtracting the revenue that goes directly to player benefits. That total is then divided by the number of teams in the league (Kaplan 2004, Coon 2010). Basketball-related income "includes any income received by the NBA, NBA Properties or NBA Media Ventures" (Coon 2010, n.p.). Some examples include ticket sales from preseason, regular season, and postseason games, concession sales, parking, and percentage of arena signage (Coon 2010).

The maximum amount a team could pay all its players for the 2010-2011 season was $58.044 million (InsideHoops.com 2010). The salary cap in the NBA is considered a "soft cap," which means teams can exceed the salary cap limit under certain exemptions provided by the league in order to re-sign their own players (Kaplan 2004, Maxcy and Mondello 2006).[6] For example, one of the exemptions allows teams to sign their newly drafted players even if they are at the salary cap limit. Another exemption is called the "Larry Bird exception," allowing teams to exceed the salary cap to re-sign a player who has played for them in at least three consecutive seasons. The league determined this to be a worthy exemption to provide an advantage for a team to keep its top players for most, if not all, of their careers (Mukherji 2000). The salary cap also governs trades between two or more NBA teams. The rules state that a team can acquire, at maximum, 125 percent plus $100,000 of the salary that it is trading away (Coon 2010). Because of the trade restriction, it is difficult for teams to trade players (Staw and Hoang 1995). Because of all the exceptions, the

[6] Kaplan (2004) stated that only two NBA teams did not take advantage of the many exemptions offered to them from 2002 to 2004.

NBA implemented a luxury tax.

The luxury tax is the financial penalty a team pays the league for exceeding the team payroll threshold. For the 2010-2011 season, the tax threshold was $70.307 million (InsideHoops.com 2010). Once a team reaches the luxury tax threshold, it must pay a percentage of every dollar above the luxury tax threshold to the league. Teams pay $1 to the league for every $1 that they are over the luxury tax threshold (Kaplan 2004, InsideHoops.com 2010). Kaplan (2004) stated that a luxury tax is attractive to both players and owners:

> For owners, depending on the level of taxation, the luxury tax can be viewed as a quasi-salary cap; it may serve as a roadblock to continued spending. For players, the tax represents freedom from the salary cap and still offers the promise of unlimited salary growth. And finally, competitive balance may be achieved through a luxury tax regime by punishing big-spending teams and perhaps even redistributing money collected to less affluent teams. (Kaplan 2004, p. 1617)

Luxury tax revenue is redistributed by the league to the teams that are under the luxury tax threshold (Kaplan 2004, Berger 2009).

In addition to the team cap, the NBA also has a cap on the amount of money an individual player can make. Beginning in 1995, the NBA implemented a rookie salary scale, which determined the salaries of players selected in the first round of the amateur draft for the first four years of their NBA career as well as for an option year (Kaplan 2004). Starting with the 2000 season, the league added a cap on the amount a veteran—defined here as any non-rookie—can make in a single season. According to Staudohar (1999), the maximum amount a player can make in one year depends on how many years of service a player has in the league. According to Kaplan (2004), the two individual player salary caps (rookie and veteran) influence salaries in three ways. First, the rookie cap limits the amount of money NBA owners give to players who have no or minimal experience in the NBA. Second, if rookie players received a high salary when entering the league and no strict upper limit on teams' total payroll existed, salaries for veteran players would be driven higher. Finally, when putting a cap on veteran players who produce the highest revenue for NBA teams, "the market will readjust downward, and nonmaximum salary players will be measured against those whose salaries have been artificially limited by the collective bargaining agreement" (Kaplan 2004, p. 1626-1627).

The caps provide financial incentives for NBA teams to tank. The rookie salary scale provides teams with the certainty of knowing exactly how much they are going to pay their first round draft pick throughout his rookie contract. This additional cost certainty may provide additional incentive to tank in certain seasons to receive (or possibly to receive) a higher draft pick in the amateur draft under certain draft formats. Sheridan (2007) summarized the tanking decision for NBA teams:

> The reason teams are so desperate to have a shot at a franchise player . . . is that there is almost no other way to transform a bad NBA team into a good one . . . You can't trade a player unless you get within 125-percent of his contract back in return. This rule against salary dumping and superstar-borrowing forces teams to swap contracts rather than players. It creates terrible stagnation. So do salary cap exceptions that allow teams to re-sign their own players for far more than other teams could offer them in free agency. A rule meant to encourage stars to remain with one team all but takes the "free" out of free agency. That leaves the draft [and tanking] as virtually the only way to land a true superstar. (Sheridan 2007, n.p.)

The different amateur draft formats are described in the following section.

1.3.3 The NBA Entry Draft

The NBA draft officially began in 1947. In the early years, teams selected in a reverse-order format. Teams, however, would commonly forfeit their first pick in draft to select what was called a "territorial player." A territorial player was an amateur player from the team's designated geographic area (Evolution of the Draft and Lottery 2007). Territorial picks were considered critical in developing a local fan base in the fledgling NBA. Empirically, the belief that having local players increase attendance has been confirmed in research examining attendance in the top German soccer league (first Bundesliga;(Brandes, Franck, and Nüesch 2008). Territorial picks remained part of the draft until 1966.

Starting in 1966, a coin flip between the last place teams in each of the NBA's two conferences determined which team received the first overall pick. The loser of the coin flip would receive the second overall selection. The draft order following the coin flip was a reverse-order format. This practice remained in place until after the 1983-1984 season. The competitiveness—or lack thereof—of some NBA teams near the end of the 1983-1984 season led some owners and league officials to complain that teams were intentionally losing games in order to gain better draft positions. The generally accepted top collegiate player in that year's draft and the first overall selection by the Houston Rockets was the University of Houston's Akeem Olajuwon, inducted into the Basketball Hall of Fame in 2008.[7] Discussing the rationale for changing the draft format, former Philadelphia 76ers General Manager Pat Williams said, "[The] Houston [Rockets] went into a complete swan dive [late in the regular season]. [. . .] The Houston thing was so flagrant, and that is why the lottery came about" (Narducci 2007, n.p.). Phoenix Suns general manager, Jerry Colangelo, claimed "There was a strong feeling [that the NBA needed] to counteract some of the feelings of the prior season

[7]The draft also featured several other prominent players, including Michael Jordan.

when one team in particular, and maybe a few others, were suspected of losing intentionally to improve their position"(Blinebury 1985, n.p.). By changing the draft format, the NBA acknowledged its concern that tanking in the regular season posed a threat to the uncertainty of game outcomes, integrity of the game, and the legitimacy of the league's product to external stakeholders.

A new draft format was introduced for the 1985 NBA Draft; a lottery gave all non-playoff teams an equal probability of securing the number one overall selection. The decision to move to a lottery format represented an important step away from the traditional reverse-order format used by all four major North American professional sports leagues at that time. The new lottery meant that each non-playoff team had the same probability of securing the number one overall pick. Ideally, the equal-chance lottery would decrease the incentive individual clubs had to intentionally lose games because all teams had an equal chance of winning. Former Philadelphia 76ers executive Pat Williams noted that, "There was great alarm in the league [with regards to tanking]. That temptation [to lose games] was removed with this lottery" (Aschburner 1993, n.p.). However, not all executives favored this lottery format. Following the conclusion of the draft, the owner of the Golden State Warriors began a movement to end the draft lottery. Golden State finished that year with the worst win-loss record in the NBA, a record that the previous season would have earned the team a 50 percent chance of obtaining the number one overall pick based on a coin flip with the worst team from the other conference. Despite the team's woeful record, the lottery determined that Golden State would receive the seventh overall selection, not one of the first two selections (Rowe 1985).

The Dallas Mavericks general manager at the time also did not agree with the lottery format: "I don't think the lottery eliminates the possibility of somebody purposely trying to lose, if that's what we're trying to eliminate" (Blinebury 1985, n.p.). Other team owners also expressed concern as to the objective of the amateur draft. Some felt that, giving all non-playoff teams a chance at winning the lottery would compromise the goal of improving the quality of the very weakest teams. In other words, teams that were close to qualifying for the postseason but won the lottery could draft the best players and further distance themselves from the worst teams. This would contribute to the same teams losing for years on end, decreasing competitive balance and ultimately undermining interest in the league as a whole (Goldpaper 1989).

To address this issue, the NBA tweaked the lottery format. Starting with the 1987 draft, the lottery determined only the order for the first three picks of the NBA draft. After the first three picks, the rest of the non-playoff teams picked in reverse-order based on their win-loss record in the previous season. The intent was to reduce the incentive to tank (because all non-playoff teams still had an opportunity to win the lottery) while increasing the chances that the worst teams would still have a high draft pick: The team with the worst record would have, at worst, the fourth overall pick in the draft. This change created confusion among several team executives who still questioned why teams that just missed the playoffs had the same probability of winning the lottery as teams that had finished at the bottom of the standings over the last few seasons (Associated Press 1989).

In response to this criticism, and other comments made by teams, Stern suggested that the system might have be altered in the future to provide the worst team a greater chance of winning the lottery (Goldpaper 1989). With the addition of new franchises through expansion, the league had to decide whether it would adjust its draft procedure. The NBA's competition committee ultimately recommended that the league's Board of Governors institute a weighted lottery format. The league's Board of Governors agreed with this recommendation and instituted a weighted-lottery format beginning with the 1990 draft. The team with the worst regular season record received a 16.7 percent chance of securing the number one selection while the best non-playoff team had a 1.5 percent chance. When introducing the new format, Stern said, "It was important that this change [to the draft format] be made with 11 teams failing to make the playoffs this season . . . We wanted to insure that the teams that finish with the worst record will get a better crack at the top picks" (Goldpaper 1989, n.p.). Indiana Pacers General Manager Donnie Walsh supported the new format: "It's probably as good a system as you can come up with . . . It's a way that the league can retain its credibility and move toward parity at the same time. Before, there was always that perception that a team could gain by losing" (Moore 1990, n.p.). However, by increasing the odds that the worst team would win, the NBA might also increase, or bring back, the incentive to tank. Thus, the NBA continued to balance two sometimes competing goals. The first goal was to improve competitive balance in the long run by giving weak teams a greater chance of receiving the most talented amateur players through the player draft. The second goal was to reduce the possibility that teams would tank and thereby erode stakeholder confidence in the uncertainty of game outcomes, which could result in a decrease in attendance, sponsorships, and media revenues among other outcomes.

The NBA's leadership clearly hoped that the new lottery format had eliminated the incentive for teams to tank because the payoff for reaching the playoffs would be a bigger lure than the opportunity of winning the draft lottery (Sefko 1989). The perceived existence of tanking was not lost on several industry insiders. The coach of the Denver Nuggets claimed "I'm not pointing any fingers, but it would [still] appear some teams, coming down the stretch, have been more concerned about the number of Ping-Pong balls they end up with [tanking], more so than the number of wins" (Monroe 1993b, n.p.). Newspaper columnists expressed similar opinions. For example, an article published in *The Salt Lake Tribune* reported that:

> The difference . . . between finishing 11th from the bottom and, say, sixth from the bottom is potentially large. The 11th team has a 1.5 percent chance of getting the first pick in the draft. The sixth team has a 9.1 percent chance. You don't think some teams would go south to play

those odds? (*Salt Lake Tribune* 1992, n.p.)

In other words, increasing your chances by almost eight percent by moving "up" five positions could provide an incentive for a team to lose once eliminated from playoff contention.

During the 1993 draft, Another issue emerged that led to a further revision of the draft format. One team, the Orlando Magic, picked first overall in 1992, but as a non-playoff team, was eligible to win the lottery for the 1993 draft. As the date of the 1993 draft approached, Minnesota Timberwolves owner Harvey Ratner asked Commissioner Stern what the implications of the Magic winning the lottery for the second consecutive year would be, to which Stern replied "a disaster" (Monroe 1993a, n.p.). Orlando had the best win-loss record of the non-playoff teams and therefore the smallest chance of winning the draft lottery (1.5%). Despite the low odds, the Orlando Magic won the 1993 draft lottery. Stern later stated that, "Institutionally, we have a problem with it [the draft lottery]" (Monroe 1993a, n.p.).

The league discussed many variations to the draft format following Orlando's improbable win. Eventually the league voted overwhelmingly to increase the chances of the team with the worst record winning the draft lottery, a decision that is still the format used today (Luksa 1993). The worst team now has a 25 percent chance of winning the draft lottery, whereas previously the worst team's probability was less than 17 percent (Evolution of the Draft and Lottery 2007).[8] The new lottery format with its increased weights still only determines the top three positions. The other draft positions are still determined by reverse order.

Debate about the NBA draft lottery continues. Iannazzone (2008) claimed that the lottery needed adjustment because after the conclusion of the 2007-2008 NBA season, a non-playoff team that won over 60 percent of its games had a chance, albeit a small one, of winning the lottery. Steinmetz (2011) stated that of the 27 years that

[8]For example, the NBA had to adjust the lottery with the addition of two new franchises, Toronto and Vancouver in 1995. The adjustment gave the teams with the second-through-sixth worse records a slightly lower chance of winning.

the NBA used a lottery format (equal-chance and two weighted-lotteries), in only three years has the worst team received the top pick. As a result, Steinmetz (2011) called the draft lottery "the place where the worst of the worst teams in the NBA get hosed [and] . . . the teams that need the most help seldom get it" (Steinmetz 2011, n.p.). Others have supported the lottery system because it does not guarantee that tanking teams receive the top pick (*Austin American-Statesman* 2007). Commissioner David Stern felt compelled to defend the lottery after the 2006-2007 season because of renewed concerns of tanking for a draft with several talented prospects (*Broadcast News* 2007). That season, two potential franchise players, Kevin Durant and Greg Oden were available in the draft. Joel Litvin, who was the NBA President of League and Basketball Operations, said, "Given how much attention [the lottery] has gotten from the media, from owners who have asked questions . . . this is the kind of thing, as with most things, we will go back to question" (Narducci 2007, n.p.). However, the NBA did not alter the lottery format in that season and has not altered it since that season.

1.4 Benefits and Costs of Tanking for NBA Teams

The top four North American professional sports leagues all have an amateur entry draft. The NFL and MLB have not changed from their original reverse-order amateur draft format. In the mid 1990s, the NHL changed its format from reverse-order to a weighted lottery. As mentioned at the opening of this chapter, the NBA was the first league to change its draft format. The NBA also has been the most active amongst the "Big Four" leagues in changing its draft format. As indicated in section 1.3.3, tanking was one of the reasons presented by team and league officials for the NBA needing to change its draft format.

Why would tanking or the perception of tanking be occurring in the NBA and lead league executives to use four different draft formats since the 1980s? Sanderson and Siegfried (2003) hypothesize that, "one [NBA] player could constitute 20% of a [team's] starting line-up [1 out of 5 on the court] and where there is more agreement about a player's potential than in football or baseball, which have larger rosters and predictions of performance are less reliable" (Sanderson and Siegfried 2003, p. 275). Sanderson and Siegfried's (2003) statement pointed to an on-the-court benefit NBA teams receive from a top draft pick. On the NBA's draft history website, the league presents evidence that only three teams since 1985 have seen a decrease in their win total the season after selecting first in the draft (National Basketball Association 2011). Research conducted by Price et al. (2010) reinforced Sanderson and Siegfried's (2003) assertion that the potential impact top draft picks have on their new teams. Price et al. (2010) showed that first overall draft picks from 1977 through 2008 produced 45 wins over the first five years in their career with over seven wins produced in their first season.

Eliminated NBA teams also could receive financial benefits from tanking late in the regular season. NBA teams generate large surpluses from restricted starters (Krautmann, von Allmen, and Berri 2009) and superstar players (Hausman and Leonard 1997). As indicated in section 1.3.2, the NBA instituted a rookie salary scale that fixes a player's salary for up to his first five years in the league according to his draft position. This salary scale provides NBA teams with cost certainty concerning newly drafted players. As a result, an NBA team can generate a significant surplus from superstar players (ex, Lebron James) acquired through the amateur draft because such players are under contract for their first five years in the league at lower salaries than what they could obtain if they were free agents and could have teams bid for their services. Price et al. (2010) estimated that one-third of the first overall draft picks obtained superstar status.[9] Superstar players improve the financial condition for these teams, and they can affect the on-court success of the team (Price, Soebbing, Berri, and Humphreys 2010). This effect on on-court success is the rationale put forth by sports leagues, including the NBA, as to why the amateur

[9] Superstar status is a player whose Wins Produced per 48 minutes (WP48) is greater than 0.200.

draft is necessary.

Top draft picks also increase an NBA team's gate revenue. Price et al. (2010) estimated that an NBA team with the first overall pick saw an increase in gate revenue of 4.5 million dollars. The team with the second overall pick saw a gate revenue increase of 2.25 million. If a team had employed a tanking strategy in the previous season, it would have lost gate revenue for that season because of the assumption the authors made that fans would be less interested in attending those games in which the team put forth less effort. Price et al. (2010) stated that teams that used a tanking strategy would have to lose over 20 additional games in the tanking season in order to offset the 4.5 million dollar gate revenue increase in the season after receiving the number one pick. This gain in gate revenue provides a financial incentive for eliminated teams to intentionally lose games late in the regular season so as to improve their chances of receiving the number one overall selection in the entry draft.

1.4.1 Research on Tanking

Academic research has examined professional and collegiate teams' incentives to win games. Taylor and Trogdon (2002) examined the incentive for NBA teams to win under three NBA draft formats: reverse-order, equal-chance lottery, and the first weighted draft lottery. Taylor and Trogdon (2002) investigated all regular season games from the 1983-1984, 1984-1985, and 1989-1990 NBA seasons. Using a random-effects logistical regression model that controlled for variables such as team quality, neutral court games, home team effect, whether a team had clinched a playoff spot, and whether a team was eliminated from playoff contention, they investigated changes to the draft policy and the incentive those changes had on team behavior to tank late in the regular season. The variables for when the team and its opponent were eliminated from playoff contention were used by Taylor and Trogdon (2002) to detect tanking behavior in the NBA.

The results showed that eliminated NBA teams were tanking under the reverse-order draft format. Specifically, teams that were eliminated from playoff contention were 22 percent less likely to win a regular season game in the 1983-1984 season. Teams that were playing against a team that had been eliminated from playoff contention were 23.7 percent more likely to win during the same time period. When the NBA instituted the equal-chance lottery, the incentive for teams to tank was eliminated. With the adoption of the weighted lottery, tanking behavior returned for regular season games. Specifically, teams that were eliminated from playoff contention were 19 percent less likely to win regular season games while teams playing an eliminated team were 25 percent more likely. Their research did not examine the latest policy adoption, when the NBA increased the probabilities for the worst teams to win the draft lottery starting with the 1993-1994 season.

Price et al. (2010) also examined tanking behavior in the NBA. Examining the 1977-1978 season the through 2008-2009 season, they investigated all four NBA draft formats and concluded that NBA teams were not tanking under the reverse-order and equal-chance lottery formats. However, when the NBA shifted to weighted lotteries, eliminated teams tanked. Specifically examining the last two draft formats, Price et al. (2010) found tanking became more persistent after the adoption of the rookie salary scale in 1995. Overall, the authors concluded that the NBA, by attempting to balance the two interrelated issues of competitive balance and deterring tanking, actually created a highly competitive secondary tournament once teams were eliminated from playoff contention.

Research examining incentives for teams to tank in professional sports leagues extends beyond the NBA. Borland, Chicu, and Macdonald (2009) examined the incentive for Australian Football League (AFL) teams to tank late in regular season games. Australian Rules Football has considered adopting a lottery draft format similar to the NBA's. Borland et al. (2009) examined two draft policies implemented by the AFL: a traditional reverse-order draft and a special assistance draft that gives clubs extra top draft selections if they do not reach a threshold of wins over a certain number of seasons. Borland et al. (2009) examined all regular season AFL games from 1968 through 2005. This sample includes games played before and after the introduction of the reverse-order draft, which began in 1986. Using a "difference-in-difference" approach, their results showed that AFL teams did not tank prior to the adoption of the reverse-order draft. The authors discussed some reasons why tanking did not occur in the AFL. These reasons included the differences in team roster size and the inability of teams to accurately project the quality of amateur players, which reinforced Sanderson and Siegfried's (2003) comment about the NBA. Even though Borland et al. (2009) did not find any evidence of tanking and the AFL did not believe tanking was a concern, the Australian Government launched its own investigation into tanking in the AFL with particular interest in how tanking or the perception of tanking was affecting the gambling revenues that the government receives (Dowling 2009).

Thus, research examining tanking in professional sports leagues has found mixed results. Research on the NBA has shown the presence of tanking under certain league-created incentives. The one research study conducted on a league outside of North American sport found no evidence of tanking. The existing research on tanking is limited in that it does not examine the entire practice of tanking across leagues or how the perception of tanking can affect the league and its policies. This dissertation begins to examine some of the other issues regarding tanking and the strategic behavior of sports leagues.

1.4.2 Relationship Between Tanking and Competitive Balance

The previous research on tanking does not examine either the impact of the draft or the impact of tanking on league-wide competitive balance. Tanking and league-wide competitive balance are related in two ways. Similar to league executives' belief that low competitive balance will harm the legitimacy of the league, tanking could have the same effect. If external stakeholders such as fans, media companies, or corporate sponsors believe that tanking is occurring during the regular season, it could harm the legitimacy of the league and affect the amount of league revenue that these key stakeholders provide to the league.

Tanking and competitive balance are related in a more direct way than that discussed in the previous paragraph. If eliminated teams are indeed tanking, competitive balance could decrease due to a higher dispersion of winning percentage among NBA teams. A decrease in competitive balance, according to league executives, would harm the legitimacy of the league and potentially threaten a league's survival. This dissertation will examine the relationship between the amateur draft and league-wide competitive balance.

1.5 Dissertation Chapters

This dissertation examines the changes to the NBA draft format over the past 30 years, particularly examining the behavior of eliminated NBA teams in regular season games. Following is a summary of each of the three research papers to fulfill the dissertation requirements of the Faculty of Graduate Studies and Research.

Chapter 2 explores the idea that bookmakers who set point-spreads for NBA games believe that NBA teams are tanking late in the regular season. Legal sports betting in the United States is a multi-billion dollar industry, based on the uncertainty of game outcome. Chapter 2 also addresses differences in bookmakers' perception by type of game (conference or nonconference). Chapter 3 examines the presence of tanking in NBA conference and nonconference games. Section 1.3.1 introduced the NBA's unbalanced schedule. Chapter 3 develops propositions surrounding eliminated teams' behavior in conference and nonconference games under the four NBA draft formats. Chapter 4 examines the effect of the amateur draft on league-wide competitive balance. Similar to the league's belief regarding tanking, a league believes that low competitive balance throughout the league threatens the legitimacy of the product and raises the environmental uncertainty regarding the nature of its product in the eyes of outside stakeholders. This chapter examines competitive balance over the entire history of the NBA and explores the effect of different policy changes such as expansion, relocation, and changing the number of teams making the playoffs. Those three chapters build towards a theory of tanking that can be used for future research. Chapter 5 presents a summary of the results of the three chapters, the working theory of tanking, and how this theory of tanking can be developed in the future by researchers examining the tanking phenomenon.

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Chapter 2

Do Gamblers Think That Teams Tank?[1]

2.1 Introduction

According to the American Gaming Association, legal sports betting was approximately a 3 billion USD industry in 2010. The betting industry relies on the uncertainty of game outcome to attract consumers. Prediction markets, like sports betting markets, efficiently aggregate information to provide highly accurate forecasts of future outcomes. In betting markets, prices—point-spreads or money-line odds—take into account all relevant information related to games and provide a market-based forecast of game outcomes. In some cases, prices set in gambling markets may reflect negative or even illegal activities associated with sporting events. Forrest and Simmons (2003) pointed out that the existence of gambling markets makes it easier to detect undesirable behavior, such as match fixing, that might otherwise go undetected. Wolfers (2006) developed evidence from point-spread betting indicating that as many as one in every fifty NCAA men's basketball games involved illegal "point shaving." Larsen, Price, and Wolfers (2008) explored the idea that betting markets contain information about referees' racial biases. The present research examines point-spreads for games in the National Basketball Association (NBA) for evidence

[1] A version of this chapter has been accepted for publication. Soebbing & Humphreys 2011. Contemporary Economic Policy.

that bookmakers believe that NBA teams are intentionally losing games at the end of the season to obtain a higher pick in the subsequent NBA entry draft, a behavior called tanking in the popular press.

Tanking appears to be a problem in some professional sports leagues that use reverse-order entry drafts to allocate new talent to teams. In this sense, the incentive to tank occurs because of league policy decisions. In many North American professional sports leagues, draft position is awarded based on performance in the previous season, creating an incentive for teams to intentionally lose games late in the regular season so as to receive a higher draft pick (Preston and Szymanski 2003). In response to the perception that tanking took place, the NBA and National Hockey League (NHL) altered their draft formats on several occasions in an effort to deter teams from tanking and decrease the public perception that teams intentionally lost games (Price, Soebbing, Berri, and Humphreys 2010).

Tanking affects betting markets in ways similar to match fixing. A front office executive for the Australian Rules Football League (AFL) commented on the relationship between the perception of tanking in that league and betting on AFL matches: "We want a clean and proper competition. And now that there is official betting on AFL games, the sport must be seen as clean - very clean" (Rucci 2008, n.p.). In October 2009, the Minister of Gaming in Victoria, Australia, launched an investigation into the possibility that AFL teams were tanking and the potential effect that tanking would have on the gambling revenue generated from AFL games for the government (Dowling 2009).

Tanking could also have a detrimental effect on bookmakers and government sponsored sports betting. If some bettors have information about potential tanking, an inefficiency exists, and informed bettors can earn rents from the information. The inefficiency in the betting market hurts bookmakers financially if the point-spread does not adjust accordingly because they might not have enough money to pay the winners from the losers' pool. In addition, bookmakers will be reluctant to set point-spreads (or money-lines) for games in which tanking could occur because the threat of losing the uncertainty of game outcome harms their ability to set a proper point-spread. If the uncertainty of game outcome is jeopardized, it affects the efficiency of betting markets, the revenue generated for bookmakers, the league, and in some cases governments. As stated in Section 1.4, the NHL and NBA have adjusted their draft formats and the Australian government has investigated the consequences of tanking in the AFL.

This chapter examines gambling market outcomes from the 2003-2004 through 2008-2009 seasons for evidence that bookmakers believe that eliminated NBA teams are tanking late in the regular season. History indicates that tanking may be a persistent problem in the NBA. As noted in Section 1.3.3, the NBA was the first professional league to alter its draft format in response to perceptions of tanking. Taylor and Trogdon (2002) concluded that NBA teams were tanking under certain draft formats because of the incentive created by the league through its policies. Furthermore, Price, et al. (2010) found that, as the league provided additional incentives for teams to tank, NBA teams responded to those incentives. The additional incentives came in the form of changes in the allocation of entry draft picks and rookie salary caps. During the 2003-2004 through 2008-2009 seasons, significant debate about the possibility of some NBA teams tanking late in the season persisted in the popular press (Soebbing and Mason 2009). One such example occurred in the 2006-2007 season, when an article in the *Las Vegas Review-Journal* stated that handicappers could detect tanking by certain teams late in the regular season. According to a prominent handicapper, “It was very apparent to the betting public that those teams were tanking games” (Youmans 2007, n.p.).

The present research finds evidence that bookmakers believe that eliminated teams tank and the point-spreads on these games change systematically between 1 and 4 points. This chapter examines the extent to which the type of opponent (conference or nonconference) faced in a game when tanking may occur affects point-spreads. This information is important because of the nature of competition for playoff spots in the NBA. The results indicate that, in some instances, tanking when playing against a conference foe affects the point-spread more than tanking when playing a against a nonconference opponent. This finding strengthens the argument that tanking occurs late in the regular season. It also reinforces the point that league policies have important economic consequences. The arrangement of this chapter is as follows. First is a brief overview of the characteristics of sports betting markets. Second is the research examining tanking in the NBA. Third is a presentation of the data and the empirical model. The fourth section is a discussion of the regression model results. Finally, the chapter concludes by offering some areas for future research.

2.2 Characteristics of Sports Betting Markets

Within sports betting, there are two main types: money-line and point-spread. Money-line betting prevails in sports such as hockey, baseball, and European football, where little scoring occurs. Money-line betting is a form of fixed-odds betting, in which bookmakers set the payoff for a bet on a team to win a game. A typical money-line bet takes the form

```
Boston Red Sox   +115
New York Yankees -120
```

where the second team listed is the home team, a negative sign identifies the favored team in the game, and the values identify payoffs to the bets. For the favorite, the number shown is the amount that must be wagered to win $100. In the example above, -120 means that a bettor must wager $120 to win $100 if the Yankees, the home team, win the game. If the Yankees win, the bettor would receive the initial bet of $120 and an additional $100 for a total winning of $220. For underdogs, the number shown is the amount won on a $100 bet. Above, +115 means that a $100 bet on the Red Sox to win would return $115. If Boston wins the game, the bettor would receive his $100 wager back and an additional $115 for a total winning of $215.

The second type of sports betting is point-spread betting. Point-spread betting is common in professional and college football and basketball, in which more scoring occurs. In point-spread betting, the bets are based on the score difference in the game, not on the winner and loser. Bets on the favored team pay off if the favorite "covers" the point-spread by winning by a margin larger than the point-spread. A typical point-spread bet takes the form

```
Los Angeles Lakers
Boston Celtics        -5.5
```

where the second team listed is the home team, a negative sign identifies the home team as the favorite, and a positive sign identifies the home team as the underdog. In this example, Boston is the home team and a five-and-a-half point favorite to beat visiting Los Angeles. Point-spread betting takes the form of risking $110 to win $100 wagers. For a bet on Boston to pay off, Boston must win by 6 points or more. If Boston wins by 6 or more points, then Boston "covered," in betting jargon. In this case, a bettor wagering $110 on Boston would receive the original $110 wagered plus an additional $100 for a return of $210 if Boston covered. If Boston does not cover, then a bet on Boston loses.[2] Bets on Los Angeles win if Los Angeles wins the game outright or loses the game by 5 points or less. Clearly, money-line odds and point-spreads can be interpreted as the price a bettor must pay for a contingent claim of a given amount of money wagered on the outcome of a game. When the point-spread is an integer and the difference in points scored by teams in the game is equal to the point-spread, the game is a "push," and all money is returned to the bettors. Although point-spreads can change as new information becomes available, all point-spread bets are evaluated at the point-spread posted by the bookmaker when the bet

[2]Note that Boston could win the game but not cover the point-spread.

was made.

Money-line odds and point-spreads are set by bookmakers. Bookmakers maximize profit by collecting money from losing bets and paying off winning bets. In general, a bookmaker's profit margin is called "over round" in money-line betting and "vigorish" or the "vig" in point-spread betting. To illustrate over round and profit in money-line betting, when $100 is wagered on the Yankees and Red Sox in the example above, the bookmaker collects $220 in bets on the game: $100 from a bet on the Red Sox and $120 from a bet on the Yankees. If the Red Sox win, the bookmaker pays the bettor who wagered on the Red Sox $215, and keeps $5 profit. If the Yankees win, the bookmaker pays the bettor who wagered on the Yankees $220 and earns no profit. On average, the bookmaker earns a profit margin that is proportional to the difference in the absolute value of the posted odds. To illustrate the vig and profit in point-spread betting, when $100 is wagered on the Lakers and Celtics in the example above. the bookmaker collects $220: $110 from the bettor wagering on the Celtics and $100 from the bettor wagering on the Lakers. If the Celtics win by 6 or more points, the bookmaker pays the bettor who wagered on the Celtics $210 and keeps $10 in profit. If the Lakers win or lose by 5 or fewer points the bookmaker pays $210 to the bettor who wagered on the Lakers and keeps $10 in profit. As shown in Section 2.2.1, point-spreads also accurately predict outcomes of games, suggesting that odds and point-spreads reflect all available information about a given game. This property has been investigated extensively in the literature (Sauer 2005) and has important implications for the efficiency of sports betting markets.

2.2.1 Efficiency in Sports Betting Markets

Wagering markets resemble financial markets in several important ways. Both involve risks and uncertain payouts. Like financial markets, the efficiency properties of wagering markets have been thoroughly investigated. Sauer (1998) identified three definitions of efficiency in wagering markets: constant returns, the absence of profit opportunities, and efficient pricing of point-spreads. Constant returns is the basis for empirical tests of efficiency in pari-mutual style wagering markets, such as horse racing and lotteries. Under constant returns, the expected returns from betting on all outcomes in a contest (i.e., all the horses in a race) is equal to 1 minus the takeout/vig.

The absence of a profit opportunity assumes both parties in a bet—the bookmaker and the bettor—cannot simultaneously make a profit. The bookmaker constructs the market in a way that induces half the money to be bet on one team and half the money to be bet on the other team. By accomplishing this task, the bookmaker guarantees a profit because he or she pays the winners from the losers' pool. The market, similar to a financial market, does not generate any systematic profit opportunities (Sauer 1998). Therefore, a bettor cannot earn profits in the long run.

The efficiency of point-spreads relates directly to the literature on financial markets. Sauer (1998) grouped the research examining the efficiency of point-spreads into two broad research questions. The first question was whether systematic profit opportunities exist in the point-spread betting market. The second question was whether the relationship between the point-spread and the actual outcome of the difference in points holds for the market. What exactly is this relationship between the point-spread and the actual difference in points? Sauer (1998) stated that, given the symmetry of the difference in points, the point-spread would be an unbiased predictor of the actual difference in points. Equation 2.1 illustrates that relationship.

$$PS = E(DP) \tag{2.1}$$

In Equation 2.1, PS is the point-spread set by the bookmaker and DP is the actual difference in points for a match. Sauer (1998) stated "a stronger definition of efficiency implies that the point-spread fully incorporates all relevant information" (Sauer 1998, p. 2049-2050). This statement implies two things. The first is the definition of strong efficiency, no information can predict the future prices. The future price is the next PS. The second is a direct relationship to efficient pricing, the PS reflects the full intrinsic value of the "stock" (game outcome). Equation 2.2 denotes this stronger definition of efficiency compared to Equation 2.1

$$E(DP - PS|\Omega) = 0 \tag{2.2}$$

Ω denotes all the relevant information regarding the match, DP denotes the difference in points of the match, and PS is the point-spread set by the bookmaker. These two definitions provide the context for examining the efficiency of betting markets in the NBA.

Sauer's (1998) two research questions, testing for the existence of systematic profit opportunities in point-spread betting markets and examining the relationship between game outcomes and point-spreads, provide a convenient way to summarize the existing literature on market efficiency in the NBA. Considerable research has addressed. Camerer (1989) examined the belief in the "hot hand" in betting markets. The hot hand was defined as winning or losing streaks by NBA teams. The belief in the hot hand is a mistake generated by bettors misunderstanding of randomness. Camerer (1989) examined point-spreads on NBA regular-season games from 1983-1986. He hypothesized that teams with winning streaks would have point-spreads set too high by bookmakers. The opposite occurred for teams with losing streaks: Point-spreads were too low. These forecasting errors (defined as the difference between the predicted spread and the actual difference in points) were grouped by streaks. His results agreed with the two hypotheses. However, the results were not large enough to be exploited by the betting public.

Brown and Sauer (1993a) criticized Camerer's (1989) results, pointing out that Camerer's (1989) conclusion was based on the premise that the hot hand phenomenon was a myth. Because Camerer (1989) did not attempt to identify changes in both point-spreads and the performance of teams, his hypotheses were only indirect tests of the hot hand effect. In order to examine all beliefs about the hot hand, Brown and Sauer (1993a) examined regular season NBA games for the 1982-1983 through

1987-1988 seasons and tested three hypotheses. The first was that the hot hand phenomenon was irrelevant to both the betting markets and the actual game outcomes. The second hypothesis was that people believe in the hot hand. Finally, hot hand effects do exist within the market because of the efficient market hypothesis. From their analyses, Brown and Sauer (1993a) concluded that the hot hand phenomenon was real in the sense that winning and losing streaks influenced the point-spreads.

Brown and Sauer (1993b) further examined the determinants of point-spreads and identified specific sources of variation in point-spreads. According to Brown and Sauer (1993b), observed point-spreads were composed of two parts: The first depended on the relative abilities of the two teams; the second reflected "noise" or random errors. This dichotomy recognized that both observable and unobservable fundamentals were taken into account by bettors but were not known to the overall market or the researcher and that unobserved random factors also affected point-spreads. Using the same sample as Brown and Sauer (1993a), they concluded that the noise component represents unobserved fundamentals that were present in the market.

Gandar, et al. (1998) examined differences from the opening point-spread and the closing point-spread for NBA regular-season games in the 1985-1986 through 1993-1994 seasons. The authors observed frequent changes between the opening point-spread and the closing point-spread in the sample. Their analyses revealed that changes in regular season point-spreads improved the forecasting accuracy of actual game point differences. Gandar et al. (1998) also revealed that changes in point-spreads were not white noise but rather reflected unobservable fundamentals. This finding was similar to that of Brown and Sauer (1993b). As Gandar et al. (1998) stated, "While we do not disagree that bookmakers are incorporating most, and sometimes all, of the fundamental information into opening lines, our results indicate that the betting public also possess fundamental information into price" (Gandar, Dare, Brown, and Zuber 1998, p. 399).

Paul and Weinbach (2005) extended both Camerer's (1989) and Brown and Sauer's (1993a) research on the effect of streaks in betting markets. In their paper examining over-betting on favorites, Paul and Weinbach (2005) examined NBA regular-season games from 1995-1996 through 2001-2002 and determined that the hot hand exists in that the public overbets on teams on winning streaks. However, Paul and Weinbach (2005) found that bettors did not pay the same attention to teams on losing streaks. This result differed from the previous research by Camerer (1989) which indicated bettors sensitivity to both winning and losing streaks.

Finally, Ashman, Bowman, and Lambrinos (2010) examined the effect that playing games on back-to-back nights has on the betting market. Using information from NBA regular-season games from 1991-1992 through the 2008-2009 seasons, Ashman, Bowman, and Lambrinos (2010) found the home teams underperformed against the point-spread in the second game in a back-to-back series when the opponent was rested. Ashman et al. (2010) also found that visiting teams that traveled from west to east tended to perform worse than visiting teams that traveled from east to west.

In summary, research on point-spread markets indicates that point-spreads did not always predict game outcomes accurately but these instances were not frequent enough to reject the hypothesis of market efficiency. Sauer (2005) suggested that researchers who use sports betting data should expand the research past the questions of whether the market is efficient or profit opportunities exist and discussed two possible areas for future sports-betting research. The first was to examine real-time pricing data, which are present on Internet betting sites such as BetFair. Research is beginning to examine this phenomenon (Croxson and Reade 2009, Sauer, Walker, and Hakes 2010). The second area of research was "applications in which efficient prices were assumed, with the aim of discovering information revealed by the pricing mechanism" (Sauer 2005, p. 418). Brown and Sauer (1993b) posited the existence of unobserved fundamentals that accounted for these changes. The research discussed above examined some of these potential unobserved fundamentals.

In the context of the efficiency literature, tanking is a fundamental factor affecting game outcomes, and the present research looks for evidence that this fundamental factor is priced in sports-betting markets reinforcing Brown and Sauer's (1993b) finding that other fundamental factors are affecting the point-spread of NBA games.

2.3 Tanking in the NBA

Tanking occurs when teams intentionally lose games for a financial gain. Tanking has been a concern in the NBA since the early 1980s, when accusations of teams intentionally losing regular season games first appeared in media reports. The benefit from tanking comes from the opportunity to move up in the entry draft to acquire better players, leading to additional wins and revenues in future seasons (Price, Soebbing, Berri, and Humphreys 2010). This behavior is problematic from the standpoint of the league because it decreases the uncertainty of game outcomes as well as year-to-year league competitive balance. As a result, the NBA strategically altered league policy, in terms of its draft format, three times over the last twenty-five years to deter tanking or reduce the perception that tanking takes place.

In the early 1980s, the NBA used the traditional reverse-order entry draft format. Under this format, the teams with the worst record in each conference would flip a coin to determine which team received the number one overall selection in he next entry draft. Based on concerns that teams were tanking late in the regular season to receive a 50-50 chance at the number one overall selection, the NBA altered its policy, beginning with the 1984-1985 season, to give all non-playoff teams an equal probability of receiving the first overall selection in the next entry draft. This equal-probability draft format displeased some owners who believed that it did not help the worst teams in the league to improve, thus affecting competitive balance. As a result, beginning with the 1989-1990 season, the NBA adopted a weighted-lottery format that gave the worst teams in the league a higher probability of receiving the number one overall selection in the following entry draft. In 1993-1994 season, the

NBA adjusted those probabilities to give the worst teams an even higher probability of receiving the number one overall selection in the draft (Soebbing and Mason 2009).

Two previous papers examined how these changes in draft policy affected teams' efforts late in the regular season. Taylor and Trogdon (2002) examined tanking in the NBA under the first three draft formats: the traditional reverse-order draft, the equal probability draft, and the first weighted-lottery draft. Taylor and Trogdon (2002) found evidence that teams tanked late in the regular season under the reverse-order and the weighted-lottery draft formats. These two draft formats explicitly rewarded teams for losing when compared to the equal probability lottery, which did not provide a strong incentive for teams to intentionally lose games late in the regular season. Price et al. (2010) extended Taylor and Trogdon's (2002) research by including all regular season games in the 1977-1978 through 2007-2008 seasons, a period containing all entry draft formats used by the NBA. Their results showed that NBA teams responded to increasing incentives to tank by engaging in this behavior more frequently.

In the light of previous research, the present research assumes that an incentive does exist for teams to lose once they are eliminated from playoff contention and looks for evidence that betting markets behave as though bookmakers believe that tanking takes place. Again, tanking can be thought of as an unobserved fundamental in the NBA betting market, as in Brown and Sauer (1993b), which identified factors like match-up problems, changes in the composition of teams from season to season, and injuries to star players as important unobservable fundamentals affecting betting markets.

2.4 Data

The current research analyzes point-spreads, game outcomes, and game characteristics data from 7,339 regular season NBA games from the 2003-2004 through 2007-2008 regular seasons. These seasons were conducted under the current NBA draft format, which was adopted in the early 1990s. The point-spread data come from Sports Insights, a subscription service that provides data from betting markets. Game characteristics data were collected from multiple sources, including ESPN and Database-Basketball (http://www.databasebasketball.com). The point at which teams clinched playoff berths or were eliminated from playoff contention was calculated by hand for each NBA season, based on the standard "magic number" formula. Table 2.1 contains summary statistics for the sample.

Table 2.1: Summary Statistics (N=7,339)

Variable	Mean	Std. Dev	Min	Max	Skewness
Final Point-spread	-3.42	6.04	-22.5	17	0.29
Difference in Points	-3.29	12.71	-52	50	0.05
Forecast Error	0.13	11.35	-46.5	46.5	-0.03
Total Points Scored	195.46	21.27	124	318	0.37
Home Team Covered	0.48	0.50	0	1	—
Away Team Clinch	0.06	0.23	0	1	—
Home Team Clinch	0.06	0.23	0	1	—
Away Team Elim.	0.05	0.21	0	1	—
Home Team Elim.	0.05	0.21	0	1	—

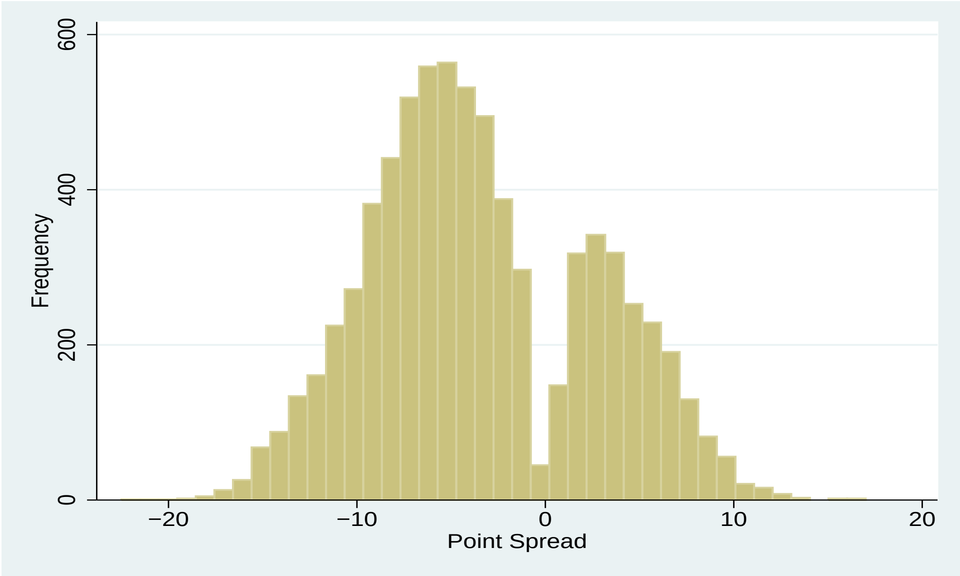
During the sample period, 7,339 regular season games were played in the NBA. The mean final point-spread, expressed as favored home teams minus points and underdog home teams plus points, was -3.42 indicating that the average home team was just under a 3.5-point favorite during the sample period. The mean difference in points scored was -3.29 indicating that the home team won by a little more than 3 points on average. The variance of the difference in points scored exceeds the variance of the point-spread by a significant amount. Actual game outcomes were much more varied than point-spreads, even though point-spreads are good predictors of game outcomes. This feature also occurs in other betting markets. The forecast error shows that, on average, the visiting team performed slightly better than predicted by the final point-spread. The average total combined points scored by the two opposing teams in a game was 195. The home team covered or won by more than the point-spread if favored and lost by less than the point-spread if not favored in 48 percent of the games in the sample. A value of zero for the skewness statistic indicates a normally distributed variable.

The last four variables show the percentage of games in the sample in which the home and visiting teams had already clinched a postseason appearance or had been eliminated from playoff contention. The skewness statistic indicates variables with a large probability mass in one tail. Skewness statistics cannot be applied to dichotomous variables. The last two variables identify teams with an incentive to tank late in the regular season. Teams that have been eliminated from playoff contention have a smaller incentive to win games. In the next section, formal tests are performed regarding the importance of tanking in determining both game outcomes and point-spreads.

Figure 2.1 shows the distribution of the point-spreads in the sample. This figure shows the slight skew to the right, as indicated by the skewness statistic in Table 2.1. This skewness comes from the home court advantage that is built into the point-spread for NBA games. In addition, the graph shows that bookmakers only infrequently list point-spreads as "pick 'em" (no favorite) in NBA games, so the height of the histogram bar at zero is quite small.

Figure 2.2 shows the distribution of points scored in the sample. The bar at zero actually contains games decided by one point. The variance of the difference in points is clearly larger than the variance of the point-spread. Again the distribution has a slight skew to the right, as indicated by the skewness statistic on Table 2.1. This skewness is evidence that the home court advantage exists in the NBA, as suggested by previous research (Mizruchi 1985, Courneya and Carron 1992, Gandar, Zuber, and Lamb 2001).

Figure 2.1: Final Point-Spread



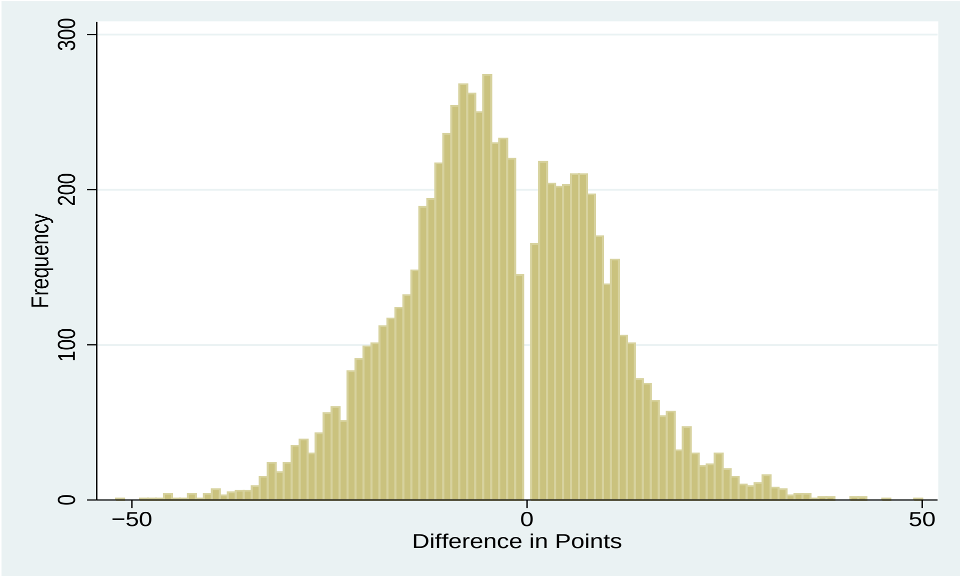
2.5 Empirical Analysis

To examine the effect of tanking on point-spreads in NBA games, the current research uses a seemingly unrelated regression (SUR) model similar to the one used by Brown and Sauer (1993a) to analyze the relationship between game outcomes and point-spreads in the NBA. Brown and Sauer (1993a) modeled the determination of point-spreads as a function of team strengths and other fundamental factors that affected point-spreads in a two-equation SUR model. The point-spread equation is as follows:

$$PS_{hags} = \alpha_{ps} + \theta_h^{ps} HT_{hgs} + \theta_a^{ps} AT_{ags} + \beta_1 hclinch_{hgs} + \beta_2 aclinch_{ags} + \beta_3 helim_{hgs} + \beta_4 aelim_{ags} + \epsilon_{hags}^{ps} \tag{2.3}$$

where s indexes seasons, g indexes games, h indexes home teams and a indexes away teams. α_{ps} captures home court advantage built into NBA point-spreads. HT_{hgs} is a vector of indicator variables that capture the ability or strength of the home team in game g in season s. AT_{ags} is a vector of indicator variables that capture the ability or strength of the away team in game g in season s. $hclinch_{hgs}$, $aclinch_{ags}$,

Figure 2.2: Difference in Points Scored



$helim_{hgs}$, and $aelim_{ags}$ are indicator variables identifying home or away teams that already clinched ($clinch$) a postseason spot or were already eliminated ($elim$) from postseason contention before game g in season s. ϵ^{ps}_{hags} is the equation error term capturing all other factors that affect point-spreads for regular season NBA games. The assumption is that ϵ_{hags} is identically and independently distributed with mean zero and constant variance σ^2_ϵ. α_{ps}, θ^{ps}_a, θ^{ps}_h, β_1, β_2, β_3, and β_4 are unknown parameters to be estimated.

The parameters β_3, and β_4 will reflect the extent to which bookmakers believe that tanking takes place in the NBA. The only teams with a clear incentive to lose games to improve their position in the next entry draft are teams that have been eliminated from playoff contention. A team still in contention for a playoff spot will still have an incentive to win games because the financial pay off from playoff appearances, in terms of additional home games and television appearances, is large (Noll 1991). β_3 and β_4 will capture any systematic variation in point-spreads for games involving teams that have an incentive to tank. If these parameters are different from zero, then some evidence that bookmakers believe that tanking takes place exists.

Brown and Sauer (1993a) also modeled the determination of game outcomes, in this context the difference in points scored, in a similar fashion

$$DP_{hags} = \alpha_{dp} + \theta_h^{dp} HT_{hgs} + \theta_a^{dp} AT_{ags} + \gamma_1 hclinch_{hgs} + \gamma_2 aclinch_{ags} + \gamma_3 helim_{hgs} + \gamma_4 aelim_{ags} + \epsilon_{hags}^{dp}. \tag{2.4}$$

In Equation 2.4, the game outcome equation, s, g, h and a and the explanatory variables are defined as in equation 2.3. α_{dp} captures the actual home-court advantage in NBA games. ϵ_{hags}^{dp} is the equation error term capturing all other factors that affect point-spreads for regular season NBA games. We assume that ϵ_{hags} is identically and independently distributed with mean zero and constant variance σ_ϵ^2. α_{dp}, θ_a^{ps}, θ_h^{ps}, β_1, β_2, β_3, and β_4 are unknown parameters to be estimated.

The parameters γ_3 and γ_4 reflect the extent to which taking occurs in the NBA. The only teams with a clear incentive to lose games to improve their positions in the next entry draft are teams that have been eliminated from playoff contention. β_3 and β_4 will capture any systematic variation in game outcomes for games involving teams who have an incentive to tank. If these parameters are different from zero, they are interpreted as evidence that NBA teams are tanking late in the regular season.

Like Brown and Sauer (1993a), the present research estimates Equations 2.3 and 2.4 using SUR technique and GLS to control for any heteroscedasticity in the equation error terms. The present research estimates Equation 2.3 separately for each season in the sample to control for year-to-year variation in team quality due to personnel and management changes. An alternative approach would be to pool games across seasons and add season-specific indicator variables. However, doing so would force the team quality indicators to be equal across seasons. The GLS approach also accounts for any correlation between the equation error terms, ϵ_{hags}^{ps} and ϵ_{hags}^{dp}.

2.5.1 Results and Discussion

Table 2.2 contains estimates of the home and away team ability index parameters, θ_a, θ_h in equations 2.3 and 2.4.[3] The parameter estimates capture the ability of each team in that season relative to the omitted team, the Atlanta Hawks. In 2004-2005, the Hawks were the worst team in the NBA, recording only 13 victories in the regular season. As noted, point-spreads are expressed as home team minus the point-spread when the home team is favored and plus the point-spread when the home team is the underdog. The estimated parameters on the home ability indicators are negative and generally significant, indicating that home teams were, on average, favored and stronger at home than the Hawks, although the Bobcats were not significantly stronger than the Hawks, according to the t-statistics in Table 2.2.[4] The away ability indexes are positive and generally significant, indicating that the away teams in the league were, on average, underdogs in games and stronger on the road than the Hawks. Brown and Sauer (1993b) pointed out that these estimates, combined with the estimated home court advantage, $\hat{\alpha}$, can be used to create a predicted point-spread for any NBA game in the 2004-2005 NBA season.

The parameters of interest are those on the indicator variables for teams that had clinched playoff sports or been eliminated from the playoffs at game time in the SUR model. Table 2.3 shows the SUR parameter estimates and p values for each of the playoff clinch and elimination indicator variables for each season in the sample for the point-spread equation, Equation 2.3, and the game outcome equation, Equation 2.4. Equation 2.3 explains between 75 and 82 percent of the observed variation in point-spreads in each of the seasons, while Equation 2.4 explains much less of the observed variation in points scored (20 and 33 percent). These results are surprising, given that point differences are much more variable than point-spreads. The parameter for

[3]The results for other seasons are available upon request. In addition, the data for Oklahoma City Thunder include both those for the current Oklahoma City team and the old Seattle Supersonics team that relocated to Oklahoma City for the 2008-2009 season.

[4]For the 2004-2005 season, the Charlotte Bobcats were an expansion team.

Table 2.2: Home and Away Ability Index, 2004-2005 Season

	Point-Spread Model				Game Outcome Model			
	Home Ability		Away Ability		Home Ability		Away Ability	
Franchise Name	Coef.	Z-stat	Coef.	Z-stat	Coef.	Z-stat	Coef.	Z-stat
Boston Celtics	-7.99	-12.10	7.41	11.29	-9.42	-3.94	9.71	4.09
Charlotte Bobcats	-1.09	-1.68	0.47	0.72	-4.64	-1.97	2.17	0.92
Chicago Bulls	-5.75	-8.68	5.01	7.63	-9.96	-4.16	10.10	4.25
Cleveland Cavaliers	-10.28	-15.53	7.97	12.16	-12.43	-5.19	6.44	2.71
Dallas Mavericks	-13.42	-20.22	12.76	19.34	-13.64	-5.68	17.09	7.15
Denver Nuggets	-10.34	-15.60	7.57	11.50	-13.83	-5.76	9.35	3.92
Detroit Pistons	-12.17	-18.42	11.48	17.46	-11.94	-5.00	13.51	5.68
Golden State Warriors	-6.59	-10.07	4.66	7.14	-7.72	-3.26	7.47	3.16
Houston Rockets	-10.28	-15.49	9.95	15.10	-11.60	-4.83	14.75	6.19
Indiana Pacers	-7.10	-10.74	6.43	9.81	-8.72	-3.64	10.70	4.51
Los Angeles Clippers	-8.07	-12.28	5.92	9.04	-10.68	-4.49	7.12	3.01
Los Angeles Lakers	-7.78	-11.81	6.31	9.63	-8.34	-3.50	5.41	2.28
Memphis Grizzlies	-10.57	-15.94	8.53	12.96	-10.87	-4.53	12.82	5.38
Miami Heat	-12.27	-18.52	12.56	19.04	-14.73	-6.15	15.36	6.44
Milwaukee Bucks	-6.68	-10.17	5.02	7.71	-9.56	-4.02	3.05	1.30
Minnesota Timberwolves	-10.86	-16.35	11.24	17.10	-9.64	-4.01	11.87	4.99
New Jersey Nets	-5.97	-9.05	4.97	7.60	-6.77	-2.84	7.96	3.36
New Orleans Hornets	-2.56	-3.92	1.20	1.84	-2.31	-0.98	4.07	1.73
New York Knickerbockers	-7.14	-10.86	5.16	7.92	-7.36	-3.09	5.46	2.32
Oklahoma City Thunder	-11.15	-16.82	9.36	14.20	-11.28	-4.70	13.01	5.45
Orlando Magic	-8.14	-12.33	6.33	9.69	-7.34	-3.07	5.78	2.45
Philadelphia 76ers	-7.97	-12.04	6.61	10.08	-7.41	-3.09	8.91	3.76
Phoenix Suns	-14.15	-21.22	14.88	22.54	-14.71	-6.10	17.74	7.42
Portland Trail Blazers	-6.28	-9.61	5.27	8.07	-5.35	-2.26	6.46	2.74
Sacramento Kings	-12.13	-18.34	10.30	15.65	-13.82	-5.77	9.93	4.17
San Antonio Spurs	-15.50	-23.30	15.33	23.05	-18.69	-7.77	16.09	6.69
Toronto Raptors	-5.60	-8.53	4.84	7.40	-6.87	-2.89	7.80	3.30
Utah Jazz	-7.24	-11.09	4.92	7.55	-6.42	-2.72	4.84	2.05
Washington Wizards	-8.68	-13.15	5.69	8.69	-10.60	-4.44	6.48	2.73

the indicator variables for teams that had clinched playoff berths before game g was played in the point-spread model are only occasionally significant, in 2003 for home teams and in 2005 and 2008 for away teams. Point-spreads for games involving teams that have clinched a playoff berth are not often different from point-spreads for games not involving playoff-bound teams, holding the relative quality of the teams involved constant. The estimated parameters for the indicator variables for games involving teams that had already been eliminated from playoff contention are all statistically significant.

The estimated parameters for home teams that had been eliminated are positive and significant, suggesting that home teams that have been eliminated from playoff contention are not favored as much as teams that have not been eliminated from playoff contention, holding the relative quality of the teams involved constant. The estimated parameters for away teams that have been eliminated are negative and significant in the point-spread model, suggesting that home teams playing opponents who have been eliminated from playoff contention are favored by more than home teams playing opponents that have not been eliminated from playoff contention, holding the relative quality of the teams involved constant. This result is evidence that bookmakers believe that NBA teams are tanking. Specifically, bookmakers believe that home teams that have been eliminated from playoff contention are tanking, so these teams are not favored in betting markets by as much as teams with no incentive to tank. Visiting teams that have been eliminated from playoff contention also have an incentive to tank, and these teams are bigger underdogs than visiting teams that have no incentive to tank. The point-spreads for games involving teams with an incentive to tank differ systematically from the point-spreads for games involving teams with no incentive to tank, and the point-spread adjustment is consistent with the idea that betting markets expect teams with an incentive to tank to put forth less effort in the game.

The evidence that tanking actually occurs in the NBA is not strong, based on the results from Equation 2.4. The estimated parameters for away teams that have been eliminated are not statistically different from zero in any of the six seasons in the game outcome equation, suggesting that home teams playing opponents who have been eliminated from playoff contention do not outscore their opponents by more than would be expected, holding the relative quality of the teams involved constant. The estimated parameters for home teams that have been eliminated are not statistically different from zero in five of the six seasons in the game outcome model. Despite the fact that betting markets adjust for tanking, little evidence of tanking can be found in the game outcome model. As noted, both Taylor and Trogdon (2002) and Price et al. (2010) found evidence of tanking in the NBA. These studies estimated the probability that a team would win a given game, not the difference in points scored, a different approach to detecting tanking. Point differences on NBA games exhibit a great deal of variability, much more than point-spreads, making it difficult to detect tanking in point differences. In addition, tanking requires only that a team loses a game, not that the team gets blown out making tests based on the conditional probability of winning a game better suited to detecting tanking than tests based on the conditional analysis of the difference in points scored.

Some interesting patterns also emerge when the events surrounding some of the seasons in the sample are considered. For example, during the 2006-2007 season, one newspaper reported that the season was unusual from a tanking standpoint, going as far as to suggest that fans thought that games could be fixed (Youmans 2007). Price et al. (2010) did not find evidence that tanking took place in the 2006-2007 season. In Table 2.3, the size of the estimated parameters on the elimination indicator variables from the 2006-2007 season are larger than those for the 2005-2006 season; the size of the parameter on the away team being eliminated doubled from 2005-2006 to 2006-2007. The point-spread adjustment for tanking was larger, suggesting that bookmakers believed tanking was more likely in 2006-2007. This pattern is consistent with the newspaper article quoting a prominent handicapper who said that tanking was worse in 2006-2007 than in the previous season (Youmans 2007). Interestingly, the estimated parameters for the elimination variables for the 2007-2008 season indicate that the point-spread adjustment for tanking was even larger in 2007-2008 than in the previous two seasons. This result could be due to variation in the quality of players available in the upcoming entry draft. Price et al. (2010) pointed out that the incentive to tank may vary with expectations about the potential new entrants available in the draft. The top three picks in the 2007 draft were Greg Oden, Kevin Durant, and Al Horford. The first three picks in the 2008 NBA draft featured players such as the 2010-2011 NBA Most Valuable Player (MVP) Derrick Rose (the first pick), Michael Beasley, and O.J. Mayo. If the 2008 class was perceived as stronger at the end of the 2007-2008 NBA season, then bookmakers might expect that the incentive to tank was greater and adjust point-spreads accordingly. This period also corresponds to the first two years that the NBA adopted a minimal age requirement for draft entrants. Previously, a player could be drafted straight from high school. The rule currently states that a player must be one year removed from high school to be eligible for the NBA draft. This extra year may provide teams with a better indication of player talent and how the player projects as a player in the NBA.

Table 2.3: SUR Results by Season

Variable	2003	2004	2005	2006	2007	2008
	Point-Spread Model					
Home Clinch	-0.961	0.051	0.585	-0.550	-0.113	0.695
	0.013	0.913	0.151	0.173	0.804	0.092
Away Clinch	0.347	-0.810	-1.134	0.593	-0.868	-0.847
	0.396	0.077	0.003	0.152	0.069	0.038
Home Eliminated	2.888	1.341	1.721	2.593	4.021	1.190
	<0.001	0.003	<0.001	<0.001	<0.001	0.003
Away Eliminated	-1.380	-0.976	-1.824	-2.173	-3.713	-1.365
	0.011	0.036	<0.001	<0.001	<0.001	<0.001
α	-3.711	-2.255	-3.384	-2.676	-3.900	-5.072
	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
R^2	0.757	0.762	0.772	0.755	0.818	0.822
	Game Outcome Model					
Home Clinch	-1.840	-2.301	3.043	2.023	-1.660	2.770
	0.214	0.172	0.070	0.223	0.339	0.099
Away Clinch	-1.331	-4.762	-3.037	-0.474	-2.461	-4.261
	0.396	0.004	0.052	0.780	0.176	0.010
Home Eliminated	2.681	3.017	2.529	4.842	2.428	1.025
	0.198	0.069	0.205	0.022	0.135	0.523
Away Eliminated	2.204	-0.131	-0.434	-0.959	-0.193	-0.812
	0.290	0.938	0.830	0.656	0.901	0.597
α	-8.421	-2.402	-2.674	-5.549	-4.609	-4.953
	<0.001	0.320	0.282	0.030	0.065	0.045
R^2	0.239	0.247	0.203	0.203	0.330	0.284

A number of robustness checks were run to test the strength of these results. The robustness checks focus on whether $helim_{hgs}$ and $aelim_{hgs}$ actually identify the perception or presence of tanking in the point-spread model or just reflect poor team performance at the end of the season. The checks examine whether the ability indexes estimated for the entire regular season represent an appropriate time frame to control for home and away team ability. Injuries, exhaustion, and player acquisitions and releases over the course of a season could lead to significant changes in a team's ability, especially later in the season. Estimating team ability over the entire regular season assumes constant team ability. To address this issue, a separate model was estimated, which allowing a team's ability to vary across groups of about 20 games. This model included the team fixed effects from the SUR model interacting with a vector of indicator variables for each 20-game period. The results from these regressions were similar to the results in Table 2.3 that assume constant team ability over the entire season. This result suggests that the elimination variable captures tanking and not just poor play from eliminated teams at the end of the season. Put another way, previous research by Taylor and Trogdon (2002) and Price et al (2010) examined multiple draft iterations in which team objectives of player development, player fatigue, and so on were held constant over time. The present research does not have that luxury of examining different draft formats. However, the robustness checks allow one to conclude that, in fact, the $helim_{hgs}$ and $aelim_{hgs}$ actually identify the presence of tanking.

The incentive for a team to tank might also change depending on the conference affiliation of the opposing team. As mentioned in Section 1.3.1, the NBA uses an unbalanced schedule in which teams play their conference opponents more than their nonconference opponents. Similar to the competition for a spot in the league's playoff tournament, the conference/nonconference distinction is important to the strategic behavior of eliminated NBA teams competing for the top draft position under the various draft formats. First, under the early reverse-order draft format, a team had to be the worst team in its conference for an opportunity to select first overall in the draft (Soebbing and Mason 2009). Once the league changed from the reverse-order format, teams received a probability of winning the lottery based not on rank order of finish in comparison to its conference foes but on their winning percentage in comparison to all non-playoff teams in the league. As a result, the importance of tanking in conference games may be diminished under the current draft format. Thus, the point-spread should not be different for games played against conference or nonconference opponents. A more detailed discussion of the conference/non-conference distinction appears in Chapter 3.

To investigate this possibility, the present research constructs an alternative model that interacts the elimination indicator variables with an indicator variable for conference opponents. Table 2.4 shows the results for this model. The home clinch variables are significant in 2003, 2006, and 2007. The away team clinch variables are significant in 2003 and 2006. Based on the estimated parameters for the elimination indicator variables interacting with the conference opponent indicator variable, the perception is that tanking exists when eliminated home teams are playing nonconference opponents, but not for games involving conference opponents. Eliminated away teams playing conference opponents did have a significant point-spread adjustment of approximately 2.3 points over the home team.

The variable for when the home team is eliminated from playoff contention and playing a conference opponent is significant in 2003, 2004, and 2007. If the home team is eliminated and plays an opponent from the other conference, that parameter is significant in 2006 and 2007. If the away team is eliminated and plays against a team from the same conference, that parameter is significant in 2006 and 2007. For an eliminated visiting team who plays a team from the other conference, none of the results for seasons in Table 2.4 are significant.[5] These models explain between 75 and 82 percent of the observed variation.

Did point-spreads vary systematically by the type of opponent? Under the current draft format there is no additional incentive for a team to tank against a conference opponent; under earlier draft formats the last place team in each conference flipped

[5]The parameter in the 2004 season has a p-value of 0.051.

Table 2.4: SUR Results with Elimination Interaction Term by Season

Variable	2003	2004	2005	2006	2007	2008
			Point-Spread Model			
Home Clinch	-1.285	-0.513	-0.055	-0.940	-1.351	0.253
	0.001	0.255	0.884	0.019	0.003	0.523
Away Clinch	1.005	-0.306	-0.623	1.251	0.398	-0.449
	0.009	0.474	0.083	0.001	0.395	0.249
Home Eliminated*Conf Opponent	1.675	1.531	1.520	1.529	4.338	0.822
	0.049	0.045	0.067	0.117	<0.001	0.263
Away Eliminated*Conf Opponent	-2.022	-0.215	-1.533	-2.326	-4.616	-0.568
	0.034	0.768	0.125	0.029	<0.001	0.452
Home Eliminated*NonConf Opponent	1.445	-0.089	-0.026	2.969	2.465	0.953
	0.212	0.925	0.981	0.013	0.001	0.165
Away Eliminated*NonConf Opponent	-0.981	2.310	0.121	-1.461	-1.037	-1.097
	0.290	0.051	0.898	0.234	0.155	0.084
α	-3.385	-2.251	-3.448	-2.706	-3.937	-8.200
	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
R^2	0.753	0.762	0.769	0.751	0.807	0.820
	—	—	—	—	—	—
			Game Outcome Model			
Home Clinch	-2.051	-3.043	2.707	1.741	-1.880	2.746
	0.148	0.062	0.080	0.285	0.258	0.086
Away Clinch	-0.481	-3.680	-2.473	0.393	-1.922	-3.929
	0.744	0.017	0.093	0.803	0.267	0.012
Home Eliminated*Conf Opponent	-2.544	1.489	1.763	2.476	2.931	2.332
	0.431	0.590	0.604	0.533	0.395	0.432
Away Eliminated*Conf Opponent	4.132	0.386	0.274	1.123	-0.403	-3.985
	0.254	0.884	0.947	0.796	0.902	0.192
Home Eliminated*NonConf Opponent	1.827	0.722	1.524	12.602	2.337	-4.468
	0.678	0.833	0.728	0.010	0.381	0.107
Away Eliminated*NonConf Opponent	6.013	4.444	0.333	-10.860	0.308	-0.765
	0.088	0.299	0.931	0.030	0.909	0.765
α	-7.644	-1.984	-2.626	-5.243	-4.652	-4.930
	0.001	0.411	0.294	0.040	0.062	0.046
R^2	0.239	0.246	0.202	0.206	0.330	0.287
	—	—	—	—	—	—

a coin for the first overall selection. This format created an additional incentive to lose to a conference opponent because the easiest way to improve draft position was to lose to conference opponents. The results in Table 2.4 show that when the eliminated home team plays a conference opponent, the point-spread decreases by 1.5 to 4.3 points depending on the season. The results for three of the six seasons are significant (2003-2004, 2004-2005, and 2007-2008). When facing nonconference opponents, the point-spread decreases between 2.5 and 3 points. Eliminated road teams facing conference opponents increase the point-spread between 2 and 4.5 points more than road teams that had not been eliminated from playoff contention. This result is significant in only two of the six seasons and could be due to a strong real or perceived home-court advantage in the NBA. When facing nonconference opponents, only one of the elimination indicators is significant appearing to give credence to the perception among bettors that conference games have additional benefit for a team that tanks late in the regular season. When examining the actual difference in points, only two of the parameters are significant. Both of these significant results occur in the 2006-2007 NBA season.

2.6 Conclusion

This chapter examined whether bookmakers believe that NBA teams tank late in the regular season. The research examines both point-spreads and differences in points scored in regular season NBA games from the 2003-2004 through 2008-2009 seasons. The conclusion is that the perception of tanking affects point-spreads in games involving teams eliminated from playoff contention during these seasons, and it affects the point-spread systematically, based on the presence of a conference opponent in the game. Only an insider familiar with the strategies discussed and implemented by NBA teams out of contention late in the season can know with certainty whether teams tank to improve their prospects in the entry draft. Future research should examine certain strategies that eliminated NBA teams can use in order to determine if tanking is occurring (see Chapter 5). Previous evidence analyzed only game outcomes to assess the likelihood that teams tank. The evidence presented in this chapter indicates that participants in betting markets behaved in a way consistent with the existence of tanking in NBA games late in the regular season, providing additional evidence that tanking actually takes place. The evidence that tanking takes place, based on the game outcome model, is weaker than the evidence that bookmakers believe that tanking takes place. However, this result could be attributed to the fact that the difference in points is possibly the wrong margin to examine for evidence of tanking: A team that tanks only has to lose the game; it does not have to lose the game by a large margin. The fact that tanking is harder to detect in point differences than in tests based on the conditional probability of losing a game, the approach used by Taylor and Trogdon (2002) and Price et al. (2010), highlighted the complexity of the tanking phenomena.

The result that bookmakers believe that tanking takes place, despite little evidence from the game outcome model that tanking actually takes place, is similar to the results in Brown and Sauer (1993a), which found that the betting public believed in the hot hand but found little evidence that the hot hand actually existed in NBA games. This result is also consistent with the idea that prediction markets efficiently aggregate information. Even though tanking appears to be difficult to detect, bookmakers clearly build a tanking adjustment into point-spreads on games involving teams with an incentive to tank.

The results of this research are important for the NBA, because they provide information about the effects of policy changes on team behavior. The NBA has been the most active of the four major North American professional sports leagues in altering its draft policy in response to the perception that teams tank late in the regular season. The results here show that this perception exists in that bookmakers continue to adjust point-spreads for tanking in late season games. Based on Camerer's (1989) research and these results, it appears that NBA decision makers believe in the "myth of tanking" and league policies being altered to manage these perceptions. Managing this public perception is important, regardless of the existence of actual tanking in the NBA, because the perception affects the legitimacy of the NBA's core product, professional basketball games with uncertain outcomes. The results of the current research from recent seasons with no change in draft policies indicate that bookmakers still believe tanking takes place late in the regular season by teams eliminated from playoff contention. However, the NBA may need to consider adjusting its draft format once again.

Future research could examine the point-spreads and differences in points scored in older NBA games. By using point-spreads back to the 1980s, an analysis of point-spreads could explore whether tanking had effects in betting markets under other draft formats and compare the size of the tanking adjustments to assess the effectiveness of the NBA draft policy. In addition, analyzing games earlier than the sample period could help to assess the effectiveness of the equal-weight draft lottery used in the mid-1980s, which was implemented to completely eliminate any incentive for teams to tank. Taylor and Trogdon (2002) concluded that no tanking took place under that draft format.

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Chapter 3

Exploring Incentives to Lose in Professional Team Sports: Do Conference Games Matter?[1]

Within most industries, organizations compete with each other for skilled labor, material resources, legitimacy, and customers. Competition occurs when the goals of one participant or organization are attained at the expense of another participant or organization (Kilduff, Elfenbein, and Staw 2010). Sport contests are no different because the outcome is zero-sum (Utt and Fort 2002). Sports leagues, especially professional sports leagues, rely on the on-field competition to sell their products to consumers (Fort and Quirk 1995). Specifically, the core of the sports product is predicated on the uncertainty of game outcome (Mason 1999)—the unpredictability regarding the outcome of the match (Forrest and Simmons 2002). The uncertainty of game outcome extends to the overall competitive balance of the league—the belief that all league members need to be of equal playing strength to maintain overall interest in league matches (Forrest and Simmons 2002).

North American professional sports leagues partition member clubs into conferences, which are further divided into divisions. The conferences and subsequent divisions are usually arranged geographically. Doing so causes teams to compete

[1]A version of this chapter has been submitted for publication. Soebbing, Humphreys, & Mason 2011. Sport Management Review.

against their geographic competitors for a berth in the playoffs. Research on other industries has shown that firms compete more intensely against firms in close proximity [ex, Porac, Thomas, and Badenfuller (1989), Baum and Mezias (1992), and Yu and Cannella (2007)]. In professional sports, this close proximity should increase the on- and off-the-field competition between division and conference teams for wins, playoff appearances, and skilled labor (players and management). To further encourage geographic competition, North American professional leagues also incorporate an unbalanced schedule in which teams play conference opponents more times than non-conference opponents (Weiss 1986).

At the beginning of each North American professional league's season, a team's goal is to make the postseason tournament (playoffs)—which determines the league champion—at the end of the regular season. A team can qualify for the playoffs in two ways. The first is by winning its division, that is, having the best regular season win-loss record compared to other members of its division. The remaining playoff spots are filled by non-division winning teams who have the best win-loss record in their conference. Thus, in a team's pursuit for a playoff berth, a win against a conference opponent is worth more to a team than a win against a nonconference opponent because the win against a conference foe directly results in a loss for that conference foe and prevents the opponent from gaining in the conference standings.

Once teams are eliminated from the first tournament, which determines playoff participants, a second tournament may arise in which the eliminated teams jockey for position in the league's amateur draft. The amateur draft is the mechanism by which North American professional leagues allocate incoming amateur talent. The reason put forth by leagues and team owners regarding the importance of the amateur draft is the need to both control player costs and improve the competitive balance of the league (Fort and Quirk 1995). However, the presence of a draft can provide opportunities for individual teams to implement strategies in their own self-interest that harm the overall league and its other members. One such strategy is tanking—teams not putting forth the level of effort necessary to maximize the overall number of team wins—for a financial gain. This has been a concern in the National Basketball Association (NBA) since the early 1980s (see Section 1.3.3 of Chapter 1). For teams not eligible to participate in the playoffs, the secondary tournament, which decides which team will select first in the amateur draft, provides financial incentives for eliminated teams to tank. A high draft pick gives a team increased gate revenues in the following season, a productive player in terms of wins produced (Price, Soebbing, Berri, and Humphreys 2010), and a large monetary surplus extracted from that player (Krautmann, von Allmen, and Berri 2009).

Similar to the competition for a spot in the league's playoff tournament, the conference/nonconference distinction is important to the strategic behavior of eliminated NBA teams competing for the top-draft position under the various draft formats. First, under the early reverse-order draft format, a team had to be the worst team in its conference to have an opportunity to select first overall in the draft (Soebbing and Mason 2009). Thus, a team's conference ranking was critical. Once the league instituted a lottery format in which teams received a probability of winning the lottery based not on rank order of finish but on their winning percentage in comparison to all teams in the league that did not make the playoffs, the importance of losing in conference games may have decreased in comparison to nonconference games. However, a loss to a rival under any draft format could come at too high a social cost due to the greater media and fan scrutiny of these rivalry games. In addition, these games may have individual player rivalries, which may make it very difficult for players to not compete vigorously against their opponents. The current research develops competing hypotheses and focuses on these potential decisions by eliminated teams.

The purpose of this chapter is to examine the strategic behavior of teams against conference and nonconference opponents under the various amateur draft formats adopted by the NBA. Previous academic research by Taylor and Trogdon (2002) and

Price et al. (2010) examined the probability that NBA teams won regular season games based on the different draft formats. Results showed that these teams responded to league incentives in which the reward for tanking was the highest. Their research, however, assumed that conference and nonconference games were "worth" the same to eliminated NBA teams. The results reported in Chapter 2, which examined the point-spreads of NBA regular-season games from 2003 through 2008, found bettors perceive additional benefits for teams tanking in conference games rather than nonconference games.

To examine the strategic behavior of eliminated teams in conference and nonconference games, this chapter examines regular-season games from the final season of the reverse-order format and the first season of each of the three lottery formats using a random effects logistic regression model. Results indicate that teams are more likely to tank in conference games than in nonconference games under the draft formats in which previous research indicated that tanking occurs. This result suggests that eliminated teams strategically decide to tank games late in the regular season regardless of any social costs that teams may incur due to tanking against geographic or traditional conference rivals. This finding has important implications for professional sports leagues, which have to be careful that policies enacted do not lead to undesired behavior.

The organization of this chapter is as follows. First, the relationship between leagues and their member teams is described, followed by a description of the tanking problem: how it arises, incentives for teams who may use this strategy, and the consequences for the league. The third section presents the formal hypotheses. Fourth is the presentation of the formal model and the results. The chapter concludes by offering some implications for sports managers and suggestions for future research.

3.1 The NBA and Its Teams

A league can be defined as a collection of teams who agree to play games under a specified set of rules (Leeds and von Allmen 2005). Under this definition, the league is the principal while the member teams are the agents (Atkinson, Stanley, and Tschirhart 1988). The primary objective of a professional sport league is to maximize the joint profits of all the owners within the league (Scully 1995). Maximizing the uncertainty of outcome for each game is the main way the league tries to accomplish this objective.[2] Szymanski (2003) stated that an organizer of a sports contest (or a sports league) has the objective to elicit effort from the contestants of the contests (the teams within a league) which may result in winning a prize. The prize given by a sports league is making the playoffs and the opportunity to win the league championship.

Each agent (team) is assumed to be attempting to maximize its own profit and, in doing so, may reduce the amount of revenues that can be generated by the principal.[3] This situation presents a problem for the principal, which can react by altering or developing league policies to align agent interests with the overall goals of the principal (Mason 1997). Some policies that North American professional sports leagues can adopt or modify include revenue sharing arrangements, rules regarding the salary cap and/or luxury tax, free agency rules, amateur draft policy, scheduling, and playoff design.

Currently, the NBA has 30 teams. These teams are split into two conferences. Within each conference, teams are separated into three divisions. Teams are divided into the conferences and subsequent divisions by geography. A total of eight teams from each conference make the playoffs. A team can clinch a playoff berth in two

[2]Previous research suggested that attendance is maximized if the home team is slightly favored (Rascher and Solmes 2007).

[3]It is generally accepted that teams in North American professional sports leagues are profit maximizers and teams in European professional leagues attempt to maximize wins instead of profits. However, “this is not to say that there are some owners with different ambitions” (Fort 2000, p. 440).

ways. The first is to finish with the best regular season record in its division. If a team does not win its division, it can still make the playoffs by finishing with one of the five best regular season records of non-division winning teams in its conference. The result is competition throughout the season by conference teams to secure one of the eight conference playoff spots.

Competition is defined "as a setting in which the goal attainment of participants is negatively linked, so that the success of one participant inherently comes at the failure of the other" (Kilduff, Elfenbein, and Staw 2010, p. 944).[4] This definition holds when examining individual NBA regular season games. The outcome of each game is zero-sum; one team wins while the other team loses (Utt and Fort 2002). With the top eight teams from each conference making the playoffs in the NBA, it is important for a team to win conference games rather than nonconference games in terms of both clinching a playoff spot and ranking in the playoff tournament. Because a win directly results in a loss for another conference opponent, the result is a two-game net gain in the standings for the winning team. When a team plays an opponent from the other conference, a win against that opponent is only a one-game increase in the conference standings because the team is not also stopping its opponent from gaining in its own conference standings.

If an NBA team makes the postseason tournament, the team will increase its revenues. A team could host between two and sixteen home playoff games, depending on how far it advances in the postseason tournament. The largest cost facing NBA teams is player salaries. NBA teams who make the playoffs do not incur additional salary expense by playing additional games (Leeds and von Allmen 2005). This fact results in playoff teams' keeping most of the revenues associated with home playoff games.[5] One report indicated that the additional revenue from making the playoffs can be the

[4]Kilduff, Elfenbein, and Staw's (2010) definition of competition comes from Deutsch's (1949) definition of competition.

[5]Teams do incur some costs with hosting playoff games. Some of these costs include utility expenses and paying employees such as ushers and concession employees. When comparing player salaries to the costs of hosting games, these costs are minimal.

difference in whether an NBA team is profitable for that season (Windhorst 2010). The bottom line is that all teams at the beginning of the season should have the goal of clinching a spot in the playoffs in order to earn the additional revenue. This team goal aligns with the NBA's objective of high uncertainty of game outcome and competitive balance from one year to the next.

To increase the competition between teams in the regular season to secure a playoff position, the NBA uses an unbalanced schedule. Throughout its history, the NBA used an unbalanced schedule in which teams play conference and divisional opponents more times than they play teams from the other conference. This schedule places greater emphasis on divisional and conference games. Weiss (1986) examined the effect of an unbalanced schedule in sports leagues and concluded that strong teams in a league win less than if a league use a balanced schedule. When strong teams win less, it means that the weaker teams win more due to the zero-sum nature of a sporting contest. As a result, competitive balance—defined as the disparity of win percentage amongst all league members—improves. According to the uncertainty of outcome hypothesis proposed in early research by Rottenberg (1956) and Neale (1964), higher competitive balance results in an increase in the consumer demand for games.

However, once a team is eliminated from playoff contention, it might not have an incentive to put forth the maximum effort to win the rest of its games. A new tournament to determine the order of selection in the amateur draft can arise in which participants intentionally lose games late in the regular season in order to move up in the amateur draft and select first overall. Tanking presents an agency problem for the league, which Mason (1997) described as teams acting in their own self-interest and not in the best interests of the league. This practice can damage the legitimacy of the league and result in a loss of sponsorship revenue for the league, a decrease in the amount of money it receives from the national media contracts, and negative publicity from local and national media. The result is a potential agency problem for league executives as they try to motivate eliminated NBA teams to put forth the level of effort necessary to maximize their overall number of wins to preserve the legitimacy of the contest and the overall league product.

3.2 Tanking

The decision to tank in the NBA revolves around the amateur draft. The common draft format used in professional sports leagues in North America and Australia is reverse-order, in which the worst team in the league receives the first overall selection, the second-worst team has the second overall selection, and so on until all teams have selected a player. Having an amateur draft, the owners and the league claim, is important for league-wide competitive balance (Kaplan 2004). The rationale presented by the leagues is that, if the strong teams get to select the best amateur talent, then it would only increase the disparity in winning percentage between the strong teams and weak teams, thus weakening the competitive balance of the league (Alyluia 1972). Leeds and von Allmen (2005) stated that the reverse-order format could have the unintended consequence of encouraging tanking. These two interrelated issues, competitive balance and deterring tanking late in the regular season, have been a concern for NBA decision makers, as discussed in Chapter 1.

In the early 1980s, the NBA had a reverse-order format. Under this format, the team with the lowest winning percentage in each conference flipped a coin to determine who received the first overall selection. The loser of the coin flip selected second in the draft. The rest of the order was determined by winning percentage first of the non-playoff teams, then the playoff teams. Beginning in 1983, media reports began to surface regarding the belief of some team executives that other teams were intentionally losing late in the regular season for a chance at the first overall selection (Soebbing and Mason 2009). For example, former Philadelphia 76ers General Manager Pat Williams said, "[The] Houston [Rockets] went into a complete swan dive [late in the regular season]" (Narducci 2007, n.p.). Academic research examining the tanking behavior under this format provides mixed results. Taylor and Trogdon (2002) investigated the 1983-1984 season, the last under this format, and found that teams were tanking during this season for a chance at the top overall selection. Price et al. (2010) examined the 1977-1978 season through the 1983-1984 season. Their results showed very weak evidence that teams were engaged in tanking behavior. For the 1983-1984 season, Price et al. (2010) concluded that teams were not tanking because only a handful of teams at most had a chance to be the worst team in the conference. After that season, the NBA voted to change the draft format to an equal-chance lottery because of the belief that teams were tanking (Soebbing and Mason 2009).

Under this equal-chance lottery format, all teams that did not receive a berth in the playoffs had the same chance of selecting first. With this format, the league hoped to eliminate the incentive for teams to tank late in the regular season (Soebbing and Mason 2009). Both Taylor and Trogdon (2002) and Price et al. (2010) concluded that teams were not tanking under this format. However, this format raised concerns for some NBA team owners regarding the purpose of the draft. Some owners stated that the purpose of the draft was to improve the competitive balance of the league by rewarding the worst teams with the best draft slots and not to reduce the incentive to tank. The belief was that, under the equal-chance lottery, the weak teams would find it more difficult to draft the best players, thereby increasing disparity between the teams that were on the verge of making the playoffs and the worst teams in the league. As a result, the league voted to alter its draft format again in 1989, switching to a weighted-draft lottery format (Soebbing and Mason 2009).

The weighted-draft lottery format gave the worst teams in the league a higher probability of receiving the first overall selection than the teams that had just missed making the playoffs. Some team executives stated that this was the best way of balancing the threat of tanking with enhancing league competitive balance through the draft (Moore 1990). Some media commentators questioned whether this draft format actually achieved this balance (Soebbing and Mason 2009). Furthermore, both Taylor and Trogdon (2002) and Price et al. (2010) found evidence that eliminated NBA teams were indeed tanking under this format.

In the 1991-1992 season, the Orlando Magic finished with the second worst record in the NBA and had the second highest probability of winning the draft lottery. The Magic won the lottery that year and selected Shaquille O'Neal. The following season, the Orlando Magic just missed the playoffs. Despite having only one chance in 66 of winning the draft lottery—a 1.5% probability—the Magic won the lottery. Facing pressure from franchise owners, front office executives, and fans following this unlikely outcome, the NBA voted to increase the probability that the worst team was awarded the top draft pick and adjusted the other draft probabilities as well. This format began with the 1994 NBA draft and is still used today. Price et al. (2010) presented the probabilities of eliminated teams receiving the first overall selection in the draft. Comparing the probabilities presented in Price et al. (2010), one can see that a more nonlinear structure was created with the NBA increasing the weights. This nonlinearity promotes a highly competitive environment that encourages the participants within the environment to put forth effort to move up in the rankings. By moving up in the rankings to achieve a higher draft percentage, the participants are rewarded for their effort by where they place among all the participants. This "tournament" approach was initially outlined by Lazear and Rosen (1981). Examining the probabilities presented by Price et al. (2010) for the latest draft change, the reward for moving up one position in terms of a higher probability of winning the lottery is higher under the second weighted-draft format than the previous draft lottery formats. Price et al (2010) also confirmed this observation that tanking by eliminated NBA teams was more prominent under this format. Taylor and Trogdon (2002) did not examine this draft format in their research.

3.2.1 Incentives for Eliminated NBA Teams to Tank

As described previously, a win may not be the optimal strategy. In the NBA, the reward of a top draft pick in the amateur draft exists for a team intentionally losing games late in the season. The strategic decision of whether to tank once eliminated from playoff contention depends on the amount of revenue a team can gain from the player it selects by moving up in the draft. The revenue comes from two main areas: the revenue generated from a player above his salary and the gate revenue associated with increased winning by the team. To understand these two areas, it is important to understand the policies that help generate the increased revenue. In the NBA, such policies address the team payroll cap, luxury tax, and a cap on how much an individual player can make. These payroll caps and luxury tax policies not only bring down the overall costs of players (Kaplan 2004) but also provide cost certainty for teams drafting amateur talent.

Salary Caps and Luxury Tax

With player salaries being the highest expense for teams (Leeds and von Allmen 2005), the NBA tried to control player salaries by instituting a team salary cap as well as an individual player cap (Kaplan 2004). In 1983, the NBA adopted the team cap, which sets both a maximum and minimum amount of money teams can pay all the players on its roster. The team cap in the NBA is considered a "soft cap," which means teams can exceed the salary cap limit under certain circumstances in order to re-sign their own players (Kaplan 2004). There are many exceptions teams can use. One of these exceptions is commonly called the "Larry Bird exception." It allows teams to re-sign players who have played for that team for at least three consecutive seasons for any amount of money. The rationale that the league gave for this exception was to provide an advantage to teams to keep their best players (Mukherji 2000). In addition to the many exceptions, there are rules governing player trades and how trades affect the salary cap. The rules state that a team can acquire 125 percent plus 100,000 dollars of the salary that it is trading away (Coon 2010). According to Staw and Hoang (1995), it is difficult for teams to trade players under the NBA rules because of the salary cap restrictions. If teams are able to trade players, they are not able to improve their team to the extent that they hope because of the salary cap rules.

Because these circumstances allowing teams to exceed the salary cap, the NBA implemented a luxury tax. The luxury tax is a financial penalty assessed on teams that spend more than the threshold the league sets (Kaplan 2004). The threshold is above the maximum team payroll cap limit. Once a team reaches the luxury tax threshold, the team must pay $1 to the league for every $1 that a team exceeds the luxury tax threshold (Kaplan 2004).

The NBA also has a cap on the amount of money an individual player can make. Beginning in 1995, the NBA implemented a rookie salary scale, which determined the salary for players selected in first round of the amateur draft for the first four years of a player's NBA career as well as an option year (Krautmann, von Allmen, and Berri 2009). Starting with the 2000 season, the league added a cap to the amount a veteran—defined here as any non-rookie—can make in a single season.

Given the limits on team payrolls and individual salaries, a team can generate a surplus—defined as the amount of revenue generated from a player minus his salary—from each player on its roster. Examining the NBA, Krautmann, von Allmen, and Berri (2009) found that the median surplus teams generate from an NBA player with less than four years of professional service is approximately $732,000 per season. Krautmann, von Allmen, and Berri (2009) also partitioned restricted players into starters and nonstarters and found that the median surplus extracted from these players is $2,700,000 and $564,000. Hausman and Leonard (1997) found that superstar players accumulate sizeable revenues for their own team, the league (in terms of TV ratings), and the opposing team (in terms of attendance, concessions, parking, etc) when the opposing team is the home team. Research by Price et al. (2010) found that one-third of first overall draft picks obtained superstar status.[6] As noted, the NBA instituted a rookie salary scale that sets a player's salary for the first five years of the contract, depending on the player's draft position. This scale reduces the cost of selecting amateur players. As a result, an NBA team can generate a significant surplus from a player selected in the amateur draft, thus increasing the incentive a team might have to tank once eliminated from playing in the postseason.

Gate Revenue and On-Court Success

In addition to the surplus generated from the player, an NBA team sees an increase in gate revenue from having one of the top draft picks. Price et al. (2010) estimated that an NBA team with the first overall pick saw an increase in gate revenue of 4.5 million dollars. The team with the second overall pick saw a gate revenue increase of 2.25 million. If a team used a tanking strategy in the previous season, the team would have endured a loss in gate revenue for that season due to a decrease in the uncertainty of outcome and poor team performance. However, Price et al. (2010) estimated that teams that used a tanking strategy would have to have lost over 20 additional games to offset the 4.5 million dollar gate revenue increase in the season after receiving the number one pick. This fact provides a further financial incentive for eliminated teams to intentionally lose games late in the regular season in order to improve their chances of receiving the first overall selection in the draft.

Not only can franchise players improve the financial outlook for these teams, but these players can also turn around the on-court performance of the teams. Sanderson and Siegfried (2003) hypothesized that the amateur draft could increase the competitive balance of the NBA as well as provide an incentive for a team to tank late in the regular season: "one player could constitute 20% of a starting line-up and where there is more agreement about a player's potential than in football or

[6] Superstar status is accorded a player whose Wins Produced per 48 minutes (WP48) is greater than 0.200.

baseball, which have larger rosters and predictions of performance are less reliable" (Sanderson and Siegfried 2003, p. 275). Research conducted by Price et al. (2010) showed that number one draft picks produced 45 wins over the first five years of their career. In the first season, number one picks produced 7.2 wins on average. As noted previously, one-third of the top selections in the amateur draft picks attain superstar status (Price, Soebbing, Berri, and Humphreys 2010). This turnaround supports the rationale that professional sports leagues use for having an amateur draft. It is also the rationale as for why eliminated teams want to tank late in the regular season. Combining the competitive success rationale with the financial incentives, Sheridan (2007) summarized the tanking decision for NBA teams:

> The reason teams are so desperate to have a shot at a franchise player ... is that there is almost no other way to transform a bad NBA team into a good one ... You can't trade a player unless you get within 125-percent of his contract back in return. This rule against salary dumping and superstar-borrowing forces teams to swap contracts rather than players. It creates terrible stagnation. So do salary cap exceptions that allow teams to re-sign their own players for far more than other teams could offer them in free agency. A rule meant to encourage stars to remain with one team all but takes the "free" out of free agency. That leaves the draft as virtually the only way to land a true superstar. (Sheridan 2007, n.p.)

Even though tanking may be the optimal strategy for eliminated teams, it is harmful from a league's standpoint. This statement is true on several levels. First affected is immediate game. While Team X is eliminated from playoff contention, its opponent may not be eliminated. This situation can be problematic for a sports league trying to ensure a season is played with the highest integrity by all its member teams. Second, tanking could adversely affect the race for the league playoffs. For example, if Team X is eliminated from the playoffs and is playing Team Y, which is competing for a playoff spot, the chances of the other teams are harmed if Team X tanks against Team Y.

Third, tanking (or the perception of tanking) damages the legitimacy of the overall league. For example, if both teams playing in a game have been eliminated from playoff contention, they could both be tanking. The outcome would be uncertain according to the definition of Forrest and Simmons (2002) because no one would know which team would win. However, since both teams are not putting forth the level of effort needed to maximize the overall number of wins, the integrity of the game and the legitimacy of the league are harmed. Damaging the legitimacy of the league could result in a loss of sponsorship revenue and national media contracts for the league, bad press, and decreased attendance. Therefore, it is important for the league to prevent tanking late in the regular season.

3.3 Hypotheses

Previous research by Taylor and Trogdon (2002) and Price et al. (2010) examining tanking behavior in the NBA assumed that all games carry equal weight. The results from Chapter 2 showed that bettors think conference games matter more to eliminated teams than nonconference games. A more detailed discussion regarding conference play in this chapter suggests that all games may not be worth the same due to the design of the league with its focus on conference play. As a result, the behavior of teams may vary based on the opponent. Similar to a team's attempting to clinch a playoff berth, a team attempting to improve its position in the NBA draft (or probability of winning the draft depending on the lottery format) could move down the standings faster when playing conference opponents compared to nonconference opponents. The two-game net "gain" occurs for teams that are attempting to lose in order to gain a better chance at receiving the first overall draft selection. This two-game net "gain" would have been critical under the reverse-order format through the 1983-1984 NBA season, when teams had to finish at the bottom of a conference for a chance at the first overall selection. Thus, Hypothesis 3.1 is stated:

Hypothesis 3.1 *Teams that are engaged in a tanking strategy under the NBA's reverse-order format are more inclined to tank in conference games rather than nonconference games due to the two-game "gain" in the standings they receive from losing in a conference game.*

Once the league changed to a draft lottery format, all the eliminated teams from each conference were pooled and ranked by win percentage rather than by rank order within their respective conference. A team finishing at the bottom of its conference was not guaranteed the first or second pick, as had occurred previously. However, conferences still mattered to the extent that some conferences were weaker in some seasons than others. This situation affected a team's ability to become playoff eligible. For example, a team with a 0.500 winning percentage could make the playoffs in one conference, but a team with a 0.600 winning percentage may not make the playoffs in the other conference. Therefore,

Hypothesis 3.2 *The incentive to tank in conference games compared to nonconference games amongst eliminated NBA teams is less under the two weighted lottery formats compared to the reverse-order draft format.*

Due to the design of how teams qualify for postseason play, NBA teams place greater significance on conference games than nonconference games. Even though the draft positions in the weighted lottery formats are not based on conference finish compared to the draft positions under the reverse-order format, teams know that conference games are worth two games in the standings compared to one game against nonconference opponents. Because the previous format (reverse-order) rewarded teams who finished lower in the conference standings, teams may perceive that conference games are still more important, giving rise to Hypothesis 3.3:

Hypothesis 3.3 *Because teams place more value in conference games than nonconference games in both the main tournament (to reach the playoffs) and the former reverse-order format, teams that tank are more likely to lose in conference games compared to nonconference games, regardless of draft format.*

Another consideration with the unbalanced schedule is the arrangement of conferences and divisions based on geography and the rivalries that are present. One reason the NBA arranges its conferences geographically is to keep travel costs at a minimum because teams play nearby conference teams more frequently than non-conference teams. Another reason is explained in research conducted on the competition among firms in other industries indicating that firms located closer to each other geographically compete more fiercely against each other than firms that are farther from each other (Porac, Thomas, and Badenfuller 1989, Baum and Mezias 1992, Yu and Cannella 2007). In the NBA context, assigning teams into conferences based upon geography should result in a more competitive environment amongst members of each conference because they are competing against those in close geographical proximity.

Rivalries can also arise due to the geographical arrangement of divisions and conferences. Rivalry is defined as "a subjective competitive relationship that an actor has with another that entails increased psychological involvement and perceived stakes of competition for the focal actor, independent of the objective characteristics of the situation" (Kilduff, Elfenbein, and Staw 2010, p. 945). Specifically within the sporting context, "sporting rivalries are followed with great interests by fans, typically hyped by the media to engender additional interest, and often result in outstanding athletic performances because of the intensity of the competition and comparable talent of the two opponents" (Wiggins and Rodgers 2010, p. xi).

This chapter does not attempt to measure the intensity of rivalries in the NBA as Kilduff, Elfenbein, and Staw (2010) did for the NCAA. However, it does acknowledge the presence of geographic competition and the rivalries that may form from close geographic proximity. Close geographic competition may have an effect on an eliminated team's strategic decision not to put forth maximum effort to win regular season games. Games between close geographic cities, especially geographic rivals, receive extra attention from players, management, local media, and fans among others, and may have an impact on the strategic behavior of teams. Because conferences are arranged geographically, tanking against conference opponents would come at a higher social cost for the team. In other words, it may be difficult for teams to tank in games against conference teams even though doing so would increase the chances of receiving the top pick in the amateur draft. This fact leads to an alternative hypothesis:

Hypothesis 3.4 *NBA teams tanking under the weighted lottery draft formats are more likely to tank in nonconference games compared to conference games due to the high social cost of tanking against teams who are in close geographic proximity or perceived geographic rivalries.*

3.4 Model and Results

To investigate the presence of tanking in the NBA, the current research uses the same methodology and model that Taylor and Trogdon (2002) incorporated for their research. Taylor and Trogdon (2002) examined all the regular season NBA games for the final season of the reverse-order draft format (1983-1984 season) and the first seasons of the equal-chance (1984-1985) and weighted lottery (1989-1990) formats. The current research also incorporates all the regular season games for the first season in which the NBA increased the probabilities for the draft lottery (1993-1994), a draft policy that Taylor and Trogdon (2002) did not examine.

Taylor and Trogdon's (2002) empirical model was a random effects logit model that controlled for other non-tanking-related factors that affected game outcomes. Equation 3.1 presents their model.

$$\begin{aligned} WIN_{ijk} = f(&HOME_{ijk}, NEUTRAL_{ijk}, WINPCT_{ijk}, OWINPCT_{ijk}, \\ &CLINCH_{ijk}, OCLINCH_{ijk}, ELIM_{ijk}, OELIM_{ijk}, \epsilon_{ijk}) \end{aligned} \tag{3.1}$$

Equation 3.1 explained observed variation in game outcomes using variation in game site, team winning percentages, and four variables that reflected the team's current position in the race for the NBA postseason. In their model, i denotes teams, j

denotes games, and k denotes seasons. $HOME$ is an indicator variable showing whether team i was the home team in game j in season k. Identifying the home team is important because the literature indicates a large home field advantage for NBA teams (Zak, Huang, and Siegfried 1979, Mizruchi 1985, Courneya and Carron 1992, Gandar, Zuber, and Lamb 2001). Some games, especially in the 1983 and 1984 seasons, occurred at a neutral site. Because neither team played in its home market, the variable $NEUTRAL$ indicates if team $i's$ j^th game was played at a neutral site in season k. $WINPCT$ is team i's winning percentage entering game j in season k. $OWINPCT$ is team i's opponent's winning percentage entering game j in season k. The winning percentage variables control for the quality of both teams in game j. Quality reflects injuries that have occurred as well as player transactions (e.g., trades, player signings, and player releases) the team has completed up to game j in the season.

$CLINCH$ and $OCLINCH$ are indicator variables for teams that had already clinched a playoff berth when team i played game j. $ELIM$ and $OELIM$ are indicator variables for teams that had already been eliminated from the postseason. A negative sign on the parameter estimate $ELIM$ is interpreted as evidence of tanking, decreasing the probability of the team i winning game j in season k. A positive sign on the parameter estimate $OELIM$ indicates that the opponent of team i was tanking and would increase the probability of team i winning game j in season k. ϵ_{ijk} is a random variable that captures the effects of all other unobservable factors in game outcomes. ϵ_{ijk} is a mean zero variable. Taylor and Trogdon (2002) assumed that the variance of the equation error term was not constant across teams and seasons and corrected the standard errors of Equation 3.1 for heteroscedasticity using White's standard error correction.

The present research first replicates the Taylor and Trogdon's (2002) model to include data from the 1993-1994 NBA regular season, the first under the present weighted lottery format. These data are included to examine all the draft formats. This replication of Taylor and Trogdon's (2002) model, in turn, allows the conference/nonconference distinction to be a robustness check on tanking behavior, as stated in Section 3.3. Data on game outcomes, cumulative winning percentages, and playoff spot contention for the 1983-84, 1985-86, 1989-1990, and 1993-1994 NBA regular seasons were gathered from multiple sources, including the *New York Times*, *Washington Post*, *Los Angeles Times*, and DatabaseBasketball (http://www.databasebasketball.com). Table 3.1 presents summary statistics for the game-level variables in Equation 3.1 in this data set. There are 8,090 team*game*season observations in the overall dataset.[7] The summary statistics are consistent with those reported by Taylor and Trogdon (2002) for their sample.

Table 3.1: Summary Statistics for 1983, 1984, 1989, and 1993 NBA Seasons

Variable	Mean	Std Dev
Win	0.500	0.500
Home Team	0.500	0.500
Neutral Site Game	0.006	0.078
Winpct*100	50.070	17.980
Opponent winpct*100	50.070	17.980
Clinched playoff berth	0.077	0.267
Opponent Clinched playoff berth	0.077	0.267
Eliminated in 1983 season	0.005	0.069
Opponent eliminated in 1983 season	0.005	0.069
Eliminated in 1984 season	0.005	0.074
Opponent eliminated in 1984 season	0.005	0.074
Eliminated in 1989 season	0.014	0.118
Opponent eliminated in 1989 season	0.014	0.118
Eliminated in 1993 season	0.017	0.128
Opponent eliminated in 1993 season	0.017	0.128
Conference Game	0.690	0.462
N=8,090		

Table 3.2 presents the parameter estimates from Equation 3.1 using a pooled sample of data from the 1983-1984, 1984-1985, 1989-1990 and 1993-1994 NBA seasons.

[7]This is the final number of observations. All observations where a team was playing its first game of the season were removed since no winning percentage exists yet for the team.

Table 3.2: Logit Results, Pooled Sample

Variable	Coefficient	Robust Std Error	Z-stat	Marginal Effect (%)
Home Team	1.35	0.07	20.06**	32.56
Neutral Site	-0.03	0.47	-0.06	-0.65
Winpct*100	0.03	0.00	18.12**	0.64
Opponent winpct*100	-0.03	0.00	-15.93**	-0.66
Clinch	0.26	0.12	2.19*	6.40
Opponent clinch	-0.27	0.13	-2.11*	-6.64
Eliminated in 1983-1984 Season	-0.57	0.27	-2.06*	-13.75
Opponent eliminated in 1983-1984 Season	0.56	0.42	1.34	13.67
Eliminated in 1984-1985 Season	-0.23	0.44	-0.53	-5.78
Opponent eliminated in 1984-1985 Season	0.25	0.35	0.70	6.18
Eliminated in 1989-1990 Season	-0.84	0.42	-2.02*	-19.82
Opponent eliminated in 1989-1990 Season	0.88	0.27	3.22**	20.73
Eliminated in 1993-1994 Season	-1.07	0.27	-4.05**	-24.60
Opponent eliminated in 1993-1994 Season	1.08	0.28	3.93**	24.82
Constant	-0.64	0.09	-6.87**	—

*= p-value<0.05, **= p-value<0.01
Dependent variable=1 if team i wins game

Table 3.2 also shows the marginal effects of a one unit change in each of the explanatory variables on the probability of winning the game in these tables. These marginal effects are reported as percentages with the interpretation of Team i being more (+) or less (-) likely to win game j in season k. For example, the marginal effect for the variable $HOMETEAM$ is interpreted as saying that if Team i is the home team, it is 32.6 percent *more* likely to win game j in season k. This marginal effect indicates a strong home-court advantage and reinforces earlier research conducted in multiple disciplines that examined the strong home-court advantage in professional basketball (Mizruchi 1985, Courneya and Carron 1992, Gandar, Zuber, and Lamb 2001).

The marginal effects on team winning percentage indicate that a one percent increase in the winning percentage indicates a less than one percent increase in the probability of winning game j. Similarly a one percent increase in the opponent's winning percentage results in a less than one percent decrease in Team *i's* probability of winning game j. If Team i has clinched a postseason playoff spot, it is six percent more likely to win game j. If Team *i's* opponent has cliched a postseason spot prior to game j, Team i is six percent less likely to win game j. These results make sense because, even if a team has clinched a playoff spot, it is trying to win games to improve its seed in the playoffs and perhaps gain home-court advantage for one or more playoff series.

As indicated, the key parameters are on the $ELIM$ and $OELIM$ indicator variables. The results in Table 3.2 indicate that, consistent with results in Taylor and Trogdon (2002), NBA teams tanked during the 1983-1984 season. The marginal effect on the eliminated variable indicates eliminated teams were approximately 14 percent less likely to win the game. Adoption of the equal weight draft lottery eliminated the incentive that teams had to tank, a finding consistent with the results of Taylor and Trogdon (2002) and Price et al. (2010). The parameter estimates on the 1989 and 1993 elimination variables are negative and statistically significant: Teams that had been eliminated from playoff contention were less likely to win games, holding constant the relative quality of the teams. The marginal effect on the probability of Team i winning on these two variables are -20 and -25 percent respectively. These results confirm that eliminated teams were approximately 20 percent less likely to win in 1989 and approximately 25 percent less likely to win in 1993, reflecting the results of Price et al's (2010) concerning the NBA creating a more competitive "losing to win" secondary tournament.

The parameter on the 1989 and 1993 opponent elimination indicator variables ($OELIM$) are positive and significant: Teams playing an opponent that had already been eliminated from playoff contention were 21 and 25 percent more likely to win games in the respective seasons, holding constant the relative quality of the teams. The introduction of the weighted-draft lottery for the 1990 NBA Draft resulted in the incentive for NBA eliminated teams to tank at the end of the season, consistent with Taylor and Trogdon's (2002) findings. Results for the 1993-1994 season suggest that increasing the draft lottery weights prior to the 1994 NBA Draft created a greater incentive for the eliminated teams to tank and support the conclusion of Price et al's (2010). In addition, the increased-weighted lottery also increased the rewards for lower performing teams. Thus, a highly competitive secondary tournament emerged once teams were eliminated from playoff contention.

Previous research examining tanking in the NBA assumed that all games were given the same weight by both the NBA and its teams. This assumption may not be correct due to the unbalanced schedule that the NBA incorporates into its design. As a result, earlier in this chapter (Section 3.3), competing hypotheses were developed to predict whether teams behave differently in conference (DC) and nonconference (IC) games. To account for the impact of this difference, the present research has an indicator for the type of game interact with the elimination indicator variables. The variable DC is equal to one for conference games, and zero otherwise, and the indicator variable IC is equal to one for interconference (nonconference) games and zero otherwise. Accounting for the incentive to tank in conference and nonconference games leads to an expanded model that now includes four variables ($ELIMDC_{ijk}$, $OELIMDC_{ijk}$, $ELIMIC_{ijk}$, $OELIMDC_{ijk}$) that indicate when a team and its opponent have been eliminated from playoff contention in within conference and nonconference games. Using Equation 3.1 as the baseline, another random-effects logistic regression model for wins incorporating game type was run.[8] The expanded model is as follows:

$$WIN_{ijk} = f(HOME_{ijk}, NEUTRAL_{ijk}, WINPCT_{ijk}, OWINPCT_{ijk}, CLINCH_{ijk}, OCLINCH_{ijk}, ELIMDC_{ijk}, OELIMDC_{ijk}, ELIMIC_{ijk}, OELIMIC_{ijk}, \epsilon_{ijk}) \tag{3.2}$$

where i again denotes teams, j denotes games, and k denotes seasons. One concern regarding the $ELIM$ and $OELIM$ variables used in Equations 3.1 and 3.2 and previous research is that these variables are not detecting tanking but rather poor team performance. Examining team's behavior in different games not only provides a look at the strategic behavior of teams but also strengthens the previous results in the literature and from Table 3.2 that the variables $ELIM$ and $OELIM$ truly indicate the presence of tanking. If the behavior is different under different game types, it pro-

[8]Normally, one would run a Hausman test to see whether using fixed or random effects is appropriate. The result from the Hausman test shows that fixed effects is the appropriate specification.

vides a stronger indication that the variables used truly indicate tanking and not just poor team performance. Table 3.3 contains the parameter estimates and marginal effects from Equation 3.2, using the same data as above.[9]

Table 3.3: Results incorporating type of game interacting with the elimination variables

Variable	Coefficient	Robust Std Error	Z-stat	Marginal Effect on Win (%)
Home Team	1.352	0.067	20.06**	32.58
Neutral Site	-0.027	0.465	-0.06	-6.81
Winpct*100	0.025	0.001	18.03**	6.37
Owinpct*100	-0.026	0.002	-15.89**	6.59
Clinch	0.267	0.119	2.24*	6.64
Oclinch	-0.277	0.127	-2.18*	-6.88
Elim83*DC	-0.558	0.274	-2.03*	-13.60
Oelim83*DC	0.553	0.418	1.32	13.51
Elim84*DC	-0.224	0.436	-0.51	-5.57
Oelim84*DC	0.241	0.354	0.68	6.01
Elim89*DC	-0.697	0.356	-1.96*	-16.76
Oelim89*DC	0.742	0.29	2.56**	17.80
Elim89*IC	-1.872	1.083	-1.73	-36.64
Oelim89*IC	1.904	0.75	2.54**	37.19
Elim93*DC	-1.018	0.298	-3.41**	-23.50
Oelim93*DC	1.027	0.278	3.70**	23.76
Elim93*IC	-1.541	0.833	-1.85	-32.31
Oelim93*IC	1.532	0.732	2.09*	32.33
Constant	-0.639	0.094	-6.83**	—

*=p-value<0.05, **=p-value<0.01
Dependent variable=1 if team i wins game

The results from Table 3.3 show that, similar to Table 3.2 indicates a strong home-court advantage in the NBA. In addition, the results regarding the strengths of both teams in game j, measured by their win percent, is similar to Table 3.2. Also, the marginal effects on the two clinch variables show a similar effect with Table 3.2.

The results found in Table 3.3 indicate that NBA teams were more likely to

[9] The variables elim83*IC, oelim83*IC, elim84*IC, and oelim84*IC were dropped due to collinearity.

tank in conference games in the 1983-1984 season. Thus, one can fail to reject Hypothesis 3.1. Only by finishing in last place did a team have the opportunity to receive the first overall selection, indicating that tanking against conference opponents had a direct impact on the standings. The results also suggest that eliminated teams attempted to capitalize on the opportunity to receive the first overall pick at the cost of higher media and public scrutiny by tanking in conference games. The adoption of the equal-weight draft lottery eliminated the incentive to tank in the NBA, and the results from the game interaction are consistent with that policy change (Soebbing and Mason 2009) and previous research (Taylor and Trogdon 2002, Price, Soebbing, Berri, and Humphreys 2010).

Under the initial weighted lottery adopted in 1989-1990, the results show that eliminated teams playing in conference games are approximately 17 percent less likely to win that game, all other factors equal. Teams that play eliminated opponents are 18 percent more likely to win that game. When the NBA increased the draft lottery weights, one finds that eliminated teams playing conference opponents were 24 percent less likely to win game j. Teams playing eliminated conference opponents were 24 percent more likely to win game j. Examining the nonconference games from the two iterations of the weighted lottery (1989 and 1993), one finds weak evidence that teams were tanking in nonconference games. Therefore, one can fail to reject Hypothesis 3.3. Teams are more likely to tank in conference games compared to nonconference games. Put another way, the financial benefits of tanking against conference opponents (teams that are geographical and conference rivals) and receiving a top draft pick outweighs the financial and social costs of negative publicity surrounding a loss to a conference opponent. In addition, the results from Table 3.3 also indicate that teams are strategically deciding to tank because the behavior is different with different opponents and under different draft formats. Finally, the results from Table 3.3 show that tanking is a deliberate strategy used by eliminated NBA teams and the losses are not just due to poor performance, confirming the previous research examining tanking in the NBA. If poor performance were the cause, then the $ELIMDC_{ijk}$, $OELIMDC_{ijk}$, $ELIMIC_{ijk}$, and $OELIMIC_{ijk}$ parameters should not be statistically different from zero.

3.5 Implications and Future Research

Professional sports leagues attempt to preserve the uncertainty of game outcome and league-wide competitive balance as a way to maximize the joint profits of all the teams in the league. In some instances, league executives must implement new policies or modify existing policies to meet these objectives and to align team interests with the objectives of the league. The goal of a professional sports team is to maximize its own profit as well as to possibly win the league championship. When attempting to maximize its own profit, a team may engage in strategies that do not align with the overall interests of the league, possibly creating a conflict between the principal, the league, and the agents or teams. One such instance occurs with the amateur draft policy.

This research examines the incentive of eliminated NBA teams to tank—intentionally losing late in the regular season so as to receive the first overall selection in the amateur draft—in conference and nonconference games. From a financial standpoint, the first overall selection provides an opportunity to obtain a franchise player at a low cost. Previous research has shown that teams receive a surplus of a little less than 3 million dollars for starting player, and that surplus increases for superstar players (Hausman and Leonard 1997, Krautmann, von Allmen, and Berri 2009). In addition, previous research has showed that teams' gate revenue receive an increase the season after they have the first overall selection (Price, Soebbing, Berri, and Humphreys 2010). This information provides a financial incentive for eliminated teams not to put forth effort to win a game, jeopardizing the legitimacy of the league. Over the past 30 years, the NBA has strategically altered the amateur draft format to try to deter tanking.

This research provides a deeper examination of the incentives that teams have to tank under the last four different draft formats in the NBA. The results show that eliminated teams engage in tanking under the reverse-order, weighted lottery, and the increased-weighted lottery. These results confirm the previous research examining tanking in the NBA. The previous research did not, however, examine the different incentives that teams have to tank under different types of games. Furthermore, this chapter analyzed two type of games—conference and nonconference—and discussed the potential benefits and costs associated with tanking in conference games as compared to nonconference games. This research a better understanding of the strategic behavior of teams that are eliminated from playoff contention. In addition, examining conference games provides a robustness check regarding the interpretation of the tanking variable used in previous studies. The results from examining the type of game indicate those teams are more likely to tank in conference games than in nonconference games, providing further insight into team behavior and confirming results from previous research regarding the tanking phenomenon.

These results have many implications for sport managers. From a league design perspective, the results show that the NBA, by introducing a weighted lottery format, actually increased the incentive for eliminated teams to tank late in the regular season. Leagues need to be cognizant of the unintended consequences brought on by changes in league policies. Attempting to manage these consequences is a difficult task. However, doing so is important to reach the leagues goal of maximizing the joint profits of all teams. The results of the research indicate that the NBA may need to alter its draft policy again or implement a rule to discourage tanking behavior.

League executives may be able to adjust another policy that might reduce the incentive to tank late in the regular season. One suggested policy change is that executives could increase the number of divisions in each conference. Doing so would provide a greater chance for a team to win its division and make the playoffs. Because a tanking strategy involves the team being eliminated from playoff contention, keeping teams in playoff contention longer during the regular season would decrease the opportunity to tank. A league could also increase the number of playoff positions but would have to find the optimal number of playoff spots to maintain value in regular season games. Specifically for the NBA, league executives could relax the restrictions and exemptions regarding the trading and signing of players. By doing so, it would allow players to move more freely between clubs. Allowing the players to move more freely between clubs would allow a team that was a poor performing team in the previous season to improve its team for the upcoming season. Currently, the draft is the easiest way for poor performing teams to improve, so teams use tanking to improve their draft position (Sheridan 2007).

3.5.1 Limitations

The present model has some limitations. This research, as well as Taylor and Trogdon (2002), treat the tanking process as static. The decision to tank could depend on the value that teams place on the amateur players available in the upcoming draft. Therefore, the incentive to tank could vary across seasons, depending on a team's perceptions of the relative quality of amateur players available in the next draft, the composition of its existing roster, or the team's projected roster needs.

In addition, it may take time for an organization to learn and adjust to changes in the draft policy. For example, a team may not tank initially. However, when seeing that teams that may have been tanking become better teams after receiving higher orders in the draft, these teams might also use the tanking strategy. Therefore, tanking in the NBA may not appear immediately after a change in draft policy. Price et al. (2010) examined that process, but a more detailed examination of the organizational learning process should be undertaken.

3.5.2 Future Research

Tanking is a complex phenomenon. This present study focuses on one dimension of tanking in one league, the incentives for NBA teams to tank in conference and nonconference games. However, the other goal of the amateur draft policy is to increase the competitive balance. Future research should examine how competitive balance in the NBA is affected by modifications to the draft policy. This topic is examined in Chapter 4.

This research examined whether tanking was used certain draft formats and whether that behavior differs in conference and nonconference games. The next question concerns how teams tank or what mechanisms they use to tank. The initial hypothesis is that the decision for an eliminated team to tank is not a decision made at the player level. NBA players attempt to maximize their income, and some may be playing for a new contract. As a result, one would expect that players would not intentionally tank games. Thus, the initial research examining how teams tank should focus on the organizational level. Future research should focus on different strategies that coaches and team executives could implement. For example, a team could play younger players more on average than other teams, decrease the starters' minutes in a contest, or increase the number of players used in a game. Detecting the mechanism through which teams tank would help inform the league for modifying the principal-agent contract to eliminate tanking, which is an undesired behavior from a league's perspective.

In addition, future research could measure the intensity of rivalries between NBA teams in an attempt to further assess the impact that rivalries have on tanking behavior. To measure the intensity of rivalries, future research could examine the number of times two teams played each other on national television, the newspaper space dedicated to a game, and national media articles on a particular team during that season. All of these measures could further inform research on tanking.

The NBA was the first North American professional sports league to move from the reverse-order amateur draft format. Since then, the National Hockey League (NHL) also adopted a weighted-draft lottery. The current NHL Commissioner, Gary Bettman, was an NBA executive during the early draft format changes. Future research needs to examine whether tanking was a problem in the NHL prior to the draft change. In addition, whether the change in draft format actually created more of an incentive for NHL teams to tank, similar to the adoption of the weighted-draft lottery in the NBA, should be researched. Finally, the Australian Football League (AFL) had also expressed concerns that teams were tanking late in the regular season. In fact, tanking was such a concern that the minister in charge of gambling investigated the effect that tanking (or the perception of tanking) had on government gambling revenues (Dowling 2009). A more in-depth examination of the tanking debate in the AFL should be undertaken in order to inform to the league and governments as to the effect of tanking.

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Chapter 4

Amateur Draft Policy and Competitive Balance in the NBA

Chapter 1 provided a historical overview of the various National Basketball Association (NBA) draft policies over the past 30 years, and the two interrelated issues that the NBA has attempted to manage. The first was to deter eliminated NBA teams from tanking late in the regular season to increase their chance of being the first to select in the amateur draft. Examining this first issue, Chapter 2 provided evidence that bookmakers believe that NBA teams are tanking late in the regular season and adjust the point-spread from one to four points due to tanking. Chapter 3 showed how tanking behavior differed between conference and nonconference regular-season games. The other related issue the NBA attempted to manage, investigated in this chapter, is the effect that the amateur draft has on league-wide competitive balance.

Competitive balance is defined as “a league structure which has relatively equal playing strength between league members” (Forrest and Simmons 2002, p. 229). It is important for the league because a highly competitive league signals to external stakeholders—such as media, corporate sponsors, and fans—that the league is a worthwhile outlet for businesses to allocate advertising money to and for fans to spend their discretionary income on. A decrease in the public’s confidence regarding the integrity of the on-field competition both at the individual match and seasonal levels could have detrimental effects on the league and its members franchises

(Forrest and Simmons 2003). As a result, professional and amateur sports leagues have stressed the importance of preserving and improving competitive balance as well as protecting the integrity of the matches even if policies implemented by sports leagues are anticompetitive (El-Hodiri and Quirk 1971).

Competitive balance research has evolved into two streams: the effect of competitive balance on attendance and how different policies adopted by a league impact competitive balance (Fort and Maxcy 2003). Research on competitive balance has examined many different policy initiatives that professional sports leagues have instituted with the intent of increasing, preserving, or maintaining league-wide competitive balance. One such policy initiative is the presence of an amateur draft, a procedure that allocates the rights to amateur players' services to teams in a professional sports league. The traditional draft format used by professional sports leagues is reverse-order, in which the worst team (the team with the lowest winning percentage) selects first, followed by the second worst, and so on. Initial research by Rottenberg (1956), El-Hodiri and Quirk (1971), and Fort and Quirk (1995) suggested that the presence of an amateur draft would only increase owners' profits and would not improve the competitive balance of a league. Specifically, Rottenberg (1956) commented that players who attempted to maximize their own profits chose teams that valued them the most. Fort and Quirk (1995) expanded on Rottenberg's (1956) research and claimed that, if a team's overall goal was profit maximization, the amateur draft restricted competition for the incoming rookie talent because the only team that could negotiate with the player is the team that drafted his rights. The result is that the salaries of rookies would remain low. Therefore, a reverse-order draft format allows weak teams in the league to purchase talent at a lower cost compared to the free agent market and resell that talent at a higher price, thereby increasing a weak team's profit. Players would eventually relocate (via trades or free agency) to the teams that valued them the most [Rottenberg's (1956) invariance principle], and competitive balance throughout the league would not improve (Fort and Quirk 1995).

Despite these arguments, leagues touted an amateur draft as a vital instrument in keeping the league competitively balanced. League executives believe that "the draft is to maintain relative parity of teams in the league, thereby providing for more evenly matched games, with no team or group of teams constantly dominating the league" (Alyluia 1972, p. 361). Some of the empirical research examining the effect of the amateur draft on competitive balance in professional leagues has supported this claim (Booth 2005, La Croix and Kawaura 1999, Grier and Tollison 1994, Butler 1995, Maxcy 2002). All of the leagues that were examined used the reverse-order draft; however none of the academic research examined a league that altered its draft format. The first professional league to adjust its draft format was the NBA.

The NBA is a unique professional league, not just because it is the first league to divert from a traditional reverse-order format but because it is the least competitively balanced of the "big four" North American professional sports leagues—Major League Baseball (MLB), the National Football League (NFL) and the National Hockey League (NHL)—according to Berri, Schmidt and Brook (2006), Fort (2006), and Maxcy and Mondello (2006). If competitive balance is as important to league executives as they claim, then one would expect the executives to be aggressive in changing league policies to improve competitive balance to improve the legitimacy of their product. Throughout its history, the league has adopted many policies and enacted many changes, including expanding to new markets, relocating existing franchises, adopting a salary cap, and changing its draft policy.

The purpose of this present research is to examine the effects that the policies listed above have had on competitive balance in the NBA. Previous research by Maxcy and Mondello (2006) examined some policy changes in the NBA, such as free agency, salary caps, expansion, presence of a rival league, and work stoppages. Of particular interest to the present research is the effect that changing draft policies has had on competitive balance in the NBA, something Maxcy and Mondello (2006) did not examine. Since 1983, the NBA has adopted four different draft formats: reverse-order, equal-chance lottery, weighted lottery, and increased-weight lottery. Some research speculated that the amateur draft in the NBA should improve competitive balance (Sanderson and Siegfried 2003, Price, Soebbing, Berri, and Humphreys 2010), but no direct examination of this effect has occurred.

Examining the entire history of the NBA (64 seasons, from 1946-1947 through 2009-2010), the results of the present research indicate that the NBA's different draft formats either have had no effect or have created more competitive balance within the NBA, thus confirming Fort and Quirk's (1995) and Rottenberg's (1956) findings. However, some policies have improved competitive balance in the NBA, including the merger of the American Basketball Association (ABA) with the NBA and the NBA's increasing the percentage of teams in the league that make the playoffs. The results have implications for both the NBA and all professional sports leagues regarding the impact of league policies on competitive balance.

The structure of this chapter is as follows. The chapter first examines the research on competitive balance. Second, it presents the research concerning the different draft formats in the NBA and the research examining the effect of the amateur draft on other leagues. Third, the chapter presents hypotheses related to the effect of different amateur draft formats on competitive balance, the empirical model to test the hypotheses, and the population data. The chapter concludes with the presentation of the results, a discussion of the results, the limitations and implications of these results, and areas for future research.

4.1 Competitive Balance

Competitive balance can be defined as equal playing strength amongst all the teams within a league (Forrest and Simmons 2002). Sports leagues rely on competition to sell their products (Neale 1964), which is the uncertainty of game outcomes (Mason 1999). Competitive balance is important for professional sports leagues because fans prefer to have a more balanced league than a less balanced league

(Fort 2003b). As Neale (1964) stated, the New York Yankees saw an attendance increase in a season in the 1950s when it did not advance to the World Series after having many consecutive years playing in the "Fall Classic." For this reason, sports leagues implement policies to help improve or maintain competitive balance. Some of the policies leaders of sports leagues promote to improve competitive balance are amateur drafts, salary caps, free agency, and revenue sharing. Fort and Quirk (1995) argued that the only policy that could improve the competitive balance of a league is an enforceable team payroll cap—the total amount of money all players on a team's roster can make over the course of the season.

The academic research examining competitive balance falls into two streams (Fort and Maxcy 2003). The first is the uncertainty of outcome hypothesis, which examines fan sensitivity to changes in competitive balance. The second stream is the analysis of competitive balance, which examines the effect that league policy changes have on competitive balance. Competitive balance analysis is a useful research stream because one "can evaluate the efficacy of league and government competition policy choices" (Fort 2003a, p. 280). Competitive balance analysis research has examined policy changes in all four North American professional sports leagues [e.g., Depken (1999), Eckard (2001), Maxcy (2002), and Maxcy and Mondello (2006)].

4.1.1 Measurements

Researchers have developed several ways to measure competitive balance, depending on how one defines the term (Zimbalist 2002). These measures generally revolve around the distribution of wins amongst teams within a league and the distribution of championships within a league. Some common ways to measure competitive balance is the actual to idealized standard deviation ratio (AISDR),[1] Herfindahl-Hirschman Index (commonly known as HHI), gini coefficients, and Spearman rank correlation coefficient (SRCC; Soebbing 2008b). On a more macro-level, some re-

[1]The AISDR is also called the Noll-Scully Ratio.

cent research used structural breaks to examine competitive balance in sports leagues (Lee and Fort 2005, Fort and Lee 2007).

The current research uses the AISDR for two reasons. The first is the AISDR's common use in the literature (Soebbing 2008b). The second reason is that the focus of the current research is on the dispersion of wins throughout the league for the regular-season, specifically what the AISDR measures. Previous research using the AISDR showed that fans respond to the dispersion of wins in professional sports (Soebbing 2008a). Equation 4.1 presents the AISDR formula:

$$AISDR_{st} = ActualSDWP_{st}/IdealSDWP_{st} \tag{4.1}$$

In Equation 4.1, Actual SDWP is the standard deviation of winning percentage (SDWP) across all teams in League s in Year t. Ideal SDWP is the ideal standard deviation of win percentage over that league for the season. Equation 4.2 presents the Ideal SDWP:

$$IdealSDWP_{st} = 0.500/\sqrt{G} \tag{4.2}$$

where G is the total number regular-season games each team plays in the league for a given season. The idea behind the Ideal SDWP is to control for the different number of games played throughout the course of league history or to compare across leagues (Soebbing 2008b). A value of 1 for Equation 4.1 indicates the ideal competitive balance established in the literature that all teams in the league win half their games. The higher the AISDR, the more dispersed the winning percentage is throughout the league and the lower competitively balanced a league is. A value of less than 1, though rare, can occur. In this case the interpretation is that the dispersion of win percentage is very narrow. This chapter examines how the changes to league policy, particularly the changes to the amateur draft format, affect competitive balance in the NBA.

4.2 Non-Draft Policies and Competitive Balance Research in the NBA

The NBA began in 1946 with 11 teams. Currently, the NBA has 30 teams. Throughout the last 64 seasons, the NBA has frequently decided to add new teams (expansion) or relocate existing franchises.[2] In addition to expansion and relocation, the NBA merged with a rival league, the ABA, in 1976. The presence of the ABA in the late 1960s and early 1970s created a highly competitive labor market for players, resulting in higher player costs for teams (Maxcy and Mondello 2006), which is already the highest cost facing NBA teams (Leeds and von Allmen 2005).

Beginning in 1983, the NBA introduced a team salary cap. A team salary cap sets both a minimum and maximum amount a team can spend on its players (Késenne 2000). The team cap in the NBA is a "soft cap" because teams can exceed the cap in order to re-sign their own players, among other exceptions (Maxcy and Mondello 2006). The NBA also has two individual player caps. The first is a rookie salary scale, which began in 1995. The rookie salary scale determines how much a player who is selected in the first round of the amateur draft makes during the years of his rookie contract (Kaplan 2004, Groothuis, Hill, and Perri 2007, Krautmann, von Allmen, and Berri 2009). The second cap the league added is a cap on the amount a veteran—any player not under a rookie contract—can make in one season. Késenne (2000) examined the theoretical effect that these three caps have on competitive balance in the NBA. He found that the team cap could improve the competitive balance in the NBA. In addition, the presence of the veteran cap created an "excess demand for top players" (Késenne 2000, p. 428), and the top players will end up going to the larger markets in the league. The result would be more competitive imbalance in the league.

Research examining competitive balance in the NBA showed that NBA fans do

[2]For a list of the many expansion teams and relocated teams, consult Rascher (2008).

prefer games with an uncertain outcome (Rascher and Solmes 2007). Maxcy and Mondello (2006) examined the effect of different policies on competitive balance in the NBA from 1951 through 2004. They used two different competitive balance measures, the AISDR and the SRCC. The AISDR, as mentioned above, measures the dispersion of wins throughout the league relative to a measure of the ideal dispersion, and the SRCC examines the turnover in league standings from one year to the next. Maxcy and Mondello (2006) focused on institutional changes in the NBA, such as the team salary cap, free agency, expansion, the presence of the rival ABA as a competitor to the NBA, and work stoppages. Results for the AISDR model showed that only the work stoppages improved competitive balance. This result should be interpreted with care because work stoppages usually bring significant changes to the operations of the sport league such as adjustments in revenue sharing, salary caps, and rule changes governing play on the court. All other variables were insignificant and, thus, had no impact on competitive balance. Using the SRCC measure, Maxcy and Mondello's (2006) found that the salary cap created more competitive imbalance, and the number of teams in the league created more competitive balance. Maxcy and Mondello (2006) did not examine the impact that the draft may have on competitive balance in NBA.

The draft is an important institutional change in the history of the NBA. The NBA has made a series of strategic decisions to adjust the draft format over the last 30 years. These adjustments have been made in an attempt to help deter teams from tanking late in the regular-season as well as to ensure that the draft would improve the competitive balance of the league (Soebbing and Mason 2009). Chapter 3 examined the tanking issue as it relates to the different amateur draft formats while this chapter examines the competitive balance rationale for the multiple changes to the draft format.

4.3 Problem and Hypotheses

Commissioners of professional sports leagues promote the reverse-order amateur draft as a way to increase competitive balance within a league (El-Hodiri and Quirk 1971). Fort and Quirk (1995) stated that the amateur draft would have no impact on competitive balance. Their research assumed that teams were profit maximizers instead of win maximizers. Thus, if teams are profit maximizers instead of utility (win) maximizers, amateur drafts restrict competition only for rookies. This restriction of competition results in lower salaries for players who are entering the league. A reverse-order draft format allows weak teams to purchase talent cheaply and resell the talent at a higher price, thereby increasing a weak team's profit (Fort and Quirk 1995, Fort 2003b). The result is that Rottenberg's (1956) invariance principle is supported and league-wide competitive balance will not improve (Fort and Quirk 1995).

Some empirical studies refute Fort and Quirk's (1995) assertion that the draft would have no impact on league-wide competitive balance. Grier and Tollison (1994) examined the relationship between the NFL Draft and league-wide competitive balance. However, instead of using one of the many competitive balance measures present in the literature, Grier and Tollison (1994) used NFL teams' winning percentage from 1983 through 1990. They concluded that a team's higher draft position in those seasons led to a higher winning percentage in the following season, a result that they interpreted as improved league-wide competitive balance. However, they did not control for other league policies such as franchise relocation, an omission that leads one to caution concerning the interpretation of their results.

Butler (1995) examined competitive balance in both the American and National Leagues (AL and NL) of the MLB from 1946 to 1992 using the SDWP as his competitive balance measure. Controlling for other league policies such as expansion and free agency, his results indicated that the introduction of the amateur draft in both leagues (AL and NL) improved competitive balance. Butler (1995) speculated that this result occurred because the large market teams could not just purchase the top amateur talent. Instead, the top amateur talent would be divided among all the teams in the league, leading to better competitive balance. Butler's (1995) findings were confirmed by Maxcy (2002). In his research, Maxcy (2002) used both the AISDR (dispersion of winning percentage) and the SRCC (turnover in standings) to look at the draft's impact on competitive balance. Maxcy (2002) concluded that the draft improved both the dispersion of winning percentage as well as caused the standings to turnover.

Some research on the NBA would support the results of the previous studies that indicated that amateur drafts improve league-wide competitive balance. The NBA touts the fact that only three NBA teams who picked first overall from 1985 through 2006 did not win more games in the following season (National Basketball Association 2011). Empirical research by Price et al. (2010) found that amateur players who were selected first overall in the NBA draft produced 45 wins over the first five years of their career with approximately seven wins produced in their first season. Similar to Grier and Tollison's (1994) research, the research conducted by Price et al. (2010) and the anecdotal evidence from the NBA (2011) cannot indicate whether league-wide competitive balance improved; it just provided evidence that the worst teams improved the following season.

However, the structure of MLB and the NFL are different than that of the NBA. This fact would lead some people to hypothesize that, in fact, the amateur draft would have no impact on competitive balance in the NBA. A fact common to both MLB and the NFL is that young players take longer to develop as compared to the NBA. Specifically in MLB, newly drafted players will spend many years in a team's minor league player development system before having the opportunity to be called up to the parent team. In the NFL's case, there is no minor league system. However, young players have to develop physically to handle violent impacts. In addition, young NFL players must learn the team's intricate offensive and defensive systems before seeing playing time. The result is that it is unclear at the outset of a player's career whether MLB and NFL draft picks will be successful. Thus, the research that shows a positive relationship between competitive balance and the amateur draft are focusing on players that make it to the field of play, not the amateur draft process itself. In the NBA, young players usually see playing time in their first season and first round picks may see significant playing time. This would lead some to speculate that the amateur draft would have no impact on league-wide competitive balance in the NBA.

To this date, the academic literature has not examined the amateur draft's impact on competitive balance in the NBA. What makes the NBA unique to study compared to the previous empirical research conducted in the NFL and MLB is that the NBA has altered its draft policy three different times in league history. The league decided to alter the draft format due to concerns of tanking by eliminated teams late in the regular-season and the stance that the amateur draft is a mechanism to improve the competitive balance of the league (Soebbing and Mason 2009).

The NBA has employed four different draft formats throughout its history, with each iteration of the draft format providing an opportunity to examine the relationship between the amateur draft and competitive balance in the NBA. When the NBA began in 1946, the league had a reverse-order draft format with a territorial component. This format allowed teams to exchange a first-round draft selection for a player in the team's selected geographic region who may have been selected by another club prior to a team's draft position. The reason for the territorial draft was that the NBA wanted young franchises and the young league overall to develop a fan base (Evolution of the Draft and Lottery 2007).

The territorial component ended in 1966, and the NBA used a straight reverse-order format in which the worst team from each conference would flip a coin to determine who selected first overall. The loser of the coin flip would select second. The rest of the draft order would be based on teams' winning percentages from the just-completed season. Given the evidence by Fort and Quirk (1995) that the amateur draft would not improve competitive balance of the league and the limitations discussed above regarding generalizing the empirical results from the NFL and MLB to the NBA, one would predict the following:

Hypothesis 4.1 *As indicated in Fort and Quirk's (1995) research, the switch from the territorial draft to a strict reverse-order draft will not have any effect on competitive balance.*

Following the 1984 draft, the NBA adopted an equal-chance lottery format. This changed marked the first time a professional sports league had used a draft format other than reverse-order. The league was not concerned with the competitive balance implications of the draft policy. Rather, the equal-chance lottery was implemented only to decrease or eliminate the incentive for eliminated teams to tank, a practice that was confirmed by previous research on tanking (Taylor and Trogdon 2002, Price, Soebbing, Berri, and Humphreys 2010). Under this format, all non-playoff teams had the same probability of winning the lottery and selecting first overall in the draft. Until the league determined the draft order, it was unclear which teams would get the top rookie talent. If the best eliminated teams were allowed to select before the worst eliminated teams, the disparity of win percentage and, thus, competitive balance should decrease. However, if the worst teams won the chance to select before the best playoff teams, then the league should be more competitively balanced. Thus:

Hypothesis 4.2 *The switch to the equal-chance lottery format from the reverse-order format will have an effect on league-wide competitive balance due to the league's desire to eliminated tanking. However, the effect [+ or -] on competitive balance is unclear until the lottery is conducted to see the order of the draft for each season.*

Beginning in 1990, the NBA altered its draft format from the equal-chance lottery format to a weighted lottery. This change was largely due to team owners and league executives questioning whether the purpose of the draft is to deter tanking or enhance competitive balance (Soebbing and Mason 2009). However, the new lottery format gave the worst teams a better chance of selecting higher in the draft compared to the best non-playoff teams, making it similar to a reverse-order format. Unlike a reverse-order format though, the weighted lottery did not guarantee that higher placement in draft selection for lower performing teams would occur, because the league still wanted to protect against eliminated teams tanking late in the regular-season. Because of the desire to revert back to the worst eliminated teams selecting before the best eliminated teams, one would predict that:

Hypothesis 4.3 *As indicated in Fort and Quirk's (1995) results, the switch from the equal-chance lottery to a weighted draft lottery will not have any effect on competitive balance.*

The final iteration of the draft lottery was implemented in 1994. Under this format, the eliminated teams with the worst records received a higher probability of winning the lottery and selecting first overall in the draft compared to the first weighted lottery. The league, in changing the draft format, was trying to make its draft order resemble a reverse-order format. Given that empirical research from the NFL and MLB may not be generalizable to the NBA, the following hypothesis is proposed

Hypothesis 4.4 *Increasing the weights in the weighted lottery draft format will not have any effect on competitive balance in the NBA.*

To test these hypotheses, the following research examines the entire history of the NBA and league-wide competitive balance throughout the period measured using the AISDR as the competitive balance measure.

4.4 Data

The data include the entire regular-season history of the NBA beginning from its inception in the 1946-1947 season through the 2009-2010 season. Data for these

64 seasons were obtained from the web sites Database Basketball[3] and Basketball-Reference.[4] Table 4.1 displays the summary statistics. The mean AISDR, the competitive balance measure, is 2.550. The AISDR range is between 0.857 (high competitive balance) and 3.479 (low competitive balance). The mean percentage of teams that made the playoffs each season is 61.2 percent. Expansion occurred in 23 percent of the seasons while relocation occurred in 28 percent of the seasons. During the league's history, there was an average of 19 teams per season, and these teams each played an average of 78 regular-season games. Examining the draft variables, 29 percent of the observed seasons occur under the reverse-order format, less than 8 percent under the equal-chance lottery, 6 percent under the first weighted lottery, and 26.6 percent under the second weighted lottery format. Realignment of the divisions occurred in 6.3 percent of the seasons.

Table 4.1: NBA Summary Statistics: n=64

Variable	Mean	Std. Dev.	Min	Max
AISDR	2.550	0.529	0.857	3.479
Playoff Freq.	0.612	0.094	0.471	0.800
Total Games	78	8	48	82
Total Teams	19	8	8	30
Expansion	0.234	0.427	0	1
Relocation	0.281	0.453	0	1
Reverse Order	0.297	0.460	0	1
Equal Chance	0.078	0.270	0	1
Weighted Lottery	0.063	0.244	0	1
Increased Weights	0.266	0.445	0	1
Division Realignment	0.063	0.244	0	1

The current research proposes two models, the first being Equation 4.3:

$$\begin{aligned} &AISDR_t = \beta_0 + \beta_1 Expand_t + \beta_2 Relocate_t + \beta_3 Cap_t + \beta_4 Draftage_t + \\ &+\beta_5 Reversedraft_t + \beta_6 Equal_t + \beta_7 WL_t + \beta_8 IWL_t + \beta_9 ABAmerge_t + \\ &\beta_{10} Playoff_t + +\beta_{11} Realign_t + \epsilon_t \end{aligned} \tag{4.3}$$

[3]http://www.databasebasketball.com
[4]http://www.basketball-reference.com

In this equation, t indexes year, β_0 is the constant term, and ϵ is the error term assumed to be normally distributed with constant variance. *Expand* is an indicator variable that shows that expansion took place during year t. *Relocate* is an indicator variable that shows that at least one franchise relocated to a brand new market to begin that season.[5] *Cap* is a trend variable over the time of some type of salary cap being in place (1983-present). It takes the value of 1 in 1983, 2 in 1984, and continues until the present. For season prior to 1983, the value of the variable is 0. *DraftAge* is an indicator variable for the NBA's current minimum draft age rule being in effect. This rule began with the 2005-2006 season and states that players must be one year removed from high school before becoming eligible for the NBA draft. The *Reversedraft* variable is an indicator variable for the presence of the reverse-order draft without the territorial component. *Equal* is the indicator variable during the seasons when the equal-weight lottery format was used by the NBA. *WL* is the indicator variable for the first weighted-draft lottery. IWL is an indicator variable for the seasons in which the NBA increased the draft weights. *ABAmerge* is an indicator variable for the first season (1976-1977) after the ABA and NBA merged. Previous research showed that the merger of these two leagues resulted in an increase in average game attendance (Noll 1974). *Playoff* is the percentage of teams in the league that made the playoffs. *Realign* is an indicator variable controlling for the initial season in which the league realigned its divisions.

It is important to examine competitive balance in the NBA by including a lagged dependent variable. The inclusion of a lagged variable provides a robustness check of Equation 4.3. Equation 4.4 includes $AISDR_{t-1}$, which is a one-year lag of the $AISDR$.

[5]This variable specifically represents franchises locating to brand new metropolitan areas. Thus moves such as the Detroit Pistons' move from Detroit to Auburn Hills are not identified under this definition.

$$
\begin{aligned}
&AISDR_t = \beta_0 + \beta_1 AISDR_{t-1} + \beta_2 Expand_t + \beta_3 Relocate_t + \beta_4 Cap_t + \\
&\beta_5 Draftage_t + \beta_6 Reversedraft_t + \beta_7 Equal_t + \beta_8 WL_t + \beta_9 IWL_t + \\
&\beta_{10} ABAmerge_t + \beta_{11} Playoff_t + \beta_{12} Realign_t + \epsilon_t
\end{aligned}
\tag{4.4}
$$

4.4.1 Econometric Issues

In time series analysis with limited observations, many conditions can lead to inconsistent estimates. The first is a unit root, which occurs when the mean and variance of the dependent variable do not vary systematically throughout the sample period (Gujarati 2003). The present research tests for a unit root using the Phillips-Perron test. The null hypothesis with the Phillips-Perron test is that the dependent variable $AISDR_t$ contains a unit root. The results show that one can reject the null hypothesis of unit root at the 99 percent confidence interval.

Autocorrelation is another problem for which one must test in the sample. Autocorrelation causes the error term to be correlated with independent variables. In the presence of autocorrelation, the parameters are biased, which leads to inflated t statistics (Gujarati 2003). To test for autocorrelation, this research uses the test explained by Wooldridge (2006). The test obtains the residuals from the original ordinary least squares (OLS) regression and regresses those residuals on the lagged residuals, ϵ_{t-1}. That regression tests the t statistics against the null hypothesis of no autocorrelation. In Equation 4.3, one can reject the null hypothesis of no autocorrelation at the 99 percent confidence interval. To correct for autocorrelation, one can use the Prais-Winsten transformation to estimate the equation using generalized least squares (GLS). With the inclusion of $AISDR_{t-1}$ in Equation 4.4, one cannot reject the null hypothesis and no correction needs to be made to this model.

The final problem is heteroscedasticity. With ϵ, the assumption is ϵ has constant variance (no heteroscedasticity). The "estat hettest" command in STATA tests the heteroscedasticity assumption within the original OLS equation (4.3). For Equations 4.3 and 4.4, the null hypothesis of no heteroscedasticity is rejected and White's robust standard error correction is used. Table 4.2 shows the results for the NBA.

Table 4.2: Regression Results for the Entire NBA

DV: $AISDR_t$				
	Model 1		Model 2	
Variable	Coef.	p-value	Coef.	p-value
$AISDR_{t-1}$	—	—	0.421	0.007
Expansion	0.222	0.059	0.273	0.040
Relocation	-0.022	0.861	0.033	0.806
Salary Cap	-0.026	0.227	-0.029	0.125
Min. Draft Age	-0.009	0.979	0.218	0.389
Reverse Order	-0.155	0.522	-0.088	0.670
Equal Chance	0.419	0.063	0.358	0.027
Weighted Lottery	0.485	0.077	0.405	0.101
Increased Weights	0.701	0.096	0.596	0.125
ABA Merger	-0.524	0.010	-0.691	0.000
Percent of Playoff Teams	-2.110	0.051	-1.192	0.317
Division Realignment	-0.218	0.181	-0.183	0.394
β_0	3.762	0.000	2.117	0.030
R^2	0.250	—	0.445	—
ρ	0.491	—	—	—

4.5 Results and Discussion

The results from Model 1 in Table 4.2 explain 25 percent of the observed variation in the dependent variable. In the draft variables, the shift from a territorial draft to a reverse-order draft does not have any effect on competitive balance. This result leads to failing to reject Hypothesis 4.1, which supports Fort and Quirk's (1995) assertion that the reverse-order amateur draft has no effect on competitive balance. When the NBA shifted from a reverse-order lottery to an equal-chance lottery, it was due to concerns that teams tanked late in the regular-season under the previous draft format. The results for Model 1 indicate that a shift from a reverse-order to an equal-chance lottery did not affect league-wide competitive balance at the 95% confidence interval with a p value of 0.063. This result leads to rejecting Hypothesis 4.2. The problem with the equal-chance lottery, according to some team executives, was it was not guaranteeing that teams with the worst record would have the first opportunity to select before the best non-playoff teams (Soebbing and Mason 2009). As a result, the NBA introduced a weighted-draft lottery. The results indicated that a shift to a weighted lottery did not have any effect on league-wide competitive balance at a p value of 0.077. This result fails to reject Hypothesis 4.3. Finally, NBA executives increased the draft weights to give the worst teams a higher probability of winning the lottery. The results again show that increasing the weights did not affect competitive balance. The result is a failure to reject Hypothesis 4.4.

The parameters in Model 2 in Table 4.2 explain 44.5 percent of the observed variation. The results regarding the draft variables in Model 2 are slightly different from Model 1. The presence of the traditional reverse-order draft format does not affect competitive balance; thus, Hypothesis 4.1 is not rejected. This result supports Fort and Quirk's (1995) research along with Rottenberg's (1956) Invariance Principle that the draft will not improve competitive balance. The results from Model 2 indicate that the draft reduces the competitive balance of the league, failing to reject Hypothesis 4.2.

At first, this result may be seem puzzling. However, as indicated earlier, the league adopted the format to deter eliminated teams from tanking late in the regular-season. Former Philadelphia 76ers executive Pat Williams summed up the equal-chance lottery by stating, "There was great alarm in the league [regarding tanking]. That temptation [to tank late in the regular-season] was removed with this lottery" (Aschburner 1993, n.p.). However, because the draft order was uncertain, it was unclear what effect it would have on competitive balance. Table 4.3 lists the teams with the worst winning percentage in the league for that season. It then lists the teams' draft position for that year. Notice in Table 4.3 that the team with the worst record selected first or second only twice during the six seasons of the equal lottery format. Under the reverse-order format, the worst team was guaranteed at least the second overall pick. Starting with the 1987 draft, the lottery determined only the first three draft positions. After the first three positions were chosen, then the draft positions were determined by reverse-order. In those three seasons, the worst team selected fourth overall in two of the three seasons, the worst position possible for the team to draft from. Overall, Table 4.3 shows that better eliminated teams were selecting before the worst eliminated teams in the league, thus creating lower competitive balance.

Table 4.3: Equal Chance Lottery Worst Team and Draft Position

Season	Team	Draft Position
1984-1985 (t)	Indiana Pacers	2
1984-1985 (t)	Golden State Warriors	7
1985-1986	New York Knicks	5
1986-1987	Los Angeles Clippers	4
1987-1988	Los Angeles Clippers	1
1988-1989	Miami Heat	4

When the NBA transitioned from the equal-chance lottery to the first weighted lottery, the move to the weighted draft was an attempt to address the competitive balance of the league more so than the issue of tanking (Soebbing and Mason 2009). The results for Model 2 in Table 4.2 show that this transition did not have any effect on league-wide competitive balance, thus one fails to reject Hypothesis 4.3. A few seasons later when the league increased the draft weights for the lower performing teams, the adoption of that policy did not affect the competitive balance. As a result, one fails to reject Hypothesis 4.4. Overall, the results in Table 4.2 indicate that the amateur draft is an anti-competitive practice used by the NBA to keep player costs down so as to improve profits for the owners and not to increase competitive balance of the league, contrary to what league and team executives may say.

Other policy changes during the history of the NBA provide interesting insights regarding the impact of policy changes on competitive balance. In both Model 1 and

Model 2, the merger of the ABA into the NBA increased the competitive balance of the league. In Model 1, an increase in the percentage of teams in the NBA that made the playoffs each year also improved the overall competitive balance of the league. The significance of the playoff variable provides confirmation of the implications of contest theory. In contest theory, a certain degree of randomness has to occur regarding the outcome of an individual match or across an entire season (Frick 2003). A postseason tournament introduces a random component because a team that may not have been the best team during the regular-season, as defined by winning percentage, can still win the league championship. Winning the league championship does bring about tangible and intangible benefits for the team.

The results for the playoff variable suggest some interesting reasons why the playoff variable increases the competitive balance of the league. One reason could be that, with more playoff spots, smaller market teams do not have to spend as much money on talent to make the playoffs as they do when fewer positions existed. In addition, large-market teams do not have to purchase excess talent to improve their chances of making the playoffs. As a result, increasing the percentage of teams making the playoffs could be beneficial to both large- and small-market teams. Hosting playoff games provides additional revenues without teams' having to pay their players extra money for making the playoffs. In addition, allowing a higher percentage of teams to make the postseason provides an incentive to teams to put forth enough effort throughout the regular-season to qualify for postseason play.

When the league introduced expansion teams, it decreased competitive balance of the league in the short term in both models. This result is consistent with the literature because both Lee and Fort (2005) and Quinn and Bursik (2007) stated that expansion should reduce competitive balance. Competitive balance declines with an additional team in the short term because expansion franchises are generally very weak teams in their first few seasons while they attempt to acquire and develop talent to compete with the more established teams in the league. The model cannot capture the long-term effect of expansion. However, one may expect that an increase in teams in untapped markets could improve competitive balance over the long term. Schmidt (2001) concluded as much in his examination of MLB. However, expansion would improve competitive balance over the long term only if expansion franchises were placed in cities of equitable market size compared to the rest of the league because the disparity of market size throughout the league is the main reason for competitive imbalance in sports leagues (Fort and Quirk 1995).

All other variables controlling for division realignment, the presence of a salary cap, teams' relocating to different market, and the minimum draft age do not affect league competitive balance in Model 1. The insignificance of the relocation variable is similar to Quinn and Bursik's (2007) result for MLB relocation. The insignificance of the salary cap variable is interesting. Maxcy and Mondello (2006) found in their research that the salary cap created more competitive imbalance using the SRCC as their competitive balance measure. Using the AISDR, Maxcy and Mondello (2006) concluded that the salary cap had no impact on competitive balance.

Two reasons may exist for the salary cap result in Table 4.2 being different from Maxcy and Mondello's (2006) result. One reason could be that Maxcy and Mondello (2006) used an indicator variable instead of a trend variable. Combining this result with Maxcy and Mondello's (2006), the results indicate that the presence of a salary cap in the NBA does not have any effect on the AISDR. The second reason is that the NBA imposes a "soft" cap, meaning that teams can exceed the salary cap under certain circumstances without penalty (Kaplan 2004). Fort and Quirk (1995) showed that a hard salary cap (no exemptions) that is enforceable by the league is the only mechanism that improves league competitive balance. The insignificance of the relocation parameter is another interesting result because one would expect that relocation of poor franchises could improve league competitive balance. However, Lee and Fort (2005) stated that "the impact of team relocation on competitive balance depends on the pre- and postmove economic welfare of individual teams"

(Lee and Fort 2005, p. 165).

4.6 Conclusion

This chapter examined policy changes implemented by the NBA during its history and their effect on competitive balance. The changes to the NBA draft policy and the effect of the draft on league-wide competitive balance were of particular interest. The results from the present research showed that most of the draft formats did not have any overall effect on competitive balance. This finding is consistent with the findings of Fort and Quirk (1995) as well as Rottenberg's (1956) Invariance Principle. Only the equal-chance lottery draft format created lower competitive balance in the NBA.

This chapter also presented some interesting findings for other areas of sport policy and league decision making. The result in Table 4.2 indicated that increasing the percentage of NBA teams that make the playoffs increased competitive balance in the league. The result also showed that expanding the playoffs created a better overall product with a more balanced league. Future research on what Soebbing (2008a) called playoff inflation and Lee (2009) examined regarding playoff expansion and its effect on attendance in MLB could further investigate the results in this chapter for the NBA. Future research could also attempt to uncover the optimal percentage of playoff teams in a league so as to not lessen the importance of regular-season games. Finally, empirical research examining NBA team seasonal attendance could examine whether NBA fans prefer teams to win games or win championships.

Future research regarding the relationship between the draft policy and overall competitive balance needs to be conducted from the viewpoint of other stakeholders. The first stakeholder is the fans. The present research implicitly assumes that fans are sensitive to changes in competitive balance. Fans provide a major source of revenue for both teams and the league as a whole. Fans' sensitivity to changes in competitive balance can also be determined by the seasonal attendance level. In terms of future research in the competitive balance analysis research, future research should examine the draft's impact on other definitions of competitive balance. Such definitions include the turnover in conference standings and concentration of playoff appearances in each conference.

This draft format is not exclusive to the NBA. In 1995, the NHL adopted a similar draft format as the NBA. NHL Commissioner Gary Bettman was an NBA executive when the NBA was adopting and altering its draft formats. The NHL adopted some different policies with its new draft lottery format including the number of spots a team can move up in the draft as well as the percentages of eliminated teams to win the draft lottery and receive the first overall pick. These differences could lead to different results in research addressing how the draft affects league competitive balance in the NHL while providing a start to examining why the NHL shifted its draft policy to resemble a draft policy similar to that of the NBA.

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Chapter 5

Conclusions

Professional sport is a lucrative business within the entertainment industry. What makes sports, particularly professional sports, unique compared to other entertainment businesses is that no one knows what the outcome of a sporting event will be. There are two outcomes that league executives pay close attention to. The first is the outcome of each individual contest. The second outcome is the season-long competition for each team to reach the postseason tournament in an attempt to become league champion. League executives recognize this important quality of sports and will adjust league policy if they believe fans, sponsors, or other outside stakeholders are questioning the legitimacy of the competition.

While the goals of the league might be preserving the uncertainty of game outcomes and the legitimately identifying a season champion, for a North American professional sports team, a team's main objective is assumed to be profit maximization (El-Hodiri and Quirk 1971). A second objective for a team is to be one of the teams in the league participating in the postseason tournament that determines the league champion. By making the postseason tournament, a team earns additional revenue due to hosting playoff games. Hosting playoff games comes at little cost to the participating teams because they do not have to pay their players additional salary for playing playoff games. As a result, teams will maximize their effort to win games. League executives look favorably upon teams maximizing their effort to win games because doing so corresponds with their desire to make sure that the game and the competition for the playoff positions are played with the utmost integrity.

What happens, though, when teams are eliminated from playoff contention? When teams are officially eliminated from playoff participation (because they have lost too many games to make the playoffs), they attempt to find ways to improve themselves for future seasons. One way is to trade older, veteran players and acquire younger players or draft picks. By trading veteran players, who usually are the most expensive players on the team, a team saves some money in the current season, money that could be used to sign free agents during the upcoming off-season. The free agents that are available in the offseason usually have at least three years of professional service due to an entry level contract being a three-year contract (Kaplan 2004). As a result, these free agents are veteran players who could help improve a team. Another common way to improve a team is through drafting amateur players. In the NBA, these amateur players come from US universities as well as professional teams in Europe and Asia. Amateur players enter the NBA with an entry-level salary (the rookie wage). The rookie wage would be related to an entry-level wage that a new college graduate would earn in a Fortune 500 company. As new employees gain more experience in the company, they have the opportunity to earn higher salaries. In the NBA, there are many instances in which entry-level workers have the same if not better performance than existing veteran players. Recent examples include LeBron James, Kevin Durant, and Kobe Bryant.

How does a team obtain an amateur player? After the conclusion of a season, the league holds a draft in which teams can select a players from the amateur players available. The draft order has traditionally been determined by the reversing the order of finish from the previous season. That is, teams that finished the worst in the previous season selected players before the teams that finished with higher winning percentages. The reason for the reverse order of finish being accepted as a good way to determine draft order goes back to the legitimacy of competition. League executives do not want the same teams winning season after season. This situation reduces the competitive balance and the legitimacy of the league. Therefore, league executives want to provide opportunities for poor performing teams to improve themselves. The draft, they believe, is a way that a team can improve itself through the opportunity of hiring a good amateur player who can improve the performance of the team. As a result, the poor performing teams are allowed to pick before the strong performing teams.

The selection of amateur players by teams in reverse order of finish has been problematic for the NBA. League executives believed that some teams, once eliminated from playoff contention, were intentionally trying to lose games to improve their position in the draft. For example, in the NBA, of the thirty teams, sixteen make the playoffs. The seventeenth best team is not in the playoffs, so it loses the ability to make extra revenue by hosting playoff games. However, it also would get the fourteenth best player in the next year's draft. However, if it were to lose the rest of its games, it is still out of the playoffs, but could possibly end up with the tenth or even the best player in the following year's draft. This action of purposely losing games to improve a team's order for the draft, called tanking, presents a problem for the league.

By tanking, teams compromise the two important objectives of the league: the uncertainty of game and championship outcomes that the league believes affect attendance at its games. For the teams, tanking represents the best way to improve both their on-court performance as well as the financial performance for two reasons. First, NBA policies make it very difficult for teams to trade for and sign the veteran players who could improve a team's on-court performance. Second, an amateur player comes at much less expense than a veteran player. Thus, NBA teams have both the financial and performance incentives to lose games once eliminated from playoff contention so as to have an opportunity to draft one of the top amateur players. The NBA, as a result of the belief that eliminated teams are tanking, has strategically adjusted its draft policy to try to deter teams from tanking as well as to provide poor performing teams the opportunity to improve themselves from the draft.

5.1 A Theory of Tanking

Kilduff (2006) stated that good theories come from researchers examining real-life events. From such observation of real-life events, Kilduff (2006) believed it was important for researchers to develop initial ideas and then use the previous academic research to see what research had been conducted. The idea for this dissertation research began when the author was thinking about instances in which teams may not want to put forth maximum effort to maximize their total amount of wins in a season. the idea took shape from the notion that teams do not just "not try to win a game," but they realize a tangible benefit that would lead team decision makers not to maximize their team's total number of wins in a season. Price et al. (2010) provided the financial reasons as to why eliminated teams would not want to maximize their season-win total. The previous research empirically examining the tanking phenomenon in the NBA determined that tanking was, indeed, present under certain draft formats (Taylor and Trogdon 2002, Price, Soebbing, Berri, and Humphreys 2010). However, previous research was lacking in trying to explain the phenomenon of tanking. This dissertation investigates the tanking phenomenon to develop a working theory of tanking within professional sports.

The previous three chapters focused on the two main league issues surrounding the draft as outlined by Soebbing and Mason (2009). The first issue was to expand the body of knowledge regarding the presence of tanking in the NBA. To do so, Chapter 2 analyzed point-spreads of NBA games over six seasons under the current weighted-lottery format. The legal gambling industry is a 3 billion dollar industry in the United States. Point-spreads are useful in this research because they are accurate predictors of game outcomes and can detect the presence of tanking in NBA regular season games. The research presented in Chapter 2 analyzed point-spreads from the

2003-2004 through 2008-2009 seasons. Results showed that the bookmakers believed that teams were tanking late in the regular season and adjusted the spread by 1 to 4 points depending on which team (home or away) was eliminated.

Furthermore, in this present research, the question was raised concerning whether the presence of tanking is different in conference and nonconference games. Conference games are played against teams that are in close geographic proximity to each other, possibly resulting in NBA teams not wanting to tank against a conference opponent due to the high media and fan scrutiny associated with these games. In addition, each season, the NBA designs an unbalanced schedule in which teams play conference teams more times in a season than nonconference teams. As a result, the presence of tanking could vary between the two types of opponents, conference and nonconference. In Chapter 2, the results showed that the bookmakers who set the point-spreads believed that tanking was occurring in conference games rather than in nonconference games. Chapter 3 examined the presence of tanking in conference and nonconference games under all four NBA draft formats. The results showed that teams did indeed tank more in conference games than nonconference games, corroborating the results from Chapter 2.

The final area of research in this dissertation is the relationship between the amateur draft and league-wide competitive balance. As with tanking, league executives believe that low competitive balance harms the legitimacy of the league. Previous academic research both in the area of competitive balance and tanking has not examined this relationship. This is an important relationship to examine in the NBA because NBA decision makers adjusted the draft format due to the belief that the amateur draft improved the competitive balance of the league. Having a competitively unbalanced league, decision makers believe, would jeopardize the legitimacy of the product in a similar fashion that tanking does. The results from the models presented in Chapter 4 showed that none of the draft formats improved competitive balance of the league, as measured by the dispersion of wins over the regular season among teams in the league. In fact, only the equal-chance lottery had any significant impact on league-wide competitive balance. However, the presence of this draft format decreased competitive balance in the NBA.

Overall, the results in Chapters 2 and 3 showed that eliminated teams were tanking late in the regular season when presented with an incentive to tank by the NBA. Integrating the results from this dissertation with the results from previous research (Price, Soebbing, Berri, and Humphreys 2010, Taylor and Trogdon 2002), one can say that the NBA unintentionally fostered a highly competitive secondary tournament among teams that were eliminated from the postseason tournament for a chance for the first selection in the amateur draft. Thus, a theory of tanking in professional sports leagues with an amateur draft can be developed. It states that *in professional sports leagues in which there is a good consensus regarding an amateur player's projected performance as well as tangible benefits for individual sports teams to not maximize total wins in a season, teams will engage in tanking behavior.*

From a league standpoint, the theory has many implications. The first is that league decision makers may want to revisit their draft policy. However, in the case of the NBA, adjusting that policy in the past seems to have created more of an incentive for teams to engage in tanking behavior. Professional sports league decision makers may want to consider other changes to how the draft positions are awarded or modify another policy such as the number of playoff positions.

There are also implications from the theory of tanking for governments who offer sports betting as part of their overall legal-gambling portfolio. The results showed that tanking exists in the NBA and could be detrimental to the revenue a government receives from betting on games in which tanking is involved. Tanking not only threatens the legitimacy of the league but also a person's desire to bet on games in that league. Specifically related to this dissertation, government officials may want to consider investigating how the perception of tanking is affecting their revenues. this action could be similar to that taken in Australia when the Minister of Gaming ordered an investigation into the effect that the perception of tanking in the AFL had on gambling revenues (Dowling 2009).

5.2 Further Development of a Tanking Theory

While this dissertation begins to develop a theory of tanking, many elements are still left unexplored but are needed to provide further clarity to the tanking theory being developed. The first is to try to examine the strength of a season's draft class. Section 2.5.1 of Chapter 2 begins to discuss draft quality in relation to higher point-spreads in one season compared to another season. However, comparing point-spreads is just one way to measure draft class strength. For example, one way to measure the draft class quality would be to examine newspaper articles that discuss the quality of the athletes available for the draft, just as previous research has examined NFL draft eligible wide receivers (Treme and Allen 2009). Knowing the relative strength of the draft class would be helpful in developing predictions as to whether eliminated teams are more likely to tank in one season than other seasons.

This dissertation examined the presence of tanking in conference and non-conference games. Chapter 3 explained the reasons for examining the conference/nonconference distinction. Another distinction that should be examined is the home/away distinction. Fans want to see the home team win more times that it loses. Thus, a team may want to tank on the road rather than in a home game to avoid criticism of fans and the local media. Future research should examine whether tanking is more likely to occur at home or on the road. The result would provide important implications for team marketing departments as well as for league decision makers. A second area of importance is to expand Chapter 2 to include point-spreads for games across all four draft formats. Such research would provide further clarity to the previous research on tanking as well as the research conducted in this dissertation.

To further the theory of tanking, the mechanism or mechanisms through which teams tank should be identified. This dissertation found that the presence of tanking exists, but how eliminated teams actually tank remains unclear. Steinmetz (2011) provided some guidance as to where researchers should begin to look for a mechanism of tanking:

> '[T]anking' is a coaching and management thing and has nothing at all to do with the players. No self-respecting professional player would go out and purposely not do his best in the hope that his team loses and therefore might get a better player in some upcoming draft. That's ludicrous. The bottom line is that if anyone is trying to execute a 'tank,' it's the coaches and front office executives who seek to orchestrate something like that. (Steinmetz 2011, n.p.)

Tanking strategies teams may use include playing younger, inexperienced players, decreasing the starters' minutes, or increasing the number of players used in a game. Detecting the mechanism through which teams tank would not only further develop the theory of tanking but also inform the league so it could either directly punish teams engaging in tanking or modify a policy or policies to eliminate the unwanted behavior. From a competitive-balance standpoint, future research should attempt to examine alternative definitions of competitive balance, particularly the reordering of the standings and the concentration of playoff appearances in each conference. By incorporating this research with the draft formats, researchers could further develop the theory of tanking that this dissertation begins to build.

5.2.1 Tanking Research Beyond the NBA

Even though the NBA provides many areas for future research, researchers should examine other leagues besides the NBA to improve the theory of tanking. The NBA was the first North American professional sports league to move from the reverse-order amateur draft format. Since then, the National Hockey League (NHL) also adopted a weighted-draft lottery. The NHL is unique for two main reasons. First, current NHL Commissioner Gary Bettman was an NBA executive during the early draft format changes. Second, the NHL produces two rankings, Central Scouting and International Scouting, for teams, ranking the upcoming prospects for the amateur draft. These rankings provide all teams with a baseline report of who scouts believe are the best players in the draft class. With these rankings, researchers could have an opportunity to examine the presence of tanking in the NHL across strong and weak draft classes.

The second league that could be examined is the Australian Football League (AFL). This league has discussed switching to a draft lottery format because of accusations of tanking. Borland, Chicu, and Macdonald's (2009) research an examination of tanking within the AFL. As this dissertation shows, many possible threads exist for future research to examine the effect that the perception of tanking has on the league product and how the draft format relates to league-wide competitive balance. Such research that would be useful information not only to researchers, but also to the AFL.

The final sports league that could be studied is European soccer. Even though European leagues do not incorporate any sort of draft policy, high financial incentives are tied to playing and winning games in the Champions League (Pawlowski, Breuer, and Hovemann 2010). Due to these financial incentives, domestic soccer leagues may see tanking behavior tied to teams that are playing a Champions League game a couple of days after playing a domestic league match. As a result, these teams may tank so as to put forth maximum effort in the Champions League games, for the considerably higher financial payout, at the expense of the domestic leagues. Such tanking could cause a potential conflict with the principal-agent relationship in an European domestic soccer league.

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