If You Prohibit It, Bootleggers Will Come: A Mixed Method Study of the Landscape of College Basketball Betting

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Abstract

Over the past 25 years, betting on sports in the United States has grown dramatically with the majority of wagers being placed in illicit markets. Only 1% of an estimated 500 billion dollar sports betting industry in the United States is done legally. With this much at stake, the incentives to alter the outcome of the games are high. Corrupt gamblers can "fix" the match by offering payments to players to "throw the game," that is, to predetermine the outcome in exchange for a payment (match fixing). This paper addresses whether match fixing in college basketball can be detected and contained with the current policies. A mixed method design will be used to identify possible "triggers" in Nevada Casino betting line movements that might warrant an investigation of cheating in the games. If match fixing can be detected at acceptable levels of probability, then current federal prohibitive law on sports betting might no longer be appropriate. Additionally, a survey will be administered to bettors in Nevada to analyze perceptions of the game's integrity, further eroding the logic of current law.

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CHAPTER 1: BACKGROUND

Having a financial stake in a sporting contest is as old as the sports themselves. The 776 B.C. site of the Olympics had a collection of statues built for the Gods which were paid for with fines handed out to athletes who were caught fixing the contests (Hill, 2012). As professional sports became popular in America during the 19th and 20th century, corruption soon followed. Rules for cricket and golf were even created because bettors were concerned of the ambiguity of how the events were conducted (Forrest, 2012).

This research investigates whether the regulations currently in place can control match fixing in college basketball. It will propose an index composed of three components: money, time, and betting line movements, which could be deployed to trigger an investigation into potential corruption.

The NCAA Basketball Tournament, affectionately known as "March Madness" is of specific interest to anyone investigating match fixing because of the amount of money that is wagered. The American Gaming Association estimated $240 million was wagered on the Tournament last year in Nevada Sports Books. If cheating is happening, it will most likely take the form of "point shaving".

Point shaving, the most common form of match fixing in college basketball, refers to the practice of players on the favored team reducing effort enough so that they do not win by more than the point spread (Paul & Weinbach, 2011). The point spread was created in 1931 by Charles McNeil, a teacher and securities analyst who was a small time gambler. Once he created the point spread, which was intended to create an equal number of wagers on each side and increase the overall number of bets placed on a given match; he opened his own bookmaking operation. The point spread establishes a favorite and an underdog in a given contest. For a favorite to win the bet, they must "cover the spread," that is, win by more than the amount of points they are favored by. With point spread betting, teams can still win the game, but as long as they don't win by more than the spread, the gamblers can win too.

History of College Basketball Scandals

Figone (2012) provides an in depth look at all of the major corruption cases in college basketball and the methods used to gain the unfair advantage. He writes, "Scandals certainly went unexposed and unrecorded thanks to active or tacit compliance from coaches, and when scandals were exposed, coaches took refuge behind selected sportswriters who kept the public in the dark, blamed the morality of the times and the character flaws of the players, and went to extraordinary lengths to promulgate the myth that college athletics are pure and untainted by corruption (154)."

The first documented case of attempted match fixing in college basketball took place in 1927. It was reported by the Wabash College athletic director that a professional gambler from rural Indiana bribed a Wabash player to fix the game vs. Franklin College of Indiana. During the 1940's, with point spread betting becoming more popular, games were manipulated in Southern California, Oregon, Kansas City, Detroit, Kentucky, Lousiana and Florida (Figone, 2012) By the 1950's, it was a safe bet that no sports, whether international, professional, or amateur, was free of the influence of organized crime. Gambling had become common place in America even though Nevada was the only state where it was legal.

In 1951, seven schools and 32 players were indicted for admitting to shaving points in their games in exchange for a small payoff from gamblers. After the 1951 College basketball season, Clair Bee, the Long Island University basketball coach said "the present mess is one of individuals and not the result of policy." That year, a September article in Life Magazine blamed the pervasive corruption in college sports on the coaches, athletic administrators, boards of trustees, and presidents.

Another major scandal was brought to the public's attention from the 1978-1979 basketball season. This scandal involved Henry Hill, the famous mobster portrayed in the film *Goodfellas*. Although the NCAA executive director was notified of a potential fix, a follow up investigation found no evidence. It wasn't until 1981 that Henry Hill brought up the fixes while being questioned for a separate offense. In total, 3 gamblers were given prison time, along with

basketball player Rick Kuhn, who was sentenced to ten years in prison, the longest ever handed out to a player convicted of game fixing.

The most recent point shaving scandal in NCAA basketball took place at Arizona State University during the 1994-1995 season. After meeting a campus bookie named Benny Silman, basketball player Stevin Smith began placing bets, using credit, on everything from football to hockey and even video games played between each other. A little over a month passed and Stevin owed $10,000, with no means to pay it back. That's when Benny told Stevin he could clear his debts if he just makes sure they don't win their games by too many points. In Stevin's *Confessions of a Point Shaver* published in Sports Illustrated, he said of the conversation with Benny; he "never used the term point shaving, never made it seem like it was dangerous" (1998). According to the FBI, 61 bets were placed totaling $900,000 during the four games Smith admitted to fixing (Sandoval, 1998). Bill Frieder, who was forced to resign as the coach of the Sun Devil team during the time of the conspiracy, stated "Everyone knows that I was not involved and didn't have any knowledge, but any time you have negative press, it makes it hard. I don't think coaching is in my future."

While it is almost impossible to know for sure how often point shaving is occurring in college basketball, this paper assumes that it is currently happening as much or more than it historically has for the past 70 years. "Except for the illegal drug trade, sports betting is probably America's biggest, most lucrative unregulated business" (Konik, 2006).

Current Regulatory Regimes

Many Federal Laws have been put forth over the years to combat sports betting. During the height of Organized Crime's gambling influence in the United States, four major pieces of Legislation were signed into law between 1961-1970:

- The Wire Act (1961) prohibits the use of most forms of communication devices to conduct gambling activities.
- The Travel Act (1961) regulates the mail and other forms of commerce that could be used to conduct gambling activities.

- The Illegal Gambling and Business Act of 1970 regulates businesses that might be set up to engage in gambling activities.
- The Racketeer Influenced and Corrupt Organizations Act of 1970 (RICO) prohibits the operation of gambling schemes based on amateur and professional sports.

(Anderson, 2012)

The Professional and Amateur Sports Protection Act (PASPA)

Historically, league commissioners of professional sports, Congress, and the NCAA have been notoriously opposed to legalized sports betting. This was evident in the passing of the Professional and Amateur Sports Protection Act (PASPA) signed into law in 1992. Although Nevada was grandfathered in to the new law, it became illegal for the remaining States to "sponsor, operate, advertise, promote, license, or authorize any type of gambling" (Heitner, 2010). Oregon, Montana and Delaware had their sports lotteries grandfathered in, which are a limited form of sports betting, but they were not allowed to expand their sports betting options following PASPA's signing.

The public's perception of sports gambling in the early 90's was certainly not swept to one side or the other. Andrew Beyer (1991) wrote for the Los Angeles Times that "there is no groundswell of popular opinion in favor of a ban on gambling in this gambling-crazed country, where it is practically un-American to watch the Super Bowl without at least a friendly wager or a stake in an office pool." Opponents of PASPA believed the professional sports leagues are acting hypocritically when proposing bans on sports gambling. James Hosker, president of the association that represents state lotteries, said "The professional sports leagues have long been aware of extensive wagering on their games, have taken virtually no action to prevent it, have frequently acquiesced in it and, in fact, have benefited from it (Beyer, 1991)."

During a Committee Hearing one year prior to PASPA becoming law, the National Football League Commissioner Paul Tagleibue argued that Congress should not be misled by claims that legalized gambling would reduce illegal gambling from taking place. According to the Director of New Jersey's Division of Gaming Enforcement, "most law enforcement officials agree that legalization has a negligible impact on, and in some ways enhances illegal markets." Brian

Sandoval, current Nevada Governor: "We should not kid ourselves: whether legal or illegal, Americans will continue to bet on the outcome of sporting events, and we will not change this behavior through legislation" (Amateur Sports Integrity Act, 2000).

Proponents of PASPA argued that regulating and overseeing sports betting in the United States would not decrease the number of illegal sports betting establishments, but the National Gambling Impact study that they commissioned acknowledged advocates who supported regulated gambling by saying it would "undermine illegal gambling and the organized crime it supports." Congress was reminded of the benefits of a potentially substantial revenue stream was not enough to justify the potential harms state sanctioned gambling would bring (Woo, 2013). This logic has been used by some to legalize cannabis in five U.S. states, with other states likely to follow.

The rise of internet betting

Internet sportsbooks have allowed a simple loophole that has significantly increased the volume of sports betting in the United States. Perhaps unforeseen during the PASPA arguments, online betting has proven PASPA to be highly unsuccessful as a tool to fight illegal gambling.

Structural changes in the betting environment lead many to believe that corruption in college basketball is only increasing. Forrestt (2012) highlights five main developments sparking a major growth in sports betting over the past decade:

1. Growth in Liquidity
2. Increases in competitiveness
3. Increase in Live Betting
4. Increase in Proposition Betting
5. Emergence of Betting Exchanges

All of these developments indicate that it is *more* likely for matches to be fixed, and it is important to note that these developments have become widespread only after Congress's 1999 Gambling Impact Study Report, which estimated illegal sports wagering between $80 and $380 billion dollars per year. New studies from Merrill Lynch and PricewaterhouseCoopers estimate worldwide sports gambling revenues to exceed 500 billion in 2015 (Krieger, 2012).

FBI budget cuts have also reduced monitoring of college gambling and game fixing. But even when they had a dedicated staff to investigate these crimes, most scandals were still uncovered by accident. It wasn't until 1996 that the NCAA created a full time position to direct enforcement of gambling (Figone, 126). In the book *Larceny games*, the author accesses FBI files to show readers that even when there is solid evidence of a potential fix, they seldom follow up with an investigation.

CHAPTER 2: LITERATURE REVIEW

There is a large body of literature arguing legalized sports gambling is the only way to discourage corruption in the form of match-fixing. Some scholars argue the federal law that bans all forms of sports betting should be repealed because it's intended purpose of keeping the games integrity is not being accomplished. Since the perceived end of Organized Crime in the United States, stakeholders have dismissed the idea that corruption in college basketball is happening at all. But as we know, match fixing only succeeds when it is not detected, and no scandal has become public since the mid 90's.

How widespread is match fixing?

As Wolfers suggested in his argument, between 1-6% of college basketball games are fixed. Figone estimated in his book *Cheating the Spread* that 1% of college athletes are involved in fixing contests, which represents 4,300 people. One reason amateur sports such as NCAA basketball may be "ripe for corruption" as stated by Wolfers (2006) is the asymmetric incentives. As stated earlier, a match can be fixed while the players who are fixing the game can still win.

The NCAA has strong incentives to downplay the real situation involving their athletes and match fixing. Although they are a non-profit organization, they are involved in multiple large financial contracts with corporate sponsors and media conglomerates (Chil Woo, 2013). They are under heavy pressure to at least maintain the appearance of high integrity in their games. In addition to their Bylaws, all basketball teams who reach the NCAA Sweet 16 Tournament in March are visited by FBI agents who talk to them about the risks involved with associating with corrupt gamblers (Sumner, 2013)

Following the 1992 Federal Ban on Sports Wagering, an NCAA survey showed "over 5% of the male student athletes bet on games in which they participated, provided inside information for gambling purposes or fixed a game in which they participated (Grady, 98)." Many scholars as well as some members of Congress argue that PASPA is outdated and not an effective measure to reach the intended goal: To maintain high integrity in Professional and Amateur Athletics in the United States (Woo, 2013)

The paper that created a media stir came from a 2006 study by Justin Wolfers. He used gambling data from over 44,000 NCAA basketball games taking place between 1989-2005 and found heavy favorites more likely to fail to cover the spread than statistically expected. He concluded between 1-6 percent of college games are corrupted by point shaving. In an OP-ED for the *New York Times* written 1 year later, Wolfers cited asymmetrical incentives built within the betting market that lead to "crimes of opportunity" (2007). As stated earlier, a match can be fixed though the team doing the fixing can still win the game by less than the point spread by reducing effort. Legal consequences and strong words, which the NCAA has applied, cannot stop the corruption (Sumner, 2013). David Schwartz, the Director of the Center for Gaming Research at the University of Nevada, Las Vegas says "It's almost a perfect storm for criminal conspiracy when you've got young athletes with uncertain futures and financial hardships who feel they're not going to be hurting anybody if they shave a few points (Sumner, 2013)."

Wolfers work was cause for some panic among the NCAA, but his results did not sway everyone (Bernhardt & Heston, 2010; Borghesi & Dare, 2009). These authors developed methods to distinguish whether patterns in winning margins are due to massive corruption, or to the primitive data-generating process of the game of basketball itself. Even though they were not all convinced that match fixing was happening as often as Wolfers demonstrated, these scholars still maintain that the laws meant to discourage corruption also make it hard to measure the illegal activity, as criminals can "conceal their betting to avoid punishment (Bernhardt & Heston, 2010, P. 14)," I.E. because it is driven underground and out of sight. It is worth noting that during the years covered in the Wolfers study, just two known point shaving scandals were uncovered. The effect of this was to create a feeling of strong sufficient monitoring of the games. As stated by Figone, "The feigned or real naiveté of college officials and the NCAA regarding game fixing showed that both groups were more interested in presenting an appearance of vigilance and reform to the public than in crafting a solution to the problem. Exposing the unsavory aspects of basketball's corruption and gambling's menace risked the profits that commercialization generated (98)."

NCAA Survey

To assess the success of NCAA Bylaws and codes of conduct, the NCAA administered a gambling survey to 23,000 student athletes, most recently in 2012. One question on the survey asks if the athlete is in at least $10,000 of debt that they feel responsible for paying back. Think about this for a moment: The NCAA is asking their athletes how much debt they have as a potential method of understanding their financial situation to see how likely they may be to accept an offer to fix a game. As Henry Hill famously stated after admitting to conspiring in match fixing, "You offer a kid ten large – [$10,000] -, he's at least going to think about it." Bringing us into a more modern betting landscape, social media and the internet are new and efficient ways for gamblers to approach an athlete. In the NCAA survey, 4.6% of athletes reported they were contacted via social media to participate in fixing a match, up from 1.2% in 2004. Henry Hill used threats and organized crime money. Now they use the internet and international borders. Visualize how much pressure an athlete like this may be under. Even though betting is banned by NCAA rules, 76% of the 23,000 student athletes surveyed by the NCAA reported that they gambled in some form within the past year, with 26% of them betting on sports (2012).

Regulated Sports Betting Markets will decrease opportunities for Match Fixing

Some scholars argue that bringing the illegal sports gambling infrastructure needs to be brought out from the underground to have any chance of detection. Stefan Szymanski, an economist at the University of Michigan who has written extensively on the subject claims legalizing sports gambling would crack down on cheating. "From a regulators perspective, if you legalize sports gambling, you enlist an army of private business people that want to help you police a sport (Mcgugan, 2015). This idea that a regulated betting market thwarts potential corruption was made clear in Thomas Schelling's *Economics and criminal Enterprise* (1967), regarding the heavily regulated stock market:

> *The greatest gambling enterprise in the United States has not been significantly touched by organized crime. That is the stock market… The reason is that the*

> *market works too well. Federal control over the stock market, designed mainly to keep it honest and informative…makes it a hard market to tamper with.*

In this area of economic life, regulation has had a positive impact.

The Betting Line

When a betting line is created, a calculation is made as to who will win the game and by how much. The line is a prediction of the comparative strengths, and the goal for a casino is often to get equal amounts of bets on each side of the betting line. If the majority of bets are on one side, the casino may decide to change the betting line. For example, if Washington is favored by 9 points, and $1,000 is bet on the opposing team, the betting line may move to lower the spread from 9 points to 8 points. This is to entice bettors to reevaluate which side of the bet has more value. Movements in the betting line indicate information, and this is exactly what tipped off a casino manager in 1994 during the Arizona State scandal. The importance of the line movement is enhanced by the time in which it occurs. The betting for a March Madness game is around 48 hours, and I will be looking line changes in the first 30 minutes and the last 30 minutes of betting, generally the most volatile times for line movements.

There are other reasons for the line to move that does not represent possible corruption. Paul and Weinbach (2011) tested changes in point spreads and found that movements may not necessarily be point shaving. They suggest that bettors show a bias towards favorites, with the percentages wagered on the favorites increasing as the point spread increases. They conclude that informed bettors reveal the ability to identify mispricing and place their bets which reduce biases in the betting lines (Gandar, 1998).

Humphreys, Paul and Weinbach used survival analysis techniques to analyze line movements of college basketball games. In their study of over 4000 games during the 2007 season, they found changes in the point spread to be unrelated to the volume of bets placed for each team. They interpret point spread movements and note that sports books are more likely to change the point spread on games with large opening point spreads. Investigating line movements for college football games, Dare (2005) found line movements to be unexplained by public information, but

that closing line forecasts that are more accurate than the opening line are due to "truly private information."

NCAA Bylaws

There is a long history on the part of the NCAA to make sure it's athletes have strong disincentives to cheat and to have a game that maintains high integrity. They began with unethical conduct legislation in 1939 (Epstein & Niland, 2012). It wasn't until 1983 that this legislation was adopted, which codified that gambling by student athletes, coaches, and administrators constituted unethical conduct. Later in 1996, the NCAA expanded its bylaws to include prohibiting betting on professional sports as well. Additional modifications were added in 1997, 2000 and 2006. These rules state that (a) students cannot provide information to individuals who are involved in organized gambling activities; (b) students can not solicit a bet on any intercollegiate team or to accept a bet on any team representing the school and (c) students cannot accept or solicit a bet on an intercollegiate competition through any method utilized by organized gambling (Epstein & Niland, 2012).

Threats to the integrity of college basketball is especially strong due to its amateur status. Many players who do not see a future in the NBA are more likely to attempt a fix because they don't have much to lose. As famous organized crime figure Henry Hill stated; "You offer a kid ten large ($10,000), he's at least going to think about it."

Suggested Reforms to combat Game Fixing

Wolfers, and other scholars suggest league commissioners support specific types of gambling that does not incentivize match fixing (Wolfers, 2007; Qtaishat, 2013).

One proposed strategy suggested to deter college basketball players from accepting bribes to fix games is to give them a stipend in addition to their athletic scholarship to lessen their vulnerability of accepting bribes from gamblers (Buckstaff, 2013). Additionally, some scholars call for further developing relationships between the NCAA, gaming commissions and the FBI (Hosmer-Henner, 2010; Tuohy, 2013)

In an article titled *Preventing Game Fixing: Sports Books as Information Markets*, Adam Hosmer-Henner lists four ways to prevent corruption in college basketball:

1. By reducing the availability of betting opportunities
2. By increasing the attached civil and criminal penalties
3. By increasing fines or salary forfeited
4. By increasing the probability of detection

The lack of a solid framework to harness illegal sports betting activity leads to an inefficient and dangerous marketplace for bettors, as gangster movies of the 70's and 80's reveal. Regulations are needed to operate through "command and control": directives are given, compliance is monitored, and non-compliance is punished (Weimer & Vining, 1999).

The evidence indicates a stronger mutually beneficial relationship between the NCAA and casinos and FBI. To call for a total prohibition of sports gambling would eliminate the most effective method of detecting game fixing (Hosmer-Henner, 31). It is not the sports betting itself that threatens the integrity of sports. It is only when the sports and the betting become intertwined. Cooperation between entities involved is essential in combating the problem. Any objective view of the reoccurring fixing of college basketball over the past 80 years shows that the right tools are not in place to limit the occurrences. There isn't any evidence that even says it's happening less than it used to when Organized Crime was at its peak. Indications show me that policies are not yet in place to correct this problem.

In 1996, Congress enacted the National Gambling Impact Study Commission Act. Tasked with the role of conducting a legal and factual study of the social and economic impacts of gambling in the U.S., the Commissions 1999 report concluded that Americans illegally wager between $80 and $380 billion dollars per year, and they recommended "betting on collegiate and amateur athletic events that is currently legal be banned altogether." The Impact Study also highlighted sports betting as "the most widespread and popular form of gambling in America."

This research will be an attempt to contribute to the monitoring of a component of NCAA basketball betting that could potentially provide a mechanism that could trigger investigations

and create a disincentive for players and gamblers to enter into match fixing. As a baseline, an investigation of the confidence of the game displayed by bettors, and an attempt to provide a mechanism for ensuring high integrity in the game. When a certain threshold is reached, we can trigger further investigation. For example, NCAA could perform interviews of players and coaches.

CHAPTER 3: METHODOLOGY

The purpose of this study is to test the three mechanisms by looking at the 63 games that take place during the 2016 NCAA March Madness Tournament. My mixed method design will consider qualitative data from a survey and betting line movements based on a three part index. Using multiple methods, or what has been called triangulation (Denzin, 1997), allows the strengths of one method to compensate for the weaknesses of another and increase the validity of the study's conclusions.

To gather the qualitative portion of my research, development of a seven question survey was completed and administered to sports bettors in multiple Las Vegas Sports Books. The first six questions related to the bettors perceptions of the NCAA Basketball games integrity, and the final question asked about their betting habits outside of Nevada Casinos. The survey was administered during the opening weekend of the 2016 March Madness Tournament, which is the busiest season for Nevada Sports Books. As long as the surveyor was placing bets on the tournament, they were eligible to fill out a survey. To entice them to complete my survey, I offered a free Corona beer upon completion. 44 surveys were completed.

All 44 surveys will filled out in Las Vegas, Nevada during the opening round of the 2016 NCAA tournament (See Appendix A for full survey). Respondents were anyone 21 and over placing bets on the Tournament in the three Sportsbooks I visited on the Las Vegas Strip; Mandalay Bay Casino, The Mirage Casino and The Luxor Casino. All surveys will filled out in the afternoon or evening hours, but many respondents shared that they have been sitting in the same seat since 7:00 AM. I incentivized potential respondents by offering a free ice cold Corona once they finished. I began with 24 Coronas, 2 bags of ice and a cooler on wheels which I purchased from the local Walgreens upon arrival to Las Vegas. The two Sportsbook Managers, both at the Luxor Casino, asked what we were doing and made us show him the clipboard, and read the survey. The second Manager who stopped us made us leave. One bettor who was asked to fill out a survey called my cousin a "jackass". Otherwise, the Coronas were enough to seal the deal with most respondents who continued yelling at the TV screens as soon as we moved on.

While one of my survey questions, if answered yes, would be admitting to a crime, I have made sure to add the word anonymous at the top so they are not tempted to lie to protect

themselves. Perhaps this would give the respondent confidence in me so that they will share reliable answers.

The quantitative portion of the mixed methods comes from a model based on a three part configuration. It will combine betting percentages on each side of the spread, time, and betting line movements, which were accessed through a Sportsinsights.com subscription. A leading sports betting analytics company, SportsInsights provide real time odds as well as betting percentages from fourteen Las Vegas Sportsbooks and offshore bookmakers. My data was provided by Pinnacle Sports, an offshore booking company located in Amsterdam.

Because there are no accepted methods to investigate match fixing, this research uses a proven scandal as a pilot for creating a more robust mechanism. The average line movement during the four games that were fixed by Arizona State player Steven Smith was 2.25 points. My benchmark is two points only because line changes only occur at half point intervals.

Through a combined analysis of sports bettor's perceptions of fairness with quantitative live betting data of the games, I can analyze the correlation. Descriptive statistics were also used to analyze the survey data (n = 44).

Ethical Considerations

The survey included human subjects and their protection and privacy is very important. Anonymity was preserved throughout the study. The University of Washington Internal Review Board application process was completed and a waiver was granted.

CHAPTER 4: RESULTS & ANALYSIS

Qualitative Results

Qualitative survey perceptions revealed multiple items of importance. First, bettors in Nevada do not trust the game's integrity nearly as much as I anticipated. 52% of respondents think match fixing is or possibly is happening. Additionally, even if match fixing was happening, 82% of respondents don't think the match fixing would be identified if it was happening. And lastly, the survey respondents think the FBI (59%) and the NCAA (41%) should be the responsible parties to investigate potential corruption in college basketball. The administered surveys also provided anecdotal evidence that leads me to believe some sports bettors enjoy prohibition in all states aside from Nevada; "If sports betting were legal in every state, I wouldn't have an excuse to get away from my wife for the weekend."

Although I was only able to get data from forty four bettors in Nevada, over half of respondents say they have bet on sports using the internet in the past year. The 2012 NCAA Gambling survey found that one third of male student athletes reported wagering on sports via the internet.

Quantitative Results

To set a benchmark for match fixing we look to a corruption scandal from Arizona State University which took place during the 1993-1994 basketball season. Four games were admitted to being fixed. The average betting line movement from the four games was 2.25 points. My benchmark is two points only because line changes only occur at half point intervals.

The four games Stevin Smith and the corrupt gamblers fixed on January 27, January 29, February 19 and March 5, 1994 are shown in Table 1 below (Borghesi & Dare, 2009).

Table 1: Four games admitted to being fixed

Date	Opponent	Opening Line	Closing Line	Line Change
1/27/1994	Oregon State	-15	-14	1
1/29/1994	Oregon	-12.5	-11.5	1
2/19/1994	USC	-9	-7.5	1.5
3/5/1994	Washington	-11	-5.5	5.5

				Average – 2.25

Notes: Line data from Borghesi & Dare, 2009, which came from a Las Vegas Sportsbook.

As we can see, in the final fixed game, large bets were placed on the underdog, Washington, which forced the betting line to move 5.5 points. That represents a huge swing in the betting line caused by large bets placed on the underdog. It does not require such a large swing for a game to still be fixed. Therefore, to trigger my model, a point spread needs to move at least two full points, which is based on the average line movement from the four games fixed.

Testimony revealed that the bettors lost over one million dollars in that game because Arizona State won by more than 5.5 points. Although four games is a small sample to set a benchmark off of, it is the most recent college basketball betting scandal.

The following table lists the betting line movements for all the games of the tournament. Data was retrieved through a SportsInsights.com subscription, and all of the quantitative data comes from Pinnacle Sports.

After applying my model during the 2016 NCAA basketball tournament, the three part index indicated three NCAA Tournament games matched the threshold based on the Arizona State scandal. You can see in the table below that three games had line changes of at least 2 points:

The games highlighted in bold text are those where a minimum two point change triggers the model.

Table 2: Overall Line change

Line Change (points)	Games
No Change	20
.5	20
1	13
1.5	7
2	**2**
2.5	0

3	**1**
	Total - 63

Notes: Line change data provided by Pinnacle Sports

The only game with a three point line movement came from the opening round in a game between Pittsburgh and Wisconsin. The betting line opened with Wisconsin as a two point favorite, but by the time the game started, Pittsburgh was a one point favorite. Because I'm interested in increasing the confidence in the game, I was conservative setting my two point benchmark. Below is the data from Pinnacle Sports, which includes the opening and closing betting lines as well as the percentage of bets placed on each side of the spread:

Time	**Game**	**Visitor Line**	**Home Line**	**Visitor %**	**Home %**
3/18/2016 6:41:52 PM	Pittsburgh @ Wisconsin	-1.0-110	1.0-110	39%	61%
3/18/2016 4:27:09 PM	Pittsburgh @ Wisconsin	-1.5-110	1.5-110	38%	62%
3/18/2016 4:20:28 PM	Pittsburgh @ Wisconsin	-1.0-115	1.0-105	38%	62%
3/18/2016 1:37:45 PM	Pittsburgh @ Wisconsin	-1.0-110	1.0-110	36%	64%
3/18/2016 1:20:37 PM	Pittsburgh @ Wisconsin	-1.0-115	1.0-105	35%	65%
3/18/2016 12:03:06 PM	Pittsburgh @ Wisconsin	-1.5-110	1.5-110	34%	66%
3/18/2016 12:02:00 PM	Pittsburgh @ Wisconsin	-1.5-105	1.5-115	34%	66%
3/18/2016 12:01:49 PM	Pittsburgh @ Wisconsin	-1.0-115	1.0-105	34%	66%
3/18/2016 11:57:58 AM	Pittsburgh @ Wisconsin	-1.0-114	1.0-106	34%	66%
3/18/2016 11:53:42 AM	Pittsburgh @ Wisconsin	-1.0-115	1.0-105	36%	64%
3/18/2016 11:53:31 AM	Pittsburgh @ Wisconsin	-1.0-105	1.0-115	36%	64%
3/18/2016 11:45:39 AM	Pittsburgh @ Wisconsin	-1.5-105	1.5-115	36%	64%
3/18/2016 11:43:36 AM	Pittsburgh @ Wisconsin	-1.0-110	1.0-110	36%	64%
3/18/2016 11:22:26 AM	Pittsburgh @ Wisconsin	-1.0-105	1.0-115	36%	64%
3/18/2016 11:21:09 AM	Pittsburgh @ Wisconsin	-1.0-110	1.0-110	36%	64%
3/18/2016 10:56:50 AM	Pittsburgh @ Wisconsin	-1.0-105	1.0-115	36%	64%
3/18/2016 10:52:55 AM	Pittsburgh @ Wisconsin	0.0-115	0.0-105	36%	64%
3/18/2016 10:27:56 AM	Pittsburgh @ Wisconsin	0.0-110	0.0-110	36%	64%
3/18/2016 10:27:36 AM	Pittsburgh @ Wisconsin	1.0-116	-1.0-104	36%	64%
3/18/2016 10:11:48 AM	Pittsburgh @ Wisconsin	1.0-110	-1.0-110	36%	64%
3/18/2016 9:54:01 AM	Pittsburgh @ Wisconsin	1.5-110	-1.5-110	36%	64%
3/18/2016 9:53:41 AM	Pittsburgh @ Wisconsin	2.0-133	-2.0+110	36%	64%

3/18/2016 9:38:57 AM	Pittsburgh @ Wisconsin	2.0-115	-2.0-105	36%	64%
3/18/2016 12:44:11 AM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	39%	61%
3/18/2016 12:18:46 AM	Pittsburgh @ Wisconsin	2.0-111	-2.0-109	39%	61%
3/15/2016 10:46:59 PM	Pittsburgh @ Wisconsin	2.0-115	-2.0-105	36%	64%
3/15/2016 10:39:32 PM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	36%	64%
3/15/2016 2:08:31 PM	Pittsburgh @ Wisconsin	2.0-105	-2.0-115	33%	67%
3/15/2016 2:07:09 PM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	33%	67%
3/15/2016 1:19:39 PM	Pittsburgh @ Wisconsin	2.0-105	-2.0-115	33%	67%
3/15/2016 1:17:20 PM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	33%	67%
3/15/2016 1:17:14 PM	Pittsburgh @ Wisconsin	2.0-115	-2.0-105	33%	67%
3/15/2016 1:12:52 PM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	33%	67%
3/15/2016 1:12:32 PM	Pittsburgh @ Wisconsin	1.0+102	-1.0-123	33%	67%
3/14/2016 10:02:43 PM	Pittsburgh @ Wisconsin	1.0-110	-1.0-110	30%	70%
3/14/2016 10:02:38 PM	Pittsburgh @ Wisconsin	1.0-115	-1.0-105	30%	70%
3/14/2016 1:30:47 PM	Pittsburgh @ Wisconsin	1.0-113	-1.0-107	29%	71%
3/14/2016 1:26:26 PM	Pittsburgh @ Wisconsin	1.0-115	-1.0-105	29%	71%
3/14/2016 1:24:22 PM	Pittsburgh @ Wisconsin	1.0-110	-1.0-110	29%	71%
3/14/2016 12:08:55 PM	Pittsburgh @ Wisconsin	1.5-115	-1.5-105	32%	68%
3/14/2016 12:07:17 PM	Pittsburgh @ Wisconsin	1.5-120	-1.5+100	32%	68%
3/14/2016 12:03:40 PM	Pittsburgh @ Wisconsin	1.5-115	-1.5-105	32%	68%
3/14/2016 12:03:35 PM	Pittsburgh @ Wisconsin	1.5-110	-1.5-110	32%	68%
3/14/2016 12:03:25 PM	Pittsburgh @ Wisconsin	1.5-115	-1.5-105	32%	68%
3/14/2016 11:53:39 AM	Pittsburgh @ Wisconsin	1.5-116	-1.5-104	32%	68%
3/14/2016 10:29:52 AM	Pittsburgh @ Wisconsin	1.5-110	-1.5-110	35%	65%
3/13/2016 9:47:19 PM	Pittsburgh @ Wisconsin	1.5-115	-1.5-105	44%	56%
3/13/2016 9:32:52 PM	Pittsburgh @ Wisconsin	1.5-110	-1.5-110	41%	59%
3/13/2016 9:31:24 PM	Pittsburgh @ Wisconsin	2.0-111	-2.0-109	41%	59%
3/13/2016 9:03:16 PM	Pittsburgh @ Wisconsin	2.0-110	-2.0-110	30%	70%

The opening round game between Arizona and Wichita St. featured a two point swing, which reaches my threshold; the data chart can be found in Appendix B.

The Elite 8 game between Wisconsin and Notre Dame featured a two point swing; the data chart can be found in Appendix C.

Bettors overwhelmingly bet on favorites, which leads bookmakers to bias point spreads slightly against strong favorites (Bernhardt & Heston, 2010). This practice is called line-shading. Evidence of line shading has been identified across betting markets in all college and professional sports (Humphreys, 2013). This bias allows for special attention paid to look at reverse line movements. Reverse line movements happen when a betting line moves in the opposite direction of the betting percentages. For example, if Washington is the favorite at -9 and they receive 75% of the bets, the line moves the opposite direction of what would be expected, to something like -8. That most likely means that someone, or a group of bettors placed a large wager on the underdog. Looking at reverse line movements, we can gain insight into possible corruption if a lot of bets are placed on the underdog. With the current framework, Nevada Casinos only post the percentage of bets on each side of the wager, not the total dollars.

Table 3: 2016 NCAA TOURNAMENT – Betting percentages on underdog

Percentage of bets on Underdog	Games
< 50%	51
51-60%	10
61-70%	2
	Total - 63

Note: Betting percentages provided by Pinnacle Sports

Data for betting percentages on the underdog are not available from the Arizona State scandal, but large percentages of bets on the underdog is secondary data that can add insight into match fixing. In this case, the two games with at least 61% of the bets on the underdog did not have a large betting line movement. On the contrary, the three games that triggered my model all contained less than 50% of bets placed on the underdog, which does not raise any suspicion of unusual betting patterns.

Although my line movement benchmark is 2 points, a 1 point swing in the first thirty minutes of betting and the last thirty minutes of betting can also tell us about where the money is going, especially if the line for the favorite moves down. For example, if North Carolina is favored by 12 points and a fixer puts $20,000 on the underdog, the line may move down to reflect the bet. These movements are what help identify potential match fixing.

Table 4: Betting Line Movements (First 30 minutes)

Line Change (first 30 minutes)	Games
No Change	21
.5	26
1	10
1.5	4
2	1
2.5	1
3	0
	Total - 63

Note: Data from Pinnacle Sports

The two games above which had at least a two point swing in the first 30 minutes of betting gives us insight into potential corruption, but we can't rule out "sharp money" from causing the change, and additionally, those two games did not have a large overall line change. Sharp money is money placed by professional bettors, who often work in groups and bet large amounts of money.

Table 5: Betting Line Movements (Last 30 minutes)

Line Change (final 30 minutes)	Games
No Change	26
.5	35
1	2
1.5	0
2	0
2.5	0
3	0
	Total - 63

Note: Data provided by Pinnacle Sports

Strengths of my model

This research attempted to create a new model that could be applied to March Madness, or all college basketball games where betting is available, to indicate potential follow up

investigations. Nevada Sports Books are the only regulated information market for sports gambling in the United States (Hosmer-Henner, 2010). Without their detailed record keeping abilities, all sports betting in the country would be undocumented and most likely go completely unnoticed. This information can be used to uncover possible corruption. For example, during the Arizona State scandal during the 1994-1995 season, the Mirage bookmaker Jimmy Vaccaro noticed irregular betting patterns placed on the opponent. The Casino stopped accepting bets on the game and notified law enforcement. This tip uncovered the scandal that eventually proved four games were fixed.

Weaknesses of my model

Although the money wagered on the NCAA Tournament in Nevada sports books only represents pennies compared to the amount bet overall in the United States, the casinos still take in more money during the NCAA Tournament than any other time during the year. This enables fixers to be able to place substantial bets without it affecting the betting line too much. "Liquidity is the greatest friend of the fixer as it enables large amounts of money to be fed into the market without driving the odds inwards against himself and without attracting undue attention" (Forrest, 2012). This makes it difficult to uncover. Because the majority of bets placed on college basketball are placed in unregulated markets with a limited data trail, the data uncovered through Nevada Casinos are not sufficient to prove corruption.

Methods to distinguish legal from illegal behavior are not simple to identify. Betting lines move for reasons other than potential corruption. Injuries to players can cause changes. The goal is to develop the model to limit the number of false positives. For example, bookmakers at one sports book may shift a line without receiving wagers on a game simply because a fellow bookmaker has shifted his price (Kreiger and Fodor, 2012). Although betting line movements certainly do contain information, it can be unrelated to suspicious betting activity (Bernhardt & Heston, 2010).

CHAPTER 5: CONCLUSION

The research contained here was partially successful. It was an introductory method that may lead to closer monitoring of gambling practices in college basketball. It is neither fool proof nor absolute. Rather, it is an attempt to investigate the possible corruption of college basketball gambling.

David Forrest (2008) thinks sports organizations will lobby "police, government and gambling regulators for more resources to uncover, investigate, and successfully prosecute cases of corruption." When the primary goals for the NCAA are maximizing power and revenue, scandals will continue to be swept under the rug. The NCAA has consistently shown its lack of oversight into these matters. Figone reasons that the primary goal of the programs where scandals have occurred is to maintain power and increase revenue production (152).

Legalization of sports gambling would add integrity to the game because all betting activity in the country can be monitored. In the United States, there is so much money at stake in the NCAA as well as the professional leagues that it is highly unlikely for information regarding a potential fix to be brought to the attention of the public. Incentives and policy decisions need to force this underground information into the public sphere.

The majority of college basketball scandals have been uncovered after Nevada Sports Books uncovered suspicious betting patterns and then notified the authorities. This leads us to believe that cooperation between the Sports Books and the NCAA is paramount. Forrest (2012) cites the desirability of the government for providing a framework which compels these parties to work together. As it stands currently, there is not enough data to follow the money. Nevada Casinos are not required to display the amount of money placed on each side of a betting line which makes it impossible to track. Further, the study provides evidence that there is not a lot of trust in the NCAA Basketball betting framework as it currently stands.

Nothing in the near future gives cause for me to believe match fixing is going away. Stevin Smith, the notorious fixer from Arizona State said in his confession to *Sports Illustrated*, "Poor, naïve teenagers plus rich, greedy gamblers equal disaster. As simple as it was for me, it can only be that simple elsewhere."

Additional insight can be gained if Nevada Casinos are required to post the amount of money on each side of the betting line instead of only betting percentages. Just like the stock market, monitoring and regulation of the betting market is necessary for any chance of detection. With the current policies in place, there is not much we can do to detect match fixing. Allowing state sanctioned sports betting could allow the bets to be tracked, the money followed, and corruption could be mitigated. But for now, PASPA stands in the way.

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Appendix A

Anonymous Sports Betting Survey - 2016 March Madness Tournament – Las Vegas

1. Do you think "match-fixing" is occurring during the current basketball tournament?

   ☐ Yes

   ☐ No

   ☐ Possibly

2. How would you rate the integrity of college basketball compared to other sports?

   ☐ High

   ☐ Average

   ☐ Poor

3. Do you think the NCAA is capable of policing college basketball from gambling related corruption?

   ☐ Yes

   ☐ No

4. If there were match fixing going on during this tournament, how confident are you that it will be identified?

   ☐ Confident

   ☐ Not confident

5. Who should be responsible to investigate potential gambling related corruption in college basketball?

   ☐ The University

   ☐ NCAA

   ☐ Nevada Gaming Commission

   ☐ FBI

   ☐ Local Police

6. Do you pay attention to movements in the betting lines before making a wager on the NCAA basketball tournament?

   ☐ Yes

   ☐ No

7. In the past year, have you bet on sports: (check all that apply)

   ☐ Online

   ☐ Through a Bookie

   ☐ With Friends

   ☐ With Co-workers

   ☐ Nevada Sports Book On

Appendix B

Time	Game	Visitor Line	Home Line	Visitor %	Home %
3/17/2016 9:10:00 PM	Wichita State @ Arizona	0.0-110	0.0-110	46%	54%
3/17/2016 9:09:55 PM	Wichita State @ Arizona	0.0-111	0.0-109	46%	54%
3/17/2016 8:59:13 PM	Wichita State @ Arizona	0.0-110	0.0-110	46%	54%
3/17/2016 8:57:13 PM	Wichita State @ Arizona	0.0-112	0.0-108	46%	54%
3/17/2016 8:55:00 PM	Wichita State @ Arizona	0.0-110	0.0-110	47%	53%
3/17/2016 8:08:15 PM	Wichita State @ Arizona	0.0-111	0.0-109	47%	53%
3/17/2016 7:16:04 PM	Wichita State @ Arizona	0.0-110	0.0-110	47%	53%
3/17/2016 7:15:22 PM	Wichita State @ Arizona	0.0-113	0.0-108	47%	53%
3/17/2016 6:55:59 PM	Wichita State @ Arizona	0.0-110	0.0-110	48%	52%
3/17/2016 6:55:54 PM	Wichita State @ Arizona	0.0-112	0.0-108	48%	52%
3/17/2016 11:57:46 AM	Wichita State @ Arizona	0.0-110	0.0-110	44%	56%
3/17/2016 11:56:49 AM	Wichita State @ Arizona	1.0-115	-1.0-105	44%	56%
3/17/2016 11:56:33 AM	Wichita State @ Arizona	1.0-118	-1.0-103	43%	57%
3/17/2016 11:56:28 AM	Wichita State @ Arizona	1.0-110	-1.0-110	44%	56%
3/17/2016 11:56:07 AM	Wichita State @ Arizona	1.0-105	-1.0-115	44%	56%
3/17/2016 9:54:05 AM	Wichita State @ Arizona	1.5-110	-1.5-110	42%	58%
3/17/2016 9:53:55 AM	Wichita State @ Arizona	2.0-133	-2.0+110	42%	58%
3/17/2016 9:53:50 AM	Wichita State @ Arizona	2.0-115	-2.0-105	42%	58%
3/17/2016 12:34:00 AM	Wichita State @ Arizona	2.0-110	-2.0-110	37%	63%
3/17/2016 12:15:33 AM	Wichita State @ Arizona	1.5-105	-1.5-115	37%	63%
3/16/2016 4:32:06 PM	Wichita State @ Arizona	1.5-110	-1.5-110	33%	67%
3/16/2016 3:57:36 PM	Wichita State @ Arizona	1.5-105	-1.5-115	36%	64%
3/16/2016 2:06:39 PM	Wichita State @ Arizona	1.5-110	-1.5-110	37%	63%
3/16/2016 1:42:22 PM	Wichita State @ Arizona	1.5-105	-1.5-115	36%	64%
3/16/2016 12:16:27 PM	Wichita State @ Arizona	1.5-110	-1.5-110	22%	78%
3/16/2016 12:15:51 PM	Wichita State @ Arizona	1.5-109	-1.5-111	22%	78%
3/16/2016 11:55:31 AM	Wichita State @ Arizona	1.5-110	-1.5-110	26%	74%
3/16/2016 11:54:35 AM	Wichita State @ Arizona	1.0-105	-1.0-115	24%	76%
3/16/2016 11:54:09 AM	Wichita State @ Arizona	1.0+100	-1.0-121	24%	76%
3/16/2016 11:53:22 AM	Wichita State @ Arizona	1.0-110	-1.0-110	24%	76%
3/16/2016 11:53:17 AM	Wichita State @ Arizona	0.0-107	0.0-113	24%	76%
3/16/2016 10:57:47 AM	Wichita State @ Arizona	0.0-110	0.0-110	25%	75%
3/16/2016 10:57:37 AM	Wichita State @ Arizona	1.0-110	-1.0-110	25%	75%

3/16/2016 10:57:22 AM	Wichita State @ Arizona	1.0-113	-1.0-107	25%	75%
3/16/2016 10:54:38 AM	Wichita State @ Arizona	1.0-110	-1.0-110	14%	86%
3/16/2016 10:53:41 AM	Wichita State @ Arizona	1.0-105	-1.0-115	14%	86%
3/16/2016 10:52:55 AM	Wichita State @ Arizona	1.0-110	-1.0-110	14%	86%
3/16/2016 10:33:54 AM	Wichita State @ Arizona	1.0-105	-1.0-115	100%	0%
3/16/2016 10:33:12 AM	Wichita State @ Arizona	1.0-110	-1.0-110	100%	0%
3/16/2016 10:33:07 AM	Wichita State @ Arizona	1.0+100	-1.0-121	100%	0%
3/16/2016 10:32:56 AM	Wichita State @ Arizona	0.0+100	0.0-121	100%	0%
3/16/2016 10:32:20 AM	Wichita State @ Arizona	0.0-110	0.0-110	100%	0%

Appendix C

Time	Game	Visitor Line	Home Line	Visitor %	Home %
3/25/2016 7:25:29 PM	Wisconsin @ Notre Dame	0.0-110	0.0-110	41%	59%
3/25/2016 7:23:30 PM	Wisconsin @ Notre Dame	1.0-115	-1.0-105	40%	60%
3/25/2016 7:22:47 PM	Wisconsin @ Notre Dame	1.0-110	-1.0-110	41%	59%
3/25/2016 7:17:33 PM	Wisconsin @ Notre Dame	1.0-105	-1.0-115	41%	59%
3/25/2016 6:41:00 PM	Wisconsin @ Notre Dame	1.5-110	-1.5-110	41%	59%
3/25/2016 6:25:35 PM	Wisconsin @ Notre Dame	1.5-105	-1.5-115	41%	59%
3/25/2016 3:34:32 PM	Wisconsin @ Notre Dame	1.5-110	-1.5-110	39%	61%
3/25/2016 3:00:44 PM	Wisconsin @ Notre Dame	2.0-110	-2.0-110	39%	61%
3/25/2016 2:54:12 PM	Wisconsin @ Notre Dame	2.0-115	-2.0-105	39%	61%
3/25/2016 10:16:37 AM	Wisconsin @ Notre Dame	1.5-110	-1.5-110	41%	59%
3/25/2016 10:14:19 AM	Wisconsin @ Notre Dame	1.0-104	-1.0-116	41%	59%
3/21/2016 5:46:00 PM	Wisconsin @ Notre Dame	1.0-110	-1.0-110	49%	51%
3/21/2016 3:34:56 PM	Wisconsin @ Notre Dame	1.0-115	-1.0-105	49%	51%
3/21/2016 10:41:13 AM	Wisconsin @ Notre Dame	1.0-110	-1.0-110	45%	55%
3/21/2016 10:41:03 AM	Wisconsin @ Notre Dame	0.5-105	-0.5-115	45%	55%
3/21/2016 10:40:57 AM	Wisconsin @ Notre Dame	0.5-110	-0.5-110	45%	55%
3/21/2016 10:36:32 AM	Wisconsin @ Notre Dame	0.0-110	0.0-110	53%	47%
3/21/2016 10:35:00 AM	Wisconsin @ Notre Dame	1.0-105	-1.0-115	48%	52%
3/21/2016 10:34:09 AM	Wisconsin @ Notre Dame	1.0-110	-1.0-110	48%	52%
3/21/2016 10:33:59 AM	Wisconsin @ Notre Dame	0.0+104	0.0-126	48%	52%
3/21/2016 10:33:43 AM	Wisconsin @ Notre Dame	0.0-110	0.0-110	48%	52%
3/21/2016 10:13:23 AM	Wisconsin @ Notre Dame	1.0-110	-1.0-110	63%	37%

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