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Were Revenues of National Basketball Association Franchises Affected by the Tim Donaghy Gambling Scandal of 2007?

Travis Buhrow*

ABSTRACT. In 2007 the National Basketball Association (NBA) endured one of the biggest scandals in the history of professional sports. Tim Donaghy, a referee in the National Basketball Association, pleaded guilty to providing inside information on NBA games to gamblers and receiving money from their winning bets. Through econometric analysis, this paper investigates if the Tim Donaghy gambling scandal of 2007 had an effect on the revenues of NBA franchises. All the statistics and data used in this paper are from the 2002-2003 through the 2011-2012 NBA regular seasons, a total of ten seasons. This paper finds that there is strong evidence to suggest that NBA franchise revenues were positively affected by the Tim Donaghy scandal. Possible reasons for this include a “Restored Confidence” effect and a “Moral Value Exemption” effect.

I. Introduction

“You can tell your friend Tim that he’s reffed his last NBA game!” he shouted.

Hearing those words, albeit secondhand, rocked me, and I felt as though my knees were going to buckle. Since receiving Tommy’s frantic phone call on the golf course, I knew my days were numbered. Still, I hadn’t specifically heard the words confirming my worst fears until that moment. ... Where or how they got the information that linked me to betting on pro basketball remained a mystery, but one thing was perfectly clear: the levee of deceit that had surrounded my life for the previous three and a half years was about to break.” (Donaghy 2009, 145)

On July 20, 2007, Murray Weiss of the *New York Post* first reported that the FBI was investigating allegations of a referee in the National Basketball Association (NBA) betting on NBA regular season games. On August 15, 2007, former NBA referee Tim Donaghy pleaded guilty to giving gamblers inside information on NBA games in exchange for

*I would like to thank Professor David Surdam for helping me shape the direction of this paper, as well as Professor Ken Brown for helping me with analysis of the econometric model.

thousands of dollars coming from their winning bets. The following year, Donaghy was sentenced to fifteen months in prison, followed by three years of supervised probation. Overall, Donaghy provided gambling picks on NBA games to multiple people over a span of four seasons, from 2003-2007. He provided information for over 100 NBA games, some of which he refereed himself.

The news of this scandal sent shockwaves throughout the world of American professional sports, leading NBA commissioner David Stern to make swift changes to multiple referee policies. These changes were implemented just months after the Donaghy scandal became public knowledge. While the NBA did an excellent job of addressing this situation and making changes to improve its product, one has to wonder about the effect the scandal had on the league in the following years. Did the scandal cause the NBA to lose fans? Did the increased media attention as a result of the scandal actually bring in more fans? Or did the scandal not have much of an effect on the NBA at all? This paper attempts to answer the following question: Did the Tim Donaghy gambling scandal of 2007 have an effect on the revenues of National Basketball Association franchises? If so, what kind of effect did it have? A linear regression will be used to try to answer these questions. The hypothesis of this paper is that the Tim Donaghy gambling scandal of 2007 has had a negative effect on the revenues of National Basketball Association franchises in the years following the scandal. It is expected that the gambling scandal lowered fan confidence in the integrity of the NBA, driving fans away from the league and lowering franchise revenues.

II. Literature Review

A great source of information on the scandal is Tim Donaghy himself. While serving his prison sentence, Donaghy wrote a memoir of all of the things he had seen and done while working as a referee in the National Basketball Association. After his release from prison, Donaghy was able to find a publisher willing to publish his claims, and in late 2009 *Personal Foul: A First-Person Account of the Scandal that Rocked the NBA* hit the shelves. Donaghy pulls no punches in his book; he even goes as far as to say that the NBA front office influences referees to call certain games in favor of the team the NBA believes will generate the most revenue. In particular, he cites Game 6 of the 2002 Western Conference Finals between the Los Angeles Lakers and the Sacramento Kings as an example

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of league manipulation (Donaghy 2009, 96-99). A Lakers win in Game 6 could have only meant good things for the NBA; as one of the premier teams in the league, a Game 7 in the series would generate plenty of extra revenue. Also, a win in Game 6 would have kept hopes alive for the Lakers to reach the NBA Finals, a much better scenario from a league perspective than if the smaller-market Kings made the finals. Statistics from the fourth quarter of the game support Donaghy's claim. The Lakers attempted 27 free throws in the fourth quarter of Game 6 compared to only 9 attempts for the Kings, helping fuel an exciting comeback victory for the Lakers. The Lakers went on to win both Game 7 of the Western Conference Finals and the NBA Finals that year, resulting in their third straight NBA Championship. Donaghy is not the only person to claim that the referees influenced this particular game; many sportswriters took to their keyboards soon after the game, expressing concern about the events that took place in the fourth quarter of the game.

Throughout *Personal Foul*, Donaghy continuously asserts that he “never fixed a game” (Donaghy 2009, 165). He admits that he bet on NBA games, and he admits that he used his inside knowledge of referees to help him make his picks, but he asserts that he never let his bets consciously influence his calls during a game. However, the public perception of Donaghy is that he is a cheater, not just somebody who made some illegal bets. The media and the NBA have had a lot to do with how the public has perceived Donaghy. For example, during a news conference on July 24, 2007, NBA Commissioner David Stern referred to Donaghy as a “rogue, isolated criminal” (National Basketball Association 2007).

No previous econometric research on the relation between the Donaghy gambling scandal and NBA franchise revenues was found when conducting research for this paper. However, there has been some simple analysis of the matter. Burkhart and Welsh (2013) looked at the legalization of sports gambling in states to see the kinds of effects it has had on professional sports. To determine the effects that sports gambling has had on revenues, they focused a lot on the Donaghy scandal and its affect on the NBA. Through a simple look at NBA revenue totals, they found that NBA total revenue rose in both the 2007-2008 and 2008-2009 seasons, the two seasons directly after the Donaghy scandal became public. Based on this, Burkhart and Welsh concluded that the Donaghy scandal did not seem to have affected NBA revenues much (Burkhart and Welsh 2013, 13).

III. Model

A model to determine how the Tim Donaghy gambling scandal affected NBA franchise revenues must control for the other variables that affect NBA franchise revenues. The model used in this paper closely follows a model used by Jacobs (2009). For his research, Jacobs created an econometric model of NBA franchise revenues in an attempt to see whether consecutive losing seasons had an effect on franchise revenues. Jacobs found that while winning seasons seemed to have a positive effect on NBA franchise revenues, having up to four consecutive losing seasons did not seem to have a significant effect on NBA franchise revenues. Along with that, his model suggested that population and attendance were the two most important variables in determining franchise revenue (Jacobs 2009, 53). The model in this study uses many of the same variables that Jacobs used, although some changes were made.

The econometric model is as follows:

$$\text{FRANREV} = \beta_0 + \beta_1(\text{TICKET}) + \beta_2(\text{FCI}) + \beta_3(\text{WIN}) + \beta_4(\text{ALLSTAR}) + \beta_5(\text{MVP}) + \beta_6(\text{ATT}) + \beta_7(\text{GATEREV}) + \beta_8(\text{POP}) + \beta_9(\text{PCI}) + \beta_{10}(\text{ARENA}) + \beta_{11}(\text{SCANDAL}) + \varepsilon$$

The model variables are defined as follows:

FRANREV= Revenues of an NBA franchise for a given season.

TICKET= Weighted average of season ticket prices for general seating categories for an NBA franchise in a given season. This excludes luxury suites and premium seating (tickets that come with at least one added amenity).

FCI= Fan Cost Index for attending a home game for a given NBA franchise in a given season. This statistic, created by Team Marketing Report, is a sum of the following items: Two adult average price tickets, two child average price tickets, four small soft drinks, two small beers, four hot dogs, two programs, parking, and two adult-size caps. In the model, FCI is calculated as the original FCI minus 4*average ticket price, in order to make sure that the effects of ticket prices are only captured in the TICKET variable.

WIN= NBA franchise's regular season win percentage for a given season.

ALLSTAR= Number of All-Stars on an NBA franchise in a given season.

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MVP= Dummy variable with a value of “1” for the NBA franchise with the MVP from the last completed season, and a value of “0” for all other NBA franchises.

ATT= NBA franchise’s total home attendance for a given season.

POP= Population of the metro area of a given NBA franchise for a given year.

PCI= Per Capita Income in the United States for a given year.

ARENA= Dummy variable with a value of “1” if the arena an NBA franchise is playing in is less than five years old in the given year, and a value of “0” if the arena an NBA franchise is playing in is at least five years old in the given year.

SCANDAL= Dummy variable with a value of “0” for any year in the model before the Tim Donaghy scandal broke (2002-2006), and a value of “1” for any year in the model after the scandal broke (2007-2011).

ε = Error term representing the variation in franchise revenue not explained by the other variables in the model.

Dependent Variable

The dependent variable in this study is total NBA franchise revenues. A study done by David Vine (2004) concluded that, across the four major professional sports, revenue was by far the most important factor in determining the value of a franchise (Vine 2004, 20). Jake Fisher of The Harvard Sports Analysis Collective (2010) arrived at the same conclusion. Based on past research, it can be concluded that NBA franchise revenues are a representative measure of the overall value of an NBA franchise. Since franchise revenues make up just a part of overall franchise value, and thus involve fewer components than overall franchise value, it is better to use NBA franchise revenues rather than NBA franchise values.

The NBA does not generally provide revenue statistics of its franchises to the public, so estimates have to be relied upon. *Forbes.com* is well-regarded as the leader in estimating franchise values and revenues across all professional sports. Because they are estimates, the quality of the numbers provided by *Forbes* needs to be examined. David Vine (2004) also compared franchise value estimates conducted by *Forbes* with actual sale prices of franchises (Vine 2004, 13). He found that *Forbes* typically undervalued professional football, basketball, and baseball franchises, while slightly overvaluing professional hockey franchises. In

particular, the actual sale prices of NBA franchises were, on average, 38 percent higher than the estimates made by *Forbes*. Vine concluded that the most likely source of the difference between the estimated values and the actual sales price, at least for professional football, baseball, and basketball teams, was an ego factor that resulted from owners wanting the prestige of owning a professional team. However, he did admit that there may be other factors involved (Vine 2004, 20). While Vine's research showed that the estimates conducted by *Forbes* are not perfect, they did show that the estimates are fairly consistent.

There are some people who disagree with the notion that *Forbes* provides the best estimates of professional sport franchise values and revenues. In a blog post, Professor Jordan Kobritz (2013) of SUNY College at Cortland argued that estimates conducted by *Bloomberg.com* of Major League Baseball (MLB) franchise values were "more accurate than anything previously published by *Forbes*" (Kobritz 2013). While Kobritz may be right about the MLB estimates, *Bloomberg* does not currently have any estimates on NBA franchise values. The estimates provided by *Forbes* are generally regarded throughout the sporting community as credible. This, along with Vine's findings on the consistency of the estimates of *Forbes*, makes a strong case for the validity of their estimates. Thus, the NBA franchise revenue estimates provided by *Forbes* will be used as the dependent variable in the model.

Independent Variables

Fan Cost Variables

The model includes two fan cost measures: ticket price and the Fan Cost Index. Ticket prices are measured as a weighted average of season ticket prices for general seating categories. Luxury suites and premium seating (tickets that come with at least one added amenity) are not included in these prices. Coates and Humphreys (2007) found that NBA franchises set ticket prices in the inelastic portion of the demand curve, a result that supports previous research (Coates and Humphreys 2007, 167). This means that as ticket prices increase, the resulting decrease in attendance will have a smaller effect on revenues than the increase in ticket prices. Thus, it is expected that franchise revenue will be positively correlated with ticket price; in other words, it is expected that as a franchise's ticket prices increase, that franchise's revenues will also increase.

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The Fan Cost Index (FCI), a measure created by Team Marketing Report, is used to determine what a typical family of four can expect to spend in order to attend a game. It is a sum of the following items: Two adult average price tickets, two child average price tickets, four small soft drinks, two small beers, four hot dogs, two programs, parking, and two adult-size caps. In the model, the FCI variable measures Team Marketing Report's Fan Cost Index minus four times the TICKET variable. This is done to remove the effect of ticket price from the FCI variable and ensure that the effect of ticket price is only measured in the TICKET variable. It is expected that the Fan Cost Index will be positively correlated with franchise revenues.

Quality of Team Variables

Three variables are included to measure the quality of the team put on the court: Win Percentage, All-Star Players, and Most Valuable Player (MVP). All else equal, it is expected that an increase in any of these three variables will lead to an increase in franchise revenue. An increase in win percentage would signify to fans that the team is improving in quality. Thus, it is likely that more fans will want to come to see the team. The number of all-star players on a team should affect fans in a similar way. Fans typically perceive a team with multiple all-stars, such as the Miami Heat with LeBron James, Dwayne Wade, and Chris Bosh, as a better and more exciting team than a team with fewer all-stars. The Most Valuable Player variable is essentially a boost to the All-Star Players variable. A team with the reigning MVP of the league should be expected to generate extra revenue as the team gains fans. Also, the franchise may see increased revenue from general basketball fans who simply want to watch the MVP play and buy his jersey.

Research has been done to try to quantify the value of star players in the NBA. Leonard and Hausman (1997) looked at the value of NBA superstars for not only their own teams, but also their value as positive externalities for the other teams in the league. In particular, Leonard and Hausman focused on local and national television ratings to determine what kind of effect these superstar players had on the league. They concluded that the players they identified as "superstars" were extremely valuable to all teams in the NBA (Leonard and Hausman 1997, 623). In fact, based on data from the 1991-1992 NBA season, they estimated Michael Jordan to be worth \$53.2 million to teams in the NBA other than

his own, or about \$2 million per team (Leonard and Hausman 1997, 617).

Fan Attendance / Population Variables

Three variables are included in the model to factor in not only how many people franchises have the potential to attract to games, but also how many people actually attend the games. These variables are Attendance, Population, and Per Capita Income. Attendance should be expected to be a large factor in franchise revenue because generally, the fewer fans that come to games, the less interest there is in the team. If fewer fans attend the games, there will be fewer concessions and merchandise sold at the arena. Also, lower attendance numbers means that fewer tickets are sold. Thus, it is expected that attendance and franchise revenue will be positively correlated.

Population is a measure of the metropolitan population of the area surrounding the arena. Typically, sports fans in cities will root for the teams from their city. For fans who don't live in a city with a professional team, it is likely that they will cheer for one of the teams nearest to them. Therefore, teams that reside in cities with higher metropolitan populations, such as the New York Knicks and the Los Angeles Lakers, have more potential fans to draw revenue from. It is expected that franchise revenue will be positively correlated with population.

Per Capita Income (PCI) is a measure of average income. In the model, PCI is measured as the Per Capita Income of the entire United States. It is expected that PCI and team revenue will be positively correlated with one another. All else equal, a higher PCI for the United States would indicate a higher average level of income for Americans. This means that, on average, Americans would have more spending power, and they would then be able to spend more money on entertainment such as the NBA. This variable is included in the model as an attempt to pick up the negative effects that the recent recession in the United States may have had on NBA franchise revenues.

Arena Quality

The Arena variable is a measure of the quality of a team's arena. Newer arenas are usually perceived by fans as nicer than older arenas. Also, newer arenas are typically perceived as safer buildings. So, it is expected

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that franchises with newer arenas will be able to attract more fans than otherwise, thus increasing revenue. In the model, the arena variable is a dummy variable. If the arena is under five years old, the variable has a value of “1”. If the arena is five years old or older, the variable has a value of “0”. Thus, the model assumes that fans view all arenas in their first five years on the same level as “new” arenas, and that fans view all arenas five years old and older on the same level as “old” arenas. It is expected that team revenue will be positively correlated with arena quality.

IV. Data

The data for this econometric regression are gathered from a multitude of sources. Team revenue statistics are estimated by Forbes. Data for ticket prices and the Fan Cost Index are from Team Marketing Report’s website www.teammarketing.com, Win percentage, All-Star, and MVP data are all from www.basketball-reference.com, one of the top overall websites for basketball statistics. Attendance statistics are from www.ESPN.com. Population data for metropolitan areas in the United States are compiled from the United States Census Bureau. For the Toronto Raptors, data for the Toronto metropolitan area are from Statistics Canada, Canada’s national statistics agency. Per Capita Income data are from the United States Bureau of Economic Analysis. Data for arena age are from two sources: www.stadiumjourney.com and www.nba.com.

Rodney Fort, a well-respected sports economist, has a website called *Rodney Fort’s Sports Business Data* where he provides excel spreadsheets full of a multitude of statistics for professional sports leagues, including the NBA. Much of the data used in this paper are from Fort’s spreadsheets, after examination to ensure that the data provided in the spreadsheets are accurate. Data for team revenue, ticket prices, the Fan Cost Index, win percentage, and attendance are all from Fort’s website.

Data are from the 2002-2003 through the 2011-2012 NBA seasons, a total of ten seasons. Every franchise from every season was included in the model for a total of 298 individual observations. All monetary values are deflated to 2002 United States dollars.

V. Regression Results

Table 1 shows the results of the linear regression. An adjusted R^2 value of 0.636276 suggests that the independent variables do a good job of explaining variations in franchise revenue. Looking at the independent variables, the results indicate that ticket price (TICKET) is positively related to NBA franchise revenues and is significant at the 1% level. Since ticket prices are expected to be on the inelastic portion of the demand curve, this result is expected. Similarly, the model results suggest that both attendance (ATT) and metro population (POP) are also positively related to NBA franchise revenues and they are both significant at the 1% level. Again, both of these results are expected, and these results agree with the results Jacobs (2009) found with his model. A team in a high population area, such as New York City or Los Angeles, is likely to have more fans than a team in an area of lower population, such as Portland or Oklahoma City. Since they will likely have more fans, they will also likely have more opportunities for ticket sales, merchandise sales, and so forth. This is why the New York Knicks, a team that has been mediocre on the court for most of the past decade, is consistently one of the top five revenue-generating franchises in the NBA.

TABLE 1—Franchise Revenue Regression Results

Variable	Coefficient	t-ratio	p-value	
CONSTANT	-74,345,800.00	-1.9427	0.05303	*
TICKET	838,762.00	8.2863	<0.00001	***
FCI	47,370.60	0.5622	0.57439	
WIN	18,103,100.00	2.1073	0.03596	**
ALLSTAR	-1,012,120.00	-0.7513	0.45311	
MVP	1,704,020.00	0.3421	0.73249	
ATT	78.87	6.9995	<0.00001	***
POP	2.19	5.0001	<0.00001	***
PCI	1,894.16	1.574	0.11658	
ARENA	5,116,440.00	1.904	0.05791	*
SCANDAL	7,058,020.00	3.1651	0.00172	***
R2			0.648523	
Adjusted R2			0.636276	

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Winning percentage (WIN) has some positive effect on NBA franchise revenues as well, and is significant at the 5% level. This indicates that winning games increases revenue for NBA franchises. The age of an NBA franchise's arena (ARENA) has a positive effect on NBA franchise revenues, but is only significant at the 10% level. This suggests that fans are more willing to come to newer arenas, thus increasing revenue for NBA franchises with newer arenas. Four of the remaining variables (FCI, ALLSTAR, MVP, and PCI) did not show any significance in the model.

What about the scandal variable? The model suggests strong positive significance for the scandal variable, as it is statistically significant at the 1% level. This means that there is reasonable evidence that the Tim Donaghy gambling scandal had a positive effect on NBA franchise revenues. This contradicts the hypothesis of this paper, which expected that the gambling scandal would have a negative effect on NBA franchise revenues.

There are two reasons that, together, likely explain the results of the model. First, it is possible that a "Restored Confidence" effect could have occurred. The breaking news of the gambling scandal, combined with the quick efforts of the NBA to revamp league policies in regards to its referees, could have restored fan confidence in the NBA. Jonathan Gibbs (2007) examined the point spread betting market of the NBA. For his research, Gibbs analyzed a large number of games. For his first data set, Gibbs used information from NBA regular season games between the 1993-1994 and 2006-2007 seasons for a total of 15,859 games (Gibbs 2007, 24). For his second data set, Gibbs used a data set that focused on in-game scores in the final minutes of the fourth quarter for games played between the 2001-2002 and 2006-2007 seasons, a total of 6,415 games (Gibbs 2007, 34). Using both of these data sets, Gibbs looked for evidence of cheating through point shaving, a type of match fixing where perpetrators try to keep a certain team from covering a published point spread. Gibbs concluded that there was strong statistical evidence to suggest point shaving in the NBA. He noted, however, that his research did not identify the individual source(s) of this point shaving. It could come from multiple sources, such as players, coaches, and referees (Gibbs 2007, 42-43).

The timing of Gibbs's paper was quite incredible, as he finished it in May of 2007, just two months before news of the gambling scandal broke. That Gibbs decided to do this research in the first place shows that fans

were concerned about the possibility of point shaving in the NBA well before the gambling scandal became public. Thus, it is reasonable to assume that many NBA fans already believed that point shaving was taking place. When the Donaghy scandal broke, the NBA quickly responded by changing many of its policies regarding referees. To lower the gambling value of having inside information on knowing the referees for upcoming games, the NBA began releasing referee identities the morning of their respective games rather than only 90 minutes before tip-off. Also, to try to prevent any similar scandals from occurring in the future, the NBA started to offer its referees more training and gambling-related counseling in season than before. Last, the NBA loosened its strict gambling rules for referees, allowing them to participate in various forms of gambling, excluding sports gambling. This was done in the hopes that referees would be less inclined to partake in sports gambling with so many allowable options now available to them (Sheridan 2007). The NBA's response of new policies and regulations for its referees may have given casual fans a new sense of confidence that the NBA was dedicated to making its league fair.

Second, a "Moral Value Exemption" effect may have some merit as well. It is possible that some fans may hold sports above their own moral values. While it is true that some fans may have already believed that some sort of point shaving was taking place in the NBA, it is likely that a large number of fans were blindsided by the news of the Tim Donaghy scandal. In a country where we tend to scrutinize public figures involved in scandals, it should be expected that these fans would have distanced themselves from the NBA. However, the number of fans that drew closer to the NBA seems to overwhelm the number of fans that distanced themselves from it. Thus, it is possible that some fans are willing to put their moral values aside for the sake of sporting entertainment.

VI. Conclusion

This paper set out to answer the question of whether the Tim Donaghy gambling scandal of 2007 had an effect on revenues of the franchises of the National Basketball Association, and if so, what kind of effect it had. The econometric analysis in this paper shows that there is strong statistical evidence to suggest that the Tim Donaghy gambling scandal has had a positive effect on NBA franchise revenues in the years following the scandal. While the analysis does not specify the exact reasons for

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why the gambling scandal has had a positive effect on NBA franchise revenues, it is likely that some combination of a “Restored Confidence” effect and a “Moral Value Exemption” effect explains the result.

Further research on this topic could be done in multiple areas. First, the model used in this paper is a basic model. More advanced econometric models could be used to test the results of this paper. Second, research could be conducted to specify exactly how much the “Restored Confidence” and “Moral Value Exemption” effects affected the results in this paper, and whether any other effects are present. Last, the research done in this paper could be replicated on other professional sports scandals to determine if similar results came of those situations. For example, the Pete Rose gambling scandal that took place in Major League Baseball would be a similar situation to the one researched in this paper. Research on the different scandals could then be compared to determine if the habits of fans of professional sports have changed over the years.

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