AN ANALYSIS OF EXPLOITATION IN WOMEN'S COLLEGE BASKETBALL

by

Tiffany Greer

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Approved by:

_____
Dr. Arthur Zillante

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Dr. Craig A. Depken, II

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Dr. David Berri

ABSTRACT

TIFFANY GREER. An analysis of exploitation in women's college basketball. (Under the direction of DR. ARTHUR ZILLANTE)

This analysis is a review of the marginal revenue product (MRP) of student athletes and how as amateurs this relates to the limited compensation they are permitted to receive. Specifically this paper examines the collegiate women's basketball programs, an underreported subset of college athletics. The continuing focus on amateurism limits student athletes to strict adherence of conference amateur compensation requirements while allowing college coaches to receive lucrative salaries. The data indicates that while many athletes likely benefit in excess of their MRP from the numerous scholarships, room and board aid provided, the third quartile of athletes contribute significantly more value than they can be compensated based on NCAA bylaws.

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LIST OF ABBREVIATIONS

CBA	Collective Bargaining Agreement
IAA	Intercollegiate Athletic Association
MLB	Major League Baseball
MRP	Marginal Revenue Product
NBA	National Basketball Association
NCAA	National Collegiate Athletic Association
NFL	National Football League
NHL	National Hockey League
WNBA	Women's National Basketball Association

CHAPTER 1: INTRODUCTION

There is a long running debate on whether the compensation professional athletes receive is in-line with the value they generate for their teams. This debate reached academia in 1974 when Gerald Scully published "Pay and Performance in Major League Baseball." Scully examined the economic losses that MLB players were suffering under the reserve system of the time and projected the salaries and marginal revenue products of players based on their on-field performance.

Various iterations of Scully's questions and framework have since been used to analyze the marginal revenue products of athletes in other segments of the other professional sports. Recently this analysis has turned to collegiate student-athletes competing in the NCAA model. The historic precedent is that this class of athletes competes as amateurs with their only source of compensation being tuition, room and board, and books. Recently, this precedent has come under increased scrutiny as the NCAA and its member conferences and institutions have signed exorbitant television broadcast deals, large sponsorship deals, make large amounts from ticket sales and concessions, and receive large amounts from donors. In 2011, Andrew Zimbalist said the following about college sports, "It's probably an $8 billion industry, roughly the size of the NFL." [1] Despite the recent addition of a cost of living stipend, various researchers have found that athletes, particularly those in the "revenue" sports of football and men's and women's basketball, are not compensated commensurate with their marginal revenue products.

[1] http://www.pbs.org/wgbh/pages/frontline/money-and-march-madness/interviews/andrew-zimbalist.html

This paper examines the difference between the compensation that student-athletes receive and the marginal revenue product they create. This paper will focus on an underrepresented area in this discussion, investigating the difference in collegiate women's basketball. Coverage of women's college athletics is a fraction of the coverage the men receive according to the Women's Sports Foundation (2010) [2] and this disparity can also be found in academia where research around men's sports is seen much more often than research around women's sports.

[2] https://www.womenssportsfoundation.org/research/article-and-report/media-coverage/women-play-sports-not-tv/

CHAPTER 2: LITERATURE REVIEW

Scully (1974) conducted one of the most well-known studies on professional sports player's salaries and performance. Scully analyzed the economic losses that Major League Baseball (MLB) players suffered because of the reserve clause. He sought to estimate and predict player's salaries and MRPs based on their on-field performance. Since Scully made his estimates, several authors have gone on to analyze what was right and what was wrong with this method (Bradbury, 2013; Krautmann, 1999). Other authors have taken the framework left by Scully and used it to compare the marginal revenue product (MRP) produced by athletes in other areas of sports. Lane, Nagel, and Netz (2012); Taha (2012); and Brown and Jewell (2006) focus on college athletes playing various revenue sports within the National Collegiate Athletic Association (NCAA) system. Lastly, Krautmann (1999) and Lane, Nagel, and Netz (2012) have introduced alternative methods of calculating MRP.

Sully (1974) outlines the economic issues that lead to Major League Baseball's (MLB) first cases of labor unrest when its players went on strike in 1972 and threatened to strike again in 1973. The players' issues were their salaries, pensions, and the reserve clause. The reserve clause gave team owners exclusive rights over a player once the player's contract ended, limiting the player's options and negotiating power to seek a salary commensurate with their MRP. While Scully cannot derive a player's MRP directly, he creates a two-equation model that relates the various aspects of a player's performance on the team's winning percentage and team winning percentage on team revenue. Scully (1974) determines linear relations occur between

team winning percentage and various performance factors as well as between winning percentage and revenue. Both equations account for various factors of on- and off-field performance and team revenue. He also recognizes that not all factors may be accounted or can be accurately represented. After stripping away costs Scully (1974) found that net MRP for a hitter ranged from $85,500-$323,100 and from $57,600-$290,100 for pitchers versus salaries from $31,700-$70,600. MLB players are found to be exploited only receiving approximately 20% of their MRP with a star player receiving less at about 15% (Scully, 1974).

Krautmann (1999) and Bradbury (2013) take opposite sides in supporting Scully's work. Krautmann (1999) argues that Scully's model is inaccurate while Bradbury (2013) acknowledges that while Scully's method has some weaknesses it is not fundamentally flawed as Krautmann suggests. Krautmann (1999) argues that after the reserve clause was partially rolled back, only limiting player movement in their first six years of major league service, an alternate approach of looking at the free agent bidding process to glean a player's economic value yields more accurate results and can be applied to non-mobile players in their first six years. Applying Scully's method to the free agent salaries still shows MRP multiple times larger than a player's salary even while modifying the equation to remove certain forms of revenue that had decreasing ties to player performance (Krautmann, 1999). Krautmann (1999) also recognizes a difference in applying the model *ex ante* and *ex post* of a free agent contract being signed. The *ex post* MRP being lower by 20% due to player performance rising at a decreasing rate.

Krautmann's (1999) free market approach regresses free agents' wages on their performance. He argues that a player's market value will find equilibrium with their MRP. His findings can be applied to those players still limited in movement with less than six years of service to find the difference between the wages they receive and their MRP. He finds that players within their first six years receive far less than their MRP, perhaps in a way to recover cost for training said players, with only small profits being had. Scully's model would extract large monopsony rents that would be evident in large profits throughout the league (Krautmann, 1999).

Bradbury (2013) acknowledges that Scully's method has its weaknesses. Bradbury agrees with Krautmann that some sources of revenue that are centrally shared league revenue should be removed from the equation. Bradbury also agrees that all models suffer from a weakness because MLB teams do not often share revenue data, and those that do, often use accounting practices to distort financial reality. Bradbury argues that the market may not be as competitive as Krautmann indicates it to be because of available substitutes in other free agents and players with less than six years of service. He cites other factors that may decrease competition in the market and, therefore wages include athletes giving hometown discounts, favoring long term deals with lower average salary, or the desire to play on a winning team. A new wave of analytics revealed that teams also misprice professional athletes by overvaluing some traits or undervaluing others (Bradbury, 2013). In comparing Scully's method and Krautmann's method Bradbury (2013) acknowledges that Krautmann's method

provides an inside look at the front office point of view while Scully's method can identify market inefficiencies.

Researchers, such as Taha (2012), have increased their attention on the MRP of college athletes in revenue generating sports in the NCAA. The spotlight has increased due to significant increases in funds that the NCAA and individual conferences receive from new broadcast rights deals. NCAA bylaws limit the compensation that student-athletes can receive to tuition and fees, room and board, books, and a cost of living allowance. Student-athletes also receive other benefits such as academic counseling, medical insurance, etc. The value of these benefits can vary depending if the athlete planned on going to college and the resulting change in average earnings that college experience brings. Taha (2012) cites studies that estimate the MRP of players in revenue sports by regressing teams' generated revenue against players drafted into the NFL and NBA. He explores the idea that the marginal cost of bringing a student-athlete to campus is very little due to open classroom and dorm room space and the fact that the average student pays less than full tuition due to financial aid, thus increasing the level student -athletes are exploited. Brown and Jewell (2006) estimates that a future NFL draft pick brings in $400,000 and a future NBA draft pick generates $1.2 million in annual revenue to their respective teams.

In a separate study, Brown and Jewell (2006) go beyond football and men's basketball to analyze women's college basketball players and the MRP they produce. Brown and Jewell (2006) use an ordinary least squares regression to show that a future WNBA player, on average, provides a MRP of $241,337 to their university. Brown

and Jewell (2006) go further applying the semiparametric quantile regression technique of Koenker and Bassett (1978) to account for outliers and demonstrate the MRP of an elite player at a variety of different school sizes. They found that such a player has a MRP of $38,000 at a university at the 20 percent quartile of revenue generation and over $400,000 to a university at the 80 percent quartile.

Lane, Nagel, and Netz (2012) use various approaches to estimate the MRP of college student-athletes in football and men's basketball. First, the researchers followed a method based on Scully's work investigating the relationship between player performance to win percentage and win percentage to team total revenue. The authors conduct an ordinary least squares regression of win percentage on individual player performance and another to win percentage and revenue running two versions of each, one with team fixed effects and the other without team fixed effects, and use it to estimate MRP. The second method the researchers use are the distribution of pro salaries to determine the MRP of college student-athletes. This pro salaries method accounts for benchwarmers that do not have measurable production and also is significantly closer to the free market. Lastly, Lane, Nagel, and Netz (2012) estimate MRP based on a player's future draft status. They compare the three models, finding that all three models provide different estimates for MRP based on if the school is a high- low- or average-revenue generating school.

CHAPTER 3: THE HISTORY OF THE NCAA AND THE ESTABLISHMENT OF AMATEURISM

The NCAA is the most well-known and largest governing body of college athletics. The NCAA is comprised of 1,123 colleges and universities that comprise 98 athletic conferences among three divisions. The NCAA derives its power from its member schools and conferences. Amateurism is a bedrock principle of college athletics and the NCAA believes that maintaining amateurism is crucial to the collegiate model. The NCAA did not always have such a strong policy about amateurism. Many consider the NCAA's amateurism exploitive of student-athletes who generate revenue multiple times higher than what they receive in tuition, room, board, and other stipends (Lemons, 2014; Miller, 2016; Taha, 2012).

Commercial sponsors and donations from alumni have been involved in college athletics since its earliest days. One of the earliest intercollegiate athletic events was a mostly student run regatta between Harvard and Yale Universities. Rodney Smith (2000) points out that this event, which took place in 1844, was sponsored by the Elkins Railroad Line. As intercollegiate athletics competition took hold more sports were played and commercialism grew. Smith notes several university presidents, including those at Harvard and MIT, were concerned with the growth and the increasing commercialization of college athletics. These individuals saw the difficulty of regulating intercollegiate athletics at the institutional level. During this time, some colleges began offering scholarships while coaches at other schools began using "non-

degree programs" and "charity funds" to conceal and compensate athletes (Lemons, 2014).

The push for national oversight occurred in the early 1900's with an extreme rash of deaths and major injuries in football. President Roosevelt called a conference at the White House to address the issue but the issues persisted. After calling another conference, the Intercollegiate Athletic Association (IAA) was formed. The IAA was renamed the NCAA in 1910 and was tasked with formulating rules for fairness and safety in intercollegiate athletics (Smith 2000).

As intercollegiate sports continued to grow in the 1900's, increases in related commercialization occurred as well. A report by the Carnegie Foundations for the Advancement of Education written in 1929 cited a need for "a change in values in a field that is sodden with the commercial and the material and the vested interest that these forces have created. Commercialism in college athletics must be diminished…" (Smith 13). In the late 1940's, rules were enacted that limited financial aid for student-athletes to tuition and fees, prohibiting all concealed and indirect benefits for student-athlete (Lemons 2014). It was at this point the narrative of amateurism of collegiate student-athletes began.

The NCAA's continued emphasis on its student-athletes being amateurs has come under increased scrutiny as college athletics has grown increasingly commercialized. To maintain amateur status, student-athletes are not allowed to sign contracts with professional teams, receive a salary for competing in athletics, play with professionals, receive benefits from an agent or prospective agent, sign a contract with an agent, and

receive prize money above actual and necessary expense, among many other requirements. Amateurism continues even though colleges pay coaches multi-million dollar salaries. In fact, according to Business Insider and ESPN, the highest paid public employee in 39 of the 50 states was a college coach, based on 2016 data from USA Today as seen in Figure 1 below. Also, the Conferences and NCAA sign ever larger broadcast rights deals. Forbes reported that in 2016 the Big Ten Conference renegotiated TV deals pushing its rights fees to approximately $440 million a year over the six year contract. The SEC at that time generated on average $375 million a year in broadcast rights, the Big 12 approximately $302 million and the Pac-12 brings in approximately $250 million. The same year, the NCAA extended its broadcast rights contract with CBS and Turner who now pay an average of $1.1 billion for March Madness (ESPN). The NCAA seeks to propagate the narrative that the vast majority of the money is distributed in ways that benefit the schools and conferences and their student-athletes. Recently, colleges have made the push to provide full cost-of-attendance scholarships in order to cover the true cost of attendance for student-athletes.

The recent push to provide more cost-of-attendance scholarships is an example of why some academics argue amateurism is a myth (Blair and Wang, 2017). The definition of amateur from Oxford dictionary is: a person who engages in a pursuit, especially a sport, on an unpaid basis. By this definition a "student-athlete" is not an amateur as they often receive in-kind payments of tuition, books, and room and board. They also argue that amateurism is not crucial to the success of college athletics (Blair

and Wang, 2017). Another article argues that while the NCAA prevents direct payment, indirect payment can be made through scholarships (tuition, room, board, books etc.) as well as by hiring better coaches, investing in better facilities and staff (Mills and Winfree, 2017). There have also been numerous court cases in recent years challenging the NCAA and their violation of anti-trust laws around compensation limits (Berri, 2016). While amateurism and restrictions around compensation are supposedly in place for competitive balance, there are generally the top schools which is often where draft picks are concentrated in basketball (Berri, 2016).

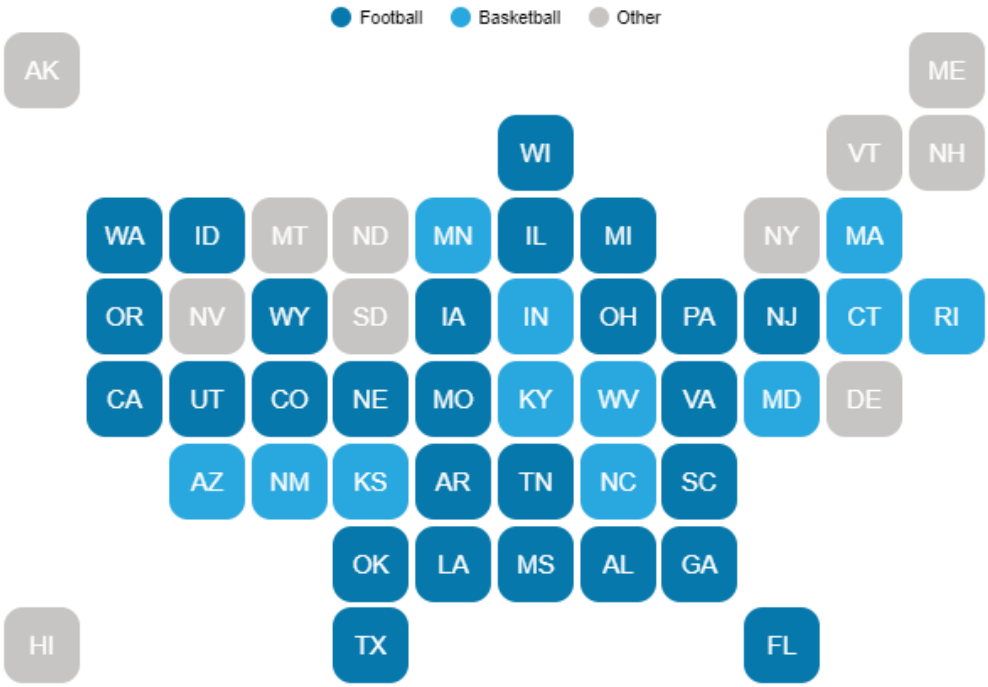

Figure 1: US Map Detailing Highest Paid Public Employees

In spite of this publicity by the NCAA, many argue that the student-athletes that make this system possible are exploited and only receive a small portion of the pie (Taha, 2012, Lemons, 2014). Taha (2012) argues that the value of a scholarship that a student-athlete receives is actually far lower than the list price. He argues that adding a student-athlete to an existing class or placing them in an unoccupied dorm room is merely using excess capacity that would have gone unused and is therefore low cost.

Lemons (2014) argues that the NCAA has monopsony power, stating that the NCAA member schools are the only "buyers" of student-athletes (member institutions of other collegiate athletic governing bodies are nearly insignificant given the very limited size of their purchasing power).

The NCAA's monopsony power can be illustrated by comparing the percent of revenue returned to its players versus the amount of revenue professional leagues return to their players. Between 45-58% of revenue generated by the MLB, NHL, NFL, and NBA are returned to their respective athletes. Only 21-23% of NCAA revenues are returned to its student-athletes. This percentage sinks even lower when analyzing the revenue sports of football and men's basketball at the highest level of the NCAA. The NCAA and its member institutions gain their monopsony power by acting as a cartel, cooperating to make economic decisions that benefit the group and maximize profits (Lemons, 2014).

Professional athletes have gained an equal share of league revenues by coming together to form players unions in each respective sport. These unions have fought to protect their athletes from the monopsony and cartel powers of the league. Some college football student-athletes have attempted to form unions to gain additional protections from the NCAA for student athletes. Their attempts have been stymied for the time being as the National Labor Relations Board denied attempts by Northwestern University football players to unionize in 2015 (Strauss, 2015).

CHAPTER 4: DATA COLLECTION

The data being used for this research came from multiple sources. Player and team statistics were provided by Dr. David Berri of Southern Utah University. Team revenue and school enrollment data was collected from the U.S Department of Education via their Equity in Athletics Data Analysis (EADA) website. Final Four appearances information was found on the NCAA website. This panel data spans four seasons, 2012-13 to the 2015-16 seasons and consists of over 17,000 player observations. Variables include team revenue, conference, number of wins/losses, players win's produced, Final Four appearances, and school enrollment. For the purpose of this research, the data has been limited to NCAA Division I teams.

Dummy variables will be used for the season to control for differences in the seasons not already accounted for. Dummy variables will also be used to account for different conferences. As there are over twenty Division I conferences, dummy variables for the Atlantic Coast Conference (ACC), the American Athletic Conference (AAC), the Big Ten Conference, the Big 12 Conference, the Southeastern Conference (SEC) and the Pac-12 Conference will be used. These conferences are being differentiated from the others as the ACC, Big Ten, Big Twelve, SEC and Pac-12 are often considered the power five conferences and the AAC is used because it includes the University of Connecticut which has been one of the most dominant women's basketball teams over the years.[3] A dummy variable will not be used for the other conferences, as they are being grouped together in the base case.

[3] Public schools have a lower cost because they are subsidized.

The wins produced metric will also be utilized which determines the value of points and possessions in terms of wins. Wins produced was first introduced in the book The Wages of Wins by David Berri, Martin Schmidt and Stacey Brook. It is a model which estimates a player's contribution to her team in terms of wins. It takes into account the player's production (field goals, free throws, rebounds, etc.), an adjustment for defensive rebounds produced by other teammates, an adjustment for assists as well as team defense and player position. All wins produced data for this research was provided by Dr. David Berri and further details can be found on the Wages of Wins blog.[4] For this data set, wins produced ranges between -2.53 and 13.88 with a mean of 2.96.

[4] http://wagesofwins.com

CHAPTER 5: METHODOLOGY

The marginal revenue product of women's basketball players is investigated in two different ways. In the first, a total revenue function is used in a Scully approach. Total revenue is modelled as a function of total wins, enrollment, Final Four appearances, the conference dummy variables, and the season dummy variables. From the total revenue this, the coefficient on wins is used to determine the marginal revenue product of each player based on their wins produced. The second way, is to consider how revenue is split in many professional sports such as the NBA and NFL. This is by doing a 50-50 revenue split which means half of the revenue generated in the league is paid out to the players.

5.1 THE SCULLY APPROACH

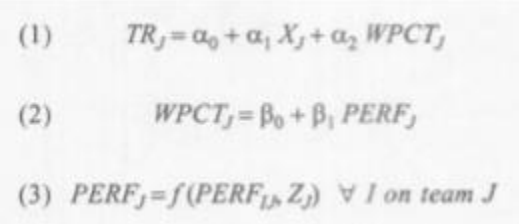

Figure 2: Scully Approach (As detailed by Krautman)

The Scully approach determines marginal revenue product by utilizing a total revenue function for team revenue and a win percent function based on performance measures. Figure 2 details the model as used by Scully. As the data used here includes the wins produced statistic, the win percent function (equation (2) in Figure 2) will not be calculated and thus equation (3) in Figure 2 does not need to be calculated. The total revenue function equation 1 from Figure 2 will be calculated as discussed above and wins produced will be multiplied by the coefficient on wins to determine marginal

revenue product for each individual player. The equation below details the model which will be used.

$$TR = \propto_0 + \propto_1 wins + \propto_2 enrollment + \propto_3 finalfour + \propto_4 conference + \propto_5 season$$

While some economists such as Krautmann find the method lacking as baseball does have competitive bidding for free agents, others such as Bradbury believe the weaknesses of Scully's method are not as severe. Other approaches have been used such as Krautmann's free market returns approach which utilizes free agent bidding to determine what salaries align with marginal revenue product. This also was viewed to help with the reserve clause issue in baseball. The second approach used will account for how revenue is distributed in some professional sports such as the NBA where players are paid roughly 50% of revenue.

5.2 REVENUE SPLIT 50-50

In many professional sports in the U.S. such as the NBA, NFL, NHL, and the WNBA, collective bargaining agreements are in place between the players union and the league. These agreements include things such as minimum player salaries, maximum salaries, short-term (10 day) contracts, moving expenses, meal expenses, benefits as well as media and promotional appearances among many other things. While these agreements are different for every sport, people estimate based on the information in the Collective Bargaining Agreements for the NBA, NFL and MLB, that the players generally receive between 45% and 50% of league revenue. For this, we will look at the observations in two different groups. The first group will consist of

all observations for the conferences singled out with the dummy variable, the AAC, ACC, Big Ten, Big Twelve, Southeastern and Pac-12; we will refer to this group as the power conferences. The second group will consist of all observations for the remaining conferences.

With the two separate groups of observations, we sum up the total revenue for each team across the four seasons and all the wins the teams had across the four seasons. The number of player observations is also summed up. From that, we can find the average revenue per player and revenue per win which can be viewed below in Table 1.

Table 1: Summary of Revenue Data For Division One Conferences

Table 1	Power 5 plus AAC Conferences	Other Conferences
Total Revenue	$ 469,233,433	$ 1,312,034,549
50% of Revenue	$ 234,616,716	$ 656,017,274
Player Observations	3722	13608
Wins	5935	15934
Revenue per Player	$ 63,035	$ 48,208
Revenue per Win	$ 39,531	$ 41,170

Take the wins produced for each player observation multiplied by the revenue per win provides an estimate of each player's value. Inevitably, there are going to be some players who negatively affect the team. Based on this calculation, these players would then have a negative MRP estimate. To control for this, set a minimum wage which all

players must receive. While we could use the minimum salary outlined in the WNBA CBA, as the 50-50 split matches almost exactly with the NBA split of revenue, we will look to their salaries for a minimum wage. According to a Bloomberg article, under the new CBA, the average NBA salary will hit $8.5 million. Under that deal, the average minimum salary is $1.7 million (the average of the minimum salary based on years in the league).[5] From this, we get that the average minimum salary is 20% of the average salary. Thus, for determining the minimum wage in our two groups, we will set the minimum wage at 20% of the average wage.

The first MRP estimate will be wins produced multiplied by the value of a win. As some players have a negative wins produced this will lead to some negative estimates and estimates below the calculated minimum wage being used. All players that make below the minimum wage calculated, will receive the minimum wage. To determine the new values for the remaining players that need a salary, calculate the following:

> Amount Remaining = Total Revenue paid - minimum paid out for next iteration + minimum and below paid out in previous iteration

Then do the following:

> Amount to subtract from remaining players= (Total Revenue paid – Amount Remaining)/number of player observations above minimum

Next, subtract that value from the original estimate of each player MRP above the minimum wage. Multiple iterations can be done until all players receive at or above the minimum wage. The results are discussed in the next section.

[5] https://www.bloomberg.com/news/articles/2016-12-15/average-nba-salary-grows-to-8-5-million-under-new-labor-deal

CHAPTER 6: RESULTS

Using the Scully method, the Total Revenue function yields the following results.

Table 2: Regression Results Using Scully Method

VARIABLES	Team revenue
wins	29,540**
	[4,271]
enrollment	-11.217**
	[4.218]
Final four	1187741**
	[274,610]
d_ACC	186,120
	[142,013]
d_AAC	679,400**
	[164,012]
d_Big12	693,093**
	[197,613]
d_BigTen	-78,689
	[161,958]
d_SEC	328,122*
	[151,657]
d_PAC12	745,551**
	[185,631]
d_201213	-245,404**
	[79,474]
d_201314	-132,947
	[79,513]
d_201415	-117,181
	[79,203]
Constant	1030353**
	[94,286]
Observations	1,364
R-squared	0.108

Standard errors in brackets

** p<0.01, * p<0.05

The coefficient on wins is $29,540. The coefficient was then multiplied by each player observations wins produced. Table 3 summarizes the results calculated from the Scully Method by showing the minimum, maximum and quartiles. The Scully Method estimates the MRP of all player observations is $657,116,987. Using this method, more than 3,000 observations have a negative MRP estimate. It is important to note that while these players have a negative MRP estimate, there is a value to having them on the court versus being a player short.

The MRP estimates for the 50-50 split are also summarized in Table 3. Using this method, we controlled for negative estimates as outlined in the Methodology section.

After using both methods outlined above, we have the following results. These results indicate that the entire third quartile of MRP calculations regardless of method used, are exploited to some degree. The minimum wage for the 50-50 split for the Power 5 plus AAC and the other conferences can be seen as the minimum in the respective columns below. A minimum wage was not implemented when using the Scully method and thus the minimum observation using that method is negative. Based on the maximum values in Table 3, it can be seen that the players producing the most wins have MRPs in the $400,000-$560,000 depending on the conference group (Power 5 plus AAC or the other conferences) and method. Quartiles were used to display summarize estimated MRPs in a concise manner due to the number of observations in the data set.

Table 3: Summary of Individual Players Marginal Revenue Product Using Both Scully and 50/50 Revenue Spilt

	Power 5 plus AAC Conferences	Others	Scully
Minimum	12607	9642	-96581
1st Quartile	12607	9642	591
2nd Quartile	27909	12896	18315
3rd Quartile	93925	66829	59375
Maximum	519340	561556	410205

CHAPTER 7: CONCLUSION

In conclusion, while the NCAA argues the importance of amateurism and compensation limited to at most full cost of attendance, there is an argument to be made that some athletes are exploited. Estimates place the average out-of-state cost of tuition at around $34,000. The definition of exploitation is the action or fact of treating someone unfairly in order to benefit from their work. Thus, based on the MRP estimates for the data set, it can be argued many schools are benefiting from the hard work and skill of many of their athletes.

While numerous academics discuss the exploitation of college athletes, the courts have continually sided with the NCAA over the athletes. Until one of these court cases is successful, some athletes will continue to be exploited.

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