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Title:

"A Comparison of NBA and WNBA Player Salaries"

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Abstract: This paper compares player base salaries in the NBA and WNBA (the premier male and female U.S. professional basketball leagues respectively). Unsurprisingly, average salaries in the NBA ($8,264,922) and considerably higher than average salaries in the WNBA ($73,738). Thinking about intra-league salary inequality, Gini Coefficients are computed for both the NBA (0.5434) and WNBA (0.2462). Thus, while WNBA salaries are much lower than NBA salaries, WNBA salaries are distributed much more equally than are NBA salaries. Following these observations, there is a discussion as to what contributes to the difference in salary levels and distributions between the two leagues.

Introduction:

This paper will explore the economic issue in regards to salary levels and dispersion both for the NBA and WNBA. There will be an internal analysis looking at each league and then a comparison between the two. This study starts by discussing the history and facts about both the NBA and WNBA. Following this the Gini coefficient is used to address the base salary inequality between different members of the same NBA league and also the WNBA league. Lorenz curves will be constructed to visually summarize inequality among values of the salary frequency distribution of each league depending on how much the curve sags below the straight diagonal line. The Gini coefficient is double the area between the line of perfect equality and the Lorenz curve. The degree of income inequality between the men's and women's leagues will also be assessed. The income data gathered showed the NBA Gini to equal 0.5434 and the WNBA Gini to equal 0.2462. Next, there will be a discussion about the NBA total league payroll and the average salary in comparison to the WNBA total league payroll and the average salary. This data will be accompanied with an explanation in regards to the factors determining the salaries in each league. Finally, the observations on income levels and Gini values will be used to illustrate why levels matter and that equality/inequality should not be the only thing of concern.

The Gini coefficient is a statistical measure of distribution, which is used to measure inequality and is frequently used to measure the distribution of income within a society. The Gini coefficient value can range between 0 and 1. 0 represents perfect equality, where everyone has the same income, and 1 represents perfect inequality, where one person has all of the income and everyone else has no income. Therefore, a higher Gini Coefficient would suggest greater inequality, with high income individuals receiving larger amounts of the total income of the population. The Lorenz curve displays the distribution of income on a graph with cumulative

population (order from lowest income to highest) on the horizontal axis and cumulative income on the vertical axis.

Methodology and Data:

The data collected for this research was found on sportrac.com, one of the largest online sports team and player contract resource on the internet ("About Spotrac"). It uses sources such as accurate NBA and WNBA news and contract data received from basketball insiders and RealGM to know the base salary figures ("Sources & Affiliates"). This allowed the base salary to be collected for all players that are involved in the thirty NBA teams and twelve WNBA teams from the year 2019-2020. Information collected from this website on the 443 players in the NBA, and the 113 players in the WNBA includes: the player's number, first name, last name, position, team, and 2019-2020 base salary. These facts and figures have been analyzed to produce total league payroll, average league salary, and a Gini coefficient for each league. Graphical representation has been made through Lorenz curves to visually display the degree of inequality distribution.

This is a topic that has not particularly been discussed or looked into, especially for a sport such as women's basketball. Therefore, there are limitations in this research, such as only looking into base salaries instead of analyzing bonuses or commission given to each player. I decided to collect base salary information because it is the initial salary paid to each player, not including bonuses, commission, or benefits. It provides the rate of compensation a player gets in exchange for their services of playing basketball. Additional sponsorship on top of base salaries makes it hard to determine the actual amount players receive, for example, from media companies, clothing companies, and other brands that they represent. These sponsorships all

have different clauses and time periods of payment. Therefore, the base salary is a rate that the player is guaranteed to make for the given year of 2019-2020, and therefore is the most accurate form of long term data. Another limitation to this study would be assessing how women's and men's basketball inequality compares to other sports inconsistencies. One reason for this is because individual sports, such as tennis or golf usually get paid for how well they do in competition rather than earning a base salary.

NBA and WNBA:

In 1946 the Basketball Association of America began; however, in 1949 it merged with the National Basketball League and became what is known today as the NBA ("NBA History"). In 1996 the NBA Board of Governors approved the idea of a WNBA, so the women's league began play in 1997 ("History"). Nowadays, the two leagues have never been closer in regards to how the game is played; nevertheless, there are still a few differences. For example, there are four quarters in both an NBA and WNBA game (each quarter is 12 minutes for the men and 10 minutes for the women). An NBA basketball is two ounces heavier and an inch larger in circumference than a WNBA basketball. A WNBA roster has a maximum of 12 players, whereas an NBA roster has a maximum of 15 players and a minimum of 12. An NBA Draft player must be at least 19 years old and have a minimum of one year post-secondary experience; however, a WNBA Draft player must be at least 22 years old. The WNBA has many players with college degrees, mainly because they are required to complete four years of education after high school to even be eligible for the draft ("The Business Of Being A WNBA Player").

League Payroll and Average Salary:

From the data assessed, the NBA total league payroll amounted to $3,661,360,623 and the average salary was equal to $8,264,922.40. The lowest earning player has a base salary of $568,422, compared to the top earning player receiving $40,231,758 as his base salary. This creates a difference of $39,663,336 between the highest and lowest paid players in the NBA league. As stated in Table 1, players who earn the top 50% of the total league payroll cumulatively obtain $3,200,536,522, so that players who earn the bottom 50% of the total league payroll cumulatively make $460,824,101. Therefore, the 50% of players earning the most in the NBA account for only 87% of the total income, whereas the 50% of players earning the least comprise 13% of the total league payroll.

Table 1. NBA Salary Distribution.

Percentage of highest earning players	Earnings	Percentage of total league payroll
Top 5%	$748,828,308	20%
Top 10%	$1,341,448,169	37%
Top 20%	$2,144,291,646	59%
Top 30%	$2,645,067,719	72%
Top 40%	$2,985,256,504	82%
Top 50%	$3,200,536,522	87%

From the data assessed, the WNBA total league payroll amounted to $11,282,051 and the average salary was equal to $73,738.90. The lowest earning player has a base salary of $2,723, compared to the top earning player receiving $127,500 as her base salary. This creates a difference of $124,777 between the highest and lowest paid players in the WNBA league. As stated in Table 2, players who earn the top 50% of the total league payroll cumulatively obtain $7,861,007, so that players who earn the bottom 50% of the total league payroll cumulatively make $3,421,044. Therefore, the 50% of players earning the most in the WNBA account for only 70% of the total income, whereas the 50% of players earning the least comprise 30% of the total league payroll.

Table 2. WNBA Salary Distribution.		
Percentage of highest earning players	**Earnings**	**Percentage of total league payroll**
Top 5%	$952,000	8%
Top 10%	$1,774,500	16%
Top 20%	$3,506,260	31%
Top 30%	$5,701,620	51%
Top 40%	$6,735,337	60%
Top 50%	$7,861,007	70%

From the above information, it is evident that the average salary levels in the NBA ($8,264,922.40) are much higher than in the WNBA ($73,738.90), with a difference of $8,191,183.50. It is also clear that there is a dramatic difference in total league payroll. For the NBA, this is equal to $3,661,360,623, whereas for the WNBA it is only $11,282,051. Therefore, the total league payroll for the WNBA accounts for only 0.31% of the NBA total league payroll. Not to mention that the lowest paid player in the NBA has a base salary of $568,422, which means that he makes more than 4 times the amount that the highest paid player in the WNBA earns, who has a base salary of $127,500.

Factors Determining Salaries:

Factors determining the NBA salaries include player experience (years in the league), points scored, rebounds, assists, and fouls committed is a negative factor. These results come from a study performed by The Sport Journal, who wanted to dive into what factors determine NBA players' salaries in recent years because previous studies do not account for the NBA's evolution. This study looks at significant variables from prior studies, the 3-point shot, the Hollinger player efficiency rating (PER), and then performs backward stepwise regression to eliminate insignificant independent variables. All of this is done to analyze what counts when NBA players' pay is determined while accounting for the constant development that occurs in

the game. In conclusion to this study, the researchers found that the prior variables of points scored, assists, experience, fouls and rebounds are statistically significant. However, the statistics from the backward stepwise model found that 3-point shooting and the Hollinger's player efficiency rating, which were previously significant are now inferior when base salaries are determined ("NBA Players' Pay and Performance: What Counts?").

The president of the WNBA thinks that one of the reasons men are paid more than women is due to sexism ("The Business Of Being A WNBA Player"). To support this, about 50% of the NBA's revenue is shared between the league and the players; however, there is about an 80-20 split for the WNBA. This means that the players only receive about 20% of the WNBA's total revenue ("The Business Of Being A WNBA Player"). In contrast, sources such as the WSN also suggest, "The root of the wage gap is simple. The NBA rakes in more than $8 billion in revenue every year and the WNBA doesn't generate a fraction of that" ("NBA vs WNBA: Revenue, Salaries, Attendance, Ratings"). In relation to this, the WNBA only create about $60 million in revenue per year. To support this quote, when looking at other statistics from the WSN, they list ticket price for the NBA ($89 USD) compared to the WNBA ($17.42 USD), average viewership for the NBA (2019 NBA Finals 15.14 million) compared to the WNBA (In 2018: 231,000 viewers), and average attendance for the NBA (18,000) compared to the WNBA (6,768). In regards to total games played, the NBA has 1,230 games during their regular season but in the WNBA season there are only 204 matchups between teams ("The Business Of Being A WNBA Player").

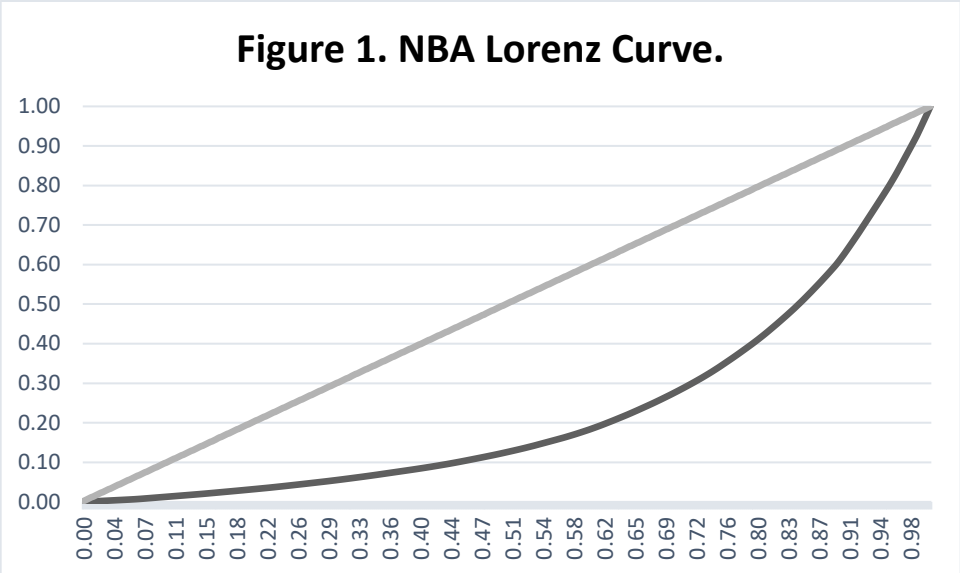
Due to low salaries more than half of the WNBA players spend the summers in European countries playing a second season after that in the United States to earn more recognition and higher pay. The starting salaries in the Euro League is $100,000, which is more than the base

salaries of about 65% of the WNBA league players. To elaborate on this more, Forbes found that the NBA referees salaries are $150,000, which means that they earn more than the highest paid WNBA player. Therefore, it is clear to see why WNBA players choose to not rest but instead compete year round in both Europe and America ("The Business Of Being A WNBA Player").

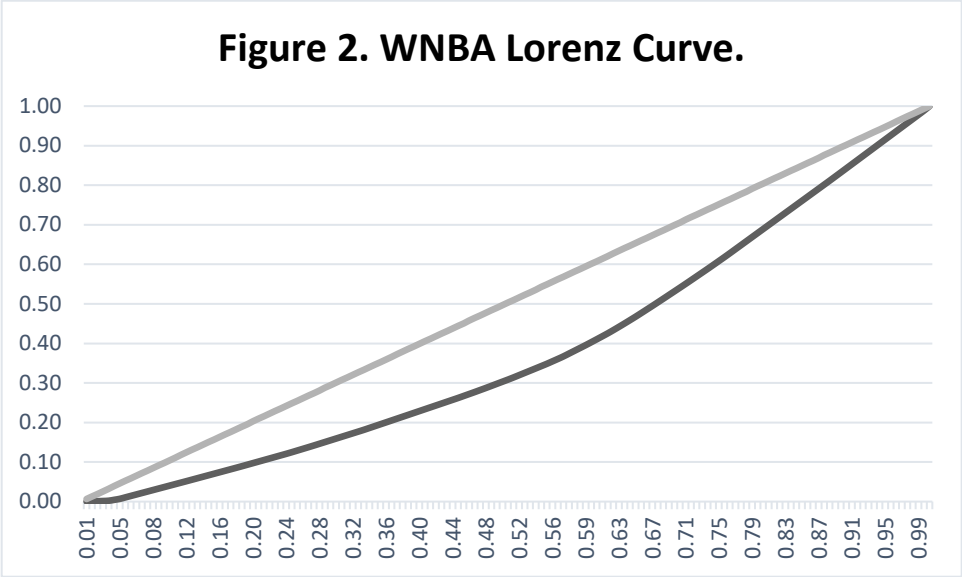
Nonetheless, it is not just basketball that displays pay disparities. For example, in the 2018 world's highest-paid athletes roundup, consisting of the top 100 highest paid athletes across 23 countries, not one woman was featured on the list ("Full List: The World's Highest-Paid Athletes 2018"). However, ranked at number 63, Serena Williams was the only woman to make it onto the 2019 list for getting paid $29.2 million ("World's Highest Paid Athletes 2019").

Gini Coefficient Results:

The income data gathered showed that the NBA Gini coefficient is equal to 0.5434. This would indicate that it is nearly exactly half way between the minimum (0) and maximum (1) value, and would stipulate a somewhat severe income gap between players in this league. The Lorenz curve illustrated in Figure 1 shows the results from the salary data gathered for the NBA.



The income data gathered showed that the WNBA Gini coefficient is equal to 0.2462. This would indicate that it is closer to the minimum (0) value than the maximum (1) value and would stipulate relative equality between players in this league. The Lorenz curve illustrated in Figure 2 shows the results from the salary data gathered for the WNBA.



From this data, we can tell that the NBA has a greater internal salary inequality than the WNBA. This would indicate that out of the 443 players in the league, there are a few people earning a lot of the total income and everyone else earns quite a lot less. However, the WNBA has a lower Gini coefficient, therefore, there is more equality and the incomes are less dispersed. This means that the majority of the salaries are more similar in comparison to the NBA. The concentration of monetary income is greater in the NBA when compared to the WNBA where the concentration of monetary income is almost nil.

Basketball Gini Coefficients Compared to Country Gini Coefficients:

Looking at the World Bank Gini estimates, a value of 0.2462 is smaller than any county (accounting for 160 countries). This would suggest that the WNBA has a distribution of incomes that is more equal than any country in the world. Only seven countries in the world (Central African Republic, Zambia, Suriname, Namibia, Botswana, Haiti, and South Africa) have a Gini coefficient value above 0.5434 ("List of Countries by Income Equality"). This implies that the NBA has a distribution of income that is less equal (i.e., more unequal) than all but these seven countries in the world. Furthermore, this suggests that some individuals have most of the income in the NBA population and everyone else has relatively low income in comparison, which correlates to the results of our data.

Inequality has increased in the U.S. in recent decades, but so have average income levels across all income groups; presently the U.S. has a higher valued Gini coefficient than India, but average incomes in the U.S. are about 15 times higher than in India. It is possible for a developing country's Gini coefficient to rise because of an increase in income inequality, but the number of people in poverty to decrease. This is due to the fact that the Gini coefficient simply measures how a fixed amount of income is distributed and does not measure the absolute level of income. Additionally, country Gini coefficients cannot be separated into global or regional values. This is partially due to the fact that methods of collection are not strictly comparable across countries and how often they calculate Gini coefficients differ ("Countries Ranked by GINI Index (World Bank Estimate)").

Concluding Remarks:

As the data above demonstrates, it is important to remember that the Gini coefficient is used as a gauge of economic inequality because it measures income distribution within a

population (in regards to this paper, the population is the NBA and WNBA). However, this gauge should not be thought of as an absolute measurement of income. For example, a high-income country and a low income country may have the same Gini coefficient due to the incomes being distributed similarly within each country. Nevertheless, as we can see in the NBA, the Gini coefficient is greater than the WNBA meaning greater inequality within the men's basketball league compared to the women's ("Gini Coefficient and Lorenz Curve Explained").

When reviewing the league payroll and average salary, it is evident that the NBA earns a lot more money than the WNBA in regards to base salary, providing a large inequality between the two leagues. From this we can determine there is external inequality between the two leagues in regards to the men getting paid so much more than their women counterparts. However, when looking at the results of our data above, the NBA has a much greater inequality internally within their league. In conclusion, we should remember that levels matter and equality between genders is not the only thing to be concerned with.

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