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Analyzing the Impact of Salary Discrepancies Between Professional Sports Organizations

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**ANALYZING THE IMPACT OF SALARY DISCREPANCIES BETWEEN
PROFESSIONAL SPORTS ORGANIZATIONS**

By

Benjamin R. Garner

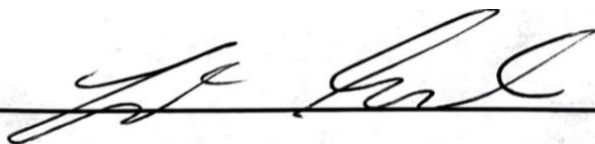
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Thesis Summary

In the 2022 Major League Baseball season, the Los Angeles Dodgers and New York Mets had team salaries of approximately \$270 million and \$268 million, respectively. These two organizations combined to spend \$538 million on player payrolls, which is higher than the Tampa Bay Rays, Kansas City Royals, Miami Marlins, Cleveland Guardians, Pittsburgh Pirates, Oakland Athletics, and Baltimore Orioles spent collectively. These teams allocated roughly \$486 million to team salaries and comprised the lowest seven payrolls in the MLB. Furthermore, individual players, such as Max Scherzer, Corey Seager, Gerrit Cole, and Anthony Rendon, even made within \$8 million of the Baltimore Orioles, who occupied the lowest league-wide ranking in team salary at \$44 million (Spotrac, 2023).

While it has long been theorized by sports fans that an organization's salary influences the success of the team, this thesis will look to examine if the supposed correlation is accurate. Many fans of small market teams contend that their organizations are a significant disadvantage regarding the competitive balance between teams. This thesis will additionally review other determinants of team success, including factors such as injuries, coaching, and the rise in foreign players. It is imperative to first assess the financial structuring and different approaches to the salary cap system of American professional sports leagues to fully understand the methods of promoting competitive balance employed by each league.

Using a regression analysis, this thesis will specifically explore the relationship of annual team salaries and team success in the National Basketball Association (NBA) and Major League Baseball (MLB). With an accurate assessment regarding the extent to

which team salary dictates team success established, the thesis will then shift to compare the correlation between the two leagues.

The results indicate that team salary may not be as impactful on team success as many would presume. However, there is an intriguing trend to monitor among the MLB and NBA, as the impact of team salary on team success is steadily increasing. After establishing the trends present in professional sports leagues, the study will conclude with the exploration of potential methods of balancing the ability to consistently improve player salaries while protecting the competitive nature of sports.

Introduction

To better understand the extent that market size impacts winning, it is imperative to establish the major components of financing a professional league. A salary cap is a specified maximum monetary amount allocated to team payroll that cannot be surpassed. While it can be calculated in a variation of methods, such as only including the active players, including or excluding player benefits, or calculating the salary at different junctures of the season (Zimbalist, 2010), the team payrolls for the purpose of this study were taken on opening day with active players only.

There are numerous variations to the salary cap among American professional sports league. The National Hockey League (NHL), National Football League (NFL), and Major League Soccer (MLS) employ hard salary caps, which maintain a maximum amount that may not be exceeded for any reason. With the implementation of a collective bargaining agreement, the players and the leagues in both the NFL and NHL calculate the total revenue from sources such as media revenue, league ventures, playoff revenue, and local revenue (Robinson, 2023). The players' portion of the total revenue, which currently remains at approximately 48% for the NFL and 50% for the NHL, is then divided among the leagues' 32 teams to establish each organization's individual salary cap (Robinson, 2023).

However, while considered salary cap leagues, there are many rules, or more accurately described as loopholes, that enable organizations to exceed the league maximum payroll. For example, the MLS has implemented the Designated Player Rule, commonly referred to as the "Beckham Rule," which enables each club to "sign up to three players whose wages do not count toward the salary cap" (Ogawa, 2020). The rule

was named after David Beckham's famous signing with the Los Angeles Galaxy in 2007 while he was still serving as the captain of the English national team and remained one of the most notable players in the world. The overall cost of any acquisition under the Designated Player Rule is incurred by the purchasing team, the league's pool of allocated money, and if needed, the team's owner (Roche, 2022).

Similarly, in the NFL, players are typically rewarded with signing bonuses that are paid out immediately. These bonuses may, however, be prorated, or divided proportionately to potentially reflect an amount of time less than the full contract, over the multiple years that the contract covers. With this strategy, NFL teams can pay players signing bonuses immediately, but "the team [does not] feel the financial impact all at once" (Robinson, 2023). While it does allow teams to acquire more talented players in the short term, it is important to consider that money paid to any player, including those on the practice squad or injured list, will be accounted for on the salary cap at some point in the future (Robinson, 2023).

While most professional sports leagues use hard salary caps, the National Basketball Association (NBA) features what is known as a soft salary cap. In similar fashion, the soft salary cap system involves determining the summation of revenue from sport-related income and dividing this total by each of the 30 NBA teams to establish a salary cap. However, the difference between soft and hard salary caps emerges in the teams' ability to go above the salary cap total. If an NBA team elects to acquire a roster with a total salary higher than that of the salary cap, the team will be subjected to pay a luxury tax. This luxury tax will then be re-distributed to teams with lower player payrolls in order to maintain competitive balance within the league. For example, in the 2021-22

NBA season, the Pacers netted \$42.2 million from the revenue sharing system, which is predominantly comprised of luxury taxes. On the other hand, the Los Angeles Lakers and Golden State Warriors were required to pay the highest amount into the revenue sharing system, as both organizations boasted team salaries far above the salary cap (East, 2023). The NBA also features an economic stipulation known as the “Larry Bird Rule.” Implemented in 2005 and consistently updated, the rule allows teams to exceed their salary cap in order to re-sign their own free agent players if they have spent three or more years with the organization without leaving in free agency (Kelly, 2017). This exception to the salary cap allows players to “gain more star power, financial stability, and overall power in determining their futures” (Kelly, 2017).

Despite the Major League Baseball’s (MLB) effort to impose a salary cap system in 1994 that ultimately led to a strike cancelling the World Series (Shin, 2017), the league remains without a salary cap. As a result of this, the MLB is considered the only “major North American men’s professional sports [league] without a salary cap” (Wagner, 2023). Many argue that the creation of a salary cap system would enable small market teams with the lowest player payrolls to compete with big market teams such as the Los Angeles Dodgers or the New York Yankees. For example, the Los Angeles Dodgers’ 2021 season payroll was roughly \$266 million, whereas the Baltimore Orioles’ and Cleveland Guardians’ season payrolls were \$42 million and \$50 million, respectively (Spotrac, 2023). While the MLB does not exhibit a specific salary cap, the league still features a luxury tax, which is commonly referred to as the Competitive Balance Tax (Synder, 2022). In other words, the MLB does not indicate a specific amount that teams must stay under, but teams that exceed \$233 million in 2023 team salary will be subjected

to a 20% tax on all overages in the first year, 30% tax in the second year, and 50% in the third consecutive year or more. The \$233 million threshold in 2023 increases to \$237 in 2024, \$241 million in 2025, and \$244 million in 2026, providing some leeway for organizations to increase salary each year (MLB, 2023).

While more challenging, there are numerous professional sports organizations that have found success with small market funding. The Florida Marlins surprising victory over the New York Yankees in the 2003 World Series or the 2011 St. Louis Cardinals World Series win over the Red Sox offers potential hope for small market teams. Some believe that creating highly effective player development systems can enable small market teams to compete with large market organizations. Teams with higher payrolls generally utilize fewer players developed within their own systems considering these organizations possess the ability to acquire expensive players during free agency and via trades (Hager, 2008). Serving as the most famous example of small market teams finding success, the Oakland Athletics in the 1990's and early 2000s "had the highest draft score for the 10 amateur drafts between 1990 and 1999" and developed many of their pitching staff members within their own systems (Hager, 2008).

By comparing the NBA, which exhibits comparatively lower discrepancy between organizational player payrolls, and the MLB, which exhibits the highest range among organizational player payrolls in American sports, this thesis will provide a better understanding of the degree of disadvantage small market teams face. Furthermore, the thesis will explore how fans respond to certain levels of competitive balance within professional sports leagues, as viewership differs depending on the certainty of outcome.

Chapter One: Literature Review

Uncertainty of Outcome in Professional Sport Leagues

Whether it occurs at the professional level with the New York Giants' defeat of the New England Patriots in Super Bowl XLII, the amateur level with the Fairleigh Dickinson's First Round upset of Purdue in the NCAA tournament, or in American cinema with films like "Rocky" or "Moneyball," there is a natural tendency to support the underdog. In a study at Bowling Green State University, more than 100 college students were faced with a hypothetical scenario involving two teams meeting in a seven-game series. The first team, Team A, was described to the students as "highly favored," implying Team B served as the underdog. Originally, 81% of the students elected to root in favor of Team B, but when presented with the theoretical scenario of Team B managing to surprisingly win the first three games, half of the students supporting Team B prior to the start of the series diverted their support in favor of Team A (Frazier, Snyder, 1991).

The endorsement on an individual level may arise from an effort to maintain interest in a contest, the desire for equity, or the reflection of hope. Regardless of the reason for support, this widely encountered concept operates in congruence with the uncertainty-of-outcome hypothesis. Arguably serving as the most fundamental issue in the in the study of the economics of sport (Alavy, Gaskell, Leach, Szymanski, 2010), the uncertainty-of-outcome hypothesis posits that an increased level of uncertainty in the outcome of a sporting event creates an increased viewership rate. While many fans desire this outcome uncertainty, the level of unpredictability that encourages the highest viewership is thoroughly examined at the professional athletics level.

Using a model that generates an estimation for the desired *ex ante*, or forecasted, probability that a home team wins an MLB regular season game, a recent study found that stadiums sell out most frequently when the home teams' win percentage is 66%. Furthermore, the highest demand on average, rather than exclusively considering sold-out games, occurs when the optimal win probability is 67% (Rascher, Solmes). In a similar study exploring this relationship between home team win rate and fan attendance in European football leagues, attendance results "seldom find that more tickets are sold when two teams have fairly equal chances to win" (Pawlowski, 2013). However, NFL fans inside the stadium compared to audiences viewing on television have contrasting preferences for the home teams' win rates. As the ex-ante outcome uncertainty value increased across NFL games, the television audiences correspondingly increased, indicating television audiences are "less partisan and more interested in watching closer games than stadium attendees" (Paul, Weinbach, 2007). When examining the desired uncertainty of outcome level for the English Premier League and certain Spanish football leagues, the evidence supports this tendency of television audiences to prefer higher road team success and more overall variation (Garcia, Rodriguez, 2006).

In order to not only maximize in-person, fan attendance, but also promote television and other methods of broadcasting, it is important for professional sports leagues to consider the desired home team win rate in their policymaking and league structuring. There are numerous measurable variables, albeit potentially minimally influencing, that provide home teams in professional sports contest with a home field or home court advantage. The most apparent home team advantages include the crowd's support improving energy levels and the familiarity with the playing surface and location.

However, the strategically created noises from the audio systems, the natural tendency for referees to benefit the home team to avoid crowd irritation, and the impact of traveling on the opposing players and coaches all impact the away teams' performances. As professional teams are consistently attempting to improve the home team advantage that supports higher fan attendance, the leagues are working to maintain the desired level of outcome uncertainty (Rascher, Solmes), creating a system that will inevitably balance itself.

Competitive Balance Between Organizations

Establishing this competitive balance, the degree of parity within a league, involves policymakers considering many additional elements to accompany upholding the home team advantage. Competitive balance can be measured between multiple seasons, exploring the variety of teams that have won the championship or lack thereof. If a certain team or select group of teams consistently remain in contention for the title throughout an extended stretch of seasons, the fans will begin to consider the league uninteresting and predictable. Additionally, competitive balance can be examined over the course of a singular season, as the teams maintaining a high level of closeness in overall win percentage encourages intra-seasonal interest and fan attendance. The final measure of competitive balance can be calculated on the outcome of a particular game, which is impacted heavily by the uncertainty of outcome hypothesis (Fort, 2006).

While outcome uncertainty impacts competitive balance, many believe there are other factors implemented by professional league policymakers that ensure evenness of teams. The drafting of amateur players, the possibility of league expansion, the introduction of foreign players, and ability to change teams during free agency directly

contribute to achieving competitive balance. For example, the Korean Professional Baseball League's introduction of the reverse-order draft style that permits the worst ranked team of the previous season to make the first selection positively impacted the competitive balance in the league (Soo Kim, Won, Han, 2017).

Additionally, teams that are being created in the process of league expansion initially have pressure to develop players and become competitive rather quickly. However, with the introduction of teams, the competitive balance may initially be weakened. A study exploring the within-season team evenness in the MLB over the course of the 1901-1999 seasons determined that the competitive balance decreased as new teams were added. Furthermore, expansion and physical movement in team location in the NBA caused a similar decrease in competitive balance across the league (Fort, Lee, 2007).

The increased global emphasis on basketball in recent years has led to a dramatic increase in foreign players in the NBA, as teams consistently seek to recruit international players to maintain competitiveness. The NBA as a league announced there are 120 international players coming from 40 different countries on the opening-night rosters, marking the "ninth straight season that opening-night rosters feature at least 100 international players" and the first time that rosters have 120 international players in consecutive seasons (NBA, 2023). Additionally, the opening day rosters for the 2021-22 MLB season featured 275 international players out of the 975 total players, which was the highest total recorded outside of the 2020-21 season (MLB). Many players in the MLB are from the Dominican Republic, Venezuela, Cuba, Puerto Rico, Mexico, and Japan, indicating "globalization of sports leagues is now evident" and "global search

for talent [is] necessary in the teams that wish to remain competitive” (Soo Kim, Won, Han, 2017).

As certain teams begin to explore larger populations of potential players in professional sports leagues, competitive organizations will be forced to follow to preserve the ability to compete with the most successful teams, inherently developing a competitive balance. However, the current system for acquiring international players in the MLB has created numerous concerns. As promising foreign prospects are identified, MLB organizations will create a deal with the player for a specific dollar amount that states he is not allowed to train with or be seen by other organizations. Days before the player turns 16 years old, which qualifies him as eligible to be signed, teams may threaten to reduce the agreed upon salary bonus or even back off on the deal entirely. By this point, the player has not been noticed by other teams and will likely not be able to find a team that has refrained from spending most of the budget allocated to international players. Furthermore, trainers may design a contract that dedicates up to 50% of the signing bonus to themselves, and “it is not uncommon for teenagers to be given performance-enhancing drugs by trainers in an effort to bolster their stock value” (Gonzales, Rivera, 2022). Teams that can discover foreign talent have found success due to low salaries and limited player power involved in the process, so to maintain competitive balance, it is important that the MLB creates a more ethical drafting system for international players.

The existence of free agency further impacts the competition within a league, and this system of bidding empowers and allows the players to develop pride in their organization. As teams begin to acquire a more talented roster, other organizations will

be obligated to spend more on team salaries to compete, forcing teams to continuously dedicate more funding to roster construction. As noted in the study of European football leagues, the “majority of spectators prefer to see the home team play either an inferior team with a win being more probable or a high-quality ‘big’ team with a strong brand, such as Bayern Munich” (Pawlowski, 2013). Furthermore, during LeBron James’ four season stint with the Miami Heat from 2011-2014, the team sold out all 155 home games, and the average home and away game attendance increased by 5,500 and 3,000, respectively. Similarly, during Michael Jordan’s limited time with the Washington Wizards, the average home and away game attendance increased by roughly 5,000 and 5,600 (Humphreys, Johnson, 2017). The ability to recruit a superstar or develop a star player allows teams to improve attendance rates, but it is innately easier to do so as a large market team with higher funding.

Other Significant Factors on Team Success

While there are many computable variables that impact the competitive balance of professional sport leagues, there are many other overlooked factors that influence a team’s season record. In addition to team salary, elements such as risk of injury, team cohesion and morale, and coaching notably can improve or harm both regular season win totals and playoff aspirations. According to a recent study, twice as many injuries occur in the NBA than in collegiate basketball, and this increase can be attributed to “a combination of factors, including team size, game schedule, and intensity of play” (Lian et. al, 2021). Players in the NBA may elect to not partake in a game for any of the following reasons: medical staff advisement on injury, personal physical pain or discomfort, personal matters, rest, or lack of playoff chances. It is important to consider

that the value lost differs depending on the quality of the player and typical performance. To determine the potential effect of injuries on team records across the NBA, a study explored the win shares lost over the course of the 2020-21 season due to missed games. With extended injuries to the Brooklyn Nets' three highest paid players in Kevin Durant, James Harden, and Kyrie Irving, their 12.88 lost win shares led the NBA. Largely caused by the staggered absences of Kawhi Leonard and Paul George, The Los Angeles Clippers trailed the Nets with 9.28 lost win shares (Bailey, 2021). It is evident, especially considering the following three teams also were estimated to have more than 8.0 lost win shares, that the availability of players and a team's overall health plays a substantial role in team success.

The variables of coaching and team cohesion have largely been examined in conjunction, as many believe coaching enables team bonding and togetherness. The two factors can be considered "central to the development of groups," and "the way leaders promote and create high levels of group cohesion [has] a dramatic effect on the way a group performs" (Turman). By surveying 15 male and 15 female collegiate athletes, Turman discovered numerous possible methods of both deterring and promoting cohesion among rosters. The coaching behaviors and techniques that athletes most often explained to negatively impact team cohesion are unequal treatment of players and embarrassing specific players. Multiple players felt as though the display of favoritism generated feelings of hatred and jealousy towards the favored individual, which obstructs the potential to form cohesion and chemistry. On the other hand, coaching strategies that benefited team unity are bragging or praising teammates to the team, sarcasm and teasing of athletes, motivational speeches, dedication and enthusiasm, and athlete-specific or

individually oriented training techniques (Turman).

Regardless of the team-building strategy employed, it is evident that a professional sports team can experience either added or reduced success as a result of the coaching. While it may be beneficial to have multiple highly paid players and a high team salary, many teams with expensive rosters have failed due in part to coaching and team cohesion. The 2013-14 Brooklyn Nets with Kevin Garnett, Paul Pierce, and Jason Terry, the 2012-13 Los Angeles Lakers with Kobe Bryant, Dwight Howard, and Steve Nash, and the 1996-1997 Houston Rockets with Hakeem Olajuwon, Charles Barkley, and Clyde Drexler found little success and “were unable to reap any of the traditional benefits of being bad” because the teams’ future assets were moved to trade for the superstars (Patterson, 2017). This trend of stars joining established teams extends into other sports leagues, as Russell Wilson’s move to the Denver Broncos and Deshaun Watson’s move to the Cleveland Browns, along with the MLB’s 2022 New York Mets acquisition of Jacob deGrom and Francisco Lindor (Kenyon, 2023), represented some of the most expensive rosters in the respective leagues. Notwithstanding that the occurrence of injuries impacted the teams’ successes, rapidly adjusting rosters in any manner may lead to insufficient time to establish team chemistry and allow coaches to understand the most effective methods of training players.

Chapter Two: Methods

In order to ensure that results are reliable and accurate, I will gather the data from Sports Reference, StatMuse, and ESPN. These websites provide the needed data for the two respective leagues. For the purpose of this thesis, the data will be accumulated from the 2012-13 NBA season through the 2021-22 NBA season and the 2013 MLB season through the 2022 MLB season. Team success can accurately be assessed by the following four dependent variables: regular season wins, regular season home court wins, playoff wins, and title or championship wins in respective leagues. Data for each of these four variables will be gathered for each of the 30 NBA organizations and 30 MLB organizations. Teams that have experienced a name change or location change within the time frame, such as the Cleveland Guardians, will still be considered the same organization. Using data from the previous 10 seasons will allow for an ample sample size, and data collection on Sports Reference, StatMuse, and ESPN will be feasible within this range.

Furthermore, team salary total information will be obtained from Sports Reference. Any luxury tax will also be factored into the total salary, as this tax system accurately displays the current efforts to level the playing field. By using an Excel regression test, it will be possible to examine the extent to which the salary total correlates with the four dependent variables by using the “multiple R” value and the effectiveness of salary when attempting to predict the dependent variables by using the “R Square” value. However, for the purposes of this study, the “R square” will be predominantly used to form conclusions regarding the predictability of salary on team success. To more specifically define the “R square” value, it is the statistical measure that

represents the degree of the variance in the dependent variable that can be specifically attributed to and explained by independent variable. Simply put, the value “indicates how much variation in the response is explained by the model” and “the higher the [resulting value], the better the model fits the data” (Akossou, Palm, 2013).

With this, it is possible to arrive at a conclusion of whether salary impacts team success, and if so, the extent to which it does. The extent to the team salaries predict the dependent variables can be estimated by examining whether the “R square” value is closer to 0 or 1. If a model created with salary as the independent variable does not explain any of the variation in the response, dependent variables, the “R square” value will be 0. On the other hand, if the model explains all the variation in the response, dependent variables, the “R square” value will be 1. However, in practice, when testing the relationship between two or more variables, there will not be an “R square” value of 0 or 1, and “studies that try to explain human behavior generally have values less than [0.50]” (Frost, 2022). Studies that involve humans, or more specifically human performance, tend to have more variation and are harder to predict.

Within Excel, the null hypothesis will indicate that there is no correlation between team salary total and team success, and the alternative hypothesis will indicate that there is a correlation between the two variables. For a research topic that possesses a great level of available data and high potential for skewed short-term data, using Excel to analyze the considerable amount of data will prove to be the most efficient route.

The data and findings from the statistical analysis will be presented in chart and tabular form to simplify the viewers’ understanding. Scatterplots for each of the two leagues will present the relationship between salary and three response variables in the

Appendix section, and the charts will be discussed in both the Results and Discussion chapters of this thesis. Further use of charts will be presented for specific NBA or MLB seasons that display differences over time or specific season outliers from the general trend, and the exploration of potential causes, meanings, and implications will additionally be considered in the Results and Discussion chapters. Two charts that indicate the average total salary of teams that accomplish a certain level of playoff success will also be presented for the NBA and MLB. For example, in the 2021-22 season, the Golden State Warriors possessed the highest (1st ranked) paid roster, and the Boston Celtics possessed the 5th highest paid roster. These two NBA Finals appearing teams, on average, were the 3rd highest paid teams in the league. However, this thesis combines data from 10 seasons, meaning the averages represented in the chart take into consideration 10 NBA Finals Champions or MLB World Series Champions, 20 NBA Finals Appearing Teams or MLB World Series Appearing Teams, and 40 NBA Conference Title Appearing Teams or MLB American League Championship Series or National League Championship Series Appearing Teams.

It is important to note that Appendices F-H do not include the 2020 MLB regular season that was comprised of only 60 games due to the COVID-19 pandemic. The 2019-20 and 2020-21 NBA seasons were similarly shortened. However, all teams played 65 or more NBA games in 2019-20, and playoff seeding was determined by regular season win percentage, rather than total regular season wins. Additionally, in the 2020-21 season, all teams played 72 games, indicating the number of games was only decreased by 12%. Considering each team played very similar numbers of regular season games in 2019-20 and the same number of regular season games in 2020-21, the data is included in

Appendices A-C. On the other hand, the significantly shortened 2020 MLB season expands the three dependent variables' ranges to an extent that causes issue with displaying the accompanying nine seasons. The 2020 season is withdrawn from Appendices F-H for this season. However, the "R Square" values displayed in Appendices E and J are calculated using data from each of the specific seasons independent of other seasons, so the resulting computations are adjusted to the 60-game regular season schedule that each MLB team played in 2020 and the shortened schedules that each NBA team played in 2019-20 and 2020-21.

Chapter Three: Results

Results within National Basketball Association

As evidenced in Appendices A-C, the relationship between Team Salary and each of the three dependent variables, which included Regular Season Wins, Home Court Wins, and Playoff Wins, was positive. Each of the 10 seasons for each response variable returned this same positive result. However, nearly all seasons displayed in Appendices A-C demonstrated weak positive correlation between Team Salary and the accompanying variable. While a positive correlation confirms that as the Team Salary variable increases, the response variables increase, the weak correlation indicates the variables' increase is in an unreliable and sporadic manner.

The results in Appendix D displayed that teams that boast higher salaries will have more success in the playoffs. The team salary, on average, for teams that managed to reach the NBA Conference Finals, reach the NBA Finals, or win the NBA Finals, was 10th, 7th, and 8th highest in the league during the season, respectively. Apart from the San Antonio Spurs' NBA Finals win in 2013-14 with the 19th most expensive team roster, each team that has won the NBA Finals since 2012-2013 has been among the 14 highest team salaries. Furthermore, excluding the Phoenix Suns' 2020-21 run to and eventual defeat in the NBA Finals with the 22nd most expensive team roster, each team that has made the NBA Finals without winning has been among the 8 highest team salaries. This would indicate a correlation between high team salary and significant success in the NBA Playoffs.

The "R Square" value discussed in the Methods section of this thesis, which demonstrates the effectiveness of the independent variable at predicting the response

variable, is examined in Appendix E. In order to avoid the confusion of results with inflation leading the highest team salary in 2021-22 to be nearly twice as high as the highest team salary in 2012-13, the “R Square” value is taken for each season. The average “R Square” value from the 2012-13 to 2021-22 seasons for using team salary to predict regular season wins is 0.1962, meaning 19.62% of the variation in the regular season wins is explained by team salary. This value of 19.62% is higher than that of the results of the regression test for team salary and home court wins, which is 0.17568, or 17.57%. Lastly, the result for the final response variable, playoff wins, is 0.15178, indicating that 15.18% of the variation in playoff wins is explained by team salary. In summation, each of the three response variables utilized in this test returned similar “R Square” levels, but the regression model for team salary predicts regular season wins most effectively, followed by home court wins and then playoff wins.

Results within Major League Baseball

As the results in Appendices A-C examining the impact of team salary on regular season wins, home court wins, and playoff wins in the NBA comparably revealed, Appendices F and G indicate that there is a positive correlation between team salary and regular season wins and home field wins in the MLB. On average, as the MLB team’s payroll increases, each of the nine seasons displayed that regular season wins and home field wins increases. However, as displayed in Appendix H, eight of the MLB seasons represented a positive correlation between team salary and playoff wins, but the 2015 season found that as MLB team payroll increased, the playoff win total decreased.

The average league-wide team salary ranking depending on the playoff round reached in the MLB is explored in Appendix I. Teams that reach the MLB National or

American League Championship Series, reach the World Series, and win the World Series represented the 9th, 11th, and 9th highest team salaries across the MLB, respectively. As noted in the NBA, there are teams that present outliers, such as the 2020 Tampa Bay Rays team that reached the World Series with the 27th highest payroll or the 2017 Houston Astros team that won the World Series with the 18th highest payroll. The resulting average MLB team salary rankings in Appendix I were very similar, but slightly inferior, to the average NBA team salary rankings in Appendix D.

The results of the regression test to determine the predictability of team salary on the success metrics are noted in Appendix J. On average, across the ten MLB seasons considered, 13.7% of variation in the number of regular season wins, 13.6% of variation in home field wins, and 9.0% of the variation in playoff wins can be explained by team salary. Comparatively, each of the regression tests found that the NBA team salary rankings are more effective than the MLB team salary rankings at determining the three response variables.

Chapter 4: Discussion and Conclusion

The results of this thesis can be analyzed and divided into three general conclusions: the overall impact of team salary on American professional sports leagues, the recent trend towards increasing predictability between team salary and team success, and the impact of the number of games within a season on competitive balance.

The team salary in the NBA, in general, accounts for more of the variation in team success than team salary in the MLB. More specifically, team salary explains 15.2% of the variation or higher for regular season wins, home court wins, and playoff wins in the NBA (Appendix E). It is evident that team success in the MLB is less reliant on team salary, as none of the three response variables returned regression results of higher than 13.7% (Appendix J). Furthermore, teams that win or appear in the NBA Finals are, on average, higher in league-wide rankings of total team salary than teams that win or appear in the MLB World Series (Appendices D and I). Many argue that the lack of a salary cap in the MLB fosters a significantly higher competitive disadvantage for small market teams. However, seeing as though the impact of team salary on team success in the MLB is less correlated than a league such as the NBA that features a soft salary cap, the results of this study contend that the current level of competitive balance between small market and big market teams in the MLB is acceptable. With the added capability of having no salary cap ensuring that players can receive the highest contract amount, there is strong reason to suggest that the MLB should refrain from disrupting the current system. The threat of players forming a strike in response to the implementation of a salary cap further supports the MLB's lack of need to seek change.

While it was not originally intended to be explored in this thesis, the regression

results demonstrated a consistent trend. In both the NBA and MLB and for each of the three response variables tested, the most recent five seasons returned higher results for team salary's explanation of the three team success metrics. For example, within the 10 MLB seasons being analyzed, the team salary explained 13.7% of the variance in regular season wins (Appendix J). However, with further examination, the most recent five seasons, which consists of the 2018-2022 seasons, returned an average of 17.4% of the variance in regular season wins being explained by team salary. On the other hand, the least recent five seasons, which consists of the 2013-2017 seasons, returned an average of 10.0% of the variance in regular season wins being explained by team salary. This trend can be further noted in the NBA, as well. Over the course of the 10 seasons inspected, 19.6% of the variation in NBA regular season wins can be explained by team salary (Appendix E). The average of the variation explained by team salary for the most recent five seasons, which consists of the 2017-18 through 2021-22 seasons, is 23.2%, and the average for the five least recent seasons, which consists of the 2012-13 through 2016-17 seasons, is 16.1%. This trend can be witnessed in the NBA and MLB for both of additional response variables: home court (or field) wins and playoff wins. With this level of consistency, it is feasible to consider that the impact of team salary is beginning to increase in American professional sports leagues.

There are several potential explanations for this trend. The NBA salary cap is increasing rather quickly every year. The Los Angeles Lakers had the highest team payroll in the 2012-13 season with \$100 million, but the Golden State Warriors' team salary was \$179 million in the 2021-22 season. The MLB, while less dramatic, has also experienced steady increases in the league's highest payroll annually. In 2013, the New

York Yankees had the highest salary with \$228 million, but the 2022 Los Angeles Dodgers used \$277 million on team payroll. The increases in the highest team salaries are furthering the gap between small and big market teams, which may lead to more extreme talent discrepancies, and in turn, more extreme team success discrepancies. It is also possible that the rise in player empowerment and the ability to transfer teams in free agency has contributed to the trend towards team salary more heavily influencing team success. More players have been changing teams in recent years, and this enhanced ability to select an organization of choice may contribute to improved team success through increased player satisfaction and team chemistry.

As noted in the Methods of this study, the 2020 MLB season featured a reduced 60 game regular season schedule. While it was excluded from the visual representations of the relationship between team salary and team success (Appendices F-H), this season offers an interesting insight into the impact of games played on the reliability of team success testing. The 2020 MLB Season received the lowest “R Square” value for the correlation between team salary and regular season wins and the second lowest “R Square” value for the correlation between team salary and home field wins (Appendix J). The reduced “R Square” values indicate that team salary was almost entirely ineffective at explaining variation in the team success during the shortened season. Many teams that had struggled recently before and proceeded to struggle after the season found success in the 2020 regular season. For example, the Miami Marlins were 63-99 and 57-105 in the two seasons prior to 2020 and 67-95 and 69-93 in the two seasons after 2020. However, the organization managed to win 31 of the 60 regular season games and even won two playoff games, which served as the only two playoff wins in the 10 seasons sampled.

Based on this, it is fair to contend that the season was an outlier of success for a small market team that typically struggles to succeed against teams with significantly higher payrolls.

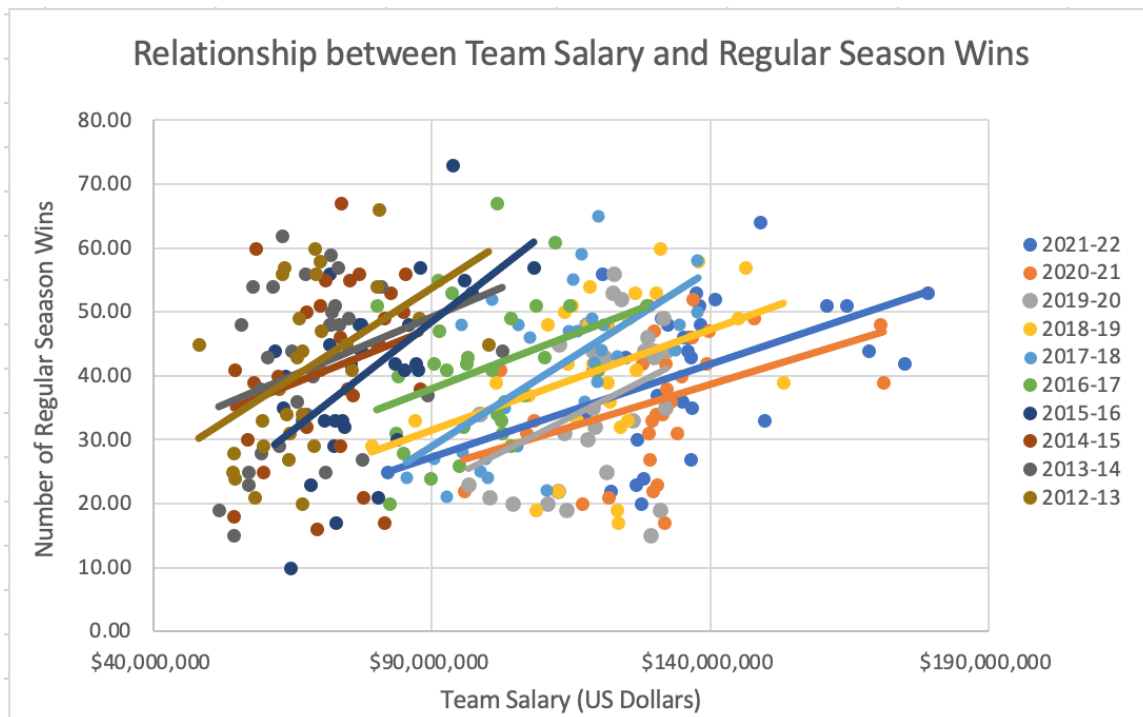
The results of this thesis offer many potential insights to American sport leagues. Regarding the results of the regression testing, on average, the association between team salary and team success is existent but rather weak. An “R Square” value of less than 0.3 is widely considered an indication that the correlation between the independent and dependent variable is weak, and the average “R Square” value across all seasons for both sports and all three response variables was less than 0.3. Considering this from a managerial standpoint, professional sports leagues are effectively maintaining competitive balance as salaries are increasing for big market teams. However, while this is reassuring, the trend indicates that team salary has continued to increase the rate at which it dictates team success. Additionally, it is imperative that professional sports leagues consider the impacts of decreasing the number of games in the regular season. While it may serve as an effective method of reducing injury and raising the average ticket price and viewership rate, teams may begin to assert that the season length is not long enough to produce a sufficient sample that separates the best teams from the worst teams.

There are many variables that impact team success in both the MLB and NBA, including the frequency of injuries, coaching, team cohesion, amateur drafting, the possibility of league expansion, the introduction of foreign players, and the rise in free agency. Many claim that the ultimate deciding factor in team success is the amount of money an organization can spend on its players. However, using the evidence of this

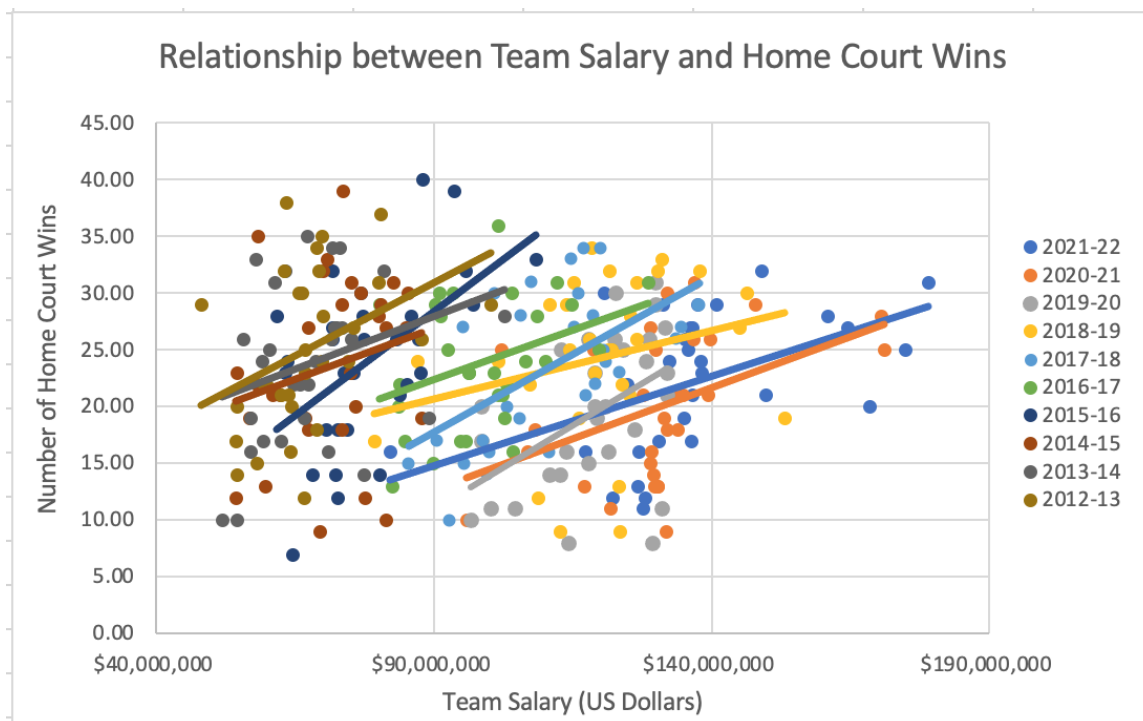
study with respect to the previous 10 NBA and MLB seasons, there are considerably more variables outside of team salary that impact the success of professional sports organizations.

Appendix

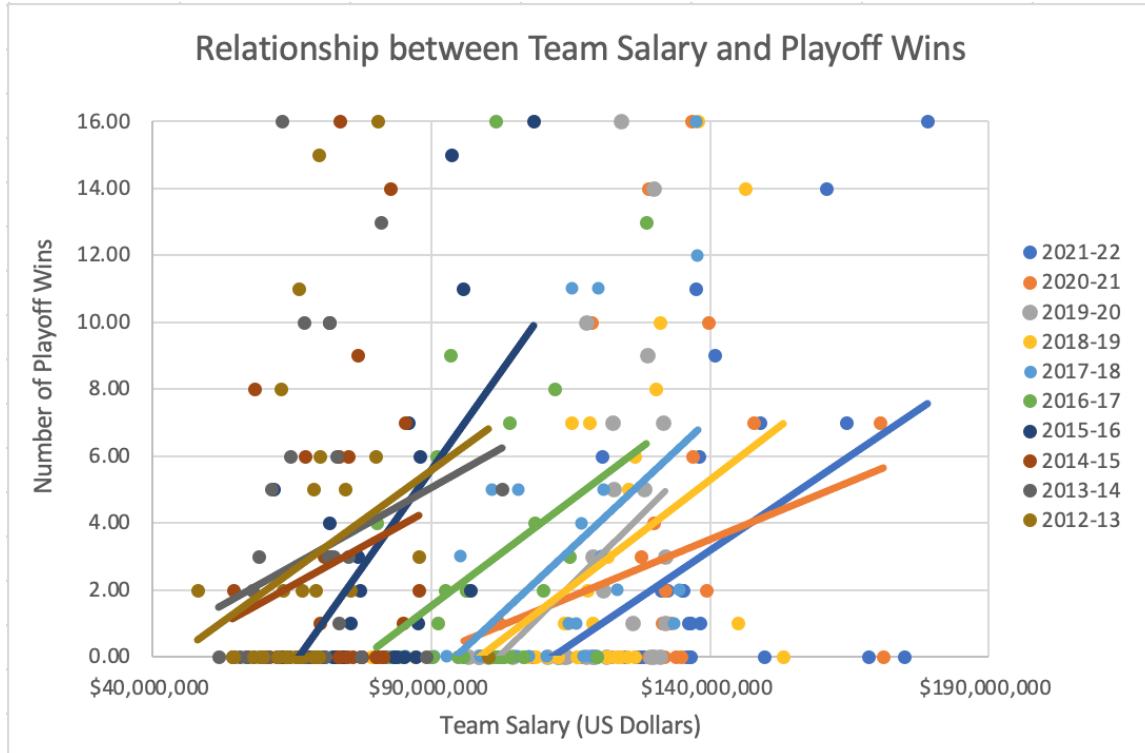
Appendix A



Appendix B



Appendix C



Appendix D

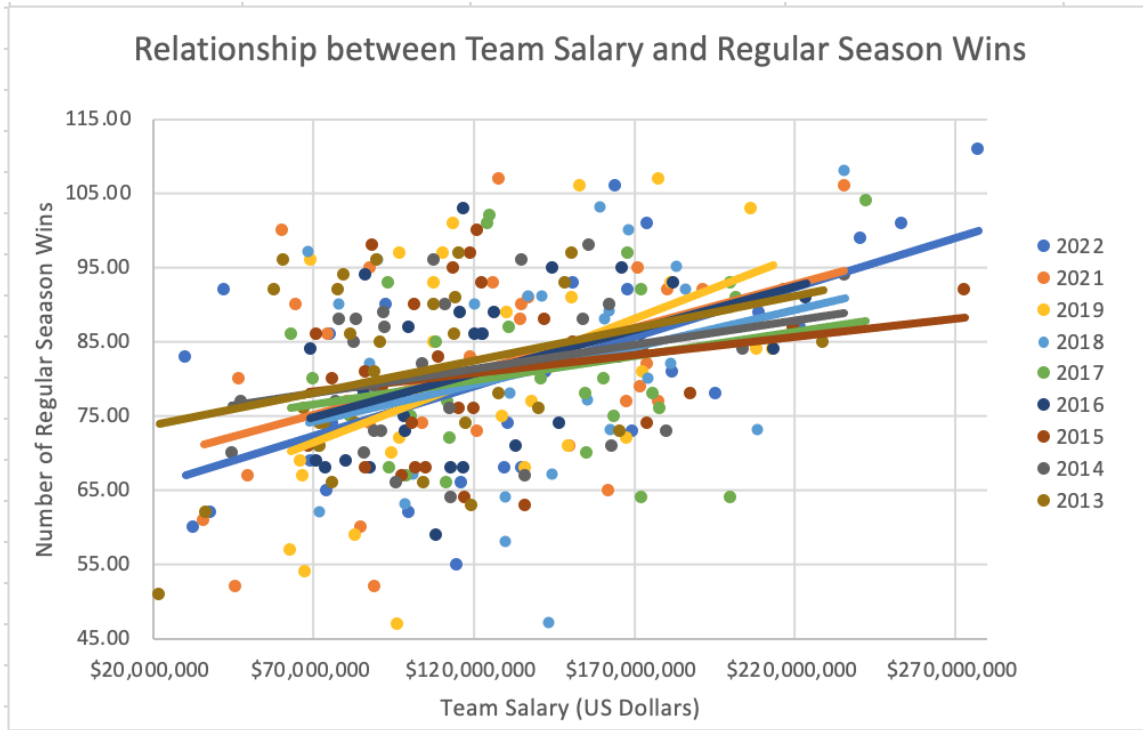
Average Salary Total Ranking to Achieve Playoff Success (2012-13 through 2021-22)

NBA Conference Finals Team	10th highest salary (9.8 on average)
NBA League Finals Team	7th highest salary (6.6 on average)
NBA Finals Champion Team	8th highest salary (7.6 on average)

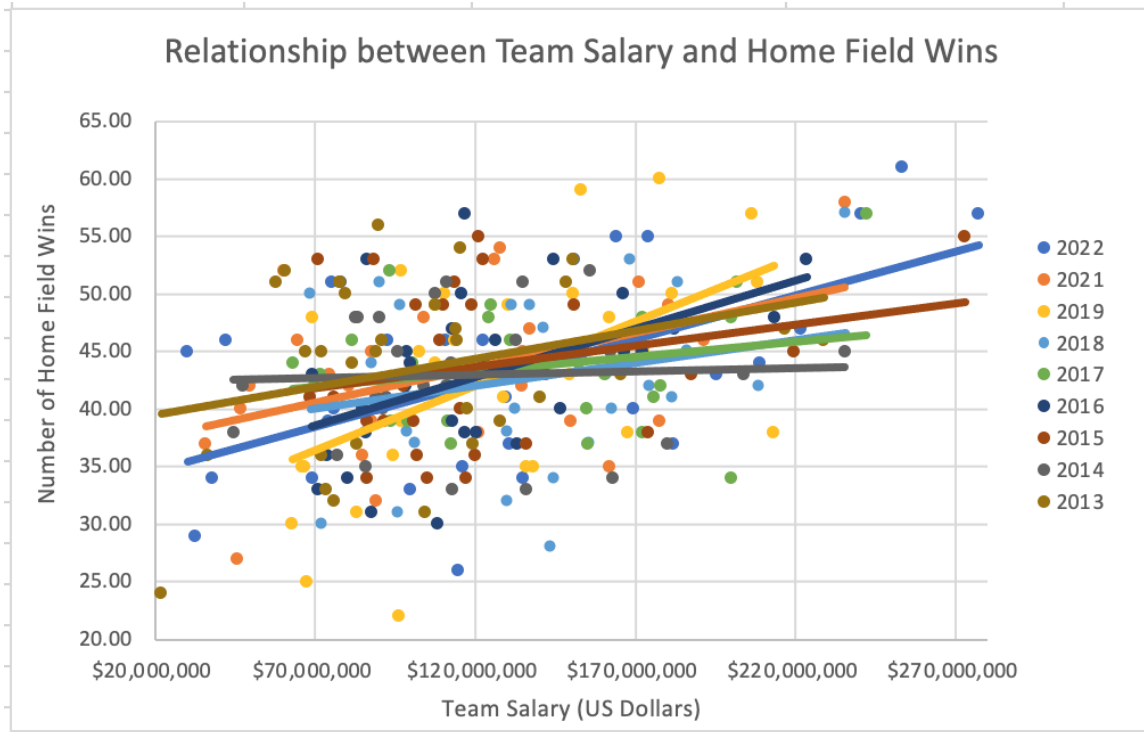
Appendix E

NBA Season	"R Square" Value - Team Salary and Regular Season Wins	"R Square" Value - Team Salary and Home Court Wins	"R Square" Value - Team Salary and Playoff Wins
2021-22	0.2258	0.2298	0.2218
2020-21	0.2076	0.1979	0.0594
2019-20	0.1605	0.2242	0.161
2018-19	0.1593	0.069	0.1949
2017-18	0.4047	0.3464	0.2603
2016-17	0.1167	0.1251	0.1186
2015-16	0.3173	0.2849	0.3236
2014-15	0.0652	0.0505	0.0429
2013-14	0.0933	0.0819	0.0555
2012-13	0.2116	0.1471	0.0798
Average	0.1962	0.17568	0.15178

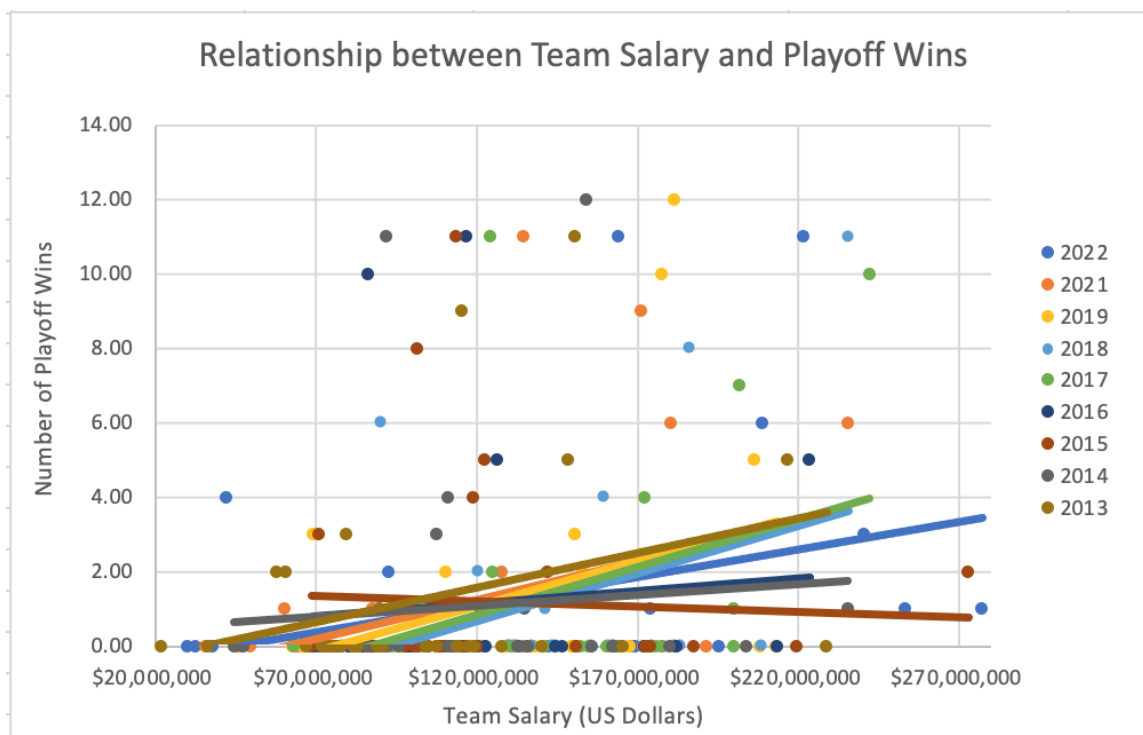
Appendix F



Appendix G



Appendix H



Appendix I

Average Salary Total Ranking to Achieve Playoff Success (2013 through 2022)

MLB American or National League Championship Appearing Team	9th highest salary (9.3 on average)
MLB World Series Appearing Teams	11th highest salary (10.5 on average)
MLB World Series Champion Team	9th highest salary (9.0 on average)

Appendix J

MLB Season	“R Square” Value - Team Salary and Regular Season Wins	“R Square” Value - Team Salary and Home Field Wins	“R Square” Value - Team Salary and Playoff Wins
2022	0.3650	0.3317	0.1092
2021	0.1734	0.2121	0.1436
2020	0.0275	0.0357	0.0749
2019	0.2226	0.2798	0.1413
2018	0.0807	0.0499	0.1596
2017	0.0642	0.0548	0.1565
2016	0.1970	0.2449	0.0092
2015	0.0451	0.0629	0.0026
2014	0.0877	0.0021	0.0070
2013	0.1071	0.0843	0.0977
Average	0.1370	0.1358	0.0902

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