Performance of Major League Baseball Players during Their "Free Agency" Season

The Honors Program
Senior Capstone Project
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Table of Contents

ABSTRACT

Do pro athletes try harder and perform better during their free agency year? Each year this question is asked in many professional sports. The purpose and objective of this project is to discover whether Major League Baseball players actually have better statistics during their free agency year. The result will add creditability to one side of the issue at hand. Data collected consists of offensive statistics in the year prior to their free agency year, their free agency year itself and the year after their free agency season. A simple paired T-test was applied for six major offensive categories: HR/AB, RBI/AB, AVG, OBP, SLG, and OPS. Two analyses were taken. The first analysis was between the year before their free agency season and their contract year and the second was between their free agency season and the year after. All data was compiled into spreadsheets and T-tests were conducted. Analysis confirmed that athletes showed an increase in their numbers from the year before the free agency year to their free agency year in all six categories, but only a significant increase in one category, RBI/AB. Data also showed that from their free agent year to the following year there was a significant drop off in statistics in all six categories. As a result, on average, athletes do tend to perform better during their free agency season. However, since there were only two significant increases in statistics, motivation to get a bigger contract cannot be the only reason for the increase in statistics. There were other reasons that affected an athlete's performance from year to year independent of whether it was their free agent year or not. These reasons are explored in more detail within the paper.

INTRODUCTION

Have you ever wondered if a professional athlete realizes that he must increase his productivity because his future compensation depends on it? In fact, it is widely accepted that player performance in any sport is a direct determinant on the amount and length of their contract. As a result, the pressure put on these athletes is exceptionally high. The American public has to keep in mind that any professional sport such as Major League Baseball (MLB) is a moneymaking business. Everyone involved in the MLB tries to make the most money possible. Owners try to earn profits based on team sales; the players try to earn a better contract; and even the coaches' hope for overall team success so their contracts increase in pay. Most people view sports as entertainment. Although this is true, athletes do not receive a set pay over their entire career. They need to keep performing in order to stay in the league and make the big bucks.

After much deliberation, this topic was considered for the Honor's Capstone project because I, for one, am a huge MLB fan. I am a New York Yankees fan, and I have always been interested in the difference between big market teams such as the Yankees, compared to a small market team such as the Tampa Bay Rays. As a result, I wanted to study whether players who received a large contract from big market teams really had the numbers to support it. As this would be too difficult to analyze, my current research topic came to mind. I always believed that players do consciously try to play better during their free agency year because they are indeed money driven. This project would, in the end, prove or disprove my own theory.

Research was conducted to determine whether athletes actually do perform better during their free agency season. This was determined by collecting three years of data for every class A and class B free agent within the MLB. Determination of the classes will be thoroughly explained in the upcoming section. The three years in question are the year before their free agency season, their free agency year (contract year), and the year after. After fully analyzing these statistics and their respective tests, a conclusion was determined for or against the hypothesis.

HYPOTHESIS

As mentioned earlier, the reason why I wanted to research this project was that I believed players do play better during their free agency season. Taking into consideration the logistics of this idea, it does indeed make sense. Have a better season and earn more money and stability. As a result, the testable hypothesis within this project is that MLB players, excluding pitchers, will have better statistics during their free agent year compared to previous seasons and even seasons after free agency.

Why were pitchers excluded?

As mentioned, pitchers are excluded from this research project. The reason for this exclusion is that pitchers statistics are too dependent on other variables. For one, pitchers are too dependent on their team. As opposed to a position player where individual success is easily measured, pitchers statistics could be easily skewed. Two reasons that pitchers are too dependent on their team include run support and the performance of the bullpen. Typically, a larger market team such as Boston, New York or Los Angeles will provide more run support than a small market team such as Kansas City. To illustrate this, a pitcher on the Boston Red Sox can allow three or so runs and still win the game. This is because Boston usually rakes in more than three runs per game. On the other hand, a team such as Kansas City may not be able to score more than three runs in a game. As a result, a starting pitcher could let up two runs and still lose the game. Letting up two runs in any large market team is almost a guaranteed win. In addition, pitchers rely on other pitchers. For example, if a starting pitcher leaves the game with the lead and the win, he relies on the relievers and/or the closer to keep the win for him. If a team has a weak bullpen, a starter might not get as many wins as he would have with a stronger bullpen. As far as relief pitchers are concerned, a pitcher can leave a man on second base. He then is relying on his replacement to get the next out, or if the man on second scores, the first pitcher will get charged with the earned run. Finally, closers are also affected by team performance. If a team is not doing well, a closer will not have many opportunities to close out the game and record saves.

The amount of innings pitched is also an issue for pitchers. A starter will only start about thirty games per year but will pitch over 200 innings while closers and relief pitchers could pitch in about eighty games a year but only pitch in 100 innings or less, on average. Even

though starters do pitch more innings, having this difference decreases the comparability between pitchers. Some more issues dealing with pitchers include that they are normally more injury prone than position players. This is due to the high strains they put on their arms and legs. Changing leagues can also create a difference in comparability. As of recently, the American League is known to have better hitters. This could cause pitchers statistics to be not as good, as compared to the National League where there are not as many good teams and hitters, pitchers might have better statistics. Finally, considering the actual contracts, starting pitchers normally get the most money. The best starting pitchers are usually type A free agents while the best relief pitchers, except for the select few, are at best type B free agents.

Why was the MLB chosen as the target sport?

There were several reasons why Major League Baseball was chosen for this study. First and possibly the most obvious reason for any sports follower, is that in the MLB, salary can be closely related to individual performance (Ahlstrom, Si, & Kennelly, 1999). Second, baseball is a highly individualistic sport. It is one of the only major sports where player's statistics are independent from the teams or other players. For example, wide receiver statistics in the NFL are dependent on whether the team has a good quarterback or not. This example actually goes both ways. If a quarterback has a good receiving core, his numbers tend to be better. Another example is that NHL goalie's statistics depend on his team. If he has a good team, which scores plenty of goals, he can allow three or possibly more goals a game and still get a win. On the other hand, if he does not have a good defense in front of him, he will face more shots, let in more goals, and possibly lose more games. Finally, there are accurate and direct comparable performance measures available (Ahlstrom, Si, & Kennelly, 1999). In the MLB, there are clear-cut statistics that can be evaluated in determining the individual success of a player's season. For example, a first baseman who hits fifty-eight homeruns in a season is automatically known to be an elite player. He achieved those fifty-eight homeruns himself and nothing else influenced that statistic.

What is a Free Agency year?

So far, within the text, the words free agency has been used often. However, what exactly does free agency mean, and when did the term come into existence? Major League Baseball and the Player's Association (MLBPA) created free agency in 1976. It was part of the

league's collective bargaining agreement defining the levels of negotiation for the MLBPA (Samsell, 2001). By definition, a free agent is a player whose contract with a team has expired. This player is now able to sign a contract with any other team of his choosing. Every year, players with concluded contracts enter the free agent market. Teams around the league enter into bidding wars trying to convince these individual players to sign with their respective clubs. Team owners look to sign players who are able to drive hard bargains since every owner is now competing for their talent. Even though free agency is a time where teams can bid for great players, there are some drawbacks for team owners. Because of these bidding wars, player salaries have reached outrageous levels, which means owners' profits are decreased. For example, for the 2009 season, the New York Yankees spent a record setting amount of money due to free agents. Even during an economic recession, they constantly sign cream-of-the-crop players. Many joke around and say that the Yankees will reignite the U.S. economy all by themselves with the amount of money they are putting into circulation (Cain, 2009).

In the MLB, free agents are classified as either type A, type B, or unclassified free agents. The Elias Sports Bureau determines this classification (Heyman, 2008). This company provides historical and statistical research in the field of professional sports. The Elias Sports Bureau services all the major sports leagues such as the MLB, NFL, NBA, and the NHL (Heyman, 2008). Type A free agents are ranked in the top 20 percent of the existing free agency pool. This percent is based on individual performance of the previous year, among other factors. The next 20 percent are considered type B free agents. The bottom 60 percent are known as unclassified free agents. To further reinforce the above topic, in 2009, the New York Yankees signed four type A free agents. This is more than any other team. Teams who lose their top players, however, do receive something in return. Teams who lose a type A free agent receive the top draft pick from the signing team in addition to a supplemental pick. Teams losing a type B free agent receive a supplemental pick, while the signing team retains its draft choice. This is a benefit for small market teams who pride themselves on "breeding" their own players from their system (Heyman, 2008).

Why would it benefit a player to play well during this year?

It is apparent that a baseball player tries to be a dominant factor in every game he plays. However, there has to be some motivation to play well during their free agency season knowing that they might not be playing with the same team the following year. There is of course the obvious reason, the money factor. Playing well will give players a better contract in the future. Whether resigning with the same team or a new team, if the player had a good season he will most likely earn more the following year. Another aspect of a better contract is a longer term. Adding more years to a contract adds stability to an athlete's life. Signing an eight-year contract almost assures that the player will be on that team and in that town for a while. There are also some other reasons why a player would want to do well. Everyone wants to win a championship at some point in his career. In order to win a championship, every player on a team must be in harmony and must play very well. This is especially true in the MLB. Becoming a fan favorite is also another reason to play well. The more consistent players are, the more they are backed by their fans. This gives a player a sense of pride and confidence, which could actually improve his game even further.

How will this project contribute to the body of knowledge in this topic area?

There have been many arguments and discussions over this issue over the past couple of years. This project will contribute another viable analysis for scholars and experts to debate. They will be able to compare seasons of the new millennium to other seasons, such as in the 1990s. If this hypothesis is proven, this information could actually be used in real life situations. For example, a manager would know when his players should have a peak season. This will enable the manager to play those players more and give them a chance to emerge as great ball players. This is a win-win for everyone involved. The player will get more money at the end of the season, the team will be better overall and possibly win a championship, and the fans will be able to see great baseball. Another possibility if the hypothesis is correct is that the information will be good for fantasy sports lovers. These lovers could do some research and find out what players are in their free agent year and this could be a good technique to get the best team possible and find some sleepers late in the draft.

REVIEW OF LITERATURE

As mentioned in the above section, there has been much debate over this issue. However, there has not been much literature published about this topic. There were, nevertheless, a few articles and research studies that I was able to find that helped me compare my results to another viable source.

One research study, "The Influence of Free-Agent Filing on MLB Player Performance," used almost the same methodology as my study. Written by Evan Holden and Paul Sommers, this study examined player's performance in the years before and after their 2003 free-agent filings. Within this study, free agents were divided into three different age groups: (1) 32 years of age or younger; (2) 33, 34, or 35 years of age; and (3) over 35 years of age (Holden & Sommers, 2005). Statistics that were analyzed include hitters' on-base percentage plus slugging average (OPS) and pitchers' walks plus hits divided by innings pitched (WHIP). Results for the contract year over the season before included increases in OPS for all age groups except the oldest age group. However, OPS decreased for all age groups in the season after the contract year. Neither of these changes was significant (Holden & Sommers, 2005). As far as pitchers are concerned, WHIP decreased in the contract year over the season before for all but the oldest group and increased in all three age groups for the year after the contract year. Yet again, these changes were not significant. Mr. Holden and Mr. Sommers concluded that both hitters and pitchers show lower performance levels one season after filing free agency (Holden & Sommers, 2005). The younger players (less than 32 years old) exhibited the smallest decline. As will be mentioned in the upcoming sections, these results agree with the results of my study.

Another study, "Free-Agent Performance in Major League Baseball: Do Teams Get What They Expect?" uses two unique theories: the equity theory and the expectancy theory. These theories are used to explain player's performance. The equity theory states that a person perceives inequity to exist when that person believes that the ratio of his or her outcomes (pay) to inputs (performance) differs from the ratio of another (Ahlstrom, Si, & Kennelly, 1999). The expectancy theory assumes that people have well-defined preferences among various outcomes (rewards) of their actions, and they will adjust their efforts based on those

expected outcomes (Ahlstrom, Si, & Kennelly, 1999). Analyzing these theories, the researchers, David Ahlstrom, Steven Si and James Kennelly, were able to come up with four different hypotheses. All four of these hypotheses can be seen in Appendix A. The sample studied was non-pitcher MLB free agents from 1976 to 1992. Data that were compiled for each player were AVG, SLG, HR, RBI, and AB and were for the year before the free-agent year, the free-agent year, and the 1st year of the new contract. The results of this research study concluded that some of the expectancy theory predictions were upheld, whereas none of the equity theory predictions were upheld (Ahlstrom, Si, & Kennelly, 1999).

A study that went against part of the previous two studies results was, "The Effects of Changing Teams on the Performance of Major League Baseball Players." Within this study, free agents were analyzed. Although not much detail about the results were mentioned, the researchers concluded that free agents showed no change in performance in the season after signing with a new team. They did find, however, that free agents showed a slight tendency to underperform relative to prior expectations based on their productivity in the previous years (Nicholson, McTeer, & White, 1998).

Finally, one last article that could be compared to my research study was, "Do Pro Athletes Try Harder in the Year before Free Agency?" As one can see from the similar titles, this article sparked my interest in this topic. Professor Thomas Bruggink explored this issue in detail with fellow students. Bruggink wanted to prove whether there was a link between free agency and player performance in professional baseball and basketball (Do Pro Athletes Try Harder in the Year Before Free Agency?, 2004). One example that he used was the Javy Lopez example. In Lopez's first eleven seasons, he had a .281 AVG and hit on average fifteen homeruns per season. In 2003, coincidently enough his contract year, he improved to .328 and belted forty homeruns (Do Pro Athletes Try Harder in the Year Before Free Agency?, 2004). The question that Bruggink asked was whether Lopez waited until the season prior to his eligibility as a free agent to have a "career" breakout season. One of Bruggink's students Sarah Bellows '02 studied the MLB in more detail. She considered each player's entire career rather than the year prior to free agency. Bruggink and Bellows found that position players hit more doubles but not more home runs, nor did their batting average

rise during their free-agent year. In addition, pitchers improved their WHIP while keeping earned runs constant (Do Pro Athletes Try Harder in the Year Before Free Agency?, 2004).

All previous studies were crucial to my research project. It is evident that pieces from each study were used within my own methodology to try to determine whether athletes do indeed play better during their contract year.

METHODOLOGY

Why were the specified years chosen?

Free agent years that were analyzed within my research project started with the 2000 season and went through to the 2007 season. Data however needed to be collected from 1999 to 2008. This is because the year prior and the year after their free agent year were used to analyze the free agent year. These years were chosen because my honor's advisor and I thought it was more beneficial to use the most recent years. Instead of analyzing one year, we felt our results would be more accurate if multiple years were analyzed. As a result, I decided to start at the new millennium.

How was the data collected?

It was interesting to find that there was not an easily accessible resource where all the free agents for each year could be found. As a result, many websites were used to obtain the data. In order to get the 2000 free agents, USAToday.com was used. SI.com was used to obtain the 2001 free agents. Finally, ESPN.com, Wikipedia.com, and MLB.com were used to find the rest of the year's data. After collecting the data, it was compiled into Microsoft Excel spreadsheets separated by each year. The six statistics that were focused on were home runs per at bat (HR/AB), runs batted in per at bat (RBI/AB), batting average (AVG), on base percentage (OBP), slugging percentage (SLG), and on base plus slugging percentage (OPS). Refer to appendix B for further descriptions of all six statistics. These numbers were chosen because they all are a good determinant of an individual's success. Also, notice that all the stats are averages. No "hard" numbers were used because too many factors could affect hard numbers. A hard number includes concrete statistics such as home runs and runs batted in. Factors that could affect hard numbers include injuries, competition of position and trades. A

player who gets hurt and only plays in thirty games will obviously have fewer at bats than if he played one hundred and fifty games that season. In addition, a player might compete with another player on the team for playing time. Consequently, that player will have fewer at bats than if he played every day. Finally, a player could be traded during the season. The player could have difficulty adjusting to his new team and his statistics might decrease for some time until he adjusts. These six statistics were collected for each player for the year before their free agency, their free agency year, and the year after. This process was very time consuming and took the majority of my time. After all data was collected, it was time to test the hypothesis.

What test was used?

The test that was used to check the hypothesis is called a paired two sample for means t-test. The two-sample test is used to determine if two population means are equal. A paired t-test was used because there is a one to one relationship between the values in the two samples. This means that the same subject is being compared but measured at different years (Paired T Test, 2002). This can be found within Excel. It is located in the data analysis box. After bringing up this t-test, there are two input ranges: the variable 1 range and the variable 2 range. The variable 1 range in this project will be the first year being analyzed. The year 2 range will be the second year being analyzed. There will also be a "hypothesized mean difference" box. A zero should be inserted in this box. Once the information is selected, it is safe to run the t-test. Appendix C shows what the t-test looks like within Excel. To illustrate an example, let us take the 2000 free agents. To analyze the difference between the year before the free agency year and the actual free agent year, the variable 1 range will be the 1999 HR/AB statistic range for all players. The variable 2 range will then be the 2000 HR/AB range for all players. This will be repeated for all six statistics. After running the t-test, certain information is revealed. The mean and variance are the two most recognizable statistics. The mean and variance are giving for both variables. The two most important figures, however, are t Stat and P(T<=t) two-tail. T Stat determines whether the change between the two variables is significant or not. This statistic also determines whether the change is an increase or decrease. If the number is greater than positive two or less than negative two, the difference is significant. At this time, if the t Stat is positive than this means

the decrease in statistics and vice versa. The P(T<=t) two-tail statistic determines the probability that this change (either decrease or increase) is by chance or if there was a factor contributing it. The higher the percentage is the greater the chances that the change happened by chance. Typically, most researches look for this number to be less than 5%. To go back to the 2000 free agents example, after running the test, the t Stat was about -1.445 (See Appendix C). This shows that there was an increase between 1999 HR/AB to 2000 HR/AB, but this difference was not significant. Also the P(T<=t) two-tail statistic is 0.155. This shows that there is a 15.5% probability that the change, increase in this example, happened by chance. To illustrate another example, look at the same year but testing RBI/AB. The t Stat was -2.368. This shows that RBI/AB did increase from 1999 to 2000 and it was indeed a significant increase. Also the P(T<=t) two-tail statistic is 0.022. This states that there is a 2.2% probability that this change (increase) happened by chance. Since this is below 5%, there is a good probability that there was some factor affecting this number. If this becomes consistent throughout my analyses then my hypothesis will be correct and confirmed.

STATISTICAL FINDINGS

The following paragraphs describe the results of each analyzed year. Take notice of the similarities between each year and whether they confirm or reject the hypothesis. To view the results in a visual form, refer to Appendix D through Appendix K. To clarify the charts, each chart shows the averages of all six statistics for all the free agents in that year. The top half of the chart compares the contract year with the year before their free agency season (Free Agency Year -1). The bottom half of the charts compare the contract year with the year after the contract year (Free Agency Year +1). Finally, T-Score is a very important number. This number is very similar to the t Stat. This shows the exact number as the t Stat and determines whether the change is significant or not, but the signs (positive or negative) are reversed. As a result, a 2.617 T-Score shows a significant increase in value between the two years analyzed. This is opposite as the t Stat. All significant values are colored in yellow. Notice the pattern between each year. The final paragraph in this section shows the average of all years within the research project and acts as the main determinant of whether my results support or reject the hypothesis.

As previously mentioned, the statistics started with the 2000 season. During this season there were only 45 major league players (excluding pitchers), that were analyzed. After conducting the t-tests, the year before their free agency year (1999) and their contract year (2000) all showed T-Scores that were positive. This concluded that players performed better during their contract year. However, since only RBI/AB was over 2.0, there was not a significant increase with the other statistics. When comparing the contract year (2000) with the year after free agency (2001), all numbers were negative. This can conclude that player's statistics declined from their contract year to the year after free agency. However, RBI/AB and OBP were the only significant decreases.

During the 2001 season, 39 players were analyzed. After conducting the t-tests for the year before the free agency season (2000) and the contract year (2001), all statistics except for OBP were positive. This means that there was an increase in value from 2000 to 2001, although the increase is not significant because none were over 2.0. The OBP number of -1.016 is definitely an outlier. Having this negative number means, that OBP numbers decreased from the year before free agency season to the year of their free agency season. This result goes against the hypothesis and most other results in other years. When comparing the 2001-2002 seasons, the results were very conclusive. All statistics were negative with OBP being the only non-significant value. These results indicate that there was a significant decrease in statistics (except OBP) from a player's contract year to the year after the contract year.

During the 2002 season, 47 players were analyzed. Results concluded that there were not any significant increases in value between the year before the contract year (2001) to the contract year itself (2002). Some were even decreases. As shown in Appendix F, two statistics, HR/AB and SLG, actually decreased from one year to the other. This again goes against the hypothesis. When comparing the contract year (2002) to the year after (2003), all data showed, a decrease in statistics but only two were significant decreases, OBP and SLG. The SLG T-Score (-8.206) was very high compared with the other numbers. As a result, it is considered an outlier.

During the 2003 season, 99 players were analyzed. As predicted, there was an increase in statistics between the 2002 and 2003 seasons. However, there were no significant increases in numbers. On the other hand, there were significant decreases in statistics between the 2003 season and the 2004 season. All but HR/AB were less than -2.0.

Analyzing the 2004 season, 49 players were looked at. The T-Scores for the year before the contract year (2003) compared with the contract year (2004) showed that all statistics showed an increase in value with only HR/AB being a significant increase. When comparing the 2004 season to the 2005 season, there was a significant decrease in three of the six categories, HR/AB, RBI/AB, and SLG. These values were -2.800, -2.082, and -2.136, respectively. The other three numbers did show a decrease in value but it was not a significant decrease, meaning they were all greater than -2.0 but all were still negative.

There were 65 players analyzed during the 2005 season. This year was very interesting based on the results. For the year before the free agency year (2004) and the contract year (2005), the T-Scores for HR/AB, RBI/AB, AVG, OBP, SLG, and OPS were -2.273, -1.432, 0.825, 0.267, -0.979, and -0.553. These results concluded that four of the statistics analyzed showed a decrease in statistics, with one being a significant decrease. This absolutely goes against the hypothesis. To compare the contract year (2005) with the year after (2006), results concluded that three of the six statistics showed a significant decrease in numbers while two of the six showed an increase in statistics, HR/AB and RBI/AB. Although not significant, this increase goes against the hypothesis once again.

Similarly, the 2006 season showed the same interesting results as during the 2005 season. During this year, 80 players were analyzed. When assessing the data for the year before the contract year (2005) and the contract year (2006), results found only one significant increase in statistics, RBI/AB, which supports the hypothesis, while having two non-significant decreases in statistics, HR/AB and OBP. The rest of the statistics showed an increase but it was not a significant amount. When comparing the 2006 to the 2007 season, all T-Scores were less than -2.0. This means there was a significant decrease in statistics in all six categories.

During the 2007 season, 67 players were analyzed. Again, T-Scores for the year before the contract year (2006) and the contract year (2007) were very different from each other. The T-Score for HR/AB, RBI/AB, AVG, OBP, SLG, and OPS were -1.401, -0.279, 0.948, 1.021, -0.422, and +0.123, respectively. As evident from the results, three of the six showed an increase in statistics while the other three showed a decrease. However, none of the six showed a significant difference. When comparing the contract year with the year after, four out of the six showed a significant decrease in statistics, while the other two showed a decrease but was not significant.

To sum up all the years, one final data set that was analyzed was the aggregate of all the years from 2000 to 2007. Results of the t-tests for the year before the free agency season to the free agent season for HR/AB, RBI/AB, AVG, OBP, SLG, and OPS had a T-Score of 0.599, 2.617, 1.906, 0.967, 1.355, and 1.318, respectively. This shows that only one statistic throughout all the years went with the hypothesis and showed a significant increase in value. The other statistics showed an increase but they were not significant enough. To compare the contract year with the year after, the T-Score for HR/AB, RBI/AB, AVG, OBP, SLG, and OPS were -4.491, -5.365, -7.138, -6.948, -7.161, and -7.573. As evident, all statistics were far lower than -2.0. This states that all statistics showed a significant decrease in numbers between the contract year and the year after. To see these statistics in visual form refer to appendix L.

PROBLEMS ENCOUNTERED

There were many problems encountered that could have affected the data set. These factors include retirement, trade prone players, team performance, switching leagues, injuries, elite players, and old age/multiple year on free agent market.

Multiple year free agency

One problem that affected the results was players who sign one-year contracts with teams. This puts the player on the free agent market every year. Typical players who sign one-year contracts are older players still trying to prove that they can remain in the league and not retire. Teams give these players a contract on a year-to-year basis because their durability is always in question. This is a problem for the analysis because these players are forced to

prove themselves every year. As a result, these players' statistics should be similar each year. There should not be an increase or drop-off in years. An example of this is Kenny Lofton. Between 2000 and 2008, Lofton had been on the free agency market six times. This indicates that Lofton had to play well every year in order to stay in the league.

Retirement

Another problem is the issue of retirement. A player, who retired the year after their free agency season, because no team signed him, will not have any data for that year. As a result, he was excluded from this analysis. However, he could have played much better his free agency year knowing that he had to prove himself capable of staying in the league. This statistic would help the hypothesis. Since it has been removed from the analysis we do not know whether it would have supported or gone against the hypothesis.

Trade prone players

Trade prone players can also affect the outcome of the presented data. This is, due to the fact, that a player being traded mid season could have his play affected greatly. If a player is on a good team, he might have the confidence and desire to play. However, if he was traded to a worse team or a team with a lot less fan support, his play might slip because he is no longer as happy as he was. This can also work both ways. If a player is currently unhappy because his team is losing, he will be happier when traded to a better team. He could possibly fit in better and be able to contribute to the team more effectively. Another problem area is when a player is traded to another league. This is mentioned in detail below.

Switching from leagues

Switching leagues in Major League Baseball is actually a big deal. In any other sport, changing leagues or divisions just requires time for the player to become acquainted with the different teams and players. In the MLB, however, changing leagues is much more. Players have actually performed better in one league than the other. This can be attributed to the minor rule differences between the leagues and the actual talent within the leagues. Recently, the American League has been known for better pitching than the National League. This will be a disadvantage for players who are traded from the National League to the American League. Position players who hit well with the assumed weak pitching of the National League might not hit as well against the dominant pitchers of the American League. To look

at it the other way, an American League player might have a much better rest of the year after being traded to the National League. This is because he will be facing weaker pitching and thus will be able to obtain better numbers.

Team performance

Team performance is indeed a problem that could have an effect on the data analysis. It is obvious that when your team is supposed to be good everyone on the team feels the pressure to do well. When the team does perform well, the moral of the team increases. Every player wants to play for a championship contender. In turn, the player will play well for that reason alone. This is an acceptable idea because when it comes down to it, the reason for playing is to win a championship; to be the best in the league. On the other hand, morale decreases when a team does poorly throughout the season. This affects the players on the team and their production could suffer because of it.

Injuries

Injuries could possibly be the biggest problem I encountered. Countless times while analyzing my data, I found that a player had two seasons with over one hundred games played and then one season with around only forty games played. After researching the individual players, I found that these forty game seasons were due to injuries. Although I did not exclude injured players from my analysis, they could have skewed the data in favor of either direction. The reason why injured players were not excluded was that even though a player only played forty games, every category being analyzed is an average. Because of this, hard numbers did not come into play. It was not until after the analysis was complete that I realized a player could have been playing hurt during those forty games. So in effect, his numbers would have gone down compared to the other two-year averages.

Elite players

One final problem that I encountered was analyzing the so-called elite players with in the league. These elite players have great statistics every year. It was difficult to find an elite player who proves my hypothesis. Most of these players have very consistent numbers from year to year. There are no drop-offs or increases. For example, Albert Pujols from the St. Louis Cardinals consistently hits over 35 homeruns each season and hits a batting average of

.300+ every year. As a result, it is hard to prove the hypothesis when a player hits .331 one season and then hits .327.

SUMMARY AND CONCLUSION

In summary, the testable hypothesis that MLB free agents do play better during their free agency year has been disproved. There is no significant evidence that players do play better during their free agency season. Although there were some statistics that supported this idea, more statistics did not. There was significant evidence, however, that players perform better during their free agency season as compared to the season after. This could be the result of adjusting to a new team. Looking back to one of the studies I read, "Free-Agent Performance in Major League Baseball: Do Teams Get What They Expect," my results agreed with their conclusion. My results supported the expectancy theory hypothesis and not the equity theory hypothesis. My results supported but not conclusively the part of the expectancy where it states that player performance will be higher in the free-agent year than in the previous year and strongly supports the part that states player performance will be lower in the 1st year of the new contract than in the previous (free-agent) year. This can be seen in Appendix A. Overall, the data shows that performance is not a function of whether or not a player is playing out his contract. Other factors must contribute to a player's performance other than the motivation for money. If not, then a player's basic ability must be the primary reason. Even though there is no significant evidence that players play better during their free agency year, it is known, however, that players are conscious of the advantages of playing better during this very important year.

RECOMMENDATIONS FOR FUTURE RESEARCH

From the results of the analysis and considering the encountered problems, additional research and analysis should be done in order to get a more accurate result. Not only should the recent years be tested but the 1990's should be tested as well. If someone wants to be very ambitious, one could test from the first free agency year in 1976. Although this would be a very interesting project, I doubt it would be easy to find information on the free agents in the 1970's and 1980's. I had a very hard time finding information for the recent years. For

example, I had a very hard time finding free agent information for the 2004 season. Comparing free agent information from decade to decade could be quite interesting. Finally, I thought it was very interesting that there was such a significant decrease in value of the six analyzed statistics between the contract year and the year after free agency. As a result, one can analyze why players performance actually drops off after their free agency year. A few thoughts I came up with was a player's transition between teams and leagues and the comfort of a lengthy contract. For example, if a player is signed to a ten-year deal, he might not feel the pressure to push himself to the max in his first year of his contract. As a result, his statistics might not be as good as they would if he was actually playing for a contract; like their free agent year.

APPENDICES

Appendix A – Results from other reading

Table 1 Equity Theory Hypotheses vs. Expectancy Theory Hypotheses in Major League Baseball

Performance comparison	Equity theory hypothesis	Expectancy theory hypothesis
Free-agent year vs. previous year	H1a: Player performance will be *lower* in the free-agent year than in the previous year.	H1b: Player performance will be *higher* in the free-agent year than in the previous year.
Free-agent year vs. career average	H2a: A player's performance in his free-agent year will be *lower* than his career average.	H2b: A player's performance will be *higher* in his free-agent year than his career average.
1st year of new contract vs. free-agent year	H3a: Player performance will *be higher* in the 1st year of the new contract than in the previous (free-agent) year.	H3b: Player performance will be *lower* in the 1st year of the new contract than in the previous (free-agent) year.
1st year of new contract vs. career average	H4a. A player's performance will be *higher* in the 1st year of his new contract than his career average.	H4b: A player's performance will be *lower* in the 1st year of his new contract than his career average.

Appendix B – Description of Statistics

- Home run per at bat – (HR/AB) – This statistic is computed by dividing the number of home runs by the total number of at bats during the season.

- Runs batted in per at bat – (RBI/AB) – This statistic is computed by dividing the number of runs batted in by the total number of at bats during the season.

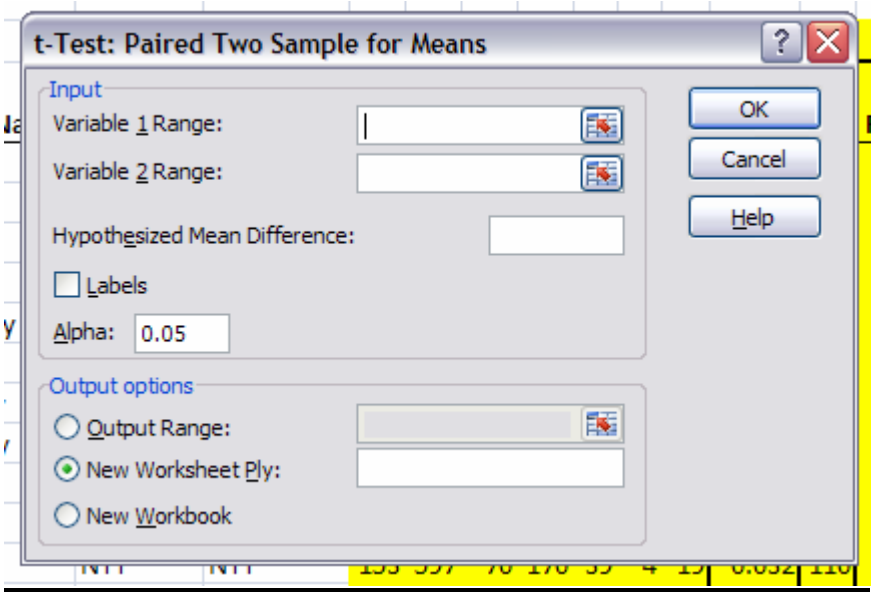
- Batting average – (AVG) – This statistic is the ratio of hits to at bats.

- On-base percentage – (OBP) – A measure of how often a batter reaches base for any reason other than a fielding error, fielder's choice, dropped/uncaught third strike, fielder's obstruction, or catcher's interference.

- Slugging percentage – (SLG) – This is a popular measure of the power of a hitter. It is calculated by dividing total bases by at bats.

- On base plus slugging percentage – (OPS) – This is calculated as the sum of a player's on-base percentage and slugging percentage.

Appendix C – T-test Screen Shots



	A	B	C
1	**1999-2000**		
2			
3	**HR/AB**		
4	t-Test: Paired Two Sample for Means		
5			
6		*Variable 1*	*Variable 2*
7	Mean	0.032680259	0.03615651
8	Variance	0.000555606	0.000582318
9	Observations	45	45
10	Pearson Correlation	0.771480649	
11	Hypothesized Mean Difference	0	
12	df	44	
13	t Stat	-1.445430797	
14	P(T<=t) one-tail	0.077711064	
15	t Critical one-tail	1.680229977	
16	P(T<=t) two-tail	0.155422128	
17	t Critical two-tail	2.015367547	

Appendix D – Results – 2000 Free Agents

2000 FREE AGENTS						
2000 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.036	0.154	0.280	0.352	0.450	0.802
Free Agency Year -1	0.033	0.139	0.272	0.348	0.434	0.782
Difference	0.003	0.016	0.008	0.003	0.016	0.020
T-Score	1.445	2.368	1.377	0.686	1.472	1.353
N	45	45	45	45	45	45
Free Agency Year +1	0.031	0.130	0.269	0.331	0.425	0.756
Free Agency Year	0.036	0.154	0.280	0.352	0.450	0.802
Difference	-0.005	-0.025	-0.012	-0.021	-0.025	-0.046
T-Score	-1.670	-3.186	-1.586	-2.829	-1.484	-1.977
N	45	45	45	45	45	45

Appendix E – Results – 2001 Free Agents

2001 FREE AGENTS						
2001 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.035	0.141	0.271	0.338	0.440	0.779
Free Agency Year -1	0.030	0.133	0.269	0.345	0.420	0.764
Difference	0.005	0.008	0.002	-0.006	0.021	0.015
T-Score	1.532	1.029	0.303	-1.016	1.311	0.708
N	39	39	39	39	39	39
Free Agency Year +1	0.029	0.124	0.256	0.331	0.401	0.732
Free Agency Year	0.035	0.141	0.271	0.338	0.440	0.779
Difference	-0.006	-0.017	-0.016	-0.007	-0.039	-0.046
T-Score	-2.406	-2.403	-2.281	-1.050	-2.838	-2.327

N	39	39	39	39	39	39

Appendix F – Results – 2002 Free Agents

2002 FREE AGENTS						
2002 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.032	0.136	0.265	0.338	0.424	0.762
Free Agency Year -1	0.033	0.132	0.264	0.334	0.427	0.761
Difference	-0.002	0.004	0.001	0.004	-0.003	0.001
T-Score	-0.793	0.647	0.180	0.677	-0.302	0.054
N	47	47	47	47	47	47
Free Agency Year +1	0.031	0.131	0.254	0.326	0.326	0.734
Free Agency Year	0.032	0.136	0.265	0.338	0.408	0.762
Difference	-0.001	-0.006	-0.011	-0.013	-0.083	-0.028
T-Score	-0.334	-0.780	-1.875	-2.006	-8.205	-1.536
N	47	47	47	47	47	47

Appendix G – Results – 2003 Free Agents

2003 FREE AGENTS						
2003 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.029	0.130	0.263	0.327	0.411	0.738
Free Agency Year -1	0.027	0.126	0.258	0.323	0.400	0.723
Difference	0.002	0.005	0.005	0.004	0.011	0.015
T-Score	1.109	1.167	1.183	0.959	1.266	1.259
N	100	100	100	100	100	100
Free Agency Year +1	0.028	0.119	0.243	0.308	0.382	0.690
Free Agency Year	0.029	0.130	0.263	0.327	0.411	0.738
Difference	-0.001	-0.011	-0.020	-0.019	-0.029	-0.048
T-Score	-0.512	-2.510	-3.519	-3.340	-2.878	-3.245

N	100	100	100	100	100	100

Appendix H – Results – 2004 Free Agents

2004 FREE AGENTS						
2004 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.032	0.136	0.262	0.327	0.419	0.745
Free Agency Year -1	0.027	0.127	0.260	0.322	0.406	0.728
Difference	0.005	0.009	0.002	0.005	0.012	0.017
T-Score	2.155	1.402	0.241	0.574	0.918	0.819
N	49	49	49	49	49	49
Free Agency Year +1	0.025	0.124	0.257	0.319	0.392	0.711
Free Agency Year	0.032	0.136	0.262	0.327	0.419	0.745
Difference	-0.007	-0.012	-0.005	-0.008	-0.026	-0.034
T-Score	-2.800	-2.083	-0.737	-1.126	-2.136	-1.849
N	49	49	49	49	49	49

Appendix I – Results – 2005 Free Agents

2005 FREE AGENTS						
2005 Free Agents	HR/AB	RBI/AB	AVG	OBP	SLG	OPS
Free Agency Year	0.029	0.130	0.271	0.340	0.420	0.760
Free Agency Year -1	0.033	0.136	0.267	0.339	0.429	0.768
Difference	-0.005	-0.006	0.004	0.002	-0.010	-0.008
T-Score	-2.273	-1.432	0.825	0.267	-0.979	-0.554
N	65	65	65	65	65	65
Free Agency Year +1	0.029	0.134	0.260	0.324	0.406	0.730
Free Agency Year	0.029	0.130	0.271	0.340	0.420	0.760
Difference	0.000	0.004	-0.011	-0.016	-0.014	-0.030
T-Score	0.050	0.881	-	-	-	-

			2.270	3.470	1.442	2.260
N	65	65	65	65	65	65

Appendix J – Results – 2006 Free Agents

2006 FREE AGENTS						
2006 Free Agents	**HR/AB**	**RBI/AB**	**AVG**	**OBP**	**SLG**	**OPS**
Free Agency Year	0.032	0.136	0.264	0.330	0.425	0.755
Free Agency Year -1	0.032	0.127	0.263	0.334	0.422	0.755
Difference	0.000	0.009	0.001	-0.003	0.003	0.000
T-Score	-0.023	2.093	0.261	-0.623	0.363	0.002
N	80	80	80	80	80	80
Free Agency Year +1	0.025	0.117	0.250	0.318	0.383	0.701
Free Agency Year	0.032	0.136	0.264	0.330	0.425	0.755
Difference	-0.007	-0.019	-0.015	-0.012	-0.042	-0.054
T-Score	-4.154	-4.359	-3.505	-2.728	-4.944	-4.536
N	80	80	80	80	80	80

Appendix K – Results – 2007 Free Agents

2007 FREE AGENTS						
2007 Free Agents	**HR/AB**	**RBI/AB**	**AVG**	**OBP**	**SLG**	**OPS**
Free Agency Year	0.026	0.129	0.269	0.335	0.411	0.746
Free Agency Year -1	0.029	0.131	0.264	0.330	0.414	0.744
Difference	-0.002	-0.001	0.004	0.005	-0.004	0.002
T-Score	-1.402	-0.279	0.948	1.021	-0.422	0.123
N	67	67	67	67	67	67
Free Agency Year +1	0.023	0.125	0.248	0.319	0.375	0.695
Free Agency Year	0.026	0.129	0.269	0.335	0.411	0.746
Difference	-0.003	-0.004	-0.021	-0.015	-0.036	-0.051

T-Score	-1.405	-0.669	-4.003	-2.873	-3.526	-3.569
N	67	67	67	67	67	67

Appendix L – Results – All Years

ALL FREE AGENTS						
All Free Agents	**HR/AB**	**RBI/AB**	**AVG**	**OBP**	**SLG**	**OPS**
Free Agency Year	0.031	0.135	0.267	0.335	0.422	0.757
Free Agency Year -1	0.030	0.130	0.264	0.333	0.417	0.750
Difference	0.000	0.005	0.004	0.002	0.005	0.007
T-Score	0.599	2.617	1.906	0.967	1.355	1.318
N	492	492	492	492	492	492
Free Agency Year +1	0.027	0.125	0.253	0.320	0.393	0.713
Free Agency Year	0.031	0.135	0.267	0.335	0.422	0.757
Difference	-0.003	-0.011	-0.014	-0.015	-0.029	-0.044
T-Score	-4.491	-5.365	-7.138	-6.948	-7.161	-7.573
N	492	492	492	492	492	492

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