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Determinants of Major League Baseball Player Salaries

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Abstract

In 2003, Michael Lewis published *Moneyball: The Art of Winning an Unfair Game*, which forever changed the finances and economics of baseball. It began a movement towards using advanced statistical analysis to determine the value of baseball players, in order to build a roster that will win the most games at the lowest cost. The Moneyball movement has resulted in a multitude of new statistics to try to drill a player's value down to one number that represents his marginal revenue product, or his individual contribution to the team's success.

Player salaries are typically the largest cost for Major League Baseball teams. Players often get paid millions of dollars because there are so few people who have their athletic abilities and skill sets needed to succeed in baseball at the major league level. The average salary of Major League Baseball players in 2012 was over $3.2 million (Associated Press, 2012). It is of the utmost importance for Major League Baseball teams to efficiently spend their money on players in order to win games at the lowest possible cost.

The biggest factor that determines how much a player will be paid is his production on the playing field. The better one plays, the more he will be paid. However, there are many other factors that affect how much players are paid that are often overlooked. This project looks at many other factors, aside from a player's talent and production levels, that may influence how much he is paid.

This study used linear regression analyses to isolate relationships between player salaries and a multitude of different factors which may have significant relationships to salaries. I have used online websites and databases to gather contract data and player performance data for a time period of one decade. The data includes a sample size of 761 player contracts signed between the 2002-2003 offseason and the 2011-2012 offseason. The project includes statistical breakdowns for hitters only, pitchers only, and all players combined, in order to gain the best understanding of what is actually impacting player contracts, and which kinds of contracts are being affected.

I have concluded that the impact of agents can be quite significant and large, although varied. Furthermore, I have uncovered several strategies that agents can use to maximize the salaries that they negotiate for their clients, like trying to position clients to sign contracts in December. I have also analyzed practices of teams to try to find the best value players at a given talent level, looking at the teams which have done so successfully.

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Chapter 1

Introduction

In 2003, Michael Lewis published *Moneyball: The Art of Winning an Unfair Game*, which forever changed the finances and economics of baseball. It began a movement towards using advanced statistical analysis to determine the value of baseball players, in order to build a roster that will win the most games at the lowest cost (Lewis, 2003). The Moneyball movement has resulted in a multitude of new statistics to try to drill a player's value down to one number that represents his marginal revenue product, or his individual contribution to the team's success.

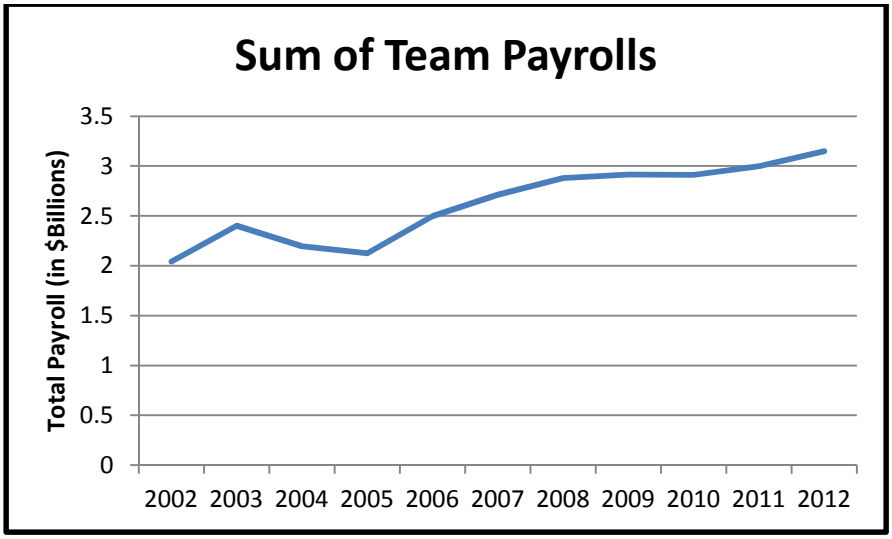
However, these statistics ignore other factors that affect how much teams pay their players. Aside from their on-field production, there are numerous other factors that influence players' salaries, including:

- The player's age
- The time of year of the contract's signing
- Whether or not the player is a Free Agent
- The team and market signing the player
- The player's agent

These other factors will be the primary focus of this project. This information can help Major League Baseball teams effectively sign players for contracts below the market value of their on-field production. It can also help player agents to get their players contracts above market value. The project will put a specific

emphasis on player agents and their influence on their clients' salaries. Similarly, the team that a player is signing with is of significant importance in this project. By studying this information, we can ascertain which teams are adept at finding players that they can pay below market value, and which teams tend to overpay certain players.

For this study, the data being used includes Major League Baseball player contracts signed beginning in the 2002-2003 offseason and continuing through the 2011-2012 offseason. In 2002, the total payrolls (by payroll, I am referring to the amount of money each team spends on paying its players) of all 30 teams was $2.04 billion (Brown, 2013). In 2012, that figure is $3.15 billion, representing an increase of 54% (Brown, 2013). Surely, this is not solely due to inflation. Clearly, the amount of money players are being paid has increased tremendously in the past decade, so it is of the utmost importance to the teams compensating these players, and the player agents negotiating the contracts, to be able to position themselves as favorably as possible to negotiate the best possible contract.



Previous Research

There is limited published research on determinants of Major League Baseball player salaries and impacts of external factors presented in this study. However, some research is found on how Major League Baseball players are paid. Palmer and King (2006) found that Major League Baseball players are fairly compensated for their on-field contributions, and are not discriminated by race factoring into their salaries. They used statistics like slugging percentage, age, MLB experience, at bats per year, runs created per game, and fielding percentage to represent a player's on-field performance and proxy what he should get paid if there is no discrimination. Furthermore, Link and Yosifov (2012) studied whether Major League Baseball players are willing to forego extra monetary returns on their performance in exchange for job security. In other words, they found that players are willing to take smaller per-year salaries in exchange for longer term contracts, in general.

However, studies are lacking when it comes to studying how effective agents and teams are at negotiating favorable player contracts. Peter Schwartz, a researcher for Forbes, devised a methodology to analyze contracts that agents negotiate for their players based on comparisons to statistically similar players who had signed contracts at the same age, while taking into account the average league salary at the time of the contract signing. They valued the contract, found the value's multiple of the league average salary, and compared this multiple to statistically similar players who signed a contract at the same age, and finally adjusted for inflation. Their results show Peter Greenberg, who represents many

of baseball's current and past stars like Jose Reyes, Johan Santana, and Bobby Abreu as baseball's best agent, earning his clients approximately 2.5 times what a statistically similar player would earn on average on the open market (Schwartz, 2007). Their analysis ranks Randy and Alan Hendricks second to Greenberg. Forbes does not reveal their method for finding statistically similar players. This also does not account for players who aren't free agents and are instead signing contract extensions, or other factors like the time of year of the signing.

Chapter 2

Major League Baseball Collective Bargaining Agreement

Collective bargaining is defined as "negotiation between an employer and a labor union usually on wages, hours, and working conditions" (Collective Bargaining, 2013). The end-product of collective bargaining is a collective bargaining agreement, which is a document that states the agreed upon wages, hours, working conditions, and more between the employer and the labor union. The document is signed by both parties and is valid for a specified time period, which is agreed upon by both parties. It is a fully enforceable, legal contract.

In Major League Baseball's Collective Bargaining Agreement (or CBA for short), Major League Baseball serves as the employer. The players, who are the employees, are represented by the Major League Baseball Players Association. The MLB CBA governs basic employment practices such as working conditions and wages, as in the definition above. However, it also governs the entire

structure of the league, such as the length of the season, the procedures for drug testing, the procedure to make any rule changes to the actual on-field game, a revenue sharing plan among all 30 teams, and much more. The CBA includes all rules for the behind-the-scenes business of Major League Baseball. In short, it contains all guidelines governing Major League Baseball except for those in the rule book about physically playing the game of baseball. Most importantly to this project, the Collective Bargaining Agreement spells out all the details governing player contracts, from who is eligible to sign new contracts, to the minimum salary, to how the values of the contracts are calculated.

Most of Major League Baseball's CBAs have had a term of approximately five years. The contracts included in this project span three different agreements: the 1997 agreement, the 2003 agreement, and the 2007 agreement (Brown, 2013). However, all of the basic rules regarding player contracts have remained the same or structurally similar so that their minute differences are negligible with regards to this project. Whenever I refer to "the CBA," I am referring to no specific agreement in particular, but rather, to the general rules governing MLB player contracts that are the same in all three of these agreements. Recently, a new CBA was ratified that went into effect in 2012. Although this agreement also does not significantly change any of the basic structures of player contracts, it does have some slightly different rules which could have some effect on future player contracts.

Free Agency

A free agent is defined as "a professional athlete (as a baseball player) who is free to negotiate a contract with any team" (Free Agent, 2013). As defined by the Collective Bargaining Agreement, a free agent is a player whose previous contract has expired and has not yet signed a new contract. A free agent is allowed to sell his services to any team desiring to compensate him for his playing abilities. However, not just any player without a contract is eligible to become a free agent. In baseball, in order to be eligible to become a free agent upon the expiration of one's contract, a player must have accumulated six or more years of Major League service time (Major League Baseball, 2006). That is, he must have been on a major league roster for at least a sum of six years before becoming a free agent. Service time can be accumulated while a player is on an active roster or is injured. A player does not accumulate service time while playing in the minor leagues (each major league team has some affiliated minor league teams to which it can send its players who it deems are not yet ready to play in the major leagues) (Major League Baseball, 2006).

However, one way for a player to become a free agent before his contract expires, or before accumulating six years of Major League service time, is if he is released by the team he was under contract with (Major League Baseball, 2006). A player is released when a team decides he is no longer wanted in the organization. Usually, players who are released are marginal players at best. For one, if the player was better, it is unlikely that his team would want to get rid of him. Also, if he was better and the team still didn't want him, they would likely

trade him to another team. When a team decides to release a player, the player immediately becomes a free agent. However, while the player is a free agent, the team that released him still has to pay him according to his existing contract; however, the player is free to sign a new contract with a new team regardless of how much service time he has accumulated. Players who are free agents solely because they were just released usually receive low salaries. They are not only less skilled players, but also have very few teams interested in them.

Beginning five days after the World Series ends (usually in late October), players who are eligible officially become free agents and are free to negotiate and sign with any team. The amount of days between the World Series ending and free agency beginning has been as much as fifteen days during the scope of the project, but it is currently at five days (Major League Baseball, 2006).

Arbitration

At the beginning of the offseason, teams have the option to offer arbitration to their own players with expiring contracts who are eligible to become free agents (eligibility requirements are outlined in previous section) (Major League Baseball, 2006). If the player accepts the offer of arbitration, he agrees to return to the team for at least one more season. If the team and player can't agree to a new contract, they will go to an arbitration hearing in which the team and the player will each submit a salary figure for how much they want the compensation to be for the upcoming season. An independent arbitrator chooses which salary is more fair, based on past rulings and the arguments made by the team and the

player (usually represented by his agent). The arbitrator can only choose the salary submitted by the team or the one submitted by the player, but nothing else.

If the player rejects the team's offer of arbitration, he is a free agent. However, depending on how well the player has performed in the past, he may be designated as a player in which his old team will receive compensation in the form of an amateur player draft pick if he signs elsewhere . The former team only receives this compensation if they offered arbitration to the player, he rejected it, and signed with a new team (Major League Baseball, 2006).

In the past, some of the best free agents were specified as being "Type A" or "Type B" free agents at the beginning of each offseason. The best players were "Type A," the next tier of players was "Type B," and the rest of the free agents were not designated in this way (Major League Baseball, 2006). Major League Baseball uses a complex formula to determine which free agents belong to which tier, if any. If a Type A free agent signed with a new team, his new organization would have to give up its first round draft pick in the next amateur draft to the player's former team as compensation for the player leaving (Major League Baseball, 2006).

If a Type B free agent signed with a new team, the player's previous team would receive an additional draft pick, but the new team wouldn't have to surrender any of its own picks (Major League Baseball, 2006). Again, this compensation only happens if the player's former team offered him arbitration.

These designations overall have not affected player salaries very much, but at times diminished the value of the lower rated Type A players, because a

team signing a Type A free agent must surrender its first round draft pick. The elite free agents, however, are not affected because they are the best players in the league; the teams that sign them do not mind losing the draft pick because of the high caliber of the player that they are signing. However, the weaker of the Type A free agents are very good players, but not necessarily elite. Therefore, teams sometimes become hesitant to forfeit a future draft pick in order to sign a player who is not elite, resulting in these players sometimes getting paid less money.

Another result has been that some of these players who are ranked as a Type A free agent have chosen not to even reach the free agent market. When their teams offered them arbitration at the beginning of the offseason, some of the Type A players who felt as if the draft pick compensation would hurt their free agent value have opted to accept arbitration and stay with their organization, with an arbitrator deciding the player's salary for the next season. This system has been changed under the newest CBA. However, this is the system that was in place for the contracts signed during the scope of this project (2002—2012).

Arbitration does not only apply to players eligible for free agency, as outlined above. Before a player accumulates six years of Major League service time, there are different rules for how they sign new contracts during these six years prior to their free agency eligibility. In general, when a player has less than three years of service time, the team can choose to pay him any salary they want, provided that it is at least at the minimum salary ($480,000 for the 2012 season) (Major League Baseball, 2006). These salaries are usually paid in separate one year contracts for each of the player's first three years in the Major Leagues.

When a player has accrued between three and six years of Major League service time and his contract expires, he is in a different situation. He is not yet eligible for free agency. He is also past the time period when his team can pay him the league minimum. This is where arbitration comes into play. Each year between having three and six years of service time, the player and his team can submit to arbitration (Major League Baseball, 2006). Similar to the process outlined previously, each party submits their desired salary number and the arbitrator can only choose one of the two submitted figures. The arbitrator is asked to rule based on comparable arbitration cases and how much service time the player has. For example, if a player with three years of service time (first time arbitration eligible) and a player with four years of service time (second time arbitration eligible) have the same performance statistics, the player with four years of service time will be rewarded a higher salary at his arbitration hearing.

During this six year period before a player becomes eligible for free agency, he is also allowed to negotiate one year or longer term contracts with his current team. Some players choose to sign a long term contract and never go to arbitration, while others opt to go to arbitration each year they are eligible for it before they reach free agency.

As soon as the offseason begins (usually late October), a team knows which of its players will be eligible for arbitration based on Major League service time. Arbitration hearings usually take place in February. Therefore, the team and the player have a significant period of time to discuss a one year contract

settlement, signing a long term deal, or not agreeing to a contract and actually following through to the arbitration hearing.

In summation, before a player is eligible for free agency, they will be paid a salary close to the league minimum for three years, and then go to arbitration for three years, unless they agree to a contract with their team before their arbitration hearing. There are some situations in which a player with between two and three years of service time can become eligible for arbitration (Major League Baseball, 2006). These players are called "Super Two" players. They will only be paid approximately the minimum salary for two years, and will be eligible to go to arbitration four times before free agency eligibility. In order to be a Super Two player, you must be in the top 22% in accumulated service time among all of the players who have between two and three years of service time, with at least 86 days of service time in the previous season (Major League Baseball, 2006). Teams sometimes try to avoid allowing their players to accumulate the service time to become a Super Two, because it results in the player getting an extra year of arbitration replacing a year of getting paid the minimum salary, which costs the team a lot more money. This status affects long-term contract negotiations, because if a player looks like he might gain Super Two status and he is negotiating a potential long term contract with his team, he can demand more money than a player who will not qualify for Super Two status.

If a team has a player that it no longer wants in the organization and the player is eligible for arbitration, the team can choose to non-tender the player. This means that instead of submitting to arbitration, the team has opted not to

tender the player a new contract for the upcoming season. This is very similar to releasing a player. However, this happens when a player does not have a current contract, so he is not being released from a contract, he is simply not being tendered a new contract by his team which has exclusive control over him.

When a player is non-tendered, he becomes a free agent even though he doesn't have the six years of Major League service time. In a similar fashion to players who are released, players who are non-tendered are likely to earn very low salaries for the same reasons. They are typically underperforming players, and sometimes have health concerns which lead their original team to prefer to non-tender them rather than pay them what they would earn in arbitration.

Arbitration salaries can be significant. Players are almost always rewarded a raise over their previous salary in arbitration. In the 2011-2012 offseason, the 142 players who filed for arbitration received an 89% raise on average from their 2011 salaries (Associated Press, 2012). Therefore, a common non-tender candidate is someone who had a very good season, earned a high salary in arbitration, and then had a disappointing season, but would still likely earn a raise through arbitration due simply to another year of accumulated service time. This player's team may prefer to non-tender the player rather than provide him a salary raise after a disappointing season.

Contract Extensions

A player and his team can negotiate a contract extension at any time. It doesn't matter how much service time the player has, if he is eligible for free

agency, or how much time he still has on his current contract. The player and his own team are always free to negotiate extensions to his current contract. This is very common when a player is in his arbitration eligibility stage before his free agency eligibility. Often, both the player and the team seek some stability rather than having three separate one year contracts during that time period. Therefore, it is common for a player and his team to negotiate a contract extension to cover some or all of the player's three (or four) arbitration years before he becomes eligible for free agency. Sometimes, these contract extensions even cover time periods in which the player would have been eligible for free agency had he not signed the extension. These extensions typically pay the player more money, all else equal, due to the fact that he is delaying free agency, where he can sell his skills on an open market, rather than just arbitration years, where he would make less than if he was on the open market.

Competitive Balance Tax

In baseball, teams' ability to generate revenue varies greatly depending on the size of the market in which they are located. For example, the New York Yankees, playing in baseball's largest market, generate much higher revenues from their television rights and ticket sales than the Oakland Athletics, located in one of baseball's smallest markets. Teams that generate more revenue have more money to spend on acquiring the best players, forming a self serving competitive advantage. In order to attempt to combat this inequality and level the playing field, Major League Baseball has a competitive balance tax (also known as a luxury tax),

which taxes teams that go over a certain payroll threshold (Major League Baseball, 2011). The tax money collected goes into a pool that is re-distributed to teams in the smallest markets. In order to calculate a team's payroll for the purposes of the competitive balance tax, each player's average annual value of his contract is used, rather than his actual salary for that specific season. Any signing bonuses are also averaged out over the full course of his contract for competitive balance tax calculations.

The tax threshold is usually a very high payroll that only one or two teams exceed each season. The tax also gets harsher for teams that go over the threshold in consecutive years. Under the most recent Collective Bargaining Agreement, the tax rates are as follows:

First Time Payer	17.5%
Second Consecutive Year Paying	30%
Third Consecutive Year Paying	40%
Fourth Consecutive Year Paying and All Subsequent Years	50%

(Major League Baseball, 2011)

Tax payments are calculated on just the amount of the overage above the threshold, not the team's full payroll. The threshold for 2013 is $178 million, and it will rise to $189 million in 2014 (Major League Baseball, 2011).

Chapter 3

The Contract Negotiation

A typical Major League Baseball contract negotiation consists of two parties: the player and the team. The team is usually represented by the General Manager. The player is usually represented by his agent. The agent's job is to negotiate the highest salary possible for the player. He does this by trying to showcase his client's on-field abilities, comparing him to other players who received desirable contracts, and trying to get as many different teams interested as possible to increase the demand for his client. He also tries to "time the market" to try to sign a contract when the demand for his client would be the highest. It is also of the agent's best interest to get his client the highest salary for the longest period of time, as agents get paid as a percentage of the salary that they negotiate for their clients.

As an example of showing an agent's role in negotiations, I will discuss Scott Boras, Major League Baseball's most well-known player agent. Boras represents well over 100 baseball players, and is known for always maximizing how much his clients get paid. He is known to create a binder for each of his high profile free agents which uses statistics to compare his clients to the best players of all time and some of the highest paid players of all time (Crasnick, 2011). He circulates these binders to any team which he thinks may have any remote interest in his client. Boras tends to wait out the market, and usually signs his clients to contracts with teams relatively late in the offseason (late December or January as opposed to November or early December).

These strategies will be put to the test later in this paper. I will show how much of an affect Scott Boras, as well as some other prominent agents, have on

their clients' salaries. I will also show how effective some of these agents' strategies are, like waiting out the market versus signing early in the offseason.

Chapter 4

Methodology

The methodology used for analysis in this study is ordinary least squares regression. I will use multiple regression to isolate many different factors that may be related to player contracts, by using the classical linear regression model of ordinary least squares regression. This method gives the best linear unbiased estimators of the different factors relating to contracts that I will analyze.

There are some inherent assumptions in the ordinary least squares regression technique. When broken, adjustments are made to the regression results in order to get the best linear unbiased estimators of the different independent variables. In linear regression, an error term is included and is calculated in results as the actual value of the dependent variable for that observation minus the value that the regression equation would have predicted for the observation. It is within this error term that assumptions of linear regression are often broken (Gujarati, 2011).

The first assumption that is often broken is that the error terms are homoskedastic, which means that they have a constant variance (Gujarati, 2011). The condition known as heteroskedasticity is when the variance of the error term is not constant. When heteroskedasticity is present, I will adjust using White's

heteroskedasticity correction, which fixes the problem by replacing the standard errors of coefficient estimates with White's heteroskedasticity-consistent standard errors (Gujarati, 2011).

Additionally, it is assumed in linear regression that the error terms are independent of each other. Autocorrelation is a condition in which the error terms are related to each other (Gujarati, 2011). When autocorrelation is present, I will adjust using Newey and West's correction, which replaces the standard errors of coefficient estimates with heteroskedasticity and autocorrelation consistent standard errors (Gujarati, 2011). This correction also works when both heteroskedasticity and autocorrelation are present.

Dependent Variable

The dependent variable for my analysis is the value of each player's contract. However, there are many ways to value player contracts. The media tends to value contracts in terms of the total amount of money that the player will earn over the course of the contract, or in terms of average annual value. This first method is represented by the sum of all payments from the team to the player. The average annual value method takes this sum and divides it by the number of years in the contract.

However, basic financial theory tells us that money has a time value; a dollar today is worth more than a dollar in the future based on interest rates. The way that the media reports salary figures does not differentiate between when the team pays players. Some contracts are "backloaded" which means that the yearly

salary increases throughout the duration of the contract, while others are "frontloaded" which means that the highest salary is in the first year, with a decreasing salary each year thereafter. Clearly, two contracts with the same average annual value can in reality be worth very different amounts based on the time value of money.

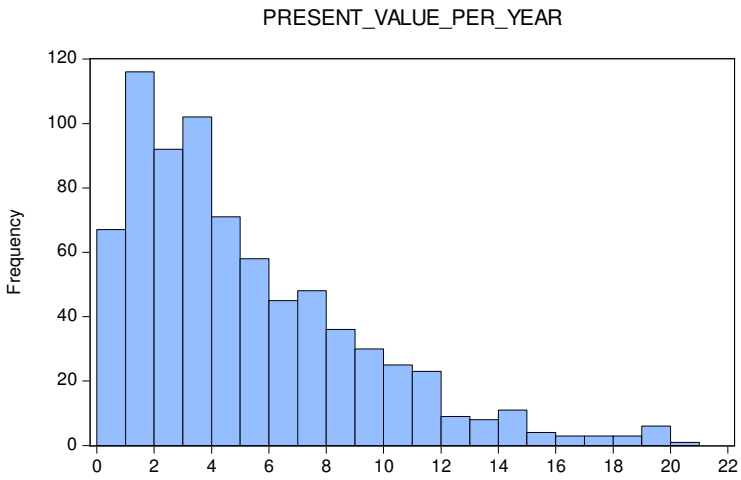
My valuation of each contract will be based on the present value of each payment from the team to the player, as an average divided by the number of years in the contract. For simplicity purposes, I will assume all payments are made at the end of the year in which they are due. Major League Baseball's Collective Bargaining Agreement states that in present value calculations, the interest rate to be used is "equal to the total of the prime interest rate in effect at The J.P. Morgan Chase Bank on the immediately preceding November 1, plus one percent, rounded to the nearest full percentage point." These are the instructions regarding interest rates in all of the Collective Bargaining Agreements throughout the span of this project's data.

However, this methodology does not account for differences in the length of contracts. If there are two contracts with the same average present value per year, the one with more years would be more valuable. In order to account for that, I will use my valuation of present value per year as well as the number of years as a separate dependent variable. I will present results reflecting present value per year, as well as reflecting the number of years in the contract.

Additionally, baseball teams have two distinct groups of players: hitters and pitchers. Hitters and pitchers possess specific skill sets and their performance

is measured in completely different ways. Therefore, I will be presenting results and analysis that is hitter-specific, pitcher-specific, and results that pertain to both hitters and pitchers.

The average present value per year of contracts signed in my sample range is $5.201 million; $5.375 million for pitchers and $5.028 million for hitters. This difference signifies a scarcity of good pitchers relative to good hitters. Overall, the distribution of salaries is right skewed. This is caused by outliers being present on the high range of salaries but not the low range, due to Major League Baseball's CBA containing a minimum salary, but no maximum salary. Therefore, the worst players can't make a salary less than a certain number, but the best players can make an unlimited salary.



Independent Variables

As previously stated, my focus in this project is on factors affecting player salaries other than their on-field production. However, in order to set a baseline for salaries, I must include on-field production in my regression analysis to account for differences in talent. The main performance statistic that I will use is Wins Above Replacement (WAR). The basic idea behind WAR is to isolate a

single player's win contribution to any given team (FanGraphs, 2013). In other words, WAR represents how many more wins a single player provides than a replacement player would. A replacement player is considered a player that would ordinarily be a reserve player on the bench or a higher-level minor league player (FanGraphs, 2013). There are two different versions of WAR. Both have the same basic idea behind them, and they are extremely similar. The differences between the two versions are small calculation differences done by their providers, notably the way they calculate pitching skills, which defensive metric they use, and which baserunning metric they use. I will use the version of WAR from FanGraphs.

WAR takes everything a player does, whether it is hitting, fielding, running the bases, and/or pitching, and combines it into one number. It also adjusts for what position the player plays, or if he can play multiple positions (FanGraphs, 2013). In baseball, there is a scarcity at some positions that are more difficult to play than others. For example, catcher and shortstop are known as positions that are very difficult to play, and there are not many catchers and shortstops who are skilled at both hitting and fielding. Usually, you can find a catcher or a shortstop who is a good fielder but a below average hitter; or a poor fielder and an above average hitter, but rarely one who is good both offensively and defensively. WAR adjusts for this and places a premium on the positions that are most scarce and most difficult to play.

WAR is also scaled to the league averages of every year, so players in high scoring eras can be compared to players from low scoring eras using WAR (FanGraphs, 2013). WAR is also adjusted for stadium factors such as the size and

dimensions of the ballpark (FanGraphs, 2013). In baseball, some stadiums are known as "hitters' parks" while others are known as "pitchers' parks." For example, the home run wall at Yankee Stadium is fairly shallow (314 feet to the right field fence), and closer to home plate than the home run wall at many other stadiums. Therefore, it is easier to hit home runs in Yankee Stadium than many other stadiums, so it is known as a hitters' park. The same is true in opposite cases, as well. Comerica Park, in Detroit, has home run walls that are very far away from home plate, making it more challenging to hit home runs there, which is why Comerica Park is known as a pitchers' park.

	Comerica Park	**Yankee Stadium**
Left Field	345 feet	318 feet
Left Center	370 feet	399 feet
Center Field	420 feet	408 feet
Right Center	365 feet	385 feet
Right Field	330 feet	314 feet

(Detroit Tigers, 2013) (New York Yankees, 2013)

Other reasons for different stadiums to have affects like this could be climate. Coors Field, in Denver, Colorado, is also an extreme hitters' park because due to the thin air of Denver's high altitude, baseballs hit in the air tend to go farther than they would in a stadium in a lower altitude, making it easier to hit home runs at Coors Field. WAR takes these factors into account so that players who hit home runs in hitters parks don't get as much credit for them as players who hit home runs in pitchers parks. In general, the following table represents normal what typical WAR figures are for different kinds of players:

Minor League Player/Bad Bench Player	<0 WAR
Bench Player	0-1 WAR

Part Time Player	1-2 WAR
Average Starting Player	2-3 WAR
Good Starting Player	3-4 WAR
All-Star	4-5 WAR
Superstar	5-6 WAR
Most Valuable Player Award Candidate	6+ WAR

(FanGraphs, 2013)

Furthermore, a hitter's value can be broken down into four elements: batting, baserunning, fielding, and positional values. Each of these values represent how many runs above average the player was worth. For example, a player with a batting value of 10 means that over the course of that season, his batting alone was worth 10 runs to his team above what an average player would produce. A baserunning value of 10 means that the player's actions while running the bases was worth 10 more runs to his team above average. A fielding value of 10 means that the player's fielding saved 10 runs from being allowed to opponents compared to an average player. Positional values are the component of WAR which adjusts for position difficulty and scarcity discussed above (FanGraphs, 2013). I will perform analysis on all players using WAR. Additionally, I will analyze hitters in terms of batting, baserunning, fielding, and positional values to see which of these values most affects their salaries.

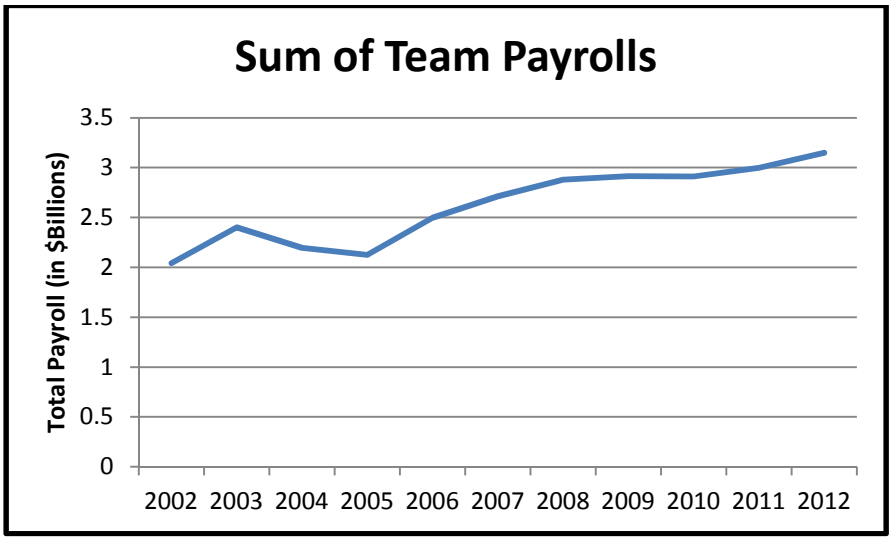
Other independent variables included are the player's age, whether he is resigning with the same team or signing with a new team, the offseason during which the contract is signed, the month of the signing, and how many years the

player has remaining until he would become a free agent. I also will take into account other factors such as a no-trade clause, which is a clause that a player and team may agree to write into a contract which prohibits the team from trading the player to another team.

Conventional wisdom about baseball players documents that they perform at their best in their late twenties to early thirties. Therefore, players in this age range or players who have not yet reached this age range are in the highest demand. I expect age to have a negative relationship with salary.

The term "home town discount" is tossed around by the media often during Major League Baseball's free agency period. The theory behind the term is that if a player really wants to play for his pre-existing team, when he becomes a free agent he will be willing to take less money to remain with his organization rather than make more money and sign with a different team. I will test the validity of that theory.

Over time, as previously discussed, total team payrolls in Major League Baseball have steadily increased.



Therefore, I will include the year of the offseason in which contracts were signed as an independent variable to capture this upward trend of player salaries. This will also explain any periods that had particularly good players who signed new contracts in the same offseason. I will exclude the 2002-2003 offseason variable, as the results for all other years will be in comparison to 2002-2003. The time of year in which a contract is signed will be indicated by the months of the offseason, starting with September, the last month of MLB's regular season, and ending with April, the first month of MLB's regular season. This will test if players tend to be overpaid or underpaid based on what point in the offseason they choose to sign their contracts. September will be omitted from results as a comparison point for all other months.

I expect the number of years until free agent eligibility to have a profound negative effect on players' salaries. This is because when a player is a free agent, which would be indicated by zero years until free agency, he is in a free, open market to sell his services to any of 30 teams. However, if a player is signing a contract extension, but is not a free agent, he can only sell his services to his current team, which would likely result in him not being paid open market value. The longer that a player has until he will become a free agent, the greater discount he should have to take to sign a contract with his current team.

Additionally, the player's agent will be included as a series of variables. An agent should have a profound effect on his clients' contracts, because his job is to get them the highest salaries possible. For regression results including only hitters or only pitchers, I only included agents that were responsible for at least

eight contracts signed in the sample. For results including both hitters and pitchers, agents responsible for at least ten contracts are included.

The team a player is signing with may also affect the salary he gets paid. Some teams, like the New York Yankees, have reputations for overpaying for players, while others, like the Oakland Athletics, have reputations of being able to find undervalued players and sign them at discounted salaries. The Colorado Rockies are omitted from regression results to serve as a comparison point for other teams.

As previously stated, no-trade clauses are rare features of contracts. Some teams even have policies in which they refuse to give any player a no trade clause, because it inhibits their ability to trade the player should the contract not work out as planned. When teams do agree to incorporate a no-trade clause into a contract, it is usually for a very good or elite player. If negotiated correctly, the player should have to forego some monetary value of his contract in exchange for the no trade provision, which would result in a negative relationship between a no trade clause and salary. I have only included no trade clause as a variable in regressions that do not include teams and agents. This is because some agents and teams often use no trade clauses in their negotiation tactics, and the effect of these no trade clauses is picked up by the agent and team categorical variables rather than by the no trade clause variable when it is included with agents and/or teams.

Chapter 5

Regression Results and Analysis: Present Value Per Year

I will first address results for present value per year of a contract (calculated by present value of contract divided by years of the contract). I will present tables of results for batters, pitchers, and both combined. Within each table, results will include regression results without teams or agents included as variables, with either one included, and with both included.

Coefficients for each variable represent the relationship of that variable, on average, with the present value per year (in millions) of a player's contract for each one unit increase of that variable. For example, a coefficient for WAR of one would mean that for every increase in one unit of WAR, a player will, on average, earn an additional one million dollars in their contract in terms of present value per year. A negative coefficient signifies an inverse relationship, in which when the variable increases, the player's salary decreases. For categorical variables, like agent, each agent's coefficient signifies the relationship between that agent and his clients' salaries (in millions of dollars per year), on average. The T-Statistics represent the ratio of the coefficient to its standard error. The higher the absolute value of the T-Statistic is, the more statistically significant the coefficient is. In all tables, *** denotes statistical significance below 1%, ** denotes statistical significance below 5%, and * denotes statistical significance below 10%.

Table 1: Present Value Per Year Results
Hitters Only

	Teams, Agents Not Included	Teams Included, Agents Not	Agents Included, Teams Not	Teams, Agents Included
Variable	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)
Constant	0.1308	1.1777	-4.1575	-0.3143

	(0.0160)	(0.1320)	(-0.4560)	(-0.0329)
WAR	1.1732*** (14.1936)	1.3701*** (16.0242)	1.3089*** (15.7909)	1.3033*** (15.2051)
Age	-0.0048 (-0.0093)	0.0174 (0.0316)	0.3144 (0.5440)	0.1131 (0.1874)
Age^2	-0.0013 (-0.1596)	-0.0011 (-0.1318)	-0.0059 (-0.6414)	-0.0025 (-0.2594)
Re-sign	0.8441** (2.4855)	0.5304 (1.4802)	0.9351*** (2.5998)	0.7081** (1.9862)
2003-2004	0.3140 (0.4929)	-0.4682 (-0.8051)	-0.1463 (-0.2605)	-0.7103 (-1.1069)
2004-2005	1.5327** (2.5199)	1.0381* (1.8582)	1.0832** (2.4322)	0.7846 (1.4473)
2005-2006	2.0650*** (4.4706)	1.6258*** (3.4398)	1.3204*** (3.5421)	1.2274** (2.5207)
2006-2007	2.5417*** (4.9368)	2.5188*** (4.6347)	2.4585*** (5.9210)	2.1482*** (3.9388)
2007-2008	2.1909*** (4.1646)	2.2390*** (3.6228)	2.1599*** (3.6942)	1.9239*** (3.0556)
2008-2009	2.6768*** (5.0990)	2.5174*** (4.3561)	2.3038*** (4.8492)	1.9996*** (3.4251)
2009-2010	1.8754*** (3.8450)	1.6250*** (2.7906)	1.7013*** (3.3920)	1.3770** (2.4320)
2010-2011	2.8421*** (6.0357)	2.3154*** (4.4647)	2.1065*** (4.6111)	1.8340*** (3.3991)
2011-2012	2.4020*** (4.4909)	1.9837*** (3.7511)	1.9581*** (4.0883)	1.6365*** (2.9708)
Oct	-1.0055 (-0.5672)	-0.1988 (-0.1644)	0.0302 (0.0256)	-0.1211 (-0.1000)
Nov	0.8828 (1.4429)	-0.1356 (-0.1754)	0.0793 (0.0932)	-0.1678 (-0.1980)
Dec	1.1684* (1.8319)	0.0093 (0.0124)	0.2413 (0.3278)	-0.0225 (-0.0279)
Jan	0.7227 (1.1782)	-0.2216 (-0.2806)	-0.5778 (-0.7790)	-0.5674 (-0.6871)
Feb	1.2795 (1.5817)	0.1424 (0.1541)	0.0725 (0.0787)	-0.1457 (-0.1488)
Mar	1.6175** (2.0224)	1.3972 (1.4659)	1.1566 (1.2402)	1.2133 (1.2644)
Apr	1.9129** (2.3591)	1.7951* (1.7225)	1.4163 (1.4167)	1.7530 (1.6309)
Years to Free Agency	-0.8919*** (-5.1527)	-0.9776*** (-4.6388)	-0.9877*** (-5.2751)	-0.9167*** (-4.3178)
No Trade Clause	4.4220*** (6.5286)			
Boras, Scott			1.7833***	1.9012***

			(2.7429)	(2.8327)
Close, Casey			0.7941 (0.7733)	1.0667 (1.0897)
Garber, Bob			-1.3312** (-2.4071)	-0.7493 (-0.9715)
Genske, Greg			1.7482* (1.7810)	1.7771* (1.7015)
Goldschmidt, Eric			-0.3192 (-0.4611)	1.4072 (1.6335)
Greenberg, Peter			-0.0955 (-0.1085)	-0.6593 (-0.7594)
Katz, Adam			0.0650 (0.0670)	-0.0975 (-0.0880)
Levinson, Sam & Seth			-0.0670 (-0.1802)	0.0524 (0.1240)
Lozano, Dan			1.3852* (1.8414)	1.4588* (1.8500)
Nero, Alan			-0.9179 (-0.8131)	-0.5767 (-0.5178)
Peters, Brian			0.9015 (0.7738)	1.3172 (1.1171)
Tellem, Arn			0.5681 (0.7425)	0.4654 (0.6017)
Wasserman Media Group			-0.9231 (-1.5405)	-0.6042 (-0.7807)
NYY		-0.5125 (-0.5279)		-0.7730 (-0.8336)
BOS		-1.1911 (-1.2785)		-0.9630 (-1.0824)
TB		-1.4640 (-1.1235)		-1.6389 (-1.2258)
TOR		-1.1326 (-1.3643)		-1.0357 (-1.3080)
BAL		-1.6694* (-1.8342)		-1.0335 (-1.1455)
CHW		0.0555 (0.0597)		-0.0871 (-0.0911)
KC		-1.5506 (-1.6449)		-1.3792 (-1.4404)
CLE		-2.1630** (-2.0196)		-2.1687* (-1.8324)
DET		0.7148 (0.5328)		0.7145 (0.5504)
MIN		-0.5428 (-0.4557)		-0.2703 (-0.2284)
LAA		0.9547		1.4388

		(0.6226)		(0.9404)
TEX		-0.7238 (-0.7834)		-0.9882 (-1.0374)
HOU		-0.6820 (-0.5330)		-0.1983 (-0.1593)
OAK		-1.2416 (-1.1862)		-1.1609 (-1.1419)
SEA		-1.9988** (-2.4226)		-2.2714*** (-2.7329)
NYM		-0.9811 (-0.9708)		-0.9383 (-0.9388)
ATL		-1.3288 (-1.2167)		-0.8858 (-0.8333)
MIA		0.8619 (0.6959)		1.2647 (0.9363)
PHI		0.3787 (0.2923)		0.3426 (0.2713)
WAS		-0.1541 (-0.1158)		-0.0930 (-0.0715)
CIN		-1.0718 (-1.1463)		-1.0545 (-1.1574)
STL		1.0351 (0.9162)		0.9194 (0.8120)
CHC		0.1120 (0.1109)		0.1416 (0.1629)
MIL		0.7599 (0.6442)		0.5420 (0.4641)
PIT		-1.2382 (-1.4015)		-0.9598 (-1.1052)
SF		-0.7569 (-0.7285)		-0.5471 (-0.5137)
SD		-2.1183** (-2.5038)		-2.3264*** (-2.7743)
LAD		-0.2136 (-0.2108)		-0.0936 (-0.0968)
ARI		-0.4295 (-0.4593)		-0.6470 (-0.6943)
R^2	0.6208	0.5938	0.5824	0.6211
Adjusted R^2	0.5991	0.5370	0.5444	0.5520

All results in Table 1 reflect Newey-West heteroskedasticity and autocorrelation consistent standard errors.

Table 2: Present Value Per Year Results
Pitchers Only

	Teams,	Teams	Agents	Teams,

	Agents Not Included	Included, Agents Not	Included, Teams Not	Agents Included
Variable	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)
Constant	1.9374 (0.2887)	-1.1718 (-0.1564)	-0.7639 (-0.1121)	-2.7707 (-0.3695)
WAR	1.4585*** (18.9428)	1.4731*** (15.4595)	1.5229*** (20.3391)	1.4351*** (15.1792)
Age	-0.0078 (-0.0197)	0.1918 (0.4553)	0.1684 (0.4154)	0.3037 (0.6904)
Age^2	-0.0010 (-0.1628)	-0.0046 (-0.7397)	-0.0039 (-0.6365)	-0.0066 (-0.9883)
Re-sign	0.4815 (1.4324)	0.6456 (1.5354)	0.5662* (1.6620)	0.6046 (1.3616)
2003-2004	-0.1033 (-0.1047)	0.3850 (0.3701)	-0.3821 (-0.3824)	0.1822 (0.1470)
2004-2005	0.3238 (0.3319)	0.6149 (0.6164)	0.3264 (0.3320)	0.4769 (0.3722)
2005-2006	0.6598 (0.6620)	0.8942 (0.9144)	0.2649 (0.2617)	0.4682 (0.3716)
2006-2007	2.0765** (2.1612)	2.6341*** (2.6285)	2.0206** (2.0859)	2.4496* (1.9396)
2007-2008	2.3008** (2.3923)	2.8096** (2.5638)	2.3921** (2.4490)	2.7844** (2.0866)
2008-2009	2.2721** (2.3844)	2.4183** (2.4378)	2.0286** (2.1025)	2.1845* (1.7365)
2009-2010	2.8811*** (3.0441)	2.9633*** (2.9285)	2.6833*** (2.7946)	2.8744** (2.3039)
2010-2011	2.0198** (2.2028)	2.2028** (2.2236)	2.0475** (2.2069)	2.2697* (1.8425)
2011-2012	2.5917*** (2.8222)	2.8177*** (2.7808)	2.6117*** (2.8073)	2.8902** (2.2806)
Oct	0.6046 (0.4942)	0.4120 (0.3400)	0.2350 (0.1876)	0.3316 (0.2338)
Nov	0.3528 (0.4036)	0.5136 (0.6533)	0.3801 (0.4327)	0.5176 (0.6235)
Dec	0.3394 (0.8287)	0.3785 (0.5062)	0.3065 (0.3682)	0.4187 (0.5259)
Jan	-0.3114 (-0.3784)	-0.2996 (-0.3749)	-0.6620 (-0.8029)	-0.6063 (-0.7817)
Feb	-0.5101 (-0.5814)	-0.3948 (-0.4720)	-0.9687 (-1.0975)	-0.7347 (-0.8203)
Mar	0.5495 (0.5895)	0.6582 (0.7997)	0.4224 (0.4532)	0.5377 (0.6335)
Apr	0.5978 (0.6429)	0.3508 (0.4024)	0.4209 (0.4529)	0.5658 (0.6604)

Years to Free Agency	-1.0988*** (-6.0046)	-1.1483*** (-6.0857)	-1.0721*** (-5.7865)	-1.0319*** (-5.0848)
No Trade Clause	1.8011*** (3.5490)			
Boras, Scott			1.8492*** (3.3864)	2.2015*** (4.0941)
Clifton, Gregg			1.5466* (1.9170)	1.2732 (1.3794)
Genske, Greg			0.6646 (0.9048)	0.3915 (0.4835)
Hendricks, Randy & Alan			1.2287** (2.0003)	0.7161 (1.0114)
Horwits, Dan			0.8995 (1.1681)	0.9707 (1.2833)
Landry, Greg			-0.3238 (-0.3213)	-0.0623 (-0.1349)
Levinson, Sam & Seth			-0.1863 (-0.3143)	-0.2937 (-0.4713)
Meister, Barry			-0.0144 (-0.0217)	0.2213 (0.3092)
Nero, Alan			0.3386 (0.3570)	1.0457 (1.1127)
Thurman, Rick			2.7559*** (3.2711)	2.9648** (2.3230)
NYY		1.6276 (1.3946)		1.6639 (1.5344)
BOS		0.3471 (0.4449)		0.6618 (0.7613)
TB		-0.5653 (-0.6406)		-0.5206 (-0.5117)
TOR		-0.1986 (-0.2740)		0.0850 (0.1163)
BAL		-0.4311 (-0.4318)		-0.7388 (-0.9264)
CHW		0.2735 (0.3642)		0.2276 (0.3132)
KC		-0.7466 (-0.8274)		-1.1513 (-1.1559)
CLE		-0.3154 (-0.3130)		-0.3536 (-0.3883)
DET		1.1345 (1.3617)		1.1719 (1.1688)
MIN		-0.3941 (-0.4418)		-0.2121 (-0.2647)
LAA		0.0309 (0.0352)		-0.0092 (-0.0111)

TEX		-0.1118 (-0.0953)		-0.4734 (-0.4709)
HOU		0.0298 (0.0357)		0.2537 (0.2897)
OAK		1.2351 (0.9847)		1.0373 (0.7677)
SEA		-0.4745 (-0.4865)		-0.6044 (-0.6259)
NYM		0.8724 (0.8877)		0.7386 (0.8028)
ATL		1.3784 (1.4885)		1.2927 (1.4281)
MIA		1.6251 (1.2891)		1.6644 (1.3445)
PHI		0.0275 (0.0276)		0.1064 (0.1096)
WAS		-0.7593 (-0.9153)		-1.0789 (-1.3120)
CIN		0.2765 (0.2954)		0.1247 (0.1444)
STL		0.1285 (0.1571)		-0.0282 (-0.0353)
CHC		-0.3617 (-0.4876)		-0.1826 (-0.2334)
MIL		1.1510 (0.9869)		0.4600 (0.4750)
PIT		-0.6567 (-0.7520)		-0.6880 (-0.7597)
SF		0.6466 (0.6701)		0.3962 (0.4311)
SD		0.0568 (0.0724)		-0.6945 (-0.9016)
LAD		0.4961 (0.5529)		0.4468 (0.5738)
ARI		0.5143 (0.5451)		0.3417 (0.3622)
R^2	0.6266	0.6388	0.6426	0.6695
Adjusted R^2	0.6016	0.5788	0.6080	0.6013

In table 2, "Teams Included, Agents Not" results reflect Newey-West heteroskedasticity and autocorrelation consistent standard errors, and "Teams, Agents Included" results reflect White heteroskedasticity consistent standard errors.

Table 3: Present Value Per Year Results
Hitters and Pitchers Together

	Teams,	Teams	Agents	Teams,

	Agents Not Included	Included, Agents Not	Included, Teams Not	Agents Included
Variable	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)
Constant	4.4899 (0.8780)	3.2871 (0.6079)	2.8926 (0.5516)	4.0448 (0.7327)
WAR	1.2839*** (21.7969)	1.3919*** (23.4632)	1.3694*** (22.7196)	1.3405*** (22.4936)
Age	-0.2371 (-0.7589)	-0.1220 (-0.3800)	-0.1253 (-0.3911)	-0.1639 (-0.4977)
Age^2	0.0026 (0.5532)	0.0008 (0.1728)	0.0011 (0.2166)	0.0016 (0.3158)
Re-sign	0.6820** (2.4638)	0.6528** (2.3082)	0.8075*** (2.6901)	0.7135** (2.3995)
2003-2004	0.5093 (0.9047)	0.1867 (0.3132)	0.1204 (0.2176)	-0.0280 (-0.047)
2004-2005	1.0350* (1.7525)	0.9469 (1.5229)	0.8829 (1.5078)	0.7219 (1.1764)
2005-2006	1.5774*** (2.8873)	1.3700** (2.3698)	1.0872** (1.9948)	1.0391* (1.7926)
2006-2007	2.4457*** (4.3414)	2.5616*** (4.1434)	2.2992*** (4.0328)	2.2423*** (3.6556)
2007-2008	2.4652*** (4.1846)	2.6184*** (4.0860)	2.3717*** (3.7979)	2.3514*** (3.6177)
2008-2009	2.6782*** (4.5014)	2.5006*** (3.9850)	2.3629*** (4.0519)	2.1736*** (3.5503)
2009-2010	2.4278*** (4.4195)	2.2241*** (3.7805)	2.2273*** (3.9995)	2.0574*** (3.5154)
2010-2011	2.5691*** (4.8682)	2.3277*** (4.1157)	2.1652*** (4.0100)	2.0477*** (3.5492)
2011-2012	2.5751*** (4.7327)	2.3682*** (4.0481)	2.3680*** (4.2100)	2.2296*** (3.7436)
Oct	0.4179 (0.4075)	0.3096 (0.3022)	0.5110 (0.5163)	0.2068 0.2061)
Nov	0.2963 (0.5584)	0.0462* (0.0863)	0.0998 (0.1908)	-0.0108 (-0.0195)
Dec	0.6341 (1.2260)	0.2325 (0.4468)	0.3914 (0.7870)	0.1512 (0.2839)
Jan	0.1082 (0.2096)	-0.2383 (-0.4560)	-0.4915 (-0.9872)	-0.5705 (-1.0615)
Feb	0.3028 (0.5117)	-0.0721 (-0.1203)	-0.2550 (-0.4387)	-0.4075 (-.06608)
Mar	1.0334* (1.8133)	0.9828 (1.6020)	0.7290 (1.2629)	0.7139 (1.1450)
Apr	1.2598** (2.0636)	1.0769 (1.6269)	0.8317 (1.3312)	0.8719 (1.3189)

Years to Free Agency	-1.0084*** (-7.675)	-1.0555*** (-7.4661)	-1.0358*** (-7.2272)	-0.9832*** (-6.6522)
No Trade Clause	3.0205*** (6.8360)			
Boras, Scott			1.6972*** (3.7155)	1.7877*** (3.9698)
Clifton, Gregg			1.5312** (2.0523)	1.5046** (2.0093)
Close, Casey			0.4517 (0.4887)	0.4754 (0.5119)
Cohen, Paul			0.8017 (1.0625)	0.4770 (0.6205)
Garber, Bob			-1.1267* (-1.8222)	-0.8076 (-1.3069)
Genske, Greg			1.3356** (1.9758)	1.1734 (1.6402)
Goldschmidt, Eric			-1.1493** (-2.4310)	-1.2807** (-2.1981)
Greenberg, Peter			-0.1969 (-0.2278)	-0.6151 (-0.7299)
Hendricks, Randy & Alan			0.8139 (1.3162)	0.3726 (0.6067)
Hilliard, Steve			1.0281 (1.1549)	0.9888 (1.0084)
Horwits, Dan			0.4955 (1.0022)	0.5470 (0.9981)
Katz, Adam			-0.2454 (-0.3480)	-0.3939 (-0.5468)
Kinzer, Paul			0.6414 (1.0495)	0.6420 (1.0623)
Landry, Greg			1.9301** (2.0387)	1.9623** (2.0152)
Levinson, Sam & Seth			-0.1490 (-0.4665)	-0.2542 (-0.7431)
Lozano, Dan			1.0258 (1.4555)	0.9714 (1.3725)
Meister, Barry			0.5480 (1.0311)	0.7261 (1.3684)
Moye, Michael			1.1756* (1.8687)	1.0520 (1.5762)
Nero, Alan			-0.2940 (-0.3716)	-0.2082 (-0.2478)
Peters, Brian			0.6502 (0.7585)	0.8621 (0.9929)
Reynolds, Larry			-0.1985 (-0.2215)	-0.5865 (-0.6521)

SFX			-0.7855 (-1.3305)	-0.9764* (-1.7678)
Tellem, Arn			0.1931 (0.2766)	-0.0034 (-0.0043)
Wasserman Media Group			-1.1336** (-2.0264)	-0.9014 (-1.4014)
NYY		0.7926 (1.0651)		0.6922 (0.9278)
BOS		-0.3541 (-0.5661)		-0.2736 (-0.4438)
TB		-1.1583 (-1.3712)		-1.3051 (-1.5109)
TOR		-0.6677 (-1.2960)		-0.5262 (-1.0161)
BAL		-1.0812* (-1.7066)		-0.6556 (-1.0927)
CHW		0.0300 (0.0539)		-0.0643 (-0.1076)
KC		-0.9605 (-1.5264)		-0.9857 (-1.5181)
CLE		-1.1485* (-1.6614)		-1.2276* (-1.8697)
DET		0.8651 (0.9993)		0.8915 (0.9943)
MIN		-0.4014 (-0.6139)		-0.1764 (-0.2684)
LAA		0.5752 (0.6977)		0.9309 (1.1254)
TEX		-0.2304 (-0.3365)		-0.5235 (-0.7419)
HOU		-0.2480 (-0.3460)		-0.0101 (-0.0139)
OAK		-0.2783 (-0.3529)		-0.2070 (-0.2615)
SEA		-1.3777** (-2.1639)		-1.3945** (-2.0821)
NYM		0.2142 (0.2982)		0.1486 (0.2020)
ATL		0.2339 (-0.2940)		0.2490 (0.3245)
MIA		1.1507 (1.2969)		1.5501* (1.7346)
PHI		0.3360 (0.4206)		0.2688 (0.3637)
WAS		-0.1704 (-0.2272)		-0.0906 (-0.1218)

CIN		-0.3775 (-0.6030)		-0.2752 (-0.4629)
STL		0.5668 (0.8682)		0.2617 (0.3936)
CHC		-0.0359 (-0.0600)		-0.2954 (-0.4799)
MIL		0.8548 (1.0928)		0.7683 (1.0219)
PIT		-0.9741* (-1.7311)		-0.9380 (-1.6262)
SF		0.0598 (0.0842)		0.0970 (0.1327)
SD		-0.7960 (-1.3780)		-0.9524 (-1.6222)
LAD		0.1137 (0.1843)		0.0943 (0.1586)
ARI		-0.2381 (-0.3949)		-0.4529 (-0.7272)
R^2	0.5952	0.5809	0.5893	0.6109
Adjusted R^2	0.5831	0.5514	0.5634	0.5689

All results in Table 3 reflect White heteroskedasticity consistent standard errors.

Performance Measure: WAR

As seen in the regression results above, a player's performance statistic, represented by WAR, is statistically significant at the 1% level in all results. On average, players make approximately an additional $1.3 million per year for each additional win they can earn for their team according to WAR. This figure tends to be slightly higher for pitchers, which leads to the conclusion that teams are valuing quality pitching higher than hitting success. This is consistent with the baseball mantra of "good pitching beats good hitting" and shows evidence of scarcity of quality pitching in comparison to quality hitting. Young pitchers often are more susceptible to injury, especially to their pitching elbow and shoulder because of the physical stress placed in those areas of their bodies. Comparatively,

young hitters encounter far fewer serious or career-threatening injuries, which makes established pitchers more valuable. Subsequently, when a team needs a pitcher they may be more apt to sign a player outside the organization, whereas when a team needs a hitter they may be more willing to give a young minor leaguer with potential a chance to take the roster spot. To illustrate, another version of Table 1 breaks down WAR into its four components: batting, baserunning, fielding, and positional.

Table 4: Results With WAR Broken Down Into Components
Excerpt of Results with Same Variables as Table 1

	Teams, Agents Included
Variable	Coefficient (T-Stat)
Batting	0.1613*** (15.8900)
Baserunning	0.1176** (2.4696)
Fielding	0.0179 (0.9047)
Positional	0.0030 (0.1012)

Table 4 illustrates the relationships between different aspects of a player's performance and his salary. Batting values have the largest coefficient, followed by baserunning, fielding, and positional variables respectively. Batting and baserunning are also statistically significant, while fielding and positional are not. Unsurprisingly, this shows that teams put the highest emphasis on a player's hitting ability when signing contracts, followed closely by baserunning. These are two values that are easily measured in statistics such as batting average, home runs, and stolen bases, as well as many more advanced statistics. On the other hand, while there is clear value in players who are quality fielders and play

difficult positions, these factors are more difficult to measure and seem to be secondary in contract negotiations between players and teams.

Agents could use this information to try to represent players who are better hitters and baserunners rather than fielders. Conversely, teams could employ a strategy to obtain the best fielders and acquire talent at rare positions because these players may be underpaid compared to players whose value derive from their hitting ability.

Age

The relationship between age and salary is not a linear relationship. In order to fix this problem, age is represented by the binomial age plus age squared. As players age, they typically reach their peak performance in their late twenties and begin to decline in their early thirties. However, due to service time rules outlined in Chapter 2, they typically don't become free agents until at least their late twenties. Typically when players are younger, and more desirable due to not having reached their peak performance level yet, they are solely under their team's control, and don't have an open market to sell their services. This results in lower salaries for much younger players. Once players do reach free agency, though, younger players are more desirable and will likely earn higher salaries due to lower injury skill deterioration risks. These young free agents are typically in their late twenties. Therefore, the youngest players tend to receive lower salaries due to a restricted market before free agency, followed by players who are

free agents at the most desirable age, followed by a decline based on the aging process.

Re-Sign

As previously discussed, the re-sign variable is intended to capture any possible "home-town discounts." Surprisingly, the results show the exact opposite. When evaluating salaries of all MLB players, the data reveals that re-signing with the same team has a positive and statistically significant relationship with salary. Instead of the player taking a discount to remain with his previous team, the organization is paying a premium to keep the player from exploring other options on the open market. This could be a function of players negotiating with their current employer first, and the teams overpaying in order to discourage the player from seeking any other offers. It could also be due to players giving their former team a final chance to top another team's offer before signing, resulting in the former team overcompensating.

Interestingly, this relationship between re-signing with the former team and earning a higher salary is much stronger for hitters than for pitchers. This could be due to pitchers being re-signed to long term extensions long before free agency. If the majority of pitchers re-sign with their team, they should not expect to earn as much of this premium as hitters would expect to earn on the free agent market. This dichotomy could be a result of teams wanting to lock in their best pitchers to long-term contracts at a young age due to the scarcity of quality pitchers.

Years

Each offseason variable in the tables above are in comparison to the 2002-2003 offseason. As expected, there is a general upward trend in salaries that players sign for as time goes on. This is due to the overall economics of MLB increasing the amount that teams are willing to spend on payroll as a whole, including substantial increases in television rights revenues, and increased attendance coupled with escalating ticket prices.

A large jump in salaries appears to occur in the 2006-2007 offseason. The 2006-2007 offseason saw the largest outlier in all contracts included in the data for this report: starting pitcher Barry Zito signed with the San Francisco Giants for seven years, guaranteeing him $126 million ($92 million present value at the time), and was vastly overpaid. Chicago Cubs outfielder Alfonso Soriano also signed a $136 million contract over eight years ($93 million present value at the time), and the organization is still trying to trade him to rid itself of the last two years and $36 million left on his contract. This seemed to start a trend of talented players getting paid salaries that only elite players would previously receive, simply because they were the best players on the free agent market, rather than being deserving of the elite money.

Another offseason that saw higher than average salaries was the 2008-2009 offseason, famous for the New York Yankees signing three of the top free agents: starting pitchers CC Sabathia and A.J. Burnett, and first baseman Mark Teixeira. All three of them were paid very handsomely. They set the bar very high

for comparable players of the offseason. Furthermore, the Yankees were interested in seemingly every free agent that offseason after missing the playoffs, which likely drove up the prices for others simply because the Yankees, baseball's wealthiest and most lavish team, were interested. However, the short=term benefit of the lavish spending led the Yankees to win the 2009 World Series, and one could argue that their return on investment paid immediate dividends.

Months

Although the majority of the results for the months of the year are not statistically significant, we can still garner valuable information from their relationships with salaries, with all results for months being compared to September. The months included are those in the offseason, and immediately prior to and after the offseason (September and April, respectively).

December, March, and April have the highest coefficients, but for vastly different reasons. In March and April, the season is about to start or has just started, and the majority of players signing contracts are typically star players who are signing multi-year extensions to stay with their team; or young players who are signing long term extensions after arbitration hearings. They are often approaching free agency eligibility, and teams are willing to pay them very well in order to shed the risk of losing them to free agency after the season. An example of this can be seen with Cincinnati Reds All-Star first baseman Joey Votto. In April of 2012, Votto, one of the game's best young hitters, was set to

earn $9.5 million, followed by $17 million in 2013, after which he would be eligible for free agency (Euston, 2013). Rather than face the uncertainty of Votto leaving after 2013, and having to compete for his services with an open market, the Reds and Votto agreed to a massive extension in April 2012 that will keep Votto under contract until at least 2023. The deal gives Votto guaranteed financial security, and gives the Reds the stability to know they will not have to compete with other teams to sign Votto as a free agent for at least another decade.

On the other hand, in December, almost every contract signed was a free agent either re-signing with his previous team or moving to a new organization. December is in the middle of baseball's offseason, and is one of the most active times for negotiating and signing player contracts. Every December, Major League Baseball hosts its annual four day Winter Meetings, which is a gathering of all the general managers of the 30 MLB teams, along with most of the prominent agents. This is the time for many free agents to reach agreements on their next contracts. However, is it a wise strategy for free agents to sign contracts at the winter meetings? Or, should they try to establish the market value before the winter meetings? Perhaps they should choose to wait out the rest of the market and sign after the new year begins in January (a favorite negotiating strategy of well-known agent Scott Boras).

The data suggests that on average, the winter meetings is the best time for agents to finalize new contracts for their clients. Many bidding wars between teams occur at the winter meetings, which could help foster an environment in which players maximize their salaries. On the other hand, this also suggests that

teams can seek bargain contracts before the winter meetings at the start of the offseason in November, and after the winter meetings leading up to the start of spring training in February.

Years to Free Agency

As expected, the length of time that a player has remaining until he is eligible to become a free agent has a negative relationship with the value of the contract he is signing. This financial impact is statistically significant at the 1% level in all sets of results. If two equal players are signing new contracts, and one is a free agent while the other is bound to his current team for another year prior to becoming a free agent, basic economic theory tells us that the player who can sell his services to more teams will generate more demand for his services. This enhances negotiating leverage and creates a higher market value for his services. The more time a player is under a single team's control before free agency eligibility, the more of a salary discount he will likely have to take to receive the financial stability of a longer contract.

This negative relationship between years to free agency and salary is significantly larger for pitchers than for hitters. This is most likely because young, developing pitchers exude much more variance in their performances than hitters. A team is taking on more risk by giving a pitcher a contract extension, so the pitcher will have to take more a discount to convince the team to extend his contract. Additionally, pitchers are more susceptible to injury than hitters due to the unnatural motion of throwing a baseball, let alone strenuously throwing a

baseball about one hundred times every five days. This also likely contributes to the bigger discount required for pitchers signing extensions before free agency.

No Trade Clause

All else equal, it was expected that a no trade clause would have a negative relationship with salaries. A no trade clause is a section negotiated into a contract which prohibits the team from trading the player to another team without his approval. This clause has value to the player, so I would expect a player's salary to be lower in exchange for the inclusion of a no-trade clause. As previously stated, a no trade clause is only included as a variable when agents and teams are excluded, due the inherent use of no trade clauses in teams' and agents' strategies.

However, the results show statistically significant and highly positive relationships between no trade clauses and salaries. This is likely because only the best players have enough leverage to command a no trade clause in a contract negotiation.

Tables 1 and 3 support this conclusion because in each of those tables, the relationship between WAR and salary is lowest for the only column in which no trade clause is included as a variable, leading to my belief that the no trade clause variable is showing a higher salary from players who also have very high WAR numbers. These are elite, All-Star caliber players. The results are similar in Table 2, with the relationship between WAR and salary the second lowest in the column with no-trade clause included.

Agents

In baseball, Scott Boras is known as the agent who is superior to all others. He is known to negotiate the highest salaried contracts for his clients. Some teams are unwilling to negotiate with him because of his shrewd negotiation skills. He represents a wide variety of players, from superstars hitting free agency to role players going through arbitration. The data presented suggests that Boras is, in fact, living up to this reputation. In Table 3, with both pitchers and hitters included in the sample, Boras has the second highest coefficients of all agents included (agents with at least 10 contracts signed in the sample are included as variables), and they are all statistically significant at the 1% level. These results suggest that the "Boras Effect" may be worth as much as almost $2 million *per year* for player contracts, certainly justifying the percentage of salary fee that a player would have to pay him for his negotiating services.

One of Boras's well-known tactics is to wait out the market and sign contracts in January or even February. Rarely does a Boras client sign at the winter meetings or earlier. While this data suggests that signing at the winter meetings is most likely to be the time to earn the greatest salary, Boras is a master of waiting until the time is right for his clients, by measuring the interest that teams have in his clients and evaluating the overall market. He often advises his clients not to sign contract extensions prior to reaching free agency, believing he will be able to maximize their value on the open market. He has represented some

of baseball's best players like Alex Rodriguez, Greg Maddux, Manny Ramirez, Prince Fielder, and Mark Teixeira.

Surprisingly, Greg Landry tops the list of agents' coefficients when both hitters and pitchers are included, even higher than Boras. Data suggests that he is worth just slightly below $2 million per year, with statistical significance at the 5% level. However, when we look at pitchers only, his results are negative, and he does not have enough contracts with hitters to qualify for results with hitters only.

Landry has two high-profile clients in starting pitcher Roy Halladay and first baseman Ryan Howard, both All-Stars for the Philadelphia Phillies (Agency Database, 2013). Halladay could contribute to Landry's negative coefficient for pitchers, because in all three contracts he has signed for Halladay, he has agreed to take less money to sign an extension with his current team before reaching free agency (Euston, 2013). This is no fault of Landry, for he was just listening to his client's desires to lock in long-term financial security, avoid a distraction of an expiring contract, and stay with his current team.

Howard, on the other hand, could boost Landry's overall results to the coefficient approaching $2 million. Landry has negotiated two large, record-setting extensions for Howard with the Phillies, that don't seem to be justified based on his WAR from the seasons prior to the extensions (3.0 and 4.6, respectively) (FanGraphs, 2013). He is a very productive player, but not worth the monstrous contract extensions that Landry was able to negotiate for him. Landry has not shown nearly as much versatility as Boras, and these Ryan Howard contracts are the likely source of his outstanding results.

Gregg Clifton is next on the list for overall players, with a coefficient of about $1.5 million that is statistically significant at the 5% level. The relationship is very similar when we look at pitchers alone. Clifton does not have enough contracts signed for batters to qualify for the results for hitters alone. His primary clients have been pitchers Tom Glavine, Mark Mulder, Bronson Arroyo, and outfielder Luis Gonzalez, which shows he has the ability to work for elite players like Glavine and Gonzalez, or more average players like Mulder and Arroyo (Agency Database, 2013). He has been very versatile in having them sign early or late in the offseason, and in both signing extensions and reaching free agent markets. Evidently, Clifton has a great ability to read the market and adjust his strategies to fit each specific client.

Greg Genske has a coefficient of about $1.3 million for overall players with statistical significance at the 5% level when teams are not included as variables. The relationship is less significant when teams are included, which could be evidence that Genske has particularly positive relationships with specific teams. Of his 19 contracts signed, six of them have been with the Yankees and Red Sox, who are both known to be very willing to spend significant money on player contracts (Euston, 2013). This shows that Genske most likely either has a good working relationship with their front offices, or, more likely, he has leveraged a strategy of keeping the Yankees and Red Sox very involved in his negotiations, resulting in these two teams being willing to overpay for his free agents. Genske also seems to specialize in representing hitters, where his relationship with salaries is statistically significant at the 10% level and worth

about $1.75 million, whereas with just pitchers his coefficient is around $0.6 million and not statistically significant. The only elite player he represents is Yankees pitcher CC Sabathia, which makes his results for hitters even more impressive (Agency Database, 2013).

On the other hand, Eric Goldshmidt's results are worse than negative one with statistical significance at the 5% level. Looking at the contracts he has signed, he does not have any big-name clients, which could inherently drive down his relationship with his clients' salaries (Agency Database, 2013). Additionally, many of his clients' contracts were signed early in the offseason, before the winter meetings. Of the eleven contracts he was responsible for, nine of which were free agents. Of those nine, six were signed in November. Goldshmidt likely would be better off pursuing a more patient strategy in which he waits until at least the start of December to sign his clients to contracts with their new teams.

Looking at only pitchers, Boras and Clifton have statistically significant relationships, but Rick Thurman stands out far beyond them, worth almost $3 million per year with statistical significance at the 5% level. Thurman only represents pitchers, with his only clients in this sample being starting pitcher Tim Lincecum, and closers Trevor Hoffman, and Brian Fuentes (Agency Database, 2013). Of the nine contracts he has signed, only three have been in free agency, making Thurman a good fit for pitchers who have a desire to gain long term financial flexibility by signing extensions with their current team.

Thurman has done terrific work for Tim Lincecum, setting a record for someone entering into their first year of arbitration eligibility, signing a two year

contract which paid $10 million followed by $13 million (Euston, 2013). After that contract expired, entering into Lincecum's final season of arbitration, he landed another two year extension paying him $18.5 million followed by $22 million. These are terrific salaries for players to earn in their arbitration eligible seasons.

The value of contracts Thurman negotiated for Fuentes and Hoffman, on the other hand, give Thurman credit for what, in reality, is a product of both teams' high valuation of "closers" and my methodology of using WAR as the statistic to represent players' on-field performance. In baseball, when a team has a small lead (one to three runs) in the ninth inning, they typically utilize a specialized relief pitcher known as the "closer" to get the final three outs of close games. Like other relief pitchers, the closer usually only pitches one inning or less. Usually, he is the best relief pitcher on the team. Each time he closes out a game with a three run lead or less, he earns a stat known as a save.

Saves are not included in the WAR computation, which values a closer just as much as a reliever with the same stats who would pitch the eighth inning rather than the ninth (FanGraphs, 2013). However, the closer earns many saves, which are greatly valued by teams when negotiating contracts. Trevor Hoffman and Brian Fuentes are both closers. WAR doesn't recognize the save statistic and thus, my methodology of using WAR values these players much lower than teams do, because teams like to have players who earn saves. Therefore, my methodology is giving credit to Rick Thurman for negotiating contracts for

Hoffman and Fuentes when in reality, these players are getting paid for their saves which WAR doesn't consider.

Looking at results for hitters only, Boras and Genske stand out yet again. However, Dan Lozano also has a coefficient of approximately $1.4 million with statistical significance at the 10% level. Lozano's best skill may be his ability to recruit clients who are truly all-star caliber and elite level players, including first basemen Albert Pujols and Joey Votto, outfielder Carlos Beltran, and third baseman Alex Rodriguez (Agency Database, 2013). However, these results suggest that he does a great job utilizing excellent contract negotiation skills.

Lozano has shown a great ability to both sign favorable contract extensions as well as free agent contracts. In the section about monthly effects, I referenced a massive contract extension that kept Joey Votto with the Reds through 2023. This extension was negotiated by Dan Lozano, who was able to negotiate this huge contract a full three years before Votto was due to become a free agent. He also negotiated a $100 million contract extension for Albert Pujols with the Cardinals, also three years before Pujols would become a free agent, followed by a $250 million free agent contract with the Angels after the previous extension expired (Euston, 2013).

In 2007, Alex Rodriguez had an opt-out clause in his contract with the New York Yankees and was represented by Scott Boras, who advised him to opt out of the contract so that he could secure a longer-term, higher-paying deal, even though the Yankees threatened to end all negotiations with Rodriguez if he did so (Euston, 2013). After Rodriguez opted out and the Yankees left the negotiation

table, Rodriguez fired Boras and hired Lozano, who helped to not only bring the Yankees back to the table to negotiate a contract for Rodriguez, but secured a record setting $275 million contract for him over ten seasons (with the possibility of it reaching $305 million based on bonuses for setting home run records), showing remarkable ability to negotiate favorable terms on a contract in which the Yankees initially proclaimed they wanted no part of. These are just a few of the examples of the great durability that Dan Lozano has shown in representing his clients and securing them with very favorable contracts.

Contrastingly, Bob Garber shows a negative relationship of about $1.3 million that is statistically significant at the 5% level when teams are not included, and a negative relationship of about $0.75 million when teams are included, although it is not statistically significant. Of his eight contracts signed for hitters, they were all free agent contracts, and all for clients Matt Stairs and Mark Loretta, who have been fairly average players throughout their careers (Agency Database, 2013). He negotiated three contracts for Matt Stairs to play for the Kansas City Royals, which could lead to the more negative relationship between Garber and his clients' salaries when teams are not included as variables. The variable for the Royals shows a negative coefficient, so for the three contracts for Stairs to play with the Royals, the negative Royals coefficient is coming into play, resulting in the coefficient for Garber being not quite as low when teams are included as variables.

Garber has also negotiated two contracts for pitchers, one free agent deal for starting pitcher C.J. Wilson and one extension for starting pitcher Roy Oswalt

two years prior to free agency (Euston, 2013). In the overall results for pitchers and hitters, Garber's coefficients, although still negative, aren't nearly as negative as in the results for only hitters. This shows that he has done a better job negotiating contracts for Wilson and Oswalt than for Stairs and Loretta. Wilson's contract was a five year deal for $77.5 million from the Los Angeles Angels, which was a large contract signed during the 2011 Winter Meetings (Euston, 2013). These results suggest that Garber should focus on getting more pitchers than hitters as clients in the future, while also noting that the pitchers he has worked with are more productive, established players than the hitters he has worked with.

Teams

Looking at Table 3, the results with both hitters and pitchers included in the data, the Seattle Mariners have the most negative coefficient, signing players at almost $1.4 million below their market value per year on average, with statistical significance at the 5% level. This suggests that the Mariners have done the best job of finding players that are undervalued by the rest of Major League Baseball. They tend to re-sign their own players to contracts below market value, showing that in some cases their own players may enjoy playing there and be willing to take less money to stay, despite knowing that the Mariners likely won't pay above market value.

However, when looking at only pitchers, this negative coefficient falls to only about $0.5 million below market value, without statistical significance, while

for only hitters, it is approximately $2 million below market value with statistical significance once again at the 5% level. This shows that the Mariners scouts and front office personnel may not be as proficient at evaluating pitchers, and are better skilled in pursuing undervalued hitters.

Similarly, the Cleveland Indians have a negative coefficient of approximately $1.2 million, with statistical significance at the 10% level, showing that they, too, productively sign undervalued players. They do this in a few different ways. First, 13 of their 19 contracts signed in the sample were re-signing their own players, with 11 of those 13 being contract extensions at a time when the player has at least one year remaining before becoming a free agent. This shows Cleveland's strategy of locking up their best players years before they are eligible for free agency in order to sign them at a discounted price. Many smaller market teams attempt this strategy, knowing that once the players reach free agency, they won't be able to compete with larger market teams to sign them. Additionally, the Indians have avoided signing players at the winter meetings. Of the 19 contracts signed, only one has been in the month of December, the highest paying month according to my analysis. They may be conscious of this trend and avoid signing hyped free agents at the winter meetings.

Similarly to Seattle, Cleveland shows an insignificant (approximately zero) coefficient when only pitchers are included in the sample, and a coefficient of more than $2 million per year below market value for contracts of only hitters. Of the strategies discussed above that the Indians seem to exhibit, they are very similar for both hitters and pitchers. Evidently, the strategies may be more

effective for hitters or may be executed by the team more efficiently for hitters. A cause of this may be the high demand and low supply for quality, young pitchers, resulting in less of a discount taken in order to sign contracts before free agency eligibility.

The San Diego Padres also exhibit coefficients of greater than $2 million per year below market value for their contracts for hitters, with statistical significance at the 5% level. Out of their nine contracts for hitters, only one was signed during December, so the Padres may be taking advantage of finding less prominent times to sign their contracts. However, this may be more a coincidence then an organizational philosophy. Six of their 13 contracts for pitchers were signed in December, showing that they do not shy away from signing players during this peak month. Additionally, they have not frequently signed hitters in December. Rather, the hitters that they are signing may just be inferior players and thus are not the hyped players that are typically signed in December. San Diego's coefficient for pitcher contracts is very close to zero, and this difference may be due to the lower quality hitters they are signing and the fact that they are not signing during December.

Looking at Table 2, the results for only pitchers, none of the teams' coefficients are statistically significant. This may be due to the high demand for pitching. Since pitchers tend to be at higher injury risk than hitters, their salaries may reflect their expected value no matter which team signs them because all of the teams are recognizing the inherent difficulty in finding reliable pitchers. However, the New York Yankees and Miami Marlins exhibit the highest

coefficients, each approximately $1.65 million above market value, although not statistically significant.

The high coefficient of the Yankees should not be surprising. Their General Manager, Brian Cashman, often states that “pitching is the key to the kingdom” referring to the belief that you have to have good pitchers in order to win (Harper, 2011). This leads to the unsurprising results showing his willingness to pay top dollar to secure pitchers. In December 2008, they signed starter CC Sabathia to a contract that was the largest ever for a pitcher at the time (Euston, 2013). They also have given closer Mariano Rivera many large salaries, as high as $15 million per year, which could drive up their coefficient for pitchers similarly to the situation described in the agents section for Rick Thurman negotiation contracts for Trevor Hoffman and Brian Fuentes (Euston, 2013).

Many would expect a similar high coefficient for the Yankees for their hitters, which is surprisingly slightly negative. This does not, however, mean that the Yankees do not spend a lot of money on hitters; they clearly do. However, these results do show that when they do spend large sums of money on hitters, they do so effectively on players who are highly productive, or have at least been highly productive prior to signing the contract.

The Marlins, on the other hand, are known for an unwillingness to spend, quite contrary to the Yankees. However, the results signify that when they do spend on pitchers, they do so ineffectively, spending too much money for the pitchers’ worth. Looking at the contracts they’ve signed for pitchers, six of the seven contracts were signed in December. Many of their hitters have been signed

in December as well, where their coefficient is about $1 million above market value, slightly lower than for pitchers. The Marlins may want to rethink their timing strategy, and try to sign some players at the very beginning of the offseason or wait out the market until after the turn of the new year.

Furthermore, when the Marlins are willing to spend more money, they have tended to do so fairly recklessly. In the 2011-2012 offseason, they were preparing to open a new stadium in the 2012 season, and signed shortstop Jose Reyes, starting pitcher Mark Buehrle, and closer Heath Bell to large contracts (Euston, 2013). While all three players are good, productive players, the Marlins were often criticized for overpaying them. Within 18 months of signing all three high-priced players, the Marlins traded them away because of their large contracts.

Chapter 6

Regression Results and Analysis: Number of Years

In this chapter, I will discuss regression results with the number of years of the contract as the dependent variable, presented in one table with all players (both hitters and pitchers) included in the sample. Within the table, results will include regression results without teams or agents included as variables, with either one included, and with both included.

Coefficients for each variable represent the relationship of that variable, on average, with the duration of a player's contract (in years) for each one unit increase of that variable. For example, a coefficient for WAR of one would mean

that for every increase in one unit of WAR, a player's contract will, on average, last one additional year. A negative coefficient signifies an inverse relationship, in which when the variable increases, the duration of the contract decreases. For categorical variables, like agent, each agent's coefficient signifies the relationship between that agent and the duration of his clients' contracts (in years), on average. The T-Statistics represent the ratio of the coefficient to its standard error. The higher the absolute value of the T-Statistic is, the more statistically significant the coefficient is. In the table, *** denotes statistical significance below 1%, ** denotes statistical significance below 5%, and * denotes statistical significance below 10%.

Table 5: Number of Years Results
Hitters and Pitchers Together

	Teams, Agents Not Included	Teams Included, Agents Not	Agents Included, Teams Not	Teams, Agents Included
Variable	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)	Coefficient (T-Stat)
Constant	2.3236 (0.8885)	2.7034 (0.9592)	2.4023 (0.8775)	3.4567 (1.1933)
WAR	0.3691*** (11.6662)	0.4230*** (12.4071)	0.4286*** (13.9613)	0.4307*** (13.7210)
Age	0.0655 (0.4321)	0.0726 (0.4536)	0.0732 (0.4666)	0.0367 (0.2249)
Age^2	-0.0025 (-1.1223)	-0.0027 (-1.1151)	-0.0027 (-1.1445)	-0.0021 (-0.8841)
Re-sign	-0.2422** (-2.2210)	-0.2516** (-2.2221)	-0.1975* (-1.6604)	-0.2290* (-1.9398)
2003-2004	0.0752 (0.2716)	-0.0917 (-0.2903)	-0.0543 (-0.1834)	-0.1508 (-0.4744)
2004-2005	0.0195 (0.0701)	0.0628 (0.1942)	0.1229 (0.4056)	0.1280 (0.4018)
2005-2006	0.1868 (0.6786)	0.1411 (0.4605)	0.1449 (0.4964)	0.1530 (0.4992)
2006-2007	0.5930** (2.1374)	0.6319* (1.9631)	0.6970** (2.2952)	0.6516** (2.0100)
2007-2008	0.6363**	0.6641**	0.7629**	0.7131**

	(2.0988)	(1.9677)	(2.3785)	(2.1140)
2008-2009	0.4846* (1.8492)	0.4789 (1.6100)	0.5449* (1.9594)	0.5525* (1.8830)
2009-2010	0.2136 (0.8275)	0.1471 (0.4830)	0.2483 (0.8700)	0.2003 (0.6471)
2010-2011	0.5483** (2.1052)	0.4567 (1.5482)	0.5279* (1.9040)	0.4751 (1.6212)
2011-2012	0.6222** (2.3043)	0.5980* (1.9547)	0.6237** (2.1759)	0.6265** (2.0720)
Oct	-0.5498 (-1.3006)	-0.3123 (-0.6837)	-0.5557 (-1.2953)	-0.4019 (-0.8808)
Nov	-0.2932 (-0.8019)	-0.2722 (-0.6726)	-0.4964 (-1.3663)	-0.4013 (-0.9954)
Dec	-0.5447 (-1.5440)	-0.5428 (-1.3748)	-0.7092** (-1.9906)	-0.6262 (-1.5838)
Jan	-0.9471*** (-2.6545)	-1.0319*** (-2.6096)	-1.1351*** (-3.1376)	-1.0846*** (-2.7423)
Feb	-1.0397*** (-2.6476)	-1.0967** (-2.5246)	-1.2261*** (-3.0636)	-1.1688*** (-2.6944)
Mar	0.1939 (0.4677)	0.2839 (0.6230)	0.1005 (0.2334)	0.2238 (0.4813)
Apr	0.6164 (1.4089)	0.7005 (1.4474)	0.4885 (1.0938)	0.6596 (1.3722)
Years to Free Agency	0.3961*** (5.4183)	0.3465*** (4.5256)	0.3101*** (3.9095)	0.3033*** (3.7697)
No Trade Clause	1.1535*** (3.9380)			
Boras, Scott			-0.1835 (-0.7564)	-0.1611 (-0.6410)
Clifton, Gregg			0.4658 (1.3352)	0.4427 (1.2865)
Close, Casey			-0.3461 (-1.2007)	-0.2964 (-0.9988)
Cohen, Paul			0.6641* (1.6564)	0.5487 (1.3976)
Garber, Bob			-0.7606*** (-2.7942)	-0.7049** (-2.5546)
Genske, Greg			-0.1825 (-0.7592)	-0.1883 (-0.7623)
Goldschmidt, Eric			0.1301 (0.3075)	-0.0150 (-0.0322)
Greenberg, Peter			-0.1064 (-0.2662)	-0.3129 (-0.7759)
Hendricks, Randy & Alan			-0.5520** (-1.9684)	-0.6411** (-2.3890)
Hilliard, Steve			-0.5109	-0.5718

			(-1.3634)	(-1.4471)
Horwits, Dan			0.4014** (2.0083)	0.3479* (1.7254)
Katz, Adam			0.1361 (0.5479)	0.1817 (0.6819)
Kinzer, Paul			-0.1999 (-0.4857)	-0.1133 (-0.2861)
Landry, Greg			0.0899 (0.3203)	-0.0214 (-0.0706)
Levinson, Sam & Seth			0.0990 (0.6381)	0.0639 (0.3819)
Lozano, Dan			0.5547 (0.9417)	0.5578 (0.9524)
Meister, Barry			0.1267 (0.5134)	0.1811 (0.7261)
Moye, Michael			-0.7502 (-1.5546)	-0.7683 (-1.4883)
Nero, Alan			-0.6307** (-1.9641)	-0.6468* (-1.9329)
Peters, Brian			-0.0536 (-0.1287)	-0.0794 (-0.2023)
Reynolds, Larry			-0.2854 (-0.7628)	-0.4151 (-0.9895)
SFX			-0.1901 (-0.6137)	-0.3964 (-1.3215)
Tellem, Arn			-0.3998 (-1.3324)	-0.3888 (-1.2493)
Wasserman Media Group			-0.3978* (-1.7060)	-0.4215* (-1.6690)
NYY		-0.4686 (-1.2926)		-0.4461 (-1.2266)
BOS		-0.5346 (-1.6446)		-0.5955* (-1.8014)
TB		-0.4645 (-1.0812)		-0.5267 (-1.2100)
TOR		-0.0300 (-0.0942)		-0.0051 (-0.0159)
BAL		-0.1365 (-0.3211)		-0.2098 (-0.4925)
CHW		-0.2820 (-0.8945)		-0.3033 (-0.9156)
KC		-0.6696* (-1.9200)		-0.6229* (-1.6946)
CLE		-1.0910*** (-2.8161)		-1.0607*** (-2.7474)
DET		-0.2363		-0.2018

		(-0.5936)		(-0.4917)
MIN		-0.5802 (-1.4291)		-0.6224 (-1.5044)
LAA		-0.1544 (-0.3624)		-0.0692 (-0.1635)
TEX		-0.5640 (-1.2318)		-0.5536 (-1.1987)
HOU		-0.4309 (-1.0240)		-0.3733 (-0.9122)
OAK		-0.3889 (-0.9897)		-0.4714 (-1.1512)
SEA		-0.5884* (-1.7834)		-0.6248* (-1.8932)
NYM		-0.1924 (-0.5420)		-0.2363 (-0.6511)
ATL		-0.1556 (-0.4408)		-0.3566 (-1.0022)
MIA		-0.0239 (-0.0583)		-0.0416 (-0.0998)
PHI		-0.4476 (-1.2988)		-0.5637 (-1.5805)
WAS		-0.4995 (-1.1312)		-0.4914 (-1.0668)
CIN		-0.3932 (-0.9634)		-0.5106 (-1.2764)
STL		-0.0796 (-0.1848)		-0.1548 (-0.3492)
CHC		-0.3717 (-1.0941)		-0.4366 (-1.2767)
MIL		-0.3712 (-0.8356)		-0.3423 (-0.7468)
PIT		-0.7877* (-1.7840)		-0.8367* (-1.8735)
SF		-0.6699* (-1.7637)		-0.7369* (-1.8472)
SD		-0.6623* (-1.8922)		-0.7109** (-2.0158)
LAD		-0.9324*** (-2.7461)		-0.9281*** (-2.6500)
ARI		-0.5017 (-1.5211)		-0.4646 (-1.3705)
R^2	0.6051	0.6008	0.6013	0.6177
Adjusted R^2	0.5933	0.5727	0.5762	0.5765

All results in Table 5 reflect White heteroskedasticity consistent standard errors.

WAR, Age, Re-sign

WAR, measuring the on field performance of players, has a positive relationship with the duration of contracts that is statistically significant at the 1% level. This is simply showing that better players earn longer contracts. On the other hand, age (expressed as a binomial age plus age squared) shows that the older a player gets, the shorter duration his contract will be, on average. This also is simple and logical; the older a player is, the less amount of time he will have playing productively, or playing at all, and therefore his contracts will be shorter term deals.

Surprisingly, a player re-signing with his previous team has a negative relationship with the duration of his contract of about 0.2 to 0.25 years, statistically significant at the 10% level. This suggests that when players re-sign, they take contracts for shorter terms. I expected that when they re-sign with their team, they would want to stay in that same city, and would be willing to sign a longer term contract. However, the opposite is shown. This could be related to the results in Chapter 5, which showed higher salaries for players re-signing with their previous team. Perhaps players re-signing have a tendency to demand higher salaries in exchange for allowing the team to make the deal a shorter term contract.

Years, Months

Unlike the present value per year results of a steady increase in salaries throughout the past decade, the duration of contracts has seemed to spike in three

particular offseasons: 2006-2007, 2007-2008, and 2011-2012. Each of these periods have seen the duration of contracts about 0.6 years longer than in 2002-2003 (left out as a variable for comparison sake), with statistical significance at the 10% level for each of their coefficients. There seems to be a steady increase until 2007-2008, followed by a steady decline, followed by another increasing trend from 2010-2011 through 2011-2012. Through the 2007-2008 offseason, the trend seems to be giving out longer free agent contracts to established, yet older, players. We have seen long term free agent contracts fail time and time again, like the Barry Zito contract previously referenced. This could explain the decrease after 2007-2008 seeing less teams giving out long term contracts to free agents unless the player is truly elite. Furthermore, this decrease after 2007-2008 can be partially attributed to the great recession and economic downturn. This inhibited spending across industries around the world, and could be a significant factor leading to the decrease in long term contracts in Major League Baseball.

The more recent increase can be attributed to the recent trend of teams locking up their young stars to long term contract extensions very early on in their careers. These deals give the team the ability to control costs and make sure they can keep their best young players, while providing these young players with long term financial security that they have never had before. These deals have become much more common within the past few years, and they tend to be very long term contracts.

Looking at different times in the offseason during which contracts are signed, it is expected that January and February would have negative relationships

with contract durations. They each have negative relationships of approximately one, with each coefficient being statistically significant at the 5% level. Most free agent contracts are signed during the months of November, December, January, and February. As noted in Chapter 5, December is when many high-priced contracts are signed at the winter meetings. January and February tends to see lower quality players signing smaller contracts, who would logically have shorter term deals. However, this shows that if a player wants to have long term security, his agent should try seek to consummate a deal before January.

The months seeing the longest term contracts in these results are September (omitted from results for comparison), March, and April, although these relationships are not statistically significant. Most of the contracts signed during these months are players re-signing with their previous teams who are not eligible for free agency. These players are usually young and logically will secure longer contracts because they have years remaining before they will be eligible to become free agents and are under the team's control until then.

Years to Free Agency

Years remaining until free agency having a positive relationship with contract duration of between 0.3 and 0.4 once again makes perfect sense. These relationships are all statistically significant at the 1% level. The longer a player will have to wait before becoming a free agent, the longer term the contracts will tend to be.

For example, if a player has completed one season in the major leagues, he has five years remaining under team control before being eligible for free agency: two years during which the team can pay him anything at least the minimum salary required by the Collective Bargaining Agreement, and three years of arbitration eligibility. If he negotiated a four year contract extension, he would then have one more year of arbitration eligibility after the contract expires. Instead, the team and player would likely negotiate a contract of five years or even more so that the player wouldn't have to go through arbitration and the team may be able to delay the player's free agency by signing an extension of more than five years.

No Trade Clause

Similarly to the results in Chapter 5, a no trade clause has a large positive relationship with the duration of contracts that is statistically significant at the 1% level. It is only included as a variable when teams and agents are excluded due to the tendency of some teams and/or agents to often or never include no trade clauses in contracts. As discussed in Chapter 5, only the best players are able to get teams to include no trade clauses in their contracts. These are also the players who are able to secure long term contracts, leading to this positive relationship. Players who want no trade clauses also want to stay with the team that they are signing with, which leads them to also seek a long term contract to stay with the team longer.

Agents

When evaluating agents, Bob Garber again seems to be doing a poor job of negotiating contracts for his clients. Not only does he negotiate below average salaries per year, but he also negotiates contracts lasting approximately 0.75 years less than average, which is statistically significant at the 5% level. Similar to his results for salary per year, this coefficient is a larger negative when teams are not included as variables, possibly due to dealing with the Kansas City Royals often, which also has a negative coefficient.

Randy and Alan Hendricks also have a negative relationship with contract duration, with a coefficient of approximately -0.6 that is statistically significant at the 5% level. They have signed a lot of older clients, like Yankees starting pitcher Andy Pettitte, who play into their late thirties and early forties (Agency Database, 2013). These types of players typically sign a series of one year contracts at this late stage of their careers until they retire.

Alan Nero also has a negative relationship with contract duration of about -0.65, statistically significant at the 10% level. Out of his 15 contracts negotiated in the sample, 11 of them were for starting pitchers Randy Johnson and Chien-Ming Wang, and catcher Jose Molina (Euston, 2013). Randy Johnson was one of the best pitchers in baseball, but all of his contracts in the sample were towards the end of his career, including a three year deal, a two year deal, and a one year deal to close out his career (Euston, 2013). Chien-Ming Wang has been trying to recover from a serious shoulder surgery for several years. He was non-tendered by the Yankees after the surgery, and he signed a one year contract with the

Nationals, followed by two more one year deals with the Nationals. Until he can prove he is healthy and able to perform effectively, no team is willing to give him more than a one year deal. Jose Molina has been a backup catcher during his entire career. Backup players are relatively replaceable, so teams very rarely give them long term contracts. Molina has signed four different two year contracts negotiated by Nero.

Interestingly, Wasserman Media Group and Arn Tellem each show coefficients of approximately -0.4, although only statistically significant for Wasserman Media Group. This is interesting because Arn Tellem is the most prominent agent for Wasserman Media Group (Wasserman Media Group). The Wasserman Media Group variable represents all other agents under the company. This shows that as a company strategy, Wasserman Media Group, led by Arn Tellem, values negotiating slightly shorter term deals.

Paul Cohen exhibits a positive relationship with contract duration of about 0.6 years. This relationship is only statistically significant when teams are not included as variables, and it is also higher in this case. His two longest contracts negotiated are both for Troy Tulowitzki, a star shortstop for the Colorado Rockies (Euston, 2013). He negotiated one seven year contract and one eleven year contract with the Rockies for Tulowitzki. When looking at the teams' coefficients, the Rockies are omitted as a point of comparison for all other teams. However, every other team's coefficient is negative, showing that the Rockies tend to give out the longest term contracts. This is picking up some of the positive relationship

from Paul Cohen's coefficient when teams are included, because part of it is attributed to the Rockies.

Dan Horwits has a positive relationship with contract duration of about 0.4 that is statistically significant at the 10% level. When looking at the 16 contracts he has negotiated in the sample, only two of them are longer than three years, and only four of them are longer than two years. However, only two of them are for one year. Horwits has effectively negotiated many two year contracts for marginal, aging players, with situations that many agents would only be able to negotiate a one year contract.

Dan Lozano's relationship with contract duration is 0.55, and falls just short of statistical significance. However, Lozano has negotiated contracts for many of baseball's stars, like perennial All-Stars Albert Pujols and Alex Rodriguez (Agency Database, 2013). Representing such highly skilled players who were signing contracts in the prime of their careers has hurt Lozano's coefficient in this case. Basically, because Lozano's clients are such superior players, he is "supposed" to secure them long term deals, attributing to factors like WAR and age. Therefore, it is still impressive that Lozano's coefficient is even slightly positive, as he has still negotiated very long contracts for them.

It is also worth noting that superior agents discussed in Chapter 5, like Scott Boras, Greg Genske, Gregg Clifton, and Greg Landry all have coefficients close to zero without statistical significance. This shows that these agents do not have a philosophical ideal contract duration that they usually tend to negotiate. Rather, they have the versatility to negotiate long term contracts for some players,

and shorter term agreements for others, depending on their clients' needs and career stage.

Overall, more agents show statistically significant relationships with contract duration than with salary per year. To have a statistically significant relationship with salary per year, the agent has to have significantly better (or worse) negotiating skills. However, a statistically significant relationship with contract duration can simply represent an agent's philosophy, rather than superior or inferior skills.

Teams

Every team's coefficients in Table 5 are negative, showing that the Colorado Rockies tend to give the longest term contracts, along with the Miami Marlins, St. Louis Cardinals, Los Angeles Angels, and Toronto Blue Jays, who have the highest coefficients, which are the coefficients closest to zero because they are all negative. The Rockies, as previously referenced, have given out two extremely long contracts to Troy Tolowitzki. They have also given Carlos Gonzalez, star outfielder, a seven year contract (Euston, 2013). The strategy in these moves was to build their team around these two stars. However, they have also given relatively long contracts to mediocre players, especially pitchers. Coors Field, Colorado's home stadium is known to be a great venue for batters to hit home runs due to the thin air at Denver's altitude. The Rockies have always struggled to sign pitchers, and they are showing an undisciplined approach of giving multiyear contracts to mediocre pitchers.

The case of the Marlins is very similar to the one discussed in Chapter 5. They are known to be very frugal. However, when they do spend money, they do so lavishly and often recklessly, both in terms of contract length and annual salary. They also try to sign their young players to long term contracts to get a discount.

Although the Cardinals are not known as free spenders, they have shown a willingness to commit long term contracts for their own free agents. They tend to value keeping their best players, and are willing to sign long term contracts to do so, feeling that it is not quite as risky as signing another team's free agent to a long term contract. We have seen this in eight year contracts they have given to Albert Pujols, outfielder Matt Holliday, and third baseman Scott Rolen, a seven year contract for catcher Yadier Molina, six year contracts for starting pitchers Chris Carpenter and Adam Wainwright, and four year contracts for Carpenter again and closer Jason Isringhausen (Euston, 2013).

The Angels have also recently signed many players to long term contracts, although they have tended to sign other teams' free agents as well as their own. They recently signed Albert Pujols for ten years and C.J. Wilson for five years in the 2011-2012 offseason (Euston, 2013). They have also extended infielder Erick Aybar and starting pitcher Ervin Santana for five years each (Euston, 2013). The Angels play in the large market of Los Angeles and this long term spending should continue.

The Toronto Blue Jays, conversely, have shown a tendency to extend their young players to lucrative long term contracts prior to their free agency eligibility. They have extended All-Star outfielder Jose Bautista for six years, outfielder

Vernon Wells for five years and then eight years, starting pitcher Roy Halladay for five years, outfielder Alex Rios for eight years, second baseman Aaron Hill for seven years, and outfielder Adam Lind for seven years (Euston, 2013). Most of these extensions are for young, talented players who are still years away from free agency. The Blue Jays try to sign these players at discounts before they can command huge salaries on the free agent market.

On the other hand, the Cleveland Indians tend to sign the shortest term contracts, with a coefficient of -1 that is statistically significant at the 1% level. This is in addition to their tendency to pay low salaries seen in Chapter 5. As previously stated, 13 of their 19 contracts signed in the sample were re-signing their own players, with 11 of them being players with at least one year until free agency. The Indians do, however, give long term contracts to these young players prior to free agency. However, when taking these factors into account of how long these players have until free agency, and the players' performance levels, the Indians manage to keep the terms of their contracts shorter than we may expect.

The Dodgers also show a negative coefficient just short of reaching one full year per contract on average, with statistical significance at the 1% level. They have exhibited a very disciplined approach when it comes to terms of free agent contracts. Of their 41 contracts signed in the sample, they have only gone beyond four years twice. The first was signing outfielder Juan Pierre for five years (Euston, 2013). He was a free agent from the Marlins in high demand because of his speed, but this contract seems like a rare mistake for the Dodgers. The second contract of more than four years was signing superstar outfielder Matt Kemp for

eight years (Euston, 2013). At the time of the signing, Kemp was one year away from free agency and just 26 years old, coming off of a season of 8.8 WAR, which is incredible (FanGraphs, 2013). The Dodgers knew they would have to give him a long term contract to keep him.

The San Francisco Giants and San Diego Padres each have a coefficient of approximately -0.7 with statistical significance at the 10% level. The Padres have shown a willingness to give out long term contract extensions. However, the players they sign to these extensions are almost always very young and years away from free agency. They extended players like starting pitcher Jake Peavy (5 years, age 23 and 6 years, age 26), outfielder Cameron Maybin (6 years, age 24), and first baseman Adrian Gonzalez (5 years, age 24) (Euston, 2013). They seem to have a philosophy of locking up their young, productive players for five to six years when they are in their mid twenties and a few years away from free agency.

The Giants, on the other hand, have shown a strong reluctance to give out any long term contracts. Of the 36 contracts they've signed in the sample, they have only gone more than three years six times. Two were extensions for their best pitcher, Matt Cain, who signed a five year deal at age 21 followed by a seven year deal at age 26 (Euston, 2013). Another contract was an eight year deal with Madison Bumgarner, another pitcher, at age 21 (Euston, 2013). Other than those three extensions, they signed Barry Zito to a seven year free agent contract that was discussed earlier, and re-signed two other of their own players, both pitchers. The Giants tend to shy away from long term commitments, but when they do sign players long term, they are usually extensions for their best young pitchers.

The Kansas City Royals and Seattle Mariners both have coefficients of approximately -0.65 with statistical significance at the 10% level. Both franchises tend to sign a lot of one year free agent contracts, while only signing multi-year deals for their own players. Most of these are young players developed by the teams' minor league systems, like designated hitter Billy Butler of the Royals and All-Star starting pitcher Felix Hernandez of the Mariners, who each received five year contracts (Euston, 2013).

Chapter 7

Applying the Time Value of Money

Basic financial theory states that the value of money depends on the time it is received. A dollar today is worth more than a dollar in the future. This is due to opportunity costs, which are the costs of foregoing another opportunity. For example, a dollar today could earn interest in the bank, be invested in stocks or bonds, or be used in a purchase. None of these activities can be done with a dollar received one year from now.

However, Major League Baseball teams and agents don't seem to use or practice this theory when negotiating contracts. Contracts are often back-loaded (highest payments occur at the end of the contract) with little consideration to the effect of the present value of the contract being signed. It is in a player's best interest to receive his salary payments as soon as possible. If he received a heavily front-loaded contract (highest payments occur at the beginning of the contract),

one would expect him to be willing to take a slight discount in exchange. This presents a great opportunity for teams with high payrolls that are close to the competitive balance tax threshold. As discussed in Chapter 2, calculations of team payrolls for the competitive balance tax are based on the average annual value of player contracts, rather than the actual payment received by the player in that season.

As an example, I will look at two of the largest recent contracts that the Yankees have signed, one for third baseman Alex Rodriguez and one for first baseman Mark Teixeira, to illustrate what the effects would have been if the contracts were heavily front-loaded. This is extremely pertinent to the Yankees because they have been over the tax threshold for many years, and will pay 50% of their overages this year. They are currently making every effort to get under the $189 million threshold for 2014. For this exercise, I will discount the cash flows in the contracts by 1% to be conservative.

Alex Rodriguez current contract structure (in $millions):

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
$29	$33	$33	$32	$30	$29	$28	$21	$20	$20

Total Nominal Value: $275 Average Annual Value: $27.5
Present Value at Time of Signing (discounting at 1%): $261.61

Proposed new structure (in $millions):

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
$255.66	$1	$1	$1	$1	$1	$1	$1	$1	$1

Total Nominal Value: $264.66 Average Annual Value: $26.47
Present Value at Time of Signing (discounting at 1%): $261.61

Mark Teixeira current contract structure (in $millions):

2009	2010	2011	2012	2013	2014	2015	2016
$25	$20	$22.5	$22.5	$22.5	$22.5	$22.5	$22.5

Total Nominal Value: $180 Average Annual Value: $22.5
Present Value at Time of Signing (discounting at 1%): $172.19

Proposed new structure (in $millions):

2009	2010	2011	2012	2013	2014	2015	2016
$167.18	$1	$1	$1	$1	$1	$1	$1

Total Nominal Value: $174.18 Average Annual Value: $21.77
Present Value at Time of Signing (discounting at 1%): $172.19

Heavily front-loading these contracts in this proposed fashion would net the same present value of payments. The players could invest a large portion of their substantial up-front payments and have the opportunity to earn much more money on it, while the team could save some money on the competitive balance tax. If the Yankees had structured these contracts, in this way, the combined average annual value of these two contracts would decrease from $50 million to $48.24 million. This may sound insignificant, but it would save the Yankees $880,000 on its competitive balance tax payment for 2013 alone.

The Yankees have been paying the competitive balance tax for the entire life of these contracts, although prior to 2013 it was only at a 40% rate. From 2008-2013, my proposed contract structure would have saved the Yankees $4.1 million in competitive balance tax payments, and this is from only these two contracts, ignoring the rest of the team. Furthermore, it would help them tremendously in their effort to get under the $189 million threshold for 2014. The contracts of Rodriguez and Teixeira would count as $48.24 million instead of $50 million, a decrease in the Yankees payroll for competitive balance tax purposes of $1.76, which would make it much easier to get the payroll under $189 million, while again only looking at two contracts.

This method of heavily front-loading contracts would require extreme capital reserves in order to pay the incredibly large first year salary. However, the

Yankees are currently paying out approximately $200 million in player salaries each year. If they committed to paying players by this front-loading philosophy, it would be much more manageable once fully implemented for the full roster. A wealthy franchise like the Yankees should also have the ability to borrow large sums of money in order to cover the costs of implementing the strategy, which has a significant cost saving potential if implemented well.

Chapter 8

Conclusions & Implications

Summary of Conclusions

Overall, many factors affecting Major League Baseball player salaries are overlooked yet have profound relationships to how players are paid. The most important factor that goes into a player's salary is his on-field ability. However, this is clearly not the only factor. Players may look to data like these in choosing their agent. Players who want to maximize their per year salary should seek representation by agents like Scott Boras, Gregg Clifton, Greg Genske, or Greg Landry, while players who value long term stability and security should hire agents like Paul Cohen, Dan Horwits, or Dan Lozano.

Agents can also use this information to best position their players for the largest contracts. They can target specific teams which tend to overpay players, and narrow this search based on if the client is a hitter or pitcher. They can also use this information to better inform their clients of the implications of signing an

extension versus waiting until free agency; or by modeling how much a contract is due to pay them immediately in an extension, versus how much they may expect to earn on the free agent market a year later. This will enable player representatives to quantitatively inform their clients in order to better serve their best interests.

Teams may also use these data to model their strategies after teams like the Indians, Mariners, or Padres. These teams don't have very strong financial resources, yet find undervalued players that they can pay below market value salaries with their operating capital. Teams with larger budgets like the Yankees, Red Sox, Dodgers, and Phillies may want to evaluate their strategies and emulate them on a larger scale budget to become even more efficient. This doesn't mean passing on the highest price free agents, but targeting them at a lower cost by maybe trying to beat the market to signing them in November, or waiting to enter into heavy negotiations until January, while trying to avoid the winter meetings.

Future Research

This study is just a general overview of outside factors that may contribute to player salaries and terms of contracts. Much more detailed studies may follow by measuring the various negotiating strategies of different agents and teams in more detail. One may look to more quantitatively study which agents tend to negotiate the best contract extensions versus the best free agent contracts; or which teams tend to sign the most players at the winter meetings versus waiting until January, etc.

Further research may also focus on present value of player contracts versus nominal values and average annual values to see which number is more focused on by both teams and agents. Financial studies like this may also seek to look into the effects of options on player salaries and how they are valued in contracts. These financial studies are of great interest to me and are areas which I plan to pursue more in the future.

Implications of Major League Baseball's New Collective Bargaining Agreement

On December 12, 2011, a new Collective Bargaining Agreement went into effect in Major League Baseball, effective through the 2016 season. Although the basic framework regarding player contracts has remained the same, there are a few changes in this CBA that have been changed from years past which may have implications for future player contracts.

First, the system described in Chapter 2 for draft pick compensation going to teams who fail to re-sign Type A and Type B free agents has been abolished. Instead, teams who fail to re-sign their free agents will only receive draft pick compensation if they offered a guaranteed contract of at least one year for a salary of at least the average of the top 125 player salaries from the previous season within five days of the end of the World Series (Major League Baseball, 2011). This will decrease the amount of instances in which a player designated as Type A is forced to take a decreased salary due to teams' hesitation to forfeit a first round draft pick. Under this new system, it is unlikely that a player who would previously face those circumstances would be offered the qualifying offer.

Additionally, Major League Baseball has instituted spending restraints on its amateur draft (Major League Baseball, 2011). In the past, teams were free to spend any amount of money they wanted in order to sign players they have drafted. However, now each draft slot is assigned an allotted amount of money to use as a signing bonus. If a team exceeds its allowance as a total for all of its picks in the first 10 rounds, there are severe consequences such as taxes on their overages and even the loss of future draft picks (Major League Baseball, 2011). A very similar system has been implemented for signing international players. In the past, foreign amateur players were treated as any other free agents were, without any restrictions on signing them. However, the new CBA has also imposed spending limits on foreign amateur players in which teams exceeding their allowance must pay taxes on overages and may be forbidden from signing international amateur players for more than a relatively insignificant sum of $250,000 in the subsequent year (Major League Baseball, 2011).

These policies will vastly decrease the amount of money spent on drafted players and foreign amateur talent, which could result in savings that were previously spent on these two areas being shifted to use in free agency and contract extensions for major league players. This has the potential to significantly increase salaries of MLB players across the board on average.

This only increases the importance of fully understanding the Major League Baseball labor market. MLB General Managers and agents must be able to see all factors affecting player salaries, including talent levels as well as external factors examined in this study, in order to accomplish their jobs

effectively in a market that has grown steadily over the past decade and figures to grow even more in the upcoming years.

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Summary

In 2003, Michael Lewis published *Moneyball: The Art of Winning an Unfair Game*, which forever changed the finances and economics of baseball. It began a movement towards using advanced statistical analysis to determine the value of baseball players, in order to build a roster that will win the most games at the lowest cost. The Moneyball movement has resulted in a multitude of new statistics to try to drill a player's value down to one number that represents his marginal revenue product, or his individual contribution to the team's success.

The biggest cost for Major League Baseball teams is typically paying their players. Players often get paid millions of dollars because there are so few people who have their athletic abilities and skill sets needed to succeed in baseball at the major league level. Major League Baseball does not have a salary cap; that is, teams can pay players whatever they want, and there is no limit as to how high a single player's salary can go, nor how high a team's player payroll can go. Teams are able to govern themselves when it comes to signing players to contracts. Some teams play in large markets, like the New York Yankees, and have the largest revenue streams, while others, like the Oakland Athletics, struggle to generate revenue and thus tend to spend less money on their players. Therefore, it is of the utmost importance for Major League Baseball teams to efficiently spend their money on players in order to win games at the lowest possible cost.

The biggest factor that determines how much a player will be paid is his production on the playing field. The better one plays, the more he will be paid.

However, there are many other factors that affect how much players are paid that are often overlooked.

This project looks at many other factors, aside from a player's talent and production levels, that may affect how much he is paid. Some of these factors include:

- The player's age
- The time of year of the contract's signing
- Whether the player is a Free Agent or not
- The team signing the player
- The player's agent

Almost all of these other external factors that relate to how much players are paid go back to Major League Baseball's Collective Bargaining Agreement with the Players Association. This document sets out all of the rules for terms of employment for teams employing players.

Players ultimately make the most money as baseball players when they are free agents. A player is a free agent when he doesn't have a playing contract and is free to negotiate a new contract with any team. This is the largest market a player will ever have to sell his services to all of Major League Baseball's 30 teams. However, the Collective Bargaining Agreement prohibits players from becoming free agents until they have played for at least six years. This is just one example of the Collective Bargaining Agreement skewing player salaries so that the best players don't always simply make the most money in any given year.

After looking at factors like time of year and a player's free agency status, this project goes on to examine Major League Baseball teams and players' agents as factors relating to player salaries. This aspect looks at which teams do the best job of paying their players the least amount of money holding the level of talent that they are signing as a constant, as well as which agents do the best job of signing their clients to the highest paying contracts, given their level of on-field talent.

The significance of this project varies from the perspective of teams, agents, and Major League Baseball as a whole. This project can allow teams to more effectively pursue strategies to sign players to lower salaries of a given performance level, and model their strategies after the teams who are already doing this most successfully. Player agents can use the results of this project to counter these strategies and find effective ways to position their clients for the largest contracts. As a whole, Major League Baseball can take these results to signify the current state of its economics of player salaries. It can use the information presented to try to make this system more efficient in cooperation with the Players Association in future Collective Bargaining Agreements.

This study uses linear regression analyses to isolate relationships between player salaries and a multitude of different factors which may have significant relationships to salaries. I have used online websites and databases to gather contract data and player performance data for a time period of one decade. The data includes a sample size of 761 player contracts signed between the 2002-2003 offseason and the 2011-2012 offseason. The project includes breakdowns of

looking at statistical results for just hitters, just pitchers, and all players combined, in order to gain the best understanding of what is really impacting player contracts, and which kinds of contracts are being affected.

In the future, studies like this may be expanded to cover certain aspects in more detail. For example, studying which agents pursue which specific strategies may be of utmost interest to a future researcher. Furthermore, there are more possible applications of financial modeling tools that can be applied to Major League Baseball's player contract structure. Options are a prominent feature in player contracts, and future researchers may wish to focus on options exclusively to try to apply financial option modeling techniques to Major League Baseball player contract options, which can be held by the team and/or the player. Future researchers also may wish to pursue studies like this within other professional sport leagues like the National Basketball Association or the National Football League.

Overall, this project represents a broad view of a very encompassing topic within professional sports, as I have tried to look at many different aspects relating to player contracts rather than focusing on one in particular.