Spring 2005

The Effect of Monopsony Power in Major League Baseball on the Salaries of Players with Less Than Six Years in the Majors

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Research Honors, Spring 2005

Abstract

This research attempts to measure the impact of monopsony power on baseball players with less than six years of experience. Past research indicates that players with less than six years of experience have lower salaries than players with the same productivity and more than six years of experience. To try and combat monopsonistic behavior, baseball player's formed the Players' Union and instituted an arbitration process. Through this process, a third party arbitrator listens to cases from both a player and owner and then chooses either the player's or the owner's salary bid. While this process is intended to help players gain market power, it is still unclear whether the actual process is effective. Therefore, it is important to evaluate trends in players' salaries before, during, and after arbitration in order to see if further changes in the arbitration process need to be made.

To do this, 19 outfielders who have filed for and received an arbitration hearing during the time frame of 1990-2003 are examined following their career throughout their pre-arbitration (first three years), arbitration year (after third year), and post-arbitration years (after fourth year on). By using the human capital model, three ratios of the players' actual salaries during these years to a predicted free agent salary are estimated. The prediction that the ratios should increase throughout these three periods, due to the fact that the players gain more market power, is supported by the results. In fact, the ratios of actual to predicted salary increase from 0.27 in pre-arbitration years, to 0.97 in the arbitration year, to over 1.2 in post-arbitration years. This indicates that the players face substantial monopsony power in the pre-arbitration year followed by a decrease in monopsony power through the arbitration process and post-arbitration years.

Introduction

The arbitration process in baseball has had its share of controversy over the past twenty years. In fact, one of the main causes for the Players' Strike in 1994 was the player and owner disagreement surrounding the stipulations of arbitration (Faurot, 1992). While this process is in place to try to gain power back for players, a question of its effectiveness remains.

When baseball players sign multimillion dollar contracts, the general public tends to question whether a single person is worth millions of dollars to simply play a game. Fortunately for baseball, statistics showing player's productivity are easy to measure and readily available. Therefore, economic analysis of the baseball market is possible.

Baseball players do not just randomly receive high salaries. Owners receive revenue based on player's performances, and owners pay players based on these revenues. In economic terms, owners try to measure a player's marginal revenue product of each player before assessing a salary.

In the baseball market, arbitration-eligibles and free agents try to attain salaries which reflect their MRP of the previous year. While free agents are free to sign with any team in the league, arbitration-eligibles must negotiate with their respective team. Therefore, all players in baseball are not in a truly competitive market (Marburger, 2004).

In this paper, I hypothesize that the ratio of a players' actual salary to that of a predicted free agent salary increases over time finally approaching one. Furthermore, I believe that during a player's pre-arbitration years (prior to arbitration and free agency), a player will face substantial monopsonistic power and that the pre-arbitration player's salary will be substantially lower than the salary predicted by the free agent regression model. If the arbitration process is effective in combating owners' monopsony power, actual wages should be close to parity with predicted

wages. Furthermore, after arbitration, the player's salary should be equal to predicted salary since he is now participating in the competitive free agent market. Through this research I hope to measure the impact of monopsony power on baseball players' salaries prior to arbitration and during arbitration to gain a better understanding of the baseball market.

Arbitration Process

Before jumping into the literature and models of baseball, it is imperative to discuss the basic characteristics of Major League Baseball. Before baseball arbitration began in 1974, players were drafted onto a team and were not able to test their "market value" by negotiating contracts with other teams. Typically, one owner held the rights to a player and thus had monopsonistic power over him. Consequently, owners often paid players well below their marginal revenue products (Frederick, 1992).

In response, players formed the MLB arbitration process in 1974 to try to gain market power back. Final-offer arbitration (FOA), as it is formally known, is set up to give players a chance to increase their salaries before they are able to file for free agency. During this process, both the player and his respective team submit their final offers between January 5 and January 15 of each year. The hearings for the cases are then scheduled during the time period of February 1 and February 20. Before the hearings, players and owners are encouraged to continue negotiations. In fact, most players who file for arbitration do not make it to the actual arbitration hearing (Faurot, 1992).

If the player and owner cannot reach an agreement, a third party arbitrator will be selected to the hearing. At this hearing, the player and owner are given one hour to present evidence and one-half hour to rebut the other side's case. Following the hearing, the arbitrator

has 24 hours to choose one offer, which will become the player's salary for the following season (Faurot, 1992). The criteria which arbitrators use to decide their judgments are:

(1) The player's contribution during the past season, including overall performance and special qualities of leadership and public appeal;

(2) Length and consistency of career contribution;

(3) The player's past compensation;

(4) Comparative baseball salaries;

(5) Recent club performance; and

(6) Any physical or mental defects in the player.

Arbitrators, however, are not permitted to decide their cases based upon:

(1) Financial position of player and club;

(2) Press comments, testimonials, or similar material regarding player or club performance;

(3) Offers made by either the player or the club prior to arbitration;

(4) Expenditures of the player or club on agents, representatives, and so on; and

(5) Salaries of other sports or occupations.

Also, arbitrators are not permitted to explain their choice of awards. They simply write the award into the Uniform Player's Contract. This indicates that the actual preferred award of the arbitrator is never revealed and must be inferred indirectly (Burgess, 2004).

It is important to note that the selection of arbitrators is an important factor in arbitration behavior. Arbitrators are selected by both the players' union and the Player Relations Committee (representing the baseball clubs). Since their "models" for determining a winner is kept secret, arbitrators must neither favor players nor clubs. If arbitrators were to favor players

over clubs, for example, the Player Relations Committee would not select them the following year (Faurot, 1992).

In fact, since the institution of this process, Dworkin (1981) indicates that the final results have been even. Of the cases which have been filed, the results are split between the players and the owners. This "indecision" regarding the decision of an arbitrator helps to push players and owners toward a negotiation rather than face a hearing (Faurot, 1992). It also suggests that the two extreme awards shown in the monopsony power model developed below are likely not to be realized since both parties realize that an arbitrator is unlikely to accept either an offer extremely favorable to owners or an offer extremely favorable to players.

Review of Literature

To be able to measure the impact of the arbitration process on player's salaries, it is first important to develop a model to measure player productivity. In The Value of Sports Talent, Rodney Fort (2003) concludes that a general Marginal Revenue Product (MRP) model is ideal (Fort, 2003). Under this theory, a player's salary can be determined based on productivity measures of a player (Fort, 2003).

In baseball, different statistics are readily available to measure player productivity. Andrew Zimbalist (1992) argues that productivity (PROD), also known as OPS (on-base percentage plus slugging percentage), which adds a player's on-base percentage ((hits + walks + hit by pitches)/ (at bats + walks + sacrifices + hit by pitches)) and slugging percentage (total bases/at bats), is the best measure of a hitter's productivity. At the time, Slugging Percentage was generally used to measure player productivity. However, Zimbalist believes that while Slugging Percentage "is a good indicator of offensive performance, it excludes one major

component of offensive contribution, walks" (Zimbalist, 1992). Therefore, OPS should be used because it not only takes into account power statistics, but also walks.

Alan Schwarz (2004) agrees with Zimbalist that OPS is the best statistic to measure a hitter's productivity. As Schwarz explains, this statistic "measures the key areas of offensive production: getting on base and advancing runners" (Schwarz, 2004). As he further explains in his article, looking at just SLG without OBP "is like subsisting on food without water" (Schwarz, 2004) because both are necessary.

Phillip Miller (2000) conducts both a theoretical and empirical comparison of negotiated salaries determined in baseball's free agent system to those determined in its final-offer arbitration system. In this model, Miller attempts to predict the salary of a player based on specific productivity measures. Some of these productivity measures range from a Runs Created (RC) variable, which is determined by (Hits + Walks)*(Total Bases)/(Plate Appearances), to runs a player saves defensively. In his results, Miller concludes that an offensive productivity measure, RC, is significant, while the defensive productivity measures are not (Miller, 2000).

Miller also concludes that there is a difference in the salary structure for arbitration eligibles and free agent players (Miller, 2000). While he finds out that there is a significant positive relationship between the salaries of free agents directly affecting the negotiated salaries of arbitration eligibles, Miller concludes that the systems do not determine equal salaries for players with the same MRP (Miller, 2000).

Marburger (1996) uses MRP models to test salary with respect to years of experience. In his study, he concludes that experience is in fact significant when determining a player's salary (Marburger, 1996). Furthermore, he concludes that players with more than six years of experience, thus able to freely sign with any team, are subject to salaries closest to their marginal

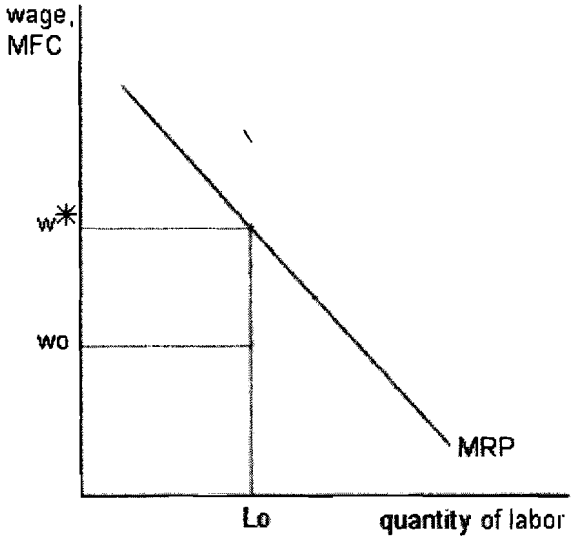
revenue products. This supports the notion that the arbitration process does not fully eliminate monopsonistic behavior.

Theoretical Framework

This study makes use of the human capital theory, which states that players should be compensated based on certain productivity measures. Since productivity is possible to measure in baseball, this theory is applicable for this research. Salary is therefore determined by certain productivity measures.

This research also makes use of a modified version of the monopsony model. This model is shown below:

Figure 1:
Monopsony Model



In this market, there are several sellers of service (pre-free-agency players), but there is only one buyer (an owner). Therefore the firm faces a monopsonistic market for labor, but it is a unique monopsonistic market. Since workers differ in both abilities and in terms of opportunity

costs, each player will have a unique MRP and a unique reservation wage. Since each player has unique characteristics and since some players can negotiate their individual wages with the firm, the traditional monopsonistic view of the marginal cost of labor curve no longer holds. Instead, we can only identify a range within which the wage settlement will occur for each player

Suppose that the team ranks players from most productive to least productive. The potential marginal revenue product is given by MRP in figure 1. If the roster is Lo number of players, Figure 1 shows that player Lo has a reservation wage of wo and a MRP of w*. Therefore, if player Lo goes to arbitration, the two wages submitted to the arbitrator would be bounded by the two constraints of the monopsony model: w* and wo. In the pre-arbitration years, a player's wage would be wo because he does not have market power, and the owner would pay only enough to ensure that the player does not exit the market. Through the arbitration process, the wage moves closer to w*, but does not reach it. If arbitrators have evenly dispersed the number of winners between owners and players and do not generally accept "extreme" proposals, the "average" wage would fall between these two constraints. Therefore, arbitration eligibles still face monopsonistic power because their actual wage is less than their MRP. However, the players do face less monopsonistic power in their arbitration year than pre-arbitration years.

Data

This model uses strictly outfielders because these individuals generally have the highest offensive production numbers. Consequently, their salaries generally reflect offensive production. The sample consists of 19 outfielders who applied for and received a hearing in the arbitration process. By following their salary and production changes throughout their respective

careers, each "phase" of their career can be represented. Table 1 lists the variables and descriptive statistics for these players:

Table 1: Variables and Descriptions (Free Agents)

Predicted Sign	Statistic	Name	Definition	Mean	Max	Min	Std. Dev.
	Dependent Variable						
	SAL	Salary	Value of Contract	$5,691,372	$26,700,038	$284,893	$6,396,355
	Independent Variable						
+	GP	Games Played	Games Played before contract was awarded	115	163	2	43
+	OPS (PROD)	OPS (PROD)	Slugging % + On-base %	753	1800	0	154

Source: Baseballreference.com

For each player, offensive statistics as well as games played from the year prior to signing a new contract or filing for arbitration are used. For example, if a player signed a new contract in 1992, the offensive statistics from 1991 are used. These statistics are used because owners will use previous offensive productivity measures to determine the value of each player. Also, the salaries are computed into 2003 dollar figures using a baseball wage index. This index is computed using the average salaries for baseball players in each year using 2004 as the base year. Therefore, all dollar values should be interpreted in 2004 baseball dollar figures.

These statistics can be found on www.baseballreference.com or www.espn.com. To find data for players who have filed for either arbitration or free agency, www.roadsidephotos.com is an excellent site and was used for this study. This website offers a complete list of players filing for free agency and arbitration as well as the year in which this was done.

Empirical Framework

This study researches and measures the impact of monopsony power on baseball players over the course of their career. To do this, three ratios are constructed measuring actual salary to a predicted free agent salary. By doing so, the ratio explains how close the player's actual salary, most notably in pre-arbitration and arbitration years, is to an estimated salary the player would have received via free agency.

The first step in this research is to develop a model which can predict free agent salary based on productivity measures. Based on my previous research which used 228 outfielders who were granted free agency and signed a new contract between 1990 and 2003, a model to predict salary has been developed. Equation 1 shows this model:

$$SAL = \beta_1 + \beta_2 OPS + \beta_3 GP + \varepsilon \qquad (1)$$

This regression assumes that salary is determined through basic human capital theory. To determine the productivity measures OPS and GP, different offensive and defensive productivity measures are included in the model. However, only OPS and GP are statistically significant. Furthermore, defensive statistics are removed from the model because of their ambiguity. As Miller indicates, the faster players could be penalized because they run to a ball and drop it, whereas a slower player would not get to the ball and would let it bounce and not be charged an error (Miller, 2000).

However, improvements to the above model are necessary because the focus of this paper is not geared to find the best productivity measures themselves, but instead to obtain the best prediction of what players would make in a free agency market. One such improvement deals with the constant of the equation. Intuitively, it makes sense that a player should not make

money if he is not productive. Also, it is intuitive that negative salaries should not be a likely prediction. Therefore, the constant term is constrained to the origin.

Another improvement deals with the actual data itself. Since baseball has been growing more rapidly in terms of inflation over the past 15 years, an inflationary baseball index using average baseball salaries for each year will give a more accurate depiction of the baseball salaries than the CPI index. Therefore, all salaries are in 2004 baseball dollar figures.

With these improvements, the equation for the predicted free agent salary is expressed in Equation 2:

$$SAL = \alpha_1 OPS + \alpha_2 GP + \varepsilon \quad (2)$$

Note that while the constant is removed, the equation still uses the same productivity measures as the previous research.

Results

The results from the two regression equations are found in Table 2. Equation 1 includes the constant term and Equation 2 suppresses the constant to zero:

Table 2: Regression Results

Dependent Variable		
Statistic		
SAL	**Equation 1**	**Equation 2**
Independent Variables		
Statistic	**Coefficients**	**Coefficients**
Constant	-18,746,990	0
Games Played	75,728	52,996
OPS	19,896	-386
R Square	0.403	0.254
Sample Size	228	228

Source: The Author

By removing the constant from the equation, the R Squared value decreases from .403 to .254. While the R-squared value for the model does decrease, the overall predictions are improved. There are zero negative salary predictions indicating that the lower bound of the salary predictions is improved. (Note that to make the R Squared value for Equation 2 comparable to the R Squared value for Equation 1, a Pearson correlation test between the unstandardized predicted values for salary and the actual salary was calculated and squared.)

To obtain the results for the ratios, a ratio representing a player's actual salary divided by the salary that was estimated using a sample of 228 outfielders is constructed. For example, the pre-arbitration ratio represents the player's actual salary divided by the predicted free agent salary estimate. These estimates are reported in Table 2. The estimated salary for each of the 19 players who went through arbitration is determined for each year by using the regression obtained in Equation 2. Then the average of all 19 players' pre-arbitration years is determined to obtain the pre-arbitration ratio. The same format is used for the arbitration ratio and post-arbitration ratio. The players' actual salary divided by the salary that was estimated in Equation 2 is conducted for the given timeframe. The results for the pre-arbitration, arbitration, and post-arbitration ratios are listed in Table 3.

Table 3: Ratios Results

	All Arbitration Players	Arbitration Players (minus outliers)
Pre-Arbitration	0.2711	0.2603
Arbitration	0.9660	0.9004
Post-Arbitration	1.2857	0.9627

Source: The Author

The first set of ratios (all arbitration players) indicates that prior to arbitration, players face significant monopsonistic exploitation. In fact, the arbitration players who received a hearing since 1990 received only 27% of what they could have made via free agency. During the arbitration year, a player is able to gain significant power back, but not completely. This is to be expected, as they are able to negotiate a new contract, but only with their own ball club. It is important, however, to note that the arbitration ratios are not statistically significant from one, yet they are statistically different from the post-arbitration ratio.

While the first two ratios seem to line up with theory, the post-arbitration ratio of 1.29 is unexpected. This indicates that these players' actual salary is 1.29 times a predicted free agent salary. To try to explain this phenomenon, the second set of ratios is offered. These ratios follow the same format, actual salary to predicted free agent salary, but leave out players who have post-arbitration ratios above 2.5. These players, which include Bernie Williams, Barry Bonds, and Bobby Bonilla, receive salaries well above a predicted free agent salary. This may be due to the fact that these players have some sort of "star power" which may lead to higher salaries. These higher salaries may be justified because "stars" attract more fans and more fans mean higher MRP. Thus, a variable that may be omitted from the estimation is some sort of proxy for star power. This might be a fruitful area for future research.

When leaving these players out of the arbitration player ratios, the results improve. As shown in Table 3, the ratios increase from 0.26 to 0.90 to 0.96. As hypothesized, the ratios for these three periods increase over time and approach one.

Conclusion

The results of the ratios indicate that players face substantial monopsonistic power early in their career, and only gain market power back through the arbitration process and free agency. This research takes Marburger (1996) and Miller's (2000) works one step further as it digs deeper into the pre-arbitration years of players. By providing meaningful ratios, the actual monopsonistic power of owners is shown. As Table 3 indicates, players in the pre-arbitration stage of their career receive only 27% of the salary they could receive via free agency. The arbitration process, however, allows players to gain some market power back, but also allows the owners to retain some monopsonistic power. As Faurot points out, this is expected because the terms for the arbitration process are negotiated by both the players' union and the Player Relations Committee.

In this research the concept that some players are paid well above their productivity contributions to their respective team is developed. It appears that some sort of "star power" is assigned to these players, which enables them to receive salaries based on characteristics other than the measures of productivity used in this study. Future research could look into the star power issue to find a way to measure this effect. Regression analysis may be able to find certain characteristics such as home runs per year, MVP awards, endorsement deals, rookie card value, an experience factor, etc. If a certain star power measure is found, the addition of that unit to this research's equation would be beneficial.

Future research could also explore the effects of the arbitration process on a player's salary at all positions. Developing a free agent model for pitchers, for example, may help to show whether these players face the same type of monopsonistic behavior as outfielders. If a

model were constructed for all position players, it may help players decided which positions are the most beneficial early in their careers.

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