# OWNER COLLUSION OR SOUND FISCAL MANAGEMENT: AN ANALYSIS OF RECENT EVENTS IN BASEBALL'S LABOR MARKET

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ABSTRACT

Prior to late 1989 and early 1990, baseball owners showed little interest in signing free agents. Players have sued owners alleging that owner inactivity in the market for free agents was demonstrative of owner collusion in violation of baseball's Basic Agreement. Owners offered as a defense the idea that their inactivity reflected their growing awareness that players in general are not worth the salaries they have been paid. Are players uniformly overpaid? This paper compares marginal revenue products to salaries for a sample of star players in an effort to assess the merits of the owners' defense. In the course of analyzing this issue new methods are offered for the computation of player marginal revenue product. The evidence indicates that players are not uniformly overpaid.

## INTRODUCTION

Compared to previous experience in matters of salaries, baseball's free agent classes of 1985, 1986, and 1987 struck out in their first time at bat.

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Baseball's ownership balked at signing free agents during that period. In response to owner disinterest, free agents have accused owners of conspiring to limit their compensation. Management has reacted to this brush-back pitch with one of their own. Free agents, management contends, have not been worth the money in the past, and their inactivity in the free agent market reflects a growing awareness that free agents are no bargain.

The discordant views of owners and players are in part reflective of the tensions and antagonisms that accompany any management-labor dispute, but there are other issues characteristic of baseball's labor market that invite controversy. Chief among these characteristics is the difficulty of measuring the contribution of an individual player to team objectives in what is a team game. The use of individual performance variables, for example, an every-day player's slugging percentage or a pitcher's walks-to-strikeouts ratio, contradicts the intangibles of team play and unselfishness that are routinely pitched by coaches as critical to team success. In the parlance of the economist, there are technological externalities, perhaps significant, associated with the manner in which individual players are arrayed in a line-up and with the roles individual players are asked to perform as part of a team. One of the functions of managers and coaches is to have insight into these technological externalities.

How have arbitrators responded to the allegations and different views of players and owners? In the fall of 1987, arbitrator Thomas Roberts ruled that owners had conspired to manipulate the free agent market after the 1985 season.[1] In fact, in two separate decisions, arbitrators have ruled that owners had conspired to manipulate the free agent market for the 1985 and 1986 seasons, in violation of Major League Baseball's Basic Agreement.[2] In assessing damages for these conspiracy cases, arbitrator Roberts, on August 31, 1989, ordered owners to pay $10.5 million as compensation for the clubs' collusion against free agents between the 1985 and 1986 seasons.[3] The purpose of this paper is to critically evaluate the owners' claim that free agent salaries, and the salaries of players in general, exceed their market value (based on player marginal revenue products), thus explaining the inactivity in the bidding for free agents. Critical to this exercise is the development of a technique for including individual player technological externalities into a calculation of player marginal revenue product (MRP). In developing such a

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1. Major League Baseball Players Ass'n v. The Twenty-Six Major League Baseball Clubs, Grievance No. 86-2, Panel Dec. No. 76 (1987) (Roberts, Arb.) [hereinafter Roberts].

2. *Id.*; Major League Baseball Players Ass'n v. The Twenty-Six Major League Baseball Clubs, Grievance No. 87-3, Panel Dec. No. 79 (1988) (Nicolau, Arb.) [hereinafter Nicolau].

3. Solomon, *$10.5 Million Awarded in Collusion Case*, Chicago Tribune, Sept. 1, 1989, § 4, at 5, col. 1.

technique this paper goes beyond the individual-player-performance-variable approach to the computation of MRP associated with many authors.[4]

In analyzing this player-management disagreement, it is useful to summarize the history and economics of baseball free agency. This task is undertaken in part one of the paper. The second part of the study is devoted to a discussion and critique of the theory relating to the computation of player marginal revenue products and salaries. In the third part of the paper, selected player marginal revenue products are measured and compared to salaries. The work is summarized and conclusions are drawn in part four.

## I. The History of Free Agency and the Appropriateness of Free Agent Salaries

For more than a decade owners have faced a fierce challenge to their monopsony power in the labor market for players. Monopsonistic exploitation by definition means player marginal revenue products in excess of salaries and, other things equal, larger profits for owners. Players contend that league rules allow owners to appropriate the financial returns to their skills. Owners contend that without league rules to ensure owner maintenance of some monopsonistic power in the labor markets for players, their teams will not be profitable. A 1984 report by the Seattle Mariners baseball club supported the owners claim, and argued that major league teams are profitable less than once for every three teams they field.[5] To further justify their claims, owners note that when they opened their books in 1985, collective losses in excess of $55 million were revealed.[6] Owners attribute this recent history of red ink to increasing costs without increases in revenues. Owners point to the fact that player salaries averaged $512,084 per year in 1989[7] compared to $76,066 per year in 1977,[8] while ticket prices have increased by a multiple less than the increase in the Consumer Price Index (CPI) over this same period.

How did salaries soar by a multiple of nearly seven in thirteen years? Owners identify a 1975 arbitration decision by Peter Seitz as the watershed.[9] Seitz's decision effectively invalidated major league baseball's reserve clause which tied players to a team until the team traded or released them. Despite legal challenges to Seitz's ruling, owners in effect lost the reserve clause

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4. *See* Scully, *Pay and Performance in Major League Baseball*, Am. Econ. Rev. 916, (Dec. 1974).

5. *Testimony Before the Select Committee on Sports and Meeting Facilities*, Illinois General Assembly 5 (April 27, 1987) (statement of Patrick O'Grady).

6. Klein, *Owning a Baseball Team in the Free Agent Era is No Fun and Games*, Wall St. J., Apr. 7, 1986, at 1, col. 1.

7. Chicago Tribune, Apr. 5, 1989, § 4, at 5, col. 1.

8. Sanoff, *Benching the Best to Save a Buck*, U.S. News & World Rep., Apr. 13, 1987, at 70-71.

9. *See* Professional Baseball Clubs, 66 Lab. Arb. (BNA) 101 (1975) (Seitz, Arb.).

without compensation. The free-agent experience during the 1977-81 period convinced owners that some form of compensation system needed to be structured to protect clubs from losing experienced players, and, perhaps more importantly, to discourage wholesale signing of free agents at prices that spelled financial disaster for the sport.

The compensation principle installed after the events of 1975 and 1976 awarded an amateur draft choice from the acquiring club to the club losing the free agent. Clubs seeking immediate improvement in their league standings were eager to part with an unproven prospect for an experienced player. Thus, unabashed competition among owners for experienced players severely eroded their monopsonistic power with serious financial consequences. Recognizing their excesses, owners sought a revised compensation formula that would restore at least a portion of their rights to determine the value of players production. Negotiations to restore this lost power began in earnest on December 31, 1979 when the 1976 Basic Agreement expired. Players, bolstered by their financial success, sought a further relaxation of the system through a reduction (from six to four) in the number of years required to become a free agent. On the other hand, the owners sought an experienced player rather than an amateur draft choice as compensation for a free-agent signing. The sides could not agree, and the players struck on June 12, 1981. On July 31, 1981 an agreement redefining compensation to clubs losing free agents was reached.[10]

The new agreement did not do much to restrain the pursuit of free agents or the escalation of their salaries. Only the expanding spill of red ink seemed to dissuade owners from playing the free-agent game. In 1985 there were sixty-two free agents available and only five were signed by new teams, and only fourteen are now bound to major league teams. Most legal authorities believe that the 1986 season provides more cogent evidence on owner collusion. The Major League Baseball Players Association points to the meetings of general managers where the Baseball Commissioner, Peter Ueberroth, encouraged clubs to share "information," and to the letters written by baseball executives, Richard Moss and Bill Giles, revealing the status of salary negotiations with certain players.[11] In 1987, ten star players filed for free agency. Of the ten, seven signed with their old clubs after a fishing of the free agent waters yielded salaries below what their clubs had offered. One player (Andre Dawson formerly of the Montreal Expos and now of the

10. Basic Agreement Between the American and National League Professional Baseball Clubs and Major League Baseball Players Ass'n, effective 1981 [hereinafter *1981 Basic Agreement*].

11. Chass, *Union Brief Cites "Collusion"*, N.Y. Times, July 5, 1988, at 37, col. 2.

Chicago Cubs) took a $700,000 pay cut,[12] one played the season in Japan, and one signed with another club.[13]

The latest Major League Baseball Basic Agreement, the collective contract that binds players and owners together, stipulates that owners cannot exchange salary information or engage in price fixing in bidding for free agents.[14] Players have accused owners of colluding and filed a number of grievances claiming illegal owner collusion beginning in 1985. A 1987 decision on the 1985 grievance supported the player's position.[15] The rulings, however, were considered by players like the Chicago White Sox's Carlton Fisk, as only "a slap on the wrist to every owner who was involved." The 1987 decision allowed seven of the 1985 free agents to negotiate with teams one month prior to the start of the 1988 season.[16] Only Kirk Gibson, who went from Detroit to Los Angeles, was able to find a new team.[17] In addition, the 1989 decision awarded 139 players a total of $10.5 million.[18] The players also triumphed in the 1988 decision on the 1986 grievance which found baseball owners guilty of collusion again.[19] Mr. George Nicolau, the arbitrator in the second grievance was "more severe and more pointed in identifying club executives and specific examples of violations than [the previous arbiter] was in finding the owners guilty of collusion against the 1985 free agents."[20] More recently, the Players Association ended their third and final collusion grievance over free agency by accepting a $280 million settlement.[21]

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12. Holtzman, *Dawson Pact Another Good Deal for Owners*, Chicago Tribune, Mar. 3, 1987, § 3, at 3, col. 1.

13. It is important to point out at the outset that the salary figures made available to the public and used in this study do not take into account bonuses and other arrangements peculiar to individual contracts. Andre Dawson's contract, for example, had several bonus provisions. The analysis in the absence of such published information on any systematic basis compares player MRP to published salary.

14. Here there is asymmetry in the most recent version of the Basic Agreement that is favorable to the player. It is common knowledge that agents routinely share information on salaries. Professional football provides the best example of agent information exchanges. Data about the particulars on salary negotiations for first-round draft choices in the NFL are routinely shared by agents. Some observers have argued this has been responsible for the significant increases in salaries for early draftees and delays in signings.

15. *See* Roberts, *supra* note 1.

16. *Id.*

17. Holtzman, *Collusion II: Owners Found Guilty Again*, Chicago Tribune, Sept. 1, 1988, § 4, at 1, col. 1.

18. Solomon, *supra* note 3, at 5.

19. Nicolau, *supra* note 2. On Sept. 17, 1990 an interim award was given to the players harmed by the club's action in the amount of $102.5 million in lost salary for the 1987 and 1988 seasons. *Id.*

20. Chass, *Arbitrator Finds Baseball Owners in Second Free Agent Conspiracy*, N.Y. Times, Sept. 1, 1989, at 1, col. 1.

21. Chass, *15 Players Try Again As Free Agents*, N.Y. Times, Dec. 8, 1990, at 45, col 5. The settlement figure encompasses the previous two awards. *Id.*

Owners ostensibly gambled that the damages awarded players would fall short of the higher salaries free agents would command in unrestrained bidding for the services of players. There is some evidence that the savings on free agent salaries may not be substantial enough to offset the fines imposed. Despite the arbitrators' rulings, owners still claim innocence. To exonerate themselves, owners point to evidence that both sides colluded in violation of the Basic Agreement. In addition, they maintain that free agent salaries uniformly exceeded player financial contributions to their teams. If players are paid less than their marginal revenue products, one inference is that something is constraining competition for the services of major league baseball players.[22] An essential task in resolving the dispute, then, is to compare player marginal revenue products and salaries. This task is pursued in the remainder of the paper.

## II. Theoretical Issues in Computing Player Marginal Revenue Products and Salaries

An article by Gerald Scully provided seminal work on estimating marginal revenue product for baseball players.[23] Scully's widely cited technique for estimating player marginal revenue products (MRPs) involved a two-equation model. The first equation defined the relationship between team and individual player performances. The second equation modeled the relationship between team revenues and team performances (win-loss percent) as well as market characteristics of the area in which the team played.[24]

As noted, salary is determined by the relative strength of the players' bargaining position vis-a-vis management. During the reserve clause era, management's power far exceeded that of the players. Since the 1976 federal court ruling involving pitcher Andy Messersmith's free agent status,[25] players have dramatically improved their bargaining strength. At least one scholar has concluded that presently free agent salaries frequently equal or exceed their MRP's.[26] Management's recent inactivity in the free agent market could be construed as a confirmation of this hypothesis, and an attempt to rectify past overbidding.

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22. However, other explanations can be offered. First, bonuses which are not included in the salary figures could explain the difference. A judgement about a contract's fairness should be made in reference to the contract as a whole. Second, in focusing on any one year, the relationship between the MRP and salary over the lifetime of a contract is ignored.

23. Scully, *supra* note 4.

24. *Id.* Scully hypothesized "the player's marginal revenue product in baseball is the ability or performance that he contributes to the team and the effect of that performance on gate receipts." *Id.*

25. Kansas City Royals v. Major League Baseball Players, 532 F.2d 615 (8th Cir. 1976).

26. Raimondo, *Free Agents Impact on the Labor Market for Baseball Players*, J. Lab. Res. 183-193 (Spring 1983). In a 1983 article, Henry Raimondo concluded "free agents . . . are receiving on average more than their estimated economic worth." *Id.*

There is theoretical support for the idea that the free agent auction mechanism systematically produces overbidding. This bias reflects substantial uncertainty in evaluating marginal revenue products.[27] The Basic Agreement for 1976-79 restricted somewhat the number of teams that may bid for a free agent, a strong indication that as the number of teams bidding for a free agent's services increases, the value of that free agent becomes inflated.[28] Thus, complete abstinence in the free agent market will be sufficient but not necessary to accomplish some of the owner's economic objectives.

While theory is useful, a comparison of free agent MRP's and salaries seems essential in arguing the existence of meaningful owner collusion in signing free agents. The Basic Agreement stipulates that the owners cannot act in concert when bidding for free agents, exchange salary information, or engage in price fixing.[29] Thus, owners cannot educate one another about, or eliminate, past excesses through an exchange of information. However, it is conceivable that owners can unanimously and independently opine that past free agent performances do not warrant their salaries. Such a proposition is far more believable if in the majority of recent free agent cases their salary exceeds their MRP. Is this the case? The credibility of the answer is sensitive to the faith put in the measurement of marginal revenue product and owner knowledge of the economic contribution of each player to their club. For all owners voluntarily to assume a no-signing stance, it must be true initially that at least one free agent salary exceeds the perception of player MRP in the group of free agents.

While the technique for measuring MRP is quite ingenious, various scholars have taken issue with this model. Before systematically discussing the shortcomings of Professor Scully's model, the author's have identified and discussed an alternative model. While researchers have adhered to Professor Scully's technical procedure for measuring player MRP, they have sought to modify his functional form or have taken issue with his representation of player performance. In addition, other authorities argue that the rules structure of player contracts affect league competitiveness and player marginal products.[30] Simply stated, closer pennant races within divisions mean greater fan interest, greater team revenues and different evaluation of

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27. Cassing & Douglas, *Implications of the Auction Mechanism in Baseball's Free Agent Draft*, S. ECON. J. 111-113 (July 1980). In a 1980 article, James Cassing and Richard W. Douglas, using computer simulations, proposed that teams can be right on average about the values of free agents for whom they bid, but the free agents they obtain are likely to be those whose value they overestimated. *Id.* Furthermore, Cassing and Douglas observed that the extent of the "winner's curse" varied directly with the number of teams bidding for free agents. *Id.*

28. *Id.* However, Cassing and Douglas argued that bidding for free agents has to be restricted to two or three teams to substantially reduce overbidding. *Id.*

29. Holtzman, *supra* note 17, at 3, col 3.

30. Daly & Moore, *Externalties, Property Rights and the Allocation of Resources in Major League Baseball*, ECON. INQUIRY 77-95 (Jan. 1981).

players' marginal revenue products than would be consistent with pennant races that are not close.[31]

The majority opinion in the authoritative literature is that the rationale for the reserve clause, competitive balance, lacks merit.[32] The conventional wisdom is centered on the neoclassical economist's assertion that owners, like players, are wealth maximizers. Consequently, so long as player contracts can be sold for cash by owners, or by the players themselves, the ownership of player property rights should not alter player allocation. Only the distribution of rents between owners and players will be affected.[33] If this model is accurate, only the salary equation in Professor Scully's two equation model needs to incorporate the particular arrangements governing player property rights. Player MRP's are not influenced by the distribution of rents.

This orthodox view on the neutral impact of the rules structure of player contracts on the marginal revenue product of players is convincing only if owners and players would internalize the competitive balance externality in the same way. Although it is assumed that all actors are wealth maximizers, it does not follow that player or owner control of player rents is immaterial to competitive balance and team revenues. The rules structure of player contracts will again exert a strong influence on the sharing of additional income generated through policy, ensuring more competitive league races. However, there is reason to suspect that player control is more likely to produce free-rider behavior and less extensive internalization of the externality than would be true if owners, who are considerably smaller in number, control player allocation. Therefore, it can be argued that players and owners would distribute talent differently, thereby altering league races and MRPs.

Any estimate of player MRP should be conditioned by the ability of the player to put fans in the seats. As noted earlier, Professor Scully's technique, although indirect, would overcome the impracticalities inherent in a more direct procedure.

> Hitters in the regular lineup play virtually every home and away game during the season. Hence, fans cannot discriminate through attendance on the basis of player appearance. Pitchers do not start every game, so it is possible to evaluate their marginal revenue products individually. But this requires laboriously analyzing attendance for every team for every game during the season.[34]

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31. Thus, the mechanism through which players are allocated is important. Technically, the distribution of talent problem faced by a league is an n-person, non-zero sum differential game.

32. Daly & Moore, *supra* note 30, at 77.

33. *Id.* at 77-79.

34. Scully, *supra* note 4, at 918.

It is possible to measure more directly the contribution of everyday players. Information on team performance and attendance when players are on the disabled list (DL) can be incorporated. Professor Scully's measure of performance is to some extent imprecise because individual player performance variables have to be selected.[35] To develop a more accurate picture of the individual's contribution to team success, the laborious task of determining team performance when the player is in and out of the line-up must be calculated.

In this section of the paper, it has been argued that player MRP may be influenced by the structure of rules governing the distribution of player talent. Furthermore, it has been noted that there is some arbitrariness in Scully-inspired models used for defining player MRPs. Through the use of statistics recognizing the impact of a player's presence in the line-up it is possible to acquire more direct, and hopefully more precise, measures of MRP. In the next section of the paper, MRPs for selected players are developed using information provided by disabled lists and through an analysis of attendance figures for a team's home games during the season.

## III. Estimating Player Marginal Revenue Products

It has been previously noted that Professor Scully's technique for estimating MRP was ingenious, but his reliance on a single performance variable for pitchers' walks-to-strikeouts ratio and for everyday players' slugging percentage represents a serious theoretical deficiency.

The presence of a player on a team, even if only on the bench, as well as the manner in which players are arrayed in the line-up, can influence the team's production or performance. In the parlance of the economist, there are significant technological externalities associated with the player inputs. The failure of Professor Scully's model to consider these technological externalities implies identical MRP estimates for players exhibiting the same level of achievement as identified by the value of the performance variable chosen to represent player contributions to the team. Since demand curves for players in a competitive market are representative of player MRPs, the demand curve for players exhibiting the same level of performance are horizontal. By taking into account that technological externalities allow for some means of discrimination, the demand curves for players could be downward sloping despite identical performances measured by one performance statistic. In short, the presence of a player likely influences team performance beyond something easily quantifiable such as slugging percentage.

"Chemistry" is one word that is used to describe how well a collection of individual players function as a team. For anyone involved in team sports, it is axiomatic that too many stars can impair team efficiency. In

35. It may be that when certain players are in the lineup other hitters receive better pitches to hit, team morale is bolstered, etc.

baseball, a player who moves a runner from first to second in a key situation, plays great defense, or is a real boost to clubhouse morale, may be more valuable to a team than the player who hits a home run in the last inning with his team trailing by ten runs. What determines a player's value to the team? Players contribute to team interest, attendance, and revenues by helping the team win. Some fans will only support winners. A good MRP estimate for an everyday player cannot be developed without the use of a variable that captures the player's contribution to a team's competitiveness on the field or a team's divisional or league standing.

The author's theory on this point embraces Professor Scully's model. In determining MRP, he recognized the importance of winning, utilizing a two-stage technique that linked the player performance variable to winning, attendance and revenue. However, winning games is not without purpose. Teams compete to determine division, league, and world series champions. Success in the minds of fans is determined by league standings, not the percentage of games won. Since team standings are not a monotonic transformation of team winning percentage, standings and winning percentages do not have the same predictive power for team attendance or revenue.[36] Although winning percentage is a powerful predictor of attendance, it explains attendance less completely than do team standings. One way in which the model, discussed *infra*, differs from Professor Scully's is the use of team standings rather than winning percentage as the operational indicator of team success.

Theoretically, a player may contribute to team revenues beyond what he adds to team performance.[37] However, the ability for an everyday player to put a statistically significant number of additional fans in the seats by their mere presence is rare. Technically, a player's contribution is measured by his influence on his team's league standing. In the author's model discussed below, virtually all everyday players contribute negligibly to attendance beyond what they contribute to their team's league standing. This position is critical in analyzing the MRP for everyday players. The first use of disabled list statistics is in an effort to determine if everyday players exert an influence on attendance aside from that exercised through their effect on team standings.

Theoretically, the individual player must be thought of as one input in a production function where attendance (the number of fans put into the stadium seats) is determined by inputs which fall into two general categories: team related variables and non-team related variables (city population, city weather, etc.). The use of dummy variables constrains the empirical ex-

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36. During the first five months of the 1989 season, only one team in the American League Eastern Division played even mediocre baseball (wins at least equalled losses), but attendance in the division was strong because the division race was competitive.

37. Henry Aaron's MRP was likely greater when he was chasing Babe Ruth's home run record. Willie Mays may have lured more fans to stadiums during his last season.

ercises that can be performed, and thus inhibits the theoretical constructs employable. For example, the log-linear construct characteristic of a Cobb-Douglas production function cannot be tested empirically whenever zero values are prominent among the observed values for inputs.[38] Finally, in crafting a production function that captures individual player contributions, the authors have visualized a two-stage production process whereby players are combined with coaches to produce an intermediate output, team quality. Team quality, in turn, is the primary, if not exclusive, conduit through which the individual player influences team attendance and revenues.

The following equation (3.1) captures these essential elements, albeit in a simple linear construct,

$$A_t = B_o + B_1 P_t + B_2 DL_t + B_3 LT_t + B_4 LO_t + B_5 WW_t + B_6 T_t + e_t,$$[39]

Regressions were run for five players using equation 3.1. Since our interest is only with the question of the significance of the DL coefficient in the presence of other key determinants of attendance, only F-test results and the disabled-list coefficients and their associated t-values are reported in Table 3.1.

TABLE 3.1

The evidence recorded in Table 3.1 suggests two things. First, the F-values indicate that the equations are all significant at the 1% level. Second,

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38. This is true because the log of 0 is not defined.

39. $A_t$ represents the home game attendance on that day divided by the population of the city in which the team resides. Home game attendance divided by population represents a reworking of the equation that Roger Noll used for producing baseball attendance in his article *Attendance and Price Setting*, GOVERNMENT AND THE SPORTS BUSINESS (1974). Since Knoll multiplied each independent variable by city population (Noll observed that each independent variable was correlated with population), an alternative equivalent representative would be to divide attendance, the dependent variable, by city population.

$P_t$ represents the type of promotion the team held on that day. Operationally, 2 represents the most expensive type of promotion, 1 represents a less-expensive promotion, and 0 represents no promotion. An old-timers game preceding the regular game would be an example of the most expensive kind of promotion, while baseball-card day represents a less-expensive promotion.

$DL_t$ represents a dummy variable indicating the presence or absence of the player analyzed on the disabled list, 0 indicates the player was off the disabled list, while 1 indicates the player was on the disabled list.

$LT_t$ represents the number of games the player's team was out of first place on game day.

$LO_t$ represents the number of games the opposing team is out of first place on game day.

$WW_t$ represents whether the game was being played on a weekday or weekend. Operationally, 0 signifies a weekday game, while 1 indicates a weekend game.

$T_t$ represents the temperature in a cold-weather city on the day of the game. Cities in the Midwest, Northeastern parts of the country and in Canada where there was no domed stadium constitute this group. In the early part of the season when temperatures can approximate freezing, attendance is adversely affected.

$e_t$ represents stochastic error.

in four of the five cases, the everyday player, each of whom is considered a star, exhibited no statistically significant effect on attendance and revenues other than that exercised through their impact on team performance. Ricky Henderson is an exception. However, when Ricky Henderson left the disabled list during the 1987 season, the American League East pennant race had been reduced to a two-team affair (Toronto and Detroit). Although the Yankees played better with Henderson in the lineup, fan interest waned as the Yankees were eliminated from contention. It appeared that fewer fans attended games when Henderson returned to the lineup. Ostensibly, the inclusion of the disabled-list variable has the benefit of actually measuring the change in attendance associated with the absence of everyday stars in the lineup. However, it can be concluded from this small sample of players that either players produce fans only as part of a team, or some story has to be manufactured about why the sign of the variable is counter-intuitive.

This finding is very significant. It suggests that the addition of a new everyday player may boost pre-season interest in a team in anticipation of what the player will do for the team (which may translate into a shift in the demand curve for tickets), but attendance day-to-day is determined by the team's on-field performance with or without the new player in the line-up. Owners pay players an anticipated MRP, while players merit actual MRP as measured by their actual contribution to their team standings.

One reason the anticipated and actual measures of MRP diverge has to do with management's inability to assess the technological externality a player exhibits. While a player's individual performance in any given year is likely to approximate his career performance as measured by some well-publicized statistics, ultimately a player's MRP or worth can be measured only with reference to how he influences team performance as measured by the team's league standing. Underlying the authors' MRP calculations for everyday players is an answer to a simple question: what is the team's standing with the player in the line-up versus their standing with the player absent from the line-up? To estimate MRPs the authors have used a four-step process. First, they compute what a starting player is entitled to as a part of a team. Second, they simulate what the team's standings would have been had the player who was on the disabled list played. Third, a statistic is developed that relates team standings to attendance, and this coefficient is used to identify the change in attendance that correlates with a player's absence or presence in the line-up. Finally, average fan expenditures are multiplied by attendance attributable to the player to compute MRP.

Marginal Revenue Product computations also require the inclusion of broadcast revenues. Fan interest in broadcasts is assumed to parallel fan interest at the gate. Since players who are placed on the disabled list are inactivated for periods of not less than fourteen days, the number of games missed generally are sufficient to give us a statistically significant impression of a player's contribution. One possible glitch in this procedure would be inactivating two or more star players for the same period of time. In none of

the cases examined were star players from the same team placed on the disabled list for the same duration.

Calculations of MRP using the fundamental procedure outlined above require four separate calculations. The four calculations with explanations and interpretations where necessary are provided in sequence below.

1. Computing team revenues for the clubs the everyday players represent. These revenues include gate receipts, concession and parking receipts, local broadcast revenues, and national broadcast revenues.

2. Statistically determining the relationship between attendance and team standings. These coefficients were developed for cities having populations of less than 1.5 million, between 1.5 and 3.5 million, between 3.5 and 5.5 million, between 5.5 and 7.5 million, and more than 7.5 million. Cities are segmented in this way to ensure a sample size sufficiently large to justify conclusions. In addition, city segmentation enables a conclusion to be drawn about how different sized cities value ballplayers through their different reactions to team competitiveness. Although it would have been preferable to compute attendance-standing coefficients for the individual cities, the 18 observations available for each city were judged to be too small a sample. The sample period covered 1969-1987 and included all major league teams. The equation (3.2) used to explain attendance is:

$$A_{i,t} = B_o + B_i P_{i,t} + B_2 SC_{i,t} + B_3 DV_{i,t-1} + B_4 TS_{i,t} + B_5 SA_{i,t} + B_6 NS_{i,t} + B_7 Y_{i,t} + e_{i,t}$$ [40]

The statistics that are relevant for MRP calculations are reported in Table 3.2. These statistics included the attendance, team standing coefficient, and related t-values, $R^2$, $R^2$, and F-tests.

TABLE 3.2

Information reported in Table 3.2 suggests several things. First, equation 3.2 generally explains a majority of the variation in attendance. Much of what is not explained could be if it was possible to represent the promotion variable seasonally. This conclusion is suggested by the regression analysis performed in conjunction with equation 3.1. In each individual player regression, promotion had the right sign and was significant at the 1% level. All F-values indicate significance at the 1% level. Second, all the standings

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40. $A_{i,t}$ = season attendance/number of games for team i in year t;
$P_{i,t}$ = city population for team i's host city in year t;
$SC_{i,t}$ = stadium capacity for team i in year t;
$DV_{i,t-1}$ = a dummy variable indicating whether team i won a pennant the previous season;
$TS_{i,t}$ = team standing at the conclusion of regular season play measured by the number of games team i finished out of first place during year t;
$SA_{i,t}$ = the age of the stadium in which team i plays its home games in year t;
$NS_{i,t}$ = number of stars that performed for team i during year t;
$Y_{i,t}$ = per capita real income for team i's host city in year t;
$e_{i,t}$ = stochastic error.

coefficients exhibit the correct sign (as the number of games a team is out of first place increases, attendance decreases), and all coefficients are significant at the 1% level. Third, while there is no discernible pattern for the standings coefficients across cities, it is clear that cities display different dispositions toward winning. It does appear that "fair-weather" fans are most prevalent in large cities. In other words, fans in large cities are generally more responsive to a team's standing than is true for fans in small cities.

3. Calculating team standings and attendance for the season if the everyday player had played the entire season. This calculation involves computing the fraction of games won with the player in the line-up and multiplying that fraction over the entire schedule to simulate the team's record. Once the team's record is revised, then the number of games they would have been out of first place is recalculated. This number is multiplied by the attendance-standing coefficient for the city size represented by that player's team to calculate attendance lost (gained) with the player on the disabled list.[41]

4. An average salary for a starting player on each team needs to be determined. Practically speaking (without analyzing the roster moves and daily line-ups of each major league team) two options are available for determining an average salary. First, it could be assumed that fans pay to see the entire twenty-five man roster. If this representation of fan interest is chosen, then once a determination is made on the fraction of team revenues attributable to players, player-induced revenue totals are divided by the total number of players on the team. Theoretically, if win-loss records over the entire season could be imputed to each player, then MRPs could be calculated using the process outlined. Collectively, such a revenue-sharing scheme among players would yield a MRP sum that equalled the share of revenues attributable to players. Individual players with an imputed record better (worse) than that actually achieved by the team would exhibit a MRP above (below) the average MRP. There are two problems with this procedure. First, it assumes that fan interest is stimulated equally by all members of the twenty-five man roster. Second, it assumes that all twenty-five players contribute equally to team performance. Clearly, when coaches name a starting line-up, they do so in the expectation that the starting players named provide the best chance for the team to win.

The caveats noted with regard to option one argue for the use of a second option, one that accords with the view that starting players are more valuable to the club and thus warrant a larger share of the team's revenues attributable to players. If starters played every inning for the entire schedule, then non-starting players are worth very little, relatively speaking. If

41. Ideally, the recalculation of standings should reflect how league standings would have been reordered had all stars played at one time. However, those calculations were performed discretely, one star at a time. As long as stars from other teams are not injured at the same time, this discrete representation is more defensible.

fans come to see players perform on the field and not in the dugout, and if fans come to expect that starters will play every inning of every game, then fan attendance and interest is predicated on the performance of starting players. In this model the value of nonstarters is assumed to be defined by the major-league minimum salary. To calculate the benchmark salary for starters in this representation of baseball, the major-league minimum salary is multiplied by the number of nonstarters, and this number is subtracted from the revenue attributable to players.[42] It was assumed that each team had sixteen starters and nine reserves on their twenty-five man rosters.

No difference in the number of starters was identified for the National and American Leagues. While the American League has the designated hitter (nine everyday players), it is likely that the National League uses more relief pitchers on a regular basis than does the American League. Thus, it was determined that National League teams employ eight everyday players and eight pitchers (four starters, two middle-relievers, and two closers) as starters. The American League teams employ nine everyday players and seven pitchers (four starters, one middle-reliever, and two closers) as starters. This general representation of team composition is likely to overestimate the "benchmark" salary for starters particularly on teams that platoon players and for teams that have high-priced specialists such as pinch-hitters. Furthermore, the major league minimum salary applies to rookies. Veteran substitute players are going to be paid considerably more and their pay, in part, reflects years of service.

The equation (3.3) for computing individual player MRP is as follows:

$MRP_{Everyday}$ = Benchmark Starting Player Salary + Standings Coefficient x Change in Standings x Average Expenditure by a Fan Attending a Game.

Before providing individual MRPs, it should be emphasized that the fraction of revenues attributable to players is of critical importance. The authors have provided a "best guess" as to what that number is, but MRP calculations for selected players are arrayed in a matrix organized around various specifications for the fraction of revenues attributable to players.

MRPs for ten selected everyday players are recorded in Table 3.3.

TABLE 3.3

The information represented in Table 3.3 has several important implications. First, everyday players are neither uniformly underpaid or overpaid no matter what fraction of team revenue is attributable to players. However, if players are responsible for 50% of team revenues, more than half the

42. Since this is a general representation, it is not difficult to deviate from it to more realistically represent a particular team. For example, if a team platoons a right-handed and left-handed hitting rightfielder, then the number of their "starters" is increased by one to reflect that fact.

players examined are underpaid (seven out of ten) and 20% of them are paid less than one-half of what they are worth. Second, salary/MRP ratios are sensitive to city size. For example, cities having populations greater than 3.5 million are twice as likely to overpay players when players account for 50% of revenues than cities having populations less than 3.5 million. Third, if players account for only 25% of team revenues, 80% of the players are overpaid. If, on the other hand, players account for 75% of revenues, then none of the players analyzed were overpaid.

As noted, the question of what fraction of team revenues is player-generated is critical. Equation 3.2 can help determine a "ballpark" estimate for the fraction of revenues attributable to players.[43] The procedure involves first separating the independent variables that explain attendance into player-related variables and non-player related variables. Next, the coefficients of the player-related variables were multiplied by attendance and then divided by total explained attendance. Using this procedure and noting that eighty-seven of all rostered players at the start of the 1987 season were identified as stars, the fraction of attendance (revenues) accounted for by players was estimated at 40.8%. Of course, this technique is likely to underestimate the players contribution, since it assumes that all attendance associated with the omitted variables is attributable to the team's management. Therefore, it would appear that the players account for at least 40% of attendance and revenues.

The technique for computing pitchers differs from everyday players in one important respect. In the case of starting pitchers, since they appear in the lineup at discrete intervals, for example, every five days, the DL coefficient reveals what a starting pitcher contributes to attendance. To compute MRPs for starting pitchers the following formula (3.4) was used.

$MRP_{Pitcher}$ = Benchmark Salary for Starting Player + DL Coefficient x Average Fan Expenditure x Number of Home Games Pitched

Starting salaries for four star starting pitchers are recorded in Table 3.4.

TABLE 3.4

In reviewing the statistics recorded in Table 3.4, it is apparent that for pitchers, just as for everyday players, the fraction of team revenues accounted for by players is critical. If players generate 50% or more of team revenues, all the pitchers in the sample are underpaid. If players are responsible for 40% of team revenues, then two pitchers in the sample are paid approximately what they are worth, while the other two are underpaid. It is noteworthy that pitchers are not uniformly overpaid in any case described in our sensitivity matrix. In fact, Dave Stewart was paid approximately only

43. In a 1989 unpublished manuscript, Robert A. Baade and Laura Tiehen, using equation 3.2, were able to explain approximately 84% of the variation in baseball attendance for the 1968-1987 period. Calculations in that paper were of critical importance in assessing the extent which players were responsible for team revenues.

25% of his worth when player contributions to revenue are represented at 25%.

## IV. Summary and Conclusions

Baseball team owners and players are locked in a protracted legal struggle over control of player rents. In the free agency era players have wrested from owners a portion of their output previously appropriated by management. Owners have argued that free agency has enabled players to command salaries in excess of their contributions to team revenues. In an effort to restore financial integrity to the game owners have balked at player demands in free agent markets in the recent past. Players have responded by suing owners for collusion in violation of the Basic Agreement. If through free agency, players have come to be uniformly overpaid, and if owners have suddenly come to recognize that fact, a case could be made that owners have not colluded but rather practiced fiscal responsibility. The empirical evidence discussed herein does not support the contention that players are consistently overpaid. The findings do not absolve the owners from collusive behavior in violation of the Basic Agreement.

However, there are a number of instances in which players are overpaid. Considerably more information needs to be developed to determine the incidence of overpayment or underpayment. A logical starting point would be to determine the fraction of team revenues that are attributable to players. The Collective Bargaining Agreement of the National Basketball Association provides that 53% of gross revenues will be allocated to player salaries, and the sensitivity analysis performed in this paper argues for such a standard in baseball. Without agreement on player contributions to revenues in a team sense, it is doubtful that agreement will ever be reached on a player's individual worth. The foregoing analysis suggests that players account for at least 40% of team attendance and revenues. Assuming the 40% figure is correct, of the fourteen players analyzed, four players were overpaid, three were paid approximately their worth, and seven were underpaid.

Finally, it should be noted that this analysis focused on a salary-MRP ratio for a single year (1987). In fairness to both players and owners, the question of whether a player's salary is warranted is better resolved through analysis of a salary-MRP ratio over the lifetime of a contract. In addition, the well-publicized salaries exclude bonuses, incentive clauses, and other forms of compensation unique to individual player contracts. It may be that the gap between salary and MRP calculations is explained by these contract particulars. Lastly, this article has been an exercise in positive economics. Player MRPs are computed taking team revenues as a given. Normative questions regarding player salaries, such as should players be paid more than the President of the United States, are left to others to resolve.

TABLE 3.1

F Values, Disabled List Coefficients for Equation 3.1 for Five Everyday Players

| PLAYER | COEFFICIENT | T-VALUE | F-VALUE |
|---|---|---|---|
| George Brett (Kansas City Royals) | -1417.5 | -.696 | 8.03358 |
| Ricky Henderson (New York Yankees) | 5791.5 | 3.204 | 17.44155 |
| Don Mattingly (New York Yankees) | 1005.4 | .342 | 10.40033 |
| Paul Moliter (Milwaukee Brewers) | 2326.7 | -.892 | 17.28249 |
| Ryne Sandberg (Chicago Cubs) | 1980.6 | .801 | 12.29288 |

TABLE 3.2

Attendance-Team Standing Coefficients for Cities of Selected Sizes, 1969-1987

| POPULATION (MILLIONS) | STANDINGS COEFFICIENT | T-VALUE | $R^2$ | $\bar{R}^2$ | F-VALUE |
|---|---|---|---|---|---|
| 0 - 1.5 | -174.016897 | -2.802 | .78 | .76 | 28.03 |
| 1.5 - 3.5 | -116.333390 | -3.062 | .33 | .30 | 10.92 |
| 3.5 - 5.5 | -223.795594 | -4.606 | .71 | .66 | 15.10 |
| 5.5 - 7.5 | -175.757370 | -3.037 | .75 | .70 | 15.42 |
| > 7.5 | -380.506601 | -5.052 | .75 | .71 | 23.93 |

## TABLE 3.3

### MRPs for Selected Everyday Players

### Assuming Fractions of Revenues Attributable to Players of .25, .40, .50, .60, and .75 for 1987

| MRP Calculations Player (city size) | ACTUAL SALARY (1987) | MRP | Salary /MRP | .25 MRP | Salary /MRP | .40 MRP | Salary /MRP | .50 MRP | Salary /MRP | .60 MRP | Salary /MRP | .75 MRP | Salary /MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BRETT (1.5-3.5) | $1,500,000 | $323,374 | 4.6 | $ 670,733 | 2.2 | $ 902,305 | 1.7 | $1,133,878 | 1.3 | $1.481,237 | 1.0 | | |
| GIBSON (3.5-5.5) | $1,300,000 | $1,606,759 | .8 | $1,935,874 | .7 | $2,155,283 | .6 | $2,374,693 | .5 | $2,703,808 | .5 | | |
| HENDERSON (>7.5) | $1,670,000 | $1,137,349 | 1.5 | $1,615,494 | 1.0 | $1,934,257 | .9 | $2,253,020 | .7 | $2,731,165 | .6 | | |
| HERR (1.5-3.5) | $ 925,000 | 698,870 | 1.3 | $1,135,839 | .8 | $1,427,152 | .6 | $1,718,464 | .5 | $2,184,845 | .4 | | |
| MATTINGLY (>7.5) | $1,975,000 | $ 397,644 | 5.0 | $ 875,789 | 2.3 | $1,194,552 | 1.7 | $1,513,315 | 1.3 | $1,991,460 | 1.0 | | |
| MOLITOR (<1.5) | $1,260,000 | $2,501,330 | .5 | $2,801,936 | .4 | $3,002,340 | .4 | $3,202,743 | .4 | $3,532,760 | .4 | | |
| PENA (1.5-3.5) | $1,150,000 | $ 585,492 | 1.9 | $1,022,461 | 1.1 | $1,313,774 | .9 | $1,605,087 | .7 | $2,071,467 | .6 | | |
| SANDBERG (5.5-7.5) | $ 740,000 | $ 504,107 | 1.5 | $ 824,218 | .9 | $1,037,625 | .7 | $1,251,032 | .6 | $1,571,143 | .5 | | |
| SCHMIDT (3.5-5.5) | $2,127,333 | $1,027,103 | 2.1 | $1,399,977 | 1.5 | $1,648,559 | 1.3 | $1,897,141 | 1.1 | $2,270,015 | .9 | | |
| SCHOFIELD (>7.5) | $ 475,000 | $ 258,284 | 1.8 | $ 652,813 | .7 | $ 915,832 | .5 | $1,178,852 | .4 | $1,573,381 | .3 | | |

## TABLE 3.4

### MRPs for Selected Starting Pitchers, 1987

| MRP Calculations / Player | Actual Salary (1987) | .25 MRP | .25 Salary /MRP | .40 MRP | .40 Salary /MRP | .50 MRP | .50 Salary /MRP | .60 MRP | .60 Salary /MRP | .75 MRP | .75 Salary /MRP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GOODEN | $1,500,000 | $2,052,452 | .7 | $2,585,987 | .6 | $2,941,676 | .5 | $3,297,366 | .5 | $3,830,901 | .4 |
| STEWART | $ 500,000 | $1,868,073 | .3 | $2,262,602 | .2 | $2,525,622 | .2 | $2,788,641 | .2 | $3,183,170 | .2 |
| SUTCLIFFE | $1,800,000 | $1,425,212 | 1.3 | $1,745,323 | 1.0 | $1,958,730 | .9 | $2,172,137 | .8 | $2,492,730 | .7 |
| VALENZUELA | $1,850,000 | $1,412,005 | 1.3 | $1,825,181 | 1.0 | $2,100,631 | .9 | $2,376,082 | .8 | $2,789,258 | .7 |