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# The Baseball Players' Labor Market Reconsidered

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*The owners wanted as few players as possible to become free agents. I wasn't entirely opposed to this; I didn't want as many free-agent players as to flood the market . . . What would likely produce the optimal mix of supply and demand? With no history of free agent movement to study, it was impossible to know which requirement would be best . . . My gut feeling—and I stress “feeling”—was that five years would be better, and if the choice lay between four and six years, I would choose the latter. The owners' committee proposed six years; I suggested five.*

Marvin Miller, Founding Executive Director of  
MLB Players Association, 1976 [24, 266–67]

There have been eight work stoppages in the turbulent quarter century that has cradled the evolution of free agency in Major League Baseball (MLB). The most recent confrontation between MLB clubs and players resulted in a players' strike and the club owners' cancellation of the conclusion of the 1994 season, including the World Series. When MLB resumed play in 1995 and again in 1996 without a collective bargaining agreement, the major unresolved bargaining issue appeared to be a luxury surtax on team payrolls.<sup>1</sup> In exchange for the payroll tax, the clubs had agreed to mutually share a modest portion of their revenue according to a negative revenue tax formula.<sup>2</sup> Justification by club owners for the imposition of the payroll tax had been the bottom-line collision between soaring team payrolls and the severe revenue disparity among franchises. Over the four-year period preceding the 1994 strike, team-average player salaries had risen 86 percent from \$597 thousand in 1990 to \$1.109 million in 1993. The ostensible source of the salary inflation was a series of record setting free agent acquisitions and salary arbitration awards that occurred in the four-year interim between the collusion of owners against free agent players and the 1994 strike.<sup>3</sup> The purpose of this paper is to explore the possibility that the escalation of MLB

1. The tax rates initially proposed by management were so prohibitive (100 percent at the outset) and the thresholds so close to 1995 average team payrolls, that the luxury tax was little more than a disguised attempt to cap payrolls *status quo*. As play resumed in 1995 closure had been achieved on all bargaining issues except for the tax. Owners wanted a 50 percent tax on payrolls above \$44 million, while the players would have agreed to a 25 percent tax on payrolls above \$50 million. The players argued that, rather than players subsidizing small market clubs through salary compression, it was the responsibility of the large market owners to share revenue with the less viable franchises of the league.

2. Compare, for example, the largest proposed contribution of \$2.3 million to the revenue sharing pool by the New York Yankees to the difference between their \$108 million revenue (2.1 percent) in 1993 and the \$43 million revenue of the Pittsburgh Pirates. For a further description of the “Ft. Lauderdale” revenue sharing proposal, see Table I *infra*.

3. The collusion of MLB owners in the free agent markets of 1986, 1987 and 1988 was confirmed through arbitration hearings in 1987, 1988 and 1989. A settlement of \$280 million was awarded to the damaged players in 1990. In

player salaries does not necessarily derive from the institution of free agency, but more from the arbitrary configuration of the eligibility requirements that has constrained free agency since its inception.<sup>4</sup> If this is the case, then a restructuring of the conditions for free agency would be a more effective cost-abatement policy than imposing the further limitations of a payroll tax, and it would serve as a more appropriate complement to revenue sharing among clubs in a comprehensive remedial policy mix.<sup>5</sup>

There has been turmoil between the lines of MLB playing fields as well. During this century three MLB teams have been able to leapfrog from first to last place within the course of a single season. All three of these fortunate reversals occurred amid the talent turnover in the brief interim between club collusion and player strike.<sup>6</sup> Evidence of concurrent, unfortunate reversals can be found in each National League (NL) division cellar. The 1993 New York Mets became the fourth team in MLB history to lose more than one-hundred games in a season within five years of winning one hundred games.<sup>7</sup> The 1992 Los Angeles Dodgers fell from a close second place in the NL West to its worst record since 1908. Ironically, the first Dodger team to finish last in eighty-seven years had acquired five 1991 free agents for a record combined annual salary of \$10.2 million. Similarly, the Mets team that collapsed in 1993 had acquired three 1992 free agents for a new record combined annual salary of \$11.1 million.<sup>8</sup> This recurrence of performance reversals and coincident salary escalation may be symptomatic of the monopolistic inefficiencies of limited free agent eligibility.<sup>9</sup> It is argued in this paper is that, because of the limited eligibility for free agency, the acquisition of free-agent talent is a negative-sum game, and that league parity is more likely the result of free agency pulling superior teams apart than improving inferior ones.<sup>10</sup> The paper reconsiders the unique duality of monopsonistic exploitation and monopolistic inefficiency

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1993, a record 84 free agents, who averaged 31 years of age, signed an average two-year deal for \$6 million. The average free agent hitter had a .273 batting average with 10 home runs, 48 runs batted in and 10 stolen bases. The average pitcher had a record of 9 wins and 7 losses with a 3.57 earned run average. Overall, salary increases for the players who filed for arbitration in 1994 increased by an average of 94 percent. The average salary increase for players that settled before arbitration in 1994 was 96 percent; for those cases in which the player won in arbitration, 160 percent; and for those cases in which the player *lost*, the average salary increase was 49 percent.

4. Changes in national media rights fees can also explain the free agent acquisitions and subsequent bargaining impasse. In the four national media contracts that have coincided with free agency, each club's average annual share has risen from less than \$1 million in 1976–79, to \$1.8 million in 1980–83, to \$7.2 million in 1984–89 to \$14.5 million in the 1990–93. The media agreement for 1994–99 is expected to cut a team's share by 100 percent to approximately \$6.4 million.

5. Revenue sharing arrangements should involve revenue that is inelastic with respect to winning. The sharing of winning elastic revenue has no effect on competitive balance and leads to the further exploitation of players. The benefits of a payroll tax or cap are subject to question [17; 30; 37].

6. The defending prestrike NL Champion Philadelphia Phillies jumped from last to first place in 1993. The 1991 World Series matched the two other last-to-first league champions: the Minnesota Twins and the Atlanta Braves.

7. In 1993 the Mets lost 103 games, and five years earlier they had won 100 games. The 1993 Oakland Athletics became the first MLB team in 78 years to plummet from first to last place in one season.

8. The 1993 San Diego Padres finished last in the NL West. In contrast to the Mets and Dodgers collapses, the fall of the Padres was the result of a suicidal cost-cutting managerial strategy and avoidance of free agent acquisition. The Padres reduced their team payroll from \$25.5 million on opening day of 1993 to \$10.5 million by the end of the season. By comparison the Mets team payroll at 1993 season's end was \$40.8 million. Although the Mets and Padres had both managed to lose in excess of one hundred games in 1993, the Padres accomplished the feat for \$30 million less.

9. In 1994 approximately two-thirds of the players on MLB active 25-man rosters remained subject to the constraints of the reserve clause, while one-third qualified for free agency. See Table IV *infra*.

10. Based on the probability  $p$  of one place move in league standings, the probability of a  $n$  place move from changes in a team's own quality would be  $p^n$ , compared the probability of a  $n$  place move because of the change in the quality of the competition of  $p^{n(n+1)/2}$ . This leads to the conclusion that "the greater the change in a team's standing, the less probable it is that changes in the absolute quality levels of other teams are the cause" [8, 97n].

that segments the baseball players' labor market, and concludes with a proposed relaxation the eligibility criteria for free agency.

## I. Theory

The era of free agency in MLB began with the *Collective Bargaining Agreement of 1976*, in which the limits of the "reserve clause," which had previously bound players to teams for perpetuity, were reduced to six years of MLB service. Traditional arguments against free agency had been that, without the binding restrictions of the reserve clause, the most talented players would gravitate toward the large market franchises where their marginal revenue product was the highest. Under free agency, it was argued, the larger market teams would accumulate most of the talent, and the competitive balance within MLB would be lessened. In opposition to these arguments, economic theory has consistently held that the distribution of talent would be the same under either free agency or the reserve clause, and that the difference under either regime would be the distribution of the rent derived from talent. According to the *invariance proposition*, player exploitation would be diminished, but competitive balance would not be affected by free agency.<sup>11</sup> Throughout the debate on the effects of free agency, however, there has been an evolving confusion between competitive balance, defined as the relative quality of play among teams, and the absolute quality of the game of baseball, defined as maximum overall production of league talent. It is argued in this paper that the limits on free agency have created competitive balance in the form of interseasonal discontinuity for MLB teams at the expense of the quality of the game.

### *The Yankee Paradox*

The customary argument for balanced competition is couched in terms of league-welfare optimality. First, it is argued that the product of professional sports teams is the game that is jointly produced between teams. Second, it is maintained that the quality of the games is determined by the uncertainty of the outcomes of the games among the members of the league. The objectives of the teams in the league are necessarily interdependent, because each game requires the existence and performance of two teams. In this peculiar case, the accumulation of talent in the singularly competitive pursuit of maximum profit by individual clubs may lead to significant negative externalities and a self-defeating dominance of the league by large-market clubs (the *Yankee paradox*). Quirk and Fort extend the argument with the contention that "one of the key ingredients of the demand by fans for team sports is the excitement generated because of the uncertainty of outcome of league games" [30, 243]. The argument follows a second proposition by Rottenberg that the interdependence of profits among teams will be internalized by the large market owners. "The wealthy teams will usually prefer winning to losing. If they do they will prefer winning by close margins to winning by wide ones. If their market behavior is consistent with this objective . . . playing talent will be more or less equally distributed among teams" [32,

11. Rottenberg reasons "that a market in which freedom is limited by a reserve rule . . . distributes players about as a free market would" [32, 55]. Demsetz applies the Coase theorem [10] when he asserts "No matter who owns the right to sell the contract for the services of a baseball player, the distribution of players among teams will remain the same" [15, 17]. Quirk and El Hodiri [16; 29] conclude that "the rules structure of professional sports is relatively ineffective in balancing playing strengths, and that the imbalance is due to the differences in the drawing potential of franchises." Daly observes that "Rottenberg's invariance proposition proved so compelling to so many economists some of whom viewed its logic to be so unassailable as to constitute a proof of its validity. Its grip on economists persists to this day" [12, 14].

255]. Competitive balance is thereby seen as being superior a priori to large market dominance in terms of league welfare. The small markets clubs will be more profitable if they have an even chance to win, whereas the large market clubs will be more profitable because they have provided a quality contest with an uncertain outcome.<sup>12</sup> While first part of this argument is necessarily true, the second part is not so easily demonstrated. Clearly the profits of the small market teams are improved through their contention for wins, and certainly large market profits depend on the existence of other teams in the league. Whether large market profits are further enhanced through league competitive balance or the closeness of the competition remains an empirical question.

Empirical evidence for the *Yankee paradox* is mixed.<sup>13</sup> Demmert tests the proposition directly and concludes: "Rottenberg bases much of his argument on the maintained hypothesis that the returns to narrow victory are larger. Such a hypothesis does not appear to merit support in light of our estimates . . . the incentive of the individual club is to win, and not necessarily by a close margin" [14, 67]. Based on their inquiry into a league-optimal level of dominance Hunt and Lewis reach the conclusion that "revenue is maximized for the division when the large SMSA team wins the division 43 percent of the time" [18, 940].<sup>14</sup> These results suggest that competitive balance may not be consistent with the joint profit maximization of the teams in the league.<sup>15</sup>

### *Quality of the Game*

Perhaps a more convincing argument for competitive balance concerns the proposition that even playing strengths are necessary to create the combination of league talent that yields the maximum league product. If this is true, then the talent allocation consistent with large market dominance produces contests that are inferior with respect to the league's joint product. It is profitable for large revenue clubs to acquire players who may have a higher marginal *revenue* product, but who still may have a lower marginal *physical* product than they would with small revenue teams. As a result, the league-wide talent combination under large market dominance is submaximal in terms of absolute quality. The following proposition obtains.

**PROPOSITION 1.** *The distribution of talent that is consistent with the maximum league product occurs when the marginal physical product of talent is equivalent among clubs in the league. The accumulation of physically redundant talent by large market clubs, therefore, leads to an inferior, submaximal league product.*

The proposition can be demonstrated in Figure 1, where the marginal revenue and marginal cost curves are shown for a two-team league comprised of a large market Team 1 (left

12. Neale originally labeled the negative interdependence among teams the "Louis-Schmelling Paradox" but he also refers to the pre-1964 New York Yankees (as does Rottenberg) in making the observation: "the greater the economic collusion and the more the sporting competition the greater the profits" [25, 2].

13. In results not reported here, MLB home attendance for the ten year period 1984–93 is inversely related to "games behind" at the end of the current and preceding seasons but positively related to "games ahead" for the preceding year. In Noll's study of the 1970–71 seasons "close pennant race" and "games behind" variables are not significant factors in explaining MLB attendance, but "recent pennant win" is. Noll concludes: "This suggests that aggregate league attendance will be substantially higher if several teams alternate in winning pennants than if one team tends to dominate" [27, 123].

14. Hunt and Lewis [18] base their estimation of a league-optimal level of competitive dominance of the large market team on a comparison of revenue maximization for the individual team (winning the division 80 percent of the time) compared to the revenue maximization for the league (winning the division 43 percent of the time).

15. Canes argues that "a policy aimed at equalizing team strengths would transfer quality from areas where winning is more valued to areas where it is less valued. . . . Since those who gain place lower value on increased wins than those who lose, *net* social benefits would be reduced. This raises doubts whether equality of team strengths is a desirable goal (emphasis original)" [8, 82].

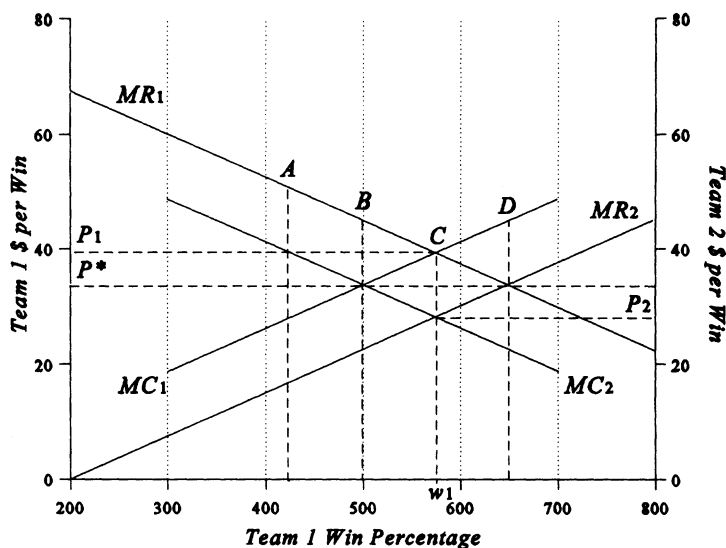


Figure 1. Quality of the Game

to right) facing a small market Team 2 (right to left). The two clubs are assumed to be identical except for the large market revenue advantage enjoyed by Team 1. Under the assumptions of team-independence of talent (players are seen as interchangeable parts) and equal cost per unit of talent for both teams, the marginal cost of talent for both teams can be shown as increasing and symmetrical around .500.<sup>16</sup> Any team playing above .500 encounters a diminishing marginal productivity of talent and a higher marginal cost of talent than does the team it dominates. Under these conditions, and given the negative interdependence between the teams of the league ( $\partial w_1/\partial w_2 = \partial w_2/\partial w_1 = -1$ ), the maximum league product is consistent with absolute competitive balance at B and league-wide payroll minimization at  $P^*$ . Now consider the competitive balance equilibrium that is consistent with joint profit maximization ( $MR_1 - MC_1 = MR_2 - MC_2 = 0$ ). These conditions yield the large market dominance solution at C with a payroll of  $P_1 w_1$  for Team 1 and  $P_2(1 - w_t)$  for Team 2. A comparison of the competitive solution at C with the league maximum production at B demonstrates the reduction in the league total product due to large market dominance. The redistribution of talent from Team 1 to Team 2 in the pursuit of competitive balance (C to B) would improve Team 2 more than it would harm Team 1 ( $MP_1 < MP_2$ ). If players are paid the value of their marginal product, the payroll reduction for Team 1 is greater than the payroll increase for Team 2 ( $MC_1 > MC_2$ ). League player costs would be minimized and net gains to the total league product would be exhausted at the league-optimal talent distribution B.

Although this proposition is intuitively appealing, its validity is heavily dependent on the assumption of the team independence of talent within the league. If playing talent is team-specific to any degree, then the pursuit of absolute competitive balance would result in a league-inferior redistribution of talent. Reconsider the redistribution of talent in the move from large market dominance at C to competitive balance at B under the conditions of team-specificity of talent (a player's contribution to team performance is partially attributable to the other members of

16. The proposition about competitive balance and league quality is still true without the second assumption, which allows the maximum league product to be consistent with the minimum league cost. The assumption of equal cost per unit of talent is made by several authors [14; 16; 17; 29; 30]. See Vrooman [37] for the effects of a relaxation of the equal cost assumption.



the team). For that matter, reconsider the transfer of talent from the disequilibrium dominance of a small market club at *A* to achieve competitive balance at *B*. If the talent that is transferred in either the move *A* to *B* or the move *C* to *B* is team-specific, then the team which loses the player is still initially hurt less than the acquiring team is improved, but the difference between the league production gains and losses (the net league gain) is smaller than under conditions of team independence of talent. The marginal cost curve for the talent-acquiring team in Figure 1 would become steeper in moves toward .500/.500. As the result of the team-specificity of talent, winning for the talent-acquiring team would become increasingly expensive compared with cost reductions for the talent-losing team. Marginal costs for the talent-acquiring teams would become greater between either *A* and *B* (Team 1) or *C* and *B* (Team 2) than under conditions of team-independence of talent.<sup>17</sup> The team-specificity of talent implies that the net gains to league total product are exhausted at a competitive balance less than absolute parity. To the extent that baseball talent is team-specific, competitive balance may yield an inferior league product. This leads to a general proposition intended to clarify the relationship between relative quality among teams and absolute quality within the league.

**PROPOSITION 2.** *A balance of relative team quality within a sports league implies maximum league quality, if and only if, the talent in that sports league is team-independent.*

### *The Irreversibility Proposition*

The existence of each MLB club implies that the teams are coalitions of individual players for which the collective results are greater than the sum of the individual results [2]. Some team members are more productive in the coalition than they would be elsewhere, some are less productive than they could be with another teams, and some players have talent that is independent of the teams for which they play. If the value of the player is partially attributable to his team, then the player's talent is team-specific. Not only is the talent of the team-specific player asymmetrical or irreversible among the teams of the league, but so is the knowledge about that team-specificity of talent. The least incomplete information about the team-specificity or independence of a player's talent resides with the owner (general manager) of the team for which the player currently plays. Incomplete information is, therefore, inherent in any transaction that involves player movement from team to team. In player for player trades the information is incomplete about the team specificity of talent, but the uncertainty is symmetrical between the trading teams.<sup>18</sup> In the acquisition of players for salaries under free agency or club to club compensation under the reserve system, the information about the team specificity of the player's talent is *asymmetrically* incomplete. The team-specificity or irreversibility of talent is due to the nature of the game, itself, and it is pos-

17. Whitney [38] observes that teams may have multiple objectives such as winning championships in addition to winning games. In this case the quality of the game argument would be unaffected. Although the joint production of wins and championships would introduce nonlinearities into both marginal revenue and marginal cost functions and raise the possibility of multiple equilibria, the nonlinearities would only occur for winning percentages above .500. In results not reported in detail here, a probit model treating division championships as a function of winning percentage during the period of division play (1970–93) yields the following probabilities of winning the division: 5 percent for .525 (85 wins), 25 percent for .556 (90 wins), 50 percent for .580 (94 wins), 75 percent for .599 (97 wins) and 90 percent for .617 (100 wins).

18. In trades involving several players for fewer players there is an asymmetry of risk. For example, large market teams often acquire a single talented player for several less talented players (the sum of whose talent may be less than that of the single player) in a trade with a more risk-averse small market team. Although the expected value of the single player is higher, the variance of the performance of the several players will be lower unless their performance is perfectly correlated.

sible that free agency may introduce additional uncertainty into the redistribution process.<sup>19</sup> The key question then arises as to whether the asymmetry of information among MLB clubs is any different under the institution of free agency than it was under the reserve system.

*Market for Lemons.* In his study of the effects of information asymmetries on the free agent market, Lehn observes that: "Presumably, the club for which a player has performed has more information with which to estimate the player's future performance than do the clubs that have not employed the player . . . If such asymmetry exists, then, the expected performance of free agents will be lower than the expected performance of eligible players who do not become free agents" [22, 254]. Lehn further suggests that, *because of free agency*, the market for talent is subject to self-selection and that the "lemons model" [1] may apply to the MLB free agent market. "This asymmetry increases the differences of what a player expects to earn as a free agent and what he could earn by signing a contract with the club for which he has been playing, resulting in a self-selection of players [22, 255]." This proposition is not necessarily true, because it is the information asymmetry that creates the adverse selection of free agents on the market, *not free agency itself*. In order for free agency to affect the information asymmetry, it must be shown that any additional uncertainty about the team-specificity of talent under free agency somehow affects the imbalance of certainty that exists between the former owner on one hand and the group of potential owners on the other.<sup>20</sup> This leads to the conclusion that the acquisition of talent is subject to the same information asymmetries between former and prospective owners under free agency or the reserve system, and that the external market for MLB talent is subject to adverse selection under either regime.<sup>21</sup>

*Winner's Curse.* In their analysis of the inefficiencies of the auction mechanism in the free agent market Cassing and Douglas [9] conclude that free agents "really are paid too much." They argue that the acquisition of free agent talent is subject to a winner's curse. "If a team bids on, say, ten free agents, then there is a tendency to win a 'biased' set of players—those for which the bidder has overestimated value. Increasing the number of bidders only increases the bias effect" [9, 112]. Because of information asymmetries and uncertainty, the bids by potential new owners may on average estimate the "true" worth of the player, but "the team that estimates value correctly on average nonetheless has a poor chance of winning when it underestimates value and a good chance of winning when it overestimates value" [9, 112]. The asymmetry of information

19. The team-specificity of talent may vary from sport to sport. Some may argue that MLB talent is the least team-specific of all major team sports. In this regard Proposition 1 would apply to MLB, whereas Proposition 2 may be more relevant for more team specific sports such as football, basketball and hockey. The team-specificity of MLB talent should not be underestimated. For example, following the 1991 season, the N.Y. Mets signed free agent Bobby Bonilla to a five year \$29 million contract to be their cornerstone player. Unfortunately, his previous hitting production for the Pittsburgh Pirates was specific to his position (fourth) in the batting order, before league MVP Barry Bonds (fifth). Since joining the Mets his "unprotected" batting average has been twenty-five points lower than his lifetime average with the Pirates.

20. The acquisition of players in the free agent market involves three parties: the former owner, the acquiring owner and the free agent player. Only the original owner knows the team specificity (independence) of the player's past performance, whereas both the player and the acquiring team owner are relatively uncertain. While the uncertainty of the player about the team specificity of his own talent becomes an additional factor under free agency, it is not necessarily a significant factor, unless it affects the asymmetry of information between owners. Because uncertainty is asymmetric under either set of operating rules, the acquisition of talent is subject to external diseconomies under either regime.

21. The information asymmetries inherent in the acquisition of players in the external market may increase the transactions cost of player acquisition to the point where it is less costly for MLB clubs to internalize the inefficient market acquisitions by developing talent within their farm systems. The internalization threshold is tautologically described by Coase [10]: "the main reason why it is profitable to establish a firm (internalize player development) would seem to be that there is a cost of using the price mechanism." For a discussion of the transactions cost approach to the baseball labor market, see Daly [12].



leads to an overpayment of free agent players, but only if there are relatively few eligible players and several prospective bidders. In the case of the winner's curse, the information asymmetry that exists under either free agency or the reserve system is a necessary, but not sufficient condition for the overbidding. Information asymmetries create the bias only because the auction process exists in a monopoly environment. Therefore, it is the arbitrary limitation of the number of free agents, not necessarily free agency, that augments the bias of the winner's curse.

*Goldbricking.* Although the information asymmetries are similar under the reserve system and free agency, the free agency transaction may still be unique in one important respect. The free agency contract usually involves an owner and a player in a one-time deal, whereas the contracting parties in reserve transactions are members of an ongoing league. The free agency transaction contains more of what Klein, Crawford and Alchian [19] call "appropriable quasi-rent" than the recurring, self-enforcing transactions among MLB owners. The free agent transaction, therefore, may be inefficient in that it is subject to postcontractual opportunism by either party.<sup>22</sup> Lehn [21; 22] observes that players who were eligible for free agency and signed with new teams were more likely to experience postcontractual injury and lost playing time than those players who were resigned by their own team.<sup>23</sup> Krautmann argues that the stochastic nature of productivity is the source of apparent contract disincentive effects and that "these vague allegations of shirking are merely a statistical artifact" [20, 967].

*Since Scully.* Following the methodology of Scully [33], several studies have sought to measure the degree of monopsonistic exploitation of MLB players through comparisons of observed player salaries with various individual performance measures.<sup>24</sup> Based on his original attempts to ascertain the worth of an individual player to a club in the era before free agency (1968–69), Scully concludes that "the economic loss to professional ball players under the reserve clause is of a considerable magnitude" [33, 929]. In the early years of free agency, several studies confirmed Scully's suspicions through comparisons of the rates of exploitation (ratios of player salary to marginal revenue product MRP) between free agents and non free agents. While there is significant evidence of underpayment of non free agents in each of these studies, there is also consistent evidence that free agents were overpaid relative to their MRPs.<sup>25</sup>

22. Consider the 1990 free agent acquisition by the Dodgers of Darryl Strawberry, formerly with the Mets, and the acquisition by the Mets of Vince Coleman, formerly with the Cardinals. The Dodgers signed Strawberry to a 5 year \$20.25 million contract, when the best offer from the Mets was 4 years for \$15.5 million. The Mets signed Coleman to replace Strawberry for a 4 year \$11 million deal when the best offer from the Cardinals was 3 years for \$7.5 million. Strawberry spent the 1992 and 1993 seasons on injured reserve, and began 1994 in drug rehabilitation before being released outright. Coleman missed over one-half of the games in 3 years. If nonperformance of these contracts was due to team specificity of talent, it would occur regardless. But if it was postcontractual opportunism, it would only have occurred in free agency.

23. Lehn suggests that the length of the free agent contracts would become shorter as owners try to minimize risk of losses due to opportunistic behavior.

24. Scully's method characterizes the human capital specifications of marginal productivity theory. The methodology explicitly assumes that "individual performance carries with it no externalities, so that team performance is simply the linear summation of individual performance" [33, 921]. Such linear reasoning by club general managers may serve to undermine the effectiveness of the free agent market. For example, consider the simple case of a manager who maximizes the joint performance of two players through his knowledge and use of their respective comparative advantages, compared to the manager of a team of equal linear talent who does not. The team of the former will dominate a priori the team of the latter, but how in Scully's analysis are the results of dominance to be assigned to individual players? Porter and Scully [28] and Scully [34; 35] suggest that such a residual should be considered a measure of the managers MRP.

25. Sommers and Quinton find evidence [36, 434, Table II] that free agents are worth more in large markets, but struggle with the conclusion that "These estimates of net benefits and costs suggest, rather misleadingly, that virtually all of the free agents in 1977 were grossly overpaid . . . it seems that owners could get better buys on talent by ignoring free agents" [36, 433–34]. Raimondo finds evidence [31, 185, Table I] of exploitation for mediocre 1977 free agents but that star players and average free agent pitchers received more than their MRPs.

More recently, Bruggink and Rose [7] use Scully's method to ascertain the amount that MLB free agent salaries were affected by the collusion of MLB owners following the 1985 and 1986 seasons. While they reach the conclusion that the salary/MRP exploitation ratios were 28–38 percent lower during the period of alleged collusion, they also provide evidence that precollusion free agents in 1984 were paid 22 percent more than their MRP [7, 1037]. Blass [6] estimates that 76 to 86 percent of 1985–6 position players (non-pitchers) eligible for free agency in are overpaid. Zimbalist [39; 40] observes that, while players with less than six years of experience are paid between one-fifth and two-thirds of their MRP, players with six or more years of MLB experience “were paid on average 23.6 percent above their MRP in 1986, 31.5 percent above their MRP in 1987, 28.0 percent above in 1988, and 39.7 percent above in 1989” [39, 130]. Zimbalist concludes that “team owners since 1976 have done a singularly unimpressive job of signing top-performing free agents or paying a player according to his output. Consequently, average team salary has been related only tenuously to team performance” [39, 91]. The results of each of these studies lead to the conclusion that limited free agent players are systematically paid more than they are worth, not because of their freedom, but because of their artificial monopoly power.

## II. Evidence

Evidence concerning the effects of free agency on competitive balance seems contradictory. Early studies [11; 13] find that free agents migrate from winning teams in small markets to large markets, whereas more recent studies [4; 30; 34; 37; 39] detect no impact of free agency on competitive balance. The apparent contradiction can be resolved with the realization that, while player movement and competitive imbalance are connected in theory, talent acquisitions do not necessarily imply dominance if those acquisitions are inefficient. The purpose of this section is to empirically reexamine player movement in the prestrike/postcollusion interim.

### *Player Movement*

Due to the unbalanced growth of the various revenue sources among MLB clubs, the customary dichotomy between large and small MLB markets based on home market population has become misleading. The distinction between the small and large *revenue* markets is further obscured by the proprietary and strategic nature of the financial data reported by the individual teams. On the eve of the ill-fated 1994 season MLB management reached an agreement that involved the sharing of revenue among teams and the unilateral imposition of a league-wide payroll cap of \$34.2 million per club. In this “Ft. Lauderdale Agreement” the clubs arrived at revenue-sharing arrangements that were presumably based on mutually reliable revenue estimates for each franchise. Revenue sharing data and team payrolls for 1994 are reported in Table I for the eight largest contributors (LMs) to the revenue sharing pool and the eight largest recipients (SMs) of the revenue sharing subsidy. Also reported are the 1993 revenue estimates (by source) for these MLB clubs by *Financial World*, the average value of free agents lost and gained in the postcollusion period, and the average winning percentages in the 1990–93 period for the MLB club and its AA minor league affiliate.<sup>26</sup>

26. Free agent gains and losses are 4 year averages of the new annualized salaries (with bonuses) of free agents who switched teams from 1990–93 and remained on the season-opening rosters. In 1990 the 30 free agents who changed teams received total annualized salaries of \$36.3 million; in 1991 57 free agents made the rosters of their new clubs for a total \$81.4 million in 1992 33 players received \$56.5 million; and in 1993 61 free agents were paid a total \$118.7 million.

Table I. Financial Characteristics for Large and Small Market Major League Baseball Clubs (\$ millions)

Franchise	Revenue Share <sup>a</sup>	1993b Revenue	1993b Gate	1993b Media	1994 <sup>a</sup> Payroll	FA Gain <sup>c</sup>	FA Loss <sup>c</sup>	AA Win Percent <sup>c</sup>	Win Percent <sup>c</sup>
Large Market Clubs:									
New York Yankees	2.30	107.6	30.1	63.0	50.7	5.28	0.96	.532	.466
Toronto Blue Jays‡	2.18	88.4	47.8	31.6	51.5	4.77	7.49	.455	.568
Atlanta Braves†	2.05	79.0	35.4	35.0	54.0	3.59	0.92	.558	.557
Baltimore Orioles‡	2.02	81.3	35.4	27.4	44.6	1.78	0.83	.501	.490
LA Dodgers†	1.85	79.7	29.9	34.0	46.6	5.00	3.66	.480	.499
Chicago White Sox‡	1.78	78.8	28.1	26.2	52.3	0.83	0.08	.525	.557
Boston Red Sox	1.71	77.5	26.8	38.0	43.9	6.82	3.27	.410	.502
New York Mets†	1.66	80.8	20.3	46.1	34.4	4.15	2.91	.508	.462
Small Market Clubs:									
California Angels	−1.30	53.8	17.1	26.7	36.6	2.55	3.10	.466	.469
Kansas City Royals	−1.99	51.7	18.3	21.0	48.7	5.46	3.27	.469	.484
Seattle Mariners	−1.99	50.7	17.0	21.0	38.5	1.58	1.32	.463	.472
Milwaukee Brewers	−2.47	46.3	17.0	21.5	30.4	1.72	3.12	.567	.491
Minnesota Twins	−2.56	48.9	18.8	22.3	32.8	2.80	5.34	.514	.509
Montreal Expos†	−3.76	46.2	14.2	24.0	24.3	0.51	2.95	.613	.521
Pittsburgh Pirates†	−3.76	43.0	14.4	23.5	29.8	0.95	5.26	.463	.562
San Diego Padres†	−3.78	47.7	14.1	25.0	20.3	1.49	3.22	.509	.466

Sources:  
a. MLB "Fort Lauderdale Agreement." b. *Financial World*. c. *Sporting News Baseball Guide*  
† National League Clubs.  
‡ New Stadiums

A few comparisons can be made regarding these general characteristics. First, the ordering of market revenue potential based on level of participation in the revenue-sharing agreement is consistent with the total-revenue estimates for MLB teams by *FW*. Four of the eight LM clubs (two NY teams, Boston and LA) received higher media than gate revenues in 1993,<sup>27</sup> one LM team (Atlanta) received a balanced share of both media and gate revenues, and the gate and stadium revenues of three franchises (Toronto, Chicago and Baltimore) are subsidized by new stadiums. With few exceptions, 1994 payrolls and the related acquisition of free agent talent by these sixteen clubs reflect variations in 1993 revenues. The success of these clubs on the playing field appears to show more relation to the performance of a club's AA affiliate than to either revenue or payroll.<sup>28</sup> Analyses of the factors influencing the movement of free agent talent require a more rigorous examination of these data.

According to the theory presented in Figure 1, free agent movement is governed by two counteractive forces. If acting alone, the marginal revenue dominance ( $MR_1 > MR_2$ ) of LM's should generate the talent distribution consistent with league revenue maximization and LM dominance at *D* ( $MR_1 = MR_2$ ), whereas the equalization of the marginal physical product of talent ( $MC_1 = MC_2$ ) should draw talent to the league-maximum product distribution at *B*. The joint effects of the revenue and productivity (cost) factors would result in a general competitive equi-

27. The Mets have a 30 year local media contract with Sportschannel for \$12 million per year in 1982. The Yankees exercised an escape option in 1988 to sign a 12 year deal with Madison Square Garden Network for \$40.5 million per year. Other local media revenues can be approximated by subtracting the \$15.5 national media from the total figure for 1993.

28. Performance at AA is accepted as a good indicator of the strength of a MLB team's farm system. The best talent is concentrated at AA (roughly equivalent to a college senior) and an AA team is usually left intact for an entire season.

Table II. Movement of Major League Baseball Free Agent Talent in Postcollusion/Prestrike Interim: 1990–93

MOVE	WIN <sub><i>t</i>-1</sub>	SMALL	BIG5	PARK	SMWIN†	LOSS	SMLOSS†	YEAR	CON	R <sup>2</sup>	N
LOSS	22.50** (6.97)	.86* (2.00)	.50 (1.06)	-1.99 (-1.87)	—	—	—	.869** (5.41)	-10.21** (-6.12)	.430	104
GAIN	-8.18** (-2.73)	1.11* (2.50)	3.18** (4.22)	.53 (1.00)	—	.481** (5.77)	-.474** (-4.42)	—	4.78** (3.36)	.370	104
NET	-10.43** (-3.31)	15.04** (4.21)	2.67** (4.40)	.32 (.86)	-33.19** (-4.67)	—	—	—	5.27** (3.43)	.530	104

*t* ratios in parentheses: \*significant at .05, \*\*significant at .01 (two-tailed test).  
†WIN<sub>*t*-1</sub> and LOSS interactions with BIG5 and PARK are not significant at .05.

librium consistent with league-profit maximization ( $MR_1 - MC_1 = MR_2 - MC_2$ ) at *C*. Predicted movement of free agent players can be broken into phases to represent the adjustment to the league equilibrium at *C*. First, players can be expected to move from winning clubs to losing clubs, because the contribution of an individual player is necessarily greater to the marginal product of a losing team than it is to a winning team. For winning SM clubs, talent will move from disequilibrium condition *A* to the optimum talent distribution at *B*, and winning LM teams at *C* may lose players in the early phases of the free agent market consistent with a move to the league productivity maximum at *B*. All winning teams, regardless of market size, have a tendency to lose talent to those clubs that they dominate. For winning SM clubs the talent redistribution is consistent with the move *A* to *B*, and for winning LM teams, the move *C* to *B* in Figure 1.

In the second phase of player movement, the revenue imbalances between teams would draw free agent talent to competitive equilibrium and large market dominance at *C*. Due to revenue imbalances, the small market club is expected to suffer a net loss of free agent talent to the large market franchise regardless of relative team quality. The SM winner and the LM loser, shown as disequilibrium condition *A*, reallocate talent in accordance with the general equilibrium adjustment *A* – *B* – *C*, whereas the SM loser and the LM winner, depicted as equilibrium *C*, allocate players consistent with a maintenance of status quo *C* – *B* – *C*. The heavy losers of free agent talent should be the most talented SM teams, and the heavy gainers should be the least talented LM teams. The most talented LM clubs may lose free agents but they can be expected to replace them, and the least talented SM teams may reacquire talent, but not enough to affect their prospects of winning. According to theory, the cold truth of MLB competition lies in the imbalance, LM dominance and league-inferior total product at equilibrium *C*.

Regression estimates of the factors affecting free agent losses and gains in the prestrike/post-collusion interim 1990–93 are reported in Table II for MLB. Free agent losses (*LOSS*), gains (*GAIN*) and net gains (*NET*) are each specified as a function of the club's winning percentage in the preceding season (*WIN<sub>t-1</sub>*), with binary variables for the eight SM franchises (*SMALL*), the five LM franchises (*BIG5*) with dominance in media revenues (Yankees, Mets, Dodgers, Red Sox, and Braves), and the three LM teams (Blue Jays, White Sox and Orioles) playing in new stadiums (*PARK*) for the seasons in which the stadiums existed.<sup>29</sup> In the structural equations, *GAIN* is treated recursively as a function of *LOSS* with an interaction term for SM free agent loss (*SMLOSS*). In its reduced form, the net-gain equation contains an additional interaction argument

29. The Blue Jays played their first full season in the Sky Dome in 1990; the White Sox first season in the new Comiskey was 1991, and the Orioles opened at Camden Yard in 1992. The Texas Rangers opened the Ball Park in Arlington and the Cleveland Indians, Jacobs Field to start the ill-fated 1994 MLB season.

for a SM team's winning percentage in the preceding year (*SMWIN*).<sup>30</sup> Free agent gains (*GAIN*) and losses (*LOSS*) are the annualized new salaries (with bonuses) of free agents who switched teams during 1990–93 and remained on the opening rosters of their new teams for the next season. Net free-agent gains (*NET*) are the differences between the new salaries of free agents gained and of free agents lost.

These results are consistent with the predictions of theory and the findings of previous empirical studies.<sup>31</sup> First, the loss of free agent talent is directly related to the overall quality of a team's talent, as measured by its winning percentage in the preceding season. This is especially true for winning small market teams. Second, the acquisition of free agent talent is inversely related to team quality and there is strong evidence that LM clubs, regardless of whether they are winning or losing, acquire significantly more free agent talent than the rest of the league. The recursive *LOSS* interaction arguments in the *GAIN* equation indicate that MLB teams acquire free agents to replace approximately half of their free agent losses. SM franchises are the significant exceptions to this pattern of loss replacement.<sup>32</sup> SM clubs lose free agent talent that they do not or cannot replace. These tendencies are confirmed by the *NET* migration of free agents the postcollusion period. LM clubs, regardless of team quality, acquire significantly more net talent than the rest of the league, while winning teams, especially those in small revenue markets, suffer the most significant free agent losses. The question remains to be answered as to whether this redistribution of free agent talent impacts competitive balance in MLB.

### Competitive Balance

There are three interrelated issues in the conceptualization of competitive balance: the dominance of large-market clubs, the closeness of league competition within the season, and the continuity of performance (superior or inferior) from season to season. Previous studies have provided evidence on the first two measures and each has reached the conclusion that there has been no change in competitive balance due to free agency.<sup>33</sup> The inconsistency of this conclusion with the perceived movement of free agent talent from small winning franchises to those clubs in large revenue markets has yet to be resolved, and the third aspect of competitive balance has yet to be

30. Interaction terms for *BIG5* and *PARK* with either *LOSS* or *WIN* were not significant at .05.

31. Cymrot [11] used Scully-like MRPs as dependent variables rather than player salaries and found that 1977–79 “nonmarginal” free agents tended to move from good teams in small markets to poor teams in large markets. This led to the conclusion that size by itself does not imply domination due to the tendency for high quality teams to lose free agents. Daly and Moore concluded that “the effective termination of the reserve clause for veteran players in 1976 has been followed by a series of free agent transactions which have clearly strengthened big city teams” [13, 94]. Quirk and El Hodiri detect “a strong positive correlation between the strength of an AL team (1929–50) and its payment for players . . . The NL data are particularly striking: if Rickey's teams, the Dodgers and the Cardinals, . . . are excluded, a strong positive correlation between acquisition costs and percentage of games won emerges” [29, 52].

32. Interaction arguments ( $SMLOSS = SMALL \times LOSS$ ) allow the statistical test of the hypothesis that a specific variable (*LOSS*) affects the dependent variable (*GAIN*) differently in the presence of a third variable (*SMALL*). In this case large and intermediate revenue clubs replace 48.1 percent of their losses, whereas SMs replace none (.481 – .474 = .007).

33. Quirk and El Hodiri [29] find no significant relationship between MLB home market population rank and win percentage rank in the period 1900–70. Scully [34] finds no significant relationship between population and winning percentage in either the pre-free agency (1961–76) or post-free agency periods (1977–87); but detects a significant drop in the average standard deviation of winning percentages for the NL between pre- and post-free agency periods. Zimbalist concludes, “By any measure competitive balance has not only not become more unequal since 1976, it has become noticeably more equal” [39, 95]. Based four measures of competitive balance (including dispersion of wins), Quirk and Fort conclude that pre- and post-free agency periods are indistinguishable and that “the experience in baseball since 1976 looks almost exactly like the prediction of microeconomic theory, that is no change in competitive balance due to free agency” [30, 284].



fully investigated. As it relates to the effects of free-agent talent acquisition, the most important aspect of competitive balance or dominance concerns season to season continuity.<sup>34</sup> If the league is competitively balanced in this respect, then dynasties and doormats are the exception, and the recently experienced season-to-season reversals are the rule. The purpose of this section is to examine the impact of free agency on the continuity of performance of MLB clubs from one season to the next, and to address the possibility that discontinuity of performance may reflect a reduction in total MLB production.

Analysis of the season-to-season continuity of team quality during and immediately preceding the free agency period involves the estimation of an autoregressive model with binary and interaction variables for LM clubs. The autoregression of a club's winning percentage is confined to a one period lag, and the LM binary variable *BIG4* is restricted to the four clubs (Yankees, Mets, Dodgers and Red Sox) that maintained a revenue advantage for the entire period. A binary variable *PARK* is used in the postcollusion period for the three clubs with new stadiums in the years in which they played in the stadiums. Estimates of the model are presented in Table III for pre-free agency (1970–76) and free agency periods. The free agency era is punctuated by two watershed events (the 1981 player strike and 1986–89 club collusion) that serve to subdivide it into post-free agency (1978–80), precollusion (1983–85), collusion (1986–89) and postcollusion (1990–93) periods.

These results are consistent with the consensus of other studies that competitive balance (in this case season-to-season performance discontinuity) has significantly increased in MLB during the free agency era.<sup>35</sup> Comparison of the autoregressive coefficients for winning percentage (as measures of continuity) and the constant terms (as measures of competitive balance) among the four periods, reveals that the pre-free agency period is characterized by significant season-to-season continuity and *BIG4* dominance. Immediately preceding free agency, over 70 percent of a club's performance is predetermined by its record in the preceding season, and *BIG4* teams enjoyed a significantly higher (.020) winning percentage than the rest of the league. Although the initial impact of free agency on continuity was minimal in the (1978–80) period, estimates for the succeeding periods reveal a gradual erosion of season to season continuity of performance, a significant increase in competitive balance and, except in the precollusion period, an absence of *BIG4* dominance. During the prestrike/postcollusion period, LM clubs playing in new stadiums outplayed the rest of the league by almost 70 percentage points. The most striking result, however, is significant evidence of an absolute discontinuity of performance of MLB teams during the prestrike/postcollusion interim.<sup>36</sup>

34. There are three key dates in the free agency election/signing process, and all occur between seasons. A 6 year player must give notice of his election to exercise the free agency option in a 15 day period beginning October 15 or the day following the last day of the World Series [3, XX B (2)(a)]. The Club then has until December 7 to offer salary arbitration, and the player has until December 19 to accept. If the player does not accept arbitration then the club is entitled to a draft pick as compensation. If the club does not offer arbitration, then they lose all rights and cannot negotiate with the player until May 1 [3, XX B (3–4)]. If a player accepts arbitration then he has not exercised his right of free agency.

35. Based on a comparison of 1962–76 and 1977–89 periods, Balfour and Porter conclude that “a team's performance is less likely to be repeated in subsequent years if players are free to move among teams” [4, 17].

36. In additional results not reported in detail here, the performance of a SM team is shown to be more significantly related to the winning record of its minor league AA affiliate in the previous year than to its own. The magnitude of the effect of net free agent acquisitions on winning is significant, but minimal. For example, the net acquisition of a \$2.05 million free agent would yield only one additional victory in a 162 game season. Free agent talent contribution team quality is shown to be a decreasing function of the quality of the team, and that returns become negative ( $\partial w / \partial FA < 0$ ) for teams that have won more than 93 games in the previous 162 game season. These results are consistent with the proposition that free agency in its current form increases MLB competition by breaking up winning SM teams, rather than improving inferior LM teams.

Table III. Competitive Balance for Major League Baseball in the Free Agency Era†

Period	<i>WIN</i> <sub><i>t</i>-1</sub>	<i>BIG4</i>	<i>PARK</i>	<i>CON</i>	<i>R</i> <sup>2</sup>	<i>N</i>
1970–76	.715** (15.38)	—	—	.142** (6.08)	.587	168
	.671** (13.55)	.020* (2.52)	—	.159** (6.56)	.596	168
1978–80	.717** (12.67)	—	—	.141** (4.84)	.678	78
	.711** (12.08)	−.01 (−.50)	—	.145** (4.82)	.663	78
1983–85	.450** (5.98)	—	—	.273** (7.51)	.320	78
	.439** (6.71)	.045** (3.14)	—	.273** (9.02)	.483	78
1986–89	.311** (3.81)	—	—	.347** (8.33)	.125	104
	.260** (2.94)	.018 (1.19)	—	.370** (8.38)	.123	104
1990–93	.036 (.40)	—	—	.480** (10.59)	.002	104
	.003 (.03)	−.010 (−.71)	.067** (5.22)	.494** (11.22)	.258	104
Interaction Model‡						
1970–76	.605** (9.64)	—	—	.197** (6.22)	—	—
1977–93	−.222** (−2.85)	—	—	.112** (2.84)	.234	532

*t* ratios in parentheses: \*significant at .05, \*\*significant at .01.  
†Excluding strike years 1981–82, expansion year 1977 and Toronto and Seattle before 1978.  
‡OLS estimates were used for the free agency interaction model because of unequal cross-sections of teams before and after expansion. Other estimates are made by pooled regression.

According to the theory advanced in Figure 1, an observed increase in competitive balance (equilibrium *C* approaching .500) could result from either a convergence of revenues or a divergence of costs among clubs in the league. Zimbalist [39] observes that the coefficient of variation among the revenues of MLB clubs has fallen slightly from .400 in 1980 to .306 in 1990. This revenue distribution remains stable throughout the prestrike period:  $\sigma/\mu = .289$  in 1991, .281 in 1992 and .291 for 1993. While this slight revenue convergence among clubs is consistent with increased balance, taken separately, it does not resolve the interseasonal discontinuity of the league with the observed movement of talent from small to large markets. If revenue convergence increases competitive balance, it should also slow the movement of free agent talent from small-market winning teams to clubs in large-revenue markets. This is contrary to the observed facts of the postcollusion period.

An alternative source of increased competitive balance concerns an increased dispersion of player costs among teams in the league. If free agent talent continues to move to large markets, then the revenue advantage remains a significant factor in the acquisition of talent. Further, if the observed free agent talent redistribution fails to result in an increased dominance of the clubs

that acquire talent, then the acquisition of that talent is *necessarily* inefficient. Consequently, the acquisition of free-agent talent in the monopolistic environment of the postcollusion period could significantly increase a large market club's marginal cost of talent to the point where its revenue advantages are effectively negated. If this proposition is true, then the discontinuity of the league's competition should be consistent with an increased dispersion of costs among teams during the period, rather than a convergence of revenues. Zimbalist observes a reduction in the coefficient of variation among MLB team average player salaries from the free agency period through the postcollusion period:  $\sigma/\mu = .357$  in 1978 to  $.294$  in 1986 and  $.225$  in 1990. In the monopolistic environment of the postcollusion period, however, the trend is reversed:  $\sigma/\mu = .304$  in 1991,  $.306$  in 1992, and  $.333$  in 1993. In the prestrike/postcollusion interim team player costs were more widely dispersed than team revenues. In the four-year period 1990–93 the 86 percent explosion in team average salary from \$597 thousand to \$1.109 million was more than doubled by the 175 percent increase in the standard deviation of team average salary from \$134 thousand to \$369 thousand. Winning small market teams are being dismantled and not being reassembled in their large market destinations. The increasing cost per unit of talent for LM clubs, therefore, yields a balance in relative team quality (interseasonal discontinuity) that is consistent with a reduction in overall league production.

### III. Free Agency Fix<sup>37</sup>

The series of *Collective Bargaining Agreements* that runs through the free agency era has segmented the MLB labor market into three seniority groups. MLB players with less than six years MLB service remain subject to the binding constraints of the reserve clause [3, XX A], whereas players with more than six years MLB service are eligible for free agency [3, XX B(1)]. Players with three or more years of MLB experience and the top 17 percent of the two-year service class are eligible for salary arbitration [3, VI F(1)], but they remain subject to the reserve clause.<sup>38</sup> Because of this legal pattern, the baseball players' labor market during the free agency era has evolved into a twisting bilateral monopoly, in which each segment is governed by different combinations of monopsonistic and monopolistic forces. The lower two tiers of players, who are not eligible for free agency, are controlled by the monopsonistic power of the club owners, whereas the upper tier is dominated by the artificial monopoly position enjoyed by players eligible for limited free agency. A labor market twist is created by the torsion of nonsynchronous lower-tier monopsony and upper-tier monopoly. The purpose of this section is to propose a method for restructuring free-agent eligibility and unwinding this labor market twist.

Comparative salary data for each labor market segment are presented by years of major league service in Table IV for the 1984, 1990 and 1994 seasons. As the market has evolved over the ten years before the 1994 strike, the first tier has remained easily identifiable. While the salaries of the average MLB player were increasing at an annual rate of 25 percent in the postcollusion period (1990–1994), salary increases in the lowest tier (41.6 percent of 1994 active players) were confined to the 4 to 9 percent range. By comparison, the salaries of Tier 2 players (25.7 percent of opening day active players) were increasing at 17.8 percent, 27.4 percent and 31.0 percent for

37. The name for this proposal is suggested by an anonymous referee, whose comments have significantly improved this paper.

38. From 1974–85 salary arbitration eligibility was 2 years, from 1986–90 it was 3 years.

Table IV. Average Major League Salaries Segmented by Service Class 1984, 1990 and 1994

MLB Service Years	Number of Players			Cumulative Distribution of Players (percent)			Mean Player Salary (\$ thousands)			Annual Salary Increase (percent)	
	1984	1990	1994	1984	1990	1994	1984	1990	1994	1984-90	1990-94
0	158	172	134	21.7	23.4	18.0	51.9	108.4	126.9	18.1	4.3
1	83	90	105	33.1	35.6	32.0	103.2	154.7	207.7	8.3	8.6
2*	69	68	71	42.5	44.9	41.6	200.3	262.8	344.1	5.2	7.7
3*	57	67	75	50.3	54.0	51.6	310.1	593.0	1019.9	15.2	17.8
4	51	66	64	57.3	63.0	60.2	412.1	760.2	1594.5	14.1	27.4
5	45	55	53	63.5	70.5	67.3	422.5	1018.1	2281.4	23.5	31.0
6	44	43	45	69.5	76.3	73.3	536.7	1047.7	1741.6	15.9	16.5
7	37	47	50	74.6	82.7	80.0	562.1	956.5	2214.8	11.7	32.9
8	37	29	33	79.7	86.7	84.5	472.9	1191.4	2508.0	25.3	27.6
9	31	20	31	84.0	89.4	88.6	607.7	1280.5	2296.3	18.5	19.8
10	27	15	19	87.7	91.4	91.2	570.5	1230.0	2417.1	19.3	24.1
11	25	14	22	91.1	93.3	94.1	618.8	920.9	1555.5	8.1	17.2
12	22	18	13	94.1	95.8	95.8	512.6	1320.3	2638.5	26.3	24.7
13+	43	31	33	100.0	100.0	100.0	673.2	1327.9	2064.4	16.2	13.9
Totals	729	735	746				329.4	597.5	1188.7	13.6	24.7

\*Second year players were eligible for arbitration in 1984. The top 17 percent of second year players (14 players in 1994 with 2.13 years service) are eligible for arbitration and included in third year 1994 data.  
Sources: Major League Baseball Players' Association and *Baseball America* [5].

players in their third, fourth and fifth years, respectively. The salary increases for the fifth and sixth year players are particularly of interest because they are higher than the average salary increase for the players in their first year of free agency. In fact, the average salary for a sixth year player exceeds that of a first year free agent. Over the decade owners anticipated free agency and sought to sign their best prospects to contracts before eligibility. In this way the former salary increases associated with free agency have “bled” into the final year of arbitration eligibility and have obscured the boundary between Tiers 2 and 3. In all, the relative distribution of players within the tiers has remained relatively stable. A slight trend toward younger players in the collusion period has been reversed in the postcollusion player distribution and, by opening day 1994, two-thirds of the 746 players on 25-man rosters are confined to Tiers 1 and 2, and one-third of the players are eligible for free agency.<sup>39</sup>

The free-agency fix for the labor market twist involves a reduction in the eligibility criterion for free agency and the elimination of the salary arbitration procedure that defines Tier 2. The elimination of Tier 2 would simultaneously reduce the domain of monopsonistic exploitation and weaken the monopoly position held by free-agent eligible players. It would also remove an arbitrary procedure that may serve to worsen the competitive balance within the league. The stated purpose of arbitration is to achieve salary parity among players of equal talent and experience regardless of market size. Small market teams are, therefore, forced to pay players partially what they would receive in the large revenue markets, and LM clubs are allowed to pay players partially what they would receive in small markets. In this way, the parity criteria of the MLB arbitra-

39. Active MLB rosters may exceed 25 players for those players placed on injured reserve.

tion procedure may currently reduce the monopsonistic exploitation by SM owners, but it may reinforce the competitive advantage for LM clubs in the second tier.<sup>40</sup> Marvin Miller's original question remains unanswered. What determines the optimal length of time before a MLB player assumes free agent status? If the conditions for free agency were truly unlimited there would be no incentive for clubs to internalize the development of the general skills of young players, and the working relationship between MLB and the Minors would vanish.<sup>41</sup> To be effective, the free agency fix should, therefore, reduce the free-agent eligibility requirement precisely to the years of MLB service necessary for the MLB clubs to recoup their investment in player development costs. A specific proposal requires a discounted payback analysis of player development expenditures immediately preceding the 1994 strike season.

#### *Player Development Expenditures (PDX)*

Although detailed expenditures are sporadically reported for either the league or the individual clubs, a series can be constructed for the free agency period sufficient to estimate the average PDX per club in 1994. Data derived from Scully [34, 118] yield a per club average PDX of \$1.029 million in 1977, \$1.546 million in 1980 and \$2.180 million in 1983. Data from Zimbalist [39, 113] yield a per club average PDX of \$1.538 million in 1981, \$2.180 million in 1983, \$2.846 million in 1986, and \$5.500 million in 1989. Finally, actual expenses released by the MLB Commissioner's Office show an average PDX of \$7.200 million per team in 1991. An exponential model based on these data yields a PDX growth rate of 12.6 percent in the free agency period (1977–91) and a projected per team average PDX of \$9.200 million in 1994. This estimate is consistent with actual PDX reported for the Pittsburgh Pirates of \$9.163 million and the Baltimore Orioles of \$8.768 million in fiscal 1993.

The relative efficiency of the overall farm system can then be gauged by a comparison of the PDX with the number of rookies placed on the 25-man active roster of the parent MLB club. Although Scully [34, 49] detected an apparent decline in the productivity of the minor league player development system by observing that the average number of rookies per club had fallen from 2.8 rookies in 1985 to 2.6 rookies in 1987 and 1.9 rookies in 1988, the trend has been reversed in the postcollusion period. Of the 746 active major leaguers opening the 1994 season 96 were rookies.<sup>42</sup> This yields average of 3.43 rookies for each of the 28 clubs and a nondiscounted average PDX of \$2.680 per player produced by the MLB player development system. This compares to a cost of production estimate of \$1.812 million per player by the Chicago White Sox in 1989 [26].

The nondiscounted PDX figure is biased in that it does not reflect two counteractive effects. First, the 12.6 percent annual growth in PDX suggests the current development expenditures overestimate those actually made for the current vintage of rookies. Second, this nondiscounted PDX underestimates the present value of expenditures made over the player development process. The

40. MLB arbitration criteria may include performance measures and salary information about other players in the league, but not information concerning the *financial* position of the player and the club. Scully [34] argues that relatively weaker franchises are more likely to go to arbitration, but makes the inference that they are the major beneficiaries of the process. This is not necessarily true. More than 90 percent of arbitration proceedings are initiated by players. SM clubs are involved in salary arbitration because they are more likely to be *brought* to arbitration by SM players seeking party with LM players.

41. The tenuous relationship between MLB Clubs and the National Association of Baseball Clubs ("the Minors") is controlled by the Professional Baseball Agreement, which was last negotiated in 1990. See Zimbalist [39] for a history.

42. This includes the expansion Florida Marlins and Colorado Rockies franchises who had only two rookies each on their rosters. A first year player is considered a rookie if he has less than 130 at bats or 50 innings pitched in MLB.



current PDX can be discounted under three assumptions:<sup>43</sup> 1) the PDX growth rate of 12.6 percent, 2) a discount rate of 10.0 percent, and 3) the average rookie has spent 4 years in the minors. These assumptions yield a discount factor of .944 and a discounted PDX of \$2.53 million per MLB rookie in 1994. The free agency fix should allow for a recovery of this investment.

#### *Development Cost Recovery (DCR)*

The monopsony conditions of Tiers 1 and 2 provide MLB clubs with an exploitation surplus of  $\lambda SAL$  for the mean salary  $SAL$  where  $\lambda = (1 - \alpha)/\alpha$  and  $\alpha = SAL/MRP$ . Zimbalist [39; 40] estimates Scully-like equations for each of the three segments of the MLB labor market, which he labels apprentices, journeymen and masters. In his results, Tier 1 players are paid  $\alpha = 21.8$  percent of their MRPs in 1986,  $\alpha = 17.1$  percent in 1987,  $\alpha = 22.6$  percent in 1988 and  $\alpha = 24.3$  percent of their MRPs in 1989. By comparison, Tier 2 players receive 50 to 65 percent of their MRPs and free-agent salaries exceeded MRPs by 23 to 39 percent over the same period. Based on these estimates Tier 1 players generate an exploitation surplus of  $\lambda = 3.59$  times their salaries in 1986,  $\lambda = 4.85$  times their salaries in 1987,  $\lambda = 3.42$  times their salaries in 1988, and  $\lambda = 3.12$  times their salaries in 1989. The free agency eligibility criterion should be set where the present value of the exploitation stream in 1994 under modified reserve is equivalent to the discounted PDX of \$2.53 million.<sup>44</sup>

Based on the salary escalation in the postcollusion period (1990–94), especially in the second tier, it is probable that  $\alpha$  estimates would be higher and the  $\lambda$  surplus correspondingly lower in the prestrike period than those under collusion in 1986–89. The isolation of  $\alpha$  and prediction of  $\lambda$  for MLB players in 1994 can be accomplished through the estimation of an exponential salary model with performance measures omitted:<sup>45</sup>

$$\ln SAL = .666 - 1.269TIER1 - .190ARBI + .240EXP - .012EXP^2 \quad R^2 = .633 \quad (1) \\ (-3.73) \quad (-8.18) \quad (-1.50) \quad (6.17) \quad (-6.08) \quad N = 746$$

where *TIER1* is a binary variable for players with less than 2.13 years MLB service (not eligible for salary arbitration), *ARBI* is a binary variable for players with at least 2.13 years but less than 4 years of MLB service (third year players and the top 17 percent of second year players), *EXP* is the actual years of MLB service and *SAL* is the annual salary for 746 players on active rosters opening the 1994 season (*t* ratios are in parentheses).

This is the first estimate of MLB players' experience-earnings profile using actual service data,<sup>46</sup> and an advantage of this specification is that it allows an estimation of the monopsonistic

43. All MLB present value calculations made in accordance with the 1990 CBA are discounted by the prime interest rate plus one percent rounded to the nearest whole. It is assumed that the path through the minors is more risky and that a rate of prime plus two percent should be used. The prime rate averaged 7.7 percent from 1990–93. Markham and Teplitz [23] estimated that between 1968 and 1977 the average time spent in the minors before promotion was 4.6 years.

44. Alchian cautions that "higher salaries obtained by star professional athletes when allowed to solicit offers from other teams is often regarded as evidence of their having been underpaid by restrictive contract. But if the team organizer invested in search for such talents and in developing the talents . . . it is hard to say the athlete was 'underpaid' or 'exploited' " [2, 35–6].

45. Blass [6] uses a similar model for 1986–87 to show that wages increase with experience independent of productivity.

46. Other studies have used the number of years that a player's name had appeared on the roster before the season. Zimbalist points out that this measure used in his analysis "does not correspond precisely with the official designation of ML service and hence only roughly indicates whether a player was eligible for salary arbitration or for free agency" [40, 125n].

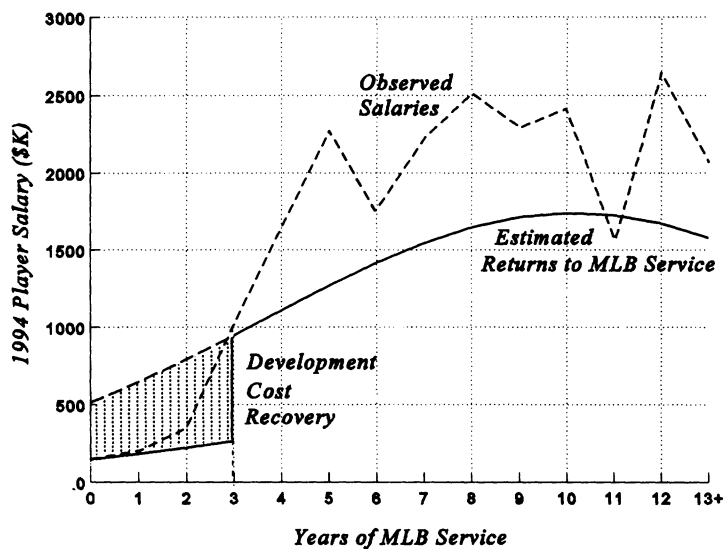


Figure 2. Free Agency Fix

exploitation surplus in the lower tier. The exponentials of the *TIER1* and *ARBI* coefficients are direct estimates of  $\alpha$  in the respective market segments for 1994:  $\alpha_1 = \exp(-1.269) = .281$  for Tier 1 players and  $\alpha_2 = \exp(-.190) = .827$  for first-year arbitration-eligible players. This suggests that the 1994 vintage of rookies can be expected to generate an exploitation surplus of approximately  $\lambda = 2.56$  times their discounted salaries for the years in which they are subject to the modified reserve clause. If player salaries shown in Table V for the reserve segment grow at their current annual rate of 8.0 percent, and if the stream of the exploitation surplus is discounted at the 10.0 percent rate used above, then the present value of a 1994 player's contribution to the surplus can be projected at \$324.9 thousand in year 1, \$521.3 thousand in year 2, \$846.5 thousand in year 3, and \$835.3 thousand in year 4.<sup>47</sup> Under these conditions a player under reserve would generate a present value DCR of \$1.700 million or two-thirds of discounted PDX following his third year, and following his fourth year would repay the club precisely all of his player development expense with a present value development cost recovery (DCR) of \$2.53 million. Full DCR could be reached if the free agent eligibility criterion was set at four complete years of MLB service.<sup>48</sup>

The free agency fix is shown in Figure 2 where observed 1994 mean player salaries by years of service from Table IV are compared to the returns to years of MLB service estimated from equation (1). DCR is the difference between simulated MRP, calculated from the salary model with the omission of *TIER1* and *ARBI*, and predicted salaries ( $\alpha SAL$ ) for the first through fourth year players under modified reserve. Under the proposed free agency fix the proportion of players facing monopsony exploitation is reduced from two-thirds to one-half, while the number

47. The joint assumption of 8.0 percent growth and 10.0 percent discount effective reduces the net discount rate to 2.0 percent. The current year 1 contribution is estimated as  $\lambda S_0 = 2.56(126.9) = \$324.9$ ; year 2 is  $\lambda S_1/(1.02) = 2.51(207.7) = \$521.3$ ; year 3 is  $\lambda S_2/(1.02)^2 = 2.46(344.1) = \$846.5$ ; and year 4 is  $[(1 - \alpha_1)/\alpha_2]S_3/(1.02)^3 = .819(1019.9) = \$835.3$ .

48. The 1990 *Basic Agreement* [3, XXIV] established a "Baseball Economic Study Committee" that recommended that salary arbitration be dropped in exchange for free agency after three years. Scully [35, 59] estimates that over the free agency period (1977–92) a MLB player's MRP exceeds his earnings after 547 career games (about 3.6 years).

of players in the free agent pool is increased from one-third to one-half of active players. The anticipatory salary bubble for sixth year players suggests two ancillary arguments in support of the free agency fix. First, it can be argued that PDX is an overstatement of actual development expense, and that full DCR over four years may be an overpayment by players.<sup>49</sup> This is probably true, but there is no reason to suspect that the free-agency anticipation effect that now characterizes the salaries of players in their sixth year would not continue to affect the salaries of fourth year players under the free agency fix. Anticipation of competition from other clubs for players after their fourth year should reduce exploitation during the fourth year to a level where realized DCR would more closely approximate actual PDX. Second, the current depression of salaries in the first year of free agency, due presumably to the free-agency anticipation effect, suggests that the expansion of the free-agent pool will compress free-agent salaries toward their MRPs and will effectively reduce the monopolistic inefficiencies that now characterize the free agent labor market of MLB.

#### IV. Conclusion

Labor strife will continue in MLB as long as the baseball players labor market is segmented by lower-tier monopsonistic exploitation and upper-tier monopolistic inefficiency. There is evidence, in this analysis, that free agent talent predictably migrates from quality small market teams to franchises in large markets, but there is also evidence that such movement does not result in large-market dominance. Superior small-market teams are dismantled in the pursuit of maximum profit through the inefficient free agent acquisitions of large-market clubs. This leads to the conclusion that the reallocation of free-agent talent under its current constraints is a negative-sum game, and that the inefficiencies originating from arbitrary free-agency criteria have contributed to the interseasonal performance discontinuity of the prestrike period. There is little support in the literature that the uncertainty of a game's or season's outcome, achieved at the expense of total league product, is preferred by fans. Equally bad teams beating one another is an uncertain outcome derived from an inferior league product. As argued in this paper, this is the flawed result of the current limitations placed on free-agent eligibility.

The policy implications of this study are clear. A remedy of MLB's problems requires a comprehensive policy designed to relieve revenue inequities among teams within the league while also reducing the costly effects of the labor market twist. The drastic reversal in shared national media revenue through the end of the century is potentially league-threatening because it occurs in an environment of grossly unequal local media and stadium revenues. Ultimately, the internalization of the *Yankee paradox* and viability of the league are the responsibilities of club owners. The first part of a comprehensive remedy should be the sharing of winning-inelastic revenues among MLB clubs more extensively than that proposed by club owners in 1994. Throughout the era of free agency MLB has also experienced a cost squeeze due to the arbitrary segmentation of its labor market. The continuation of salary arbitration and the proposed imposition of cost-sharing salary caps or luxury taxes would continue to deepen player exploitation and serve to reinforce the revenue advantages of large-market clubs.<sup>50</sup> The second element in a comprehensive MLB remedy

49. All MLB parent club spending in the minors is considered a "player development expense." This assumes that player development is the only benefit that the parent club receives from its association with its minor league affiliates. The MLB parent club pays all salaries and meal money for minor league players (about 130) and umpires and buys all equipment.

50. See Vrooman [37] for a discussion of the effects of payroll caps and revenue sharing on exploitation and competitive balance.

should then be a restructuring of the MLB labor market to reduce the domain of player exploitation and to alleviate free-agent inefficiency, rather than the imposition of further restrictions in player movement. The monopolistic overpayment of free-agent talent and the exploitation of talent under the reserve clause can be simultaneously reduced if the pool of players eligible for free agency is allowed to increase (and the number of reserved players to correspondingly decrease) to an optimal level. The specific free-agency fix proposed for MLB suggests that salary arbitration for players in their fourth, fifth and sixth years be eliminated, and that the eligibility requirement for free agency be set at four years, rather than the current six years of completed MLB service. This would allow MLB clubs to recoup player development expenses (estimated \$2.53 million per player in 1994), while reducing the number of reserved players by almost one-fourth and increasing competition in the free agency pool by approximately fifty percent.

## References

1. Akerlof, George A., "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *Quarterly Journal of Economics*, August 1970, 488–500.
2. Alchian, Armen, "Specificity, Specialization and Coalitions." *Journal of Institutional and Theoretical Economics*, 140/1, 1984, 34–49.
3. *Basic Agreement between The American League of Professional Baseball Clubs and the National League of Baseball Clubs and Major League Players Association*, January 1990.
4. Balfour, Alan and Philip K. Porter, "The Reserve Clause in Professional Sports: Legality and Effect on Competitive Balance." *Labor Law Journal*, January 1991, 8–17.
5. *Baseball America*, 4 April 1994.
6. Blass, Asher A., "Does the Baseball Labor Market Contradict the Human Capital Model of Investment?" *The Review of Economics and Statistics*, May 1992, 261–8.
7. Bruggink, Thomas H. and David R. Rose, "Financial Restraint in the Free Agent Labor Market for Major League Baseball: Players Look at Strike Three." *Southern Economic Journal*, April 1990, 1029–43.
8. Canes, Michael E. "The Social Benefits of Restrictions on Team Quality," in *Government and the Sports Business*, edited by Roger Noll. Washington: Brookings, 1974.
9. Cassing, James and Richard Douglas, "Implications of the Auction Mechanism in Baseball's Free Agent Draft." *Southern Economic Journal*, July 1980, 110–21.
10. Coase, Ronald H. *The Firm, the Market and the Law*. Chicago: University of Chicago Press, 1988.
11. Cymrot, Donald J., "Migration Trends and Earnings of Free Agents in Major League Baseball, 1976–79." *Economic Inquiry*, October 1983, 545–56.
12. Daly, George. "The Baseball Player's Labor Market Revisited," in *Diamonds Are Forever: The Business of Baseball*, edited by Paul Sommers. Washington: Brookings, 1992, 11–28.
13. ——— and William J. Moore, "Externalities Property Rights and the Allocation of Resources in Major League Baseball." *Economic Inquiry*, January 1981, 77–95.
14. Demmert, Henry G. *The Economics of Professional Team Sports*. Lexington, Mass.: D. C. Heath, 1973.
15. Demsetz, Harold, "When Does the Rule of Liability Matter?" *Journal of Legal Studies*, January 1972, 13–28.
16. El Hodiri, Mohamed and James Quirk, "An Economic Model of a Professional Sports League." *Journal of Political Economy*, November/December 1971, 1302–19.
17. Fort, Rodney and James Quirk, "Cross-subsidization, Incentives, and Outcomes in Professional Team Sports Leagues." *Journal of Economic Literature*, September 1995, 1265–99.
18. Hunt, Joseph W. and Kenneth A. Lewis, "Dominance, Recontracting and the Reserve Clause: Major League Baseball." *American Economic Review*, December 1976, 936–43.
19. Klein, Benjamin, Robert Crawford, and Armen Alchian, "Vertical Integration, Appropriable Rents and the Competitive Contracting Process." *Journal of Law and Economics*, October 1978, 297–326.
20. Krautmann, Anthony C., "Shirking or Stochastic Productivity in Major League Baseball?" *Southern Economic Journal*, April 1990, 961–68.
21. Lehn, Kenneth. "Property Rights, Risk Sharing and Player Disability in Major League Baseball," in *Sportometrics*, edited by Brian Goff and Robert Tollison. College Station: Texas A&M Press, 1990.
22. ———. "Information Asymmetries in Baseball's Free Agent Market," in *Sportometrics*, edited by Brian Goff and Robert Tollison. College Station: Texas A&M Press, 1990.
23. Markham, Jesse, and Paul Teplitz. *Baseball Economics and Public Policy*. Lexington, Mass.: D. C. Heath, 1981.
24. Miller, Marvin. *A Whole Different Ball Game*. New York: Simon and Schuster, 1991.

25. Neale, Walter C., "The Peculiar Economics of Professional Sports." *Quarterly Journal of Economics*, February 1964, 1–14.
26. Nightingale, Dave, "The \$1.8 Million Odyssey." *The Sporting News*, 18 June 1990, 7–9.
27. Noll, Roger G. "Attendance and Price Setting," in *Government and the Sports Business*, edited by Roger Noll. Washington: Brookings, 1974.
28. Porter, Philip K. and Gerald W. Scully, "Measuring Managerial and Allocative Efficiency: The Case of Baseball," in *Sportometrics*, edited by Brian Goff and Robert Tollison. College Station: Texas A&M Press, 1990.
29. Quirk, James and Mohamed El Hodiri. "The Economic Theory of Professional Sports Leagues," in *Government and the Sports Business*, edited by Roger Noll. Washington: Brookings, 1974.
30. Quirk, James and Rodney D. Fort. *Pay Dirt: The Business of Professional Team Sports*. Princeton: Princeton University Press, 1992.
31. Raimondo, Henry, "Free Agents' Impact on the Labor Market for Baseball Players." *Journal of Labor Research*, Spring 1983, 183–93.
32. Rottenberg, Simon, "The Baseball Players Labor Market." *Journal of Political Economy*, June 1956, 242–58.
33. Scully, Gerald W., "Pay and Performance in Major League Baseball." *American Economic Review*, December 1974, 915–30.
34. ———. *The Business of Major League Baseball*. Chicago: University of Chicago Press, 1989.
35. ———. *The Market Structure of Sports*. Chicago: University of Chicago Press, 1995.
36. Sommers, Paul M. and Noel Quinton, "Pay and Performance in Baseball: The Case of the First Family of Free Agents." *Journal of Human Resources*, Summer 1982, 426–36.
37. Vrooman, John. "A General Theory of Professional Sports Leagues." *Southern Economic Journal*, April 1995, 971–90.
38. Whitney, James D., "Winning Games versus Winning Championships: The Economics of Fan Interest and Team Performance." *Economic Inquiry*, October 1988, 703–24.
39. Zimbalist, Andrew. *Baseball and Billions*. New York: Basic Books, 1992.
40. ———. "Salaries and Performance: Beyond the Scully Model," in *Diamonds Are Forever: The Business of Baseball*, edited by Paul Sommers. Washington: Brookings, 1992.