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Professional baseball has a history of intense labor disputes, which have caused games to be canceled or postponed every few years. At the same time, player salaries grew at a compound rate of 13.5 percent per year from 1976 to 1993, reaching an average of $1.1 million in the latter year. Team owners, who are generally extremely wealthy businessmen, complain that players' demands are making the business unprofitable. "This dispute among millionaires leaves most fans confused and disgusted with both sides." (25)

This article offers an economic explanation of labor strife in baseball. While spectator revenue is dependent on individual players' performance and contribution to victories, broadcast revenue is not. There is currently no way for individual players to claim a share of the increasingly important category of broadcast revenue, except through collective action.

The Marginal Spectator Revenue Product

Professional sport is both a cooperative and a competitive industry, the nature of which requires competing teams to cooperate in producing an entertaining contest. Early analyses often viewed sports leagues as cartels, exploring the possibilities of collusion and price fixing. More recent literature on the economics of sports has focused on the competitive aspects of the business.

In studies of baseball, a common methodology involves estimation of two relationships, one between a player's performance and the number of wins for his team, and the second between a team's victories and its total revenue. The combination of the two yields an estimate of the individual player's marginal revenue product, which should in theory be the maximum that a team owner is willing to pay that player.

This article uses new developments in sabermetrics (the study of baseball statistics) to estimate each player'' marginal contribution to team victories. By using a formula based on a player's batting statistics, it is possible to estimate how many runs an entire team duplicating those statistics would score, and what percentage of games such a team would win given an average number of runs allowed. This player's "winning percentage" is applied pro rata to the player's share of team at-bats during a season to arrive at "marginal wins created", the number of victories for which that player may take credit beyond the wins expected of a borderline-quality or replacement level player.

The number of marginal wins created is the key to calculating each player's marginal spectator revenue product. Fans are much more likely to attend when their team is winning; each additional game won or lost causes ticket sales to rise or fall dramatically. Annual data for all major league baseball teams for 1970-92 show that the gain in attendance per win averaged 23,000, or slightly more than 1 percent of the season total. Revenue per fan, at 1993 prices, averaged $13.50, making the net revenue per win roughly $310,000. Multiplying this figure by a player's marginal wins created yields the player's marginal spectator revenue product (MSRP).

Player Performance, Bargaining Power, and Salaries

There is a high correlation between a player's 1992 marginal wins and his 1993 salary, and an even higher correlation between lifetime average marginal wins and current salary. However, salaries generally exceed players' MSRPs. The salary-to-value index (SVI), or ratio of 1993 salary to 1992 MSRP, had a mean value of 2.02, indicating that players on average were paid twice what they contributed to revenues in the stadium. Since baseball salaries are highly skewed, the median SVI was considerably lower, at 1.15.

Examining salaries by years of service, players in their first three years of service had mean SVIs between .6 and .7, indicating that they were paid roughly two-thirds of the revenue they brought into the stadium. The mean SVI jumps to 1.3 for 4 years of service, and 1.6 for 5 years, reflecting an increase in bargaining power: the players' union has won the right to binding arbitration for salary negotiations, starting after approximately three years in the major leagues. For those who have completed six or more years and hence enjoy free agent status, bargaining power is even greater: the mean SVI jumps again to 3.0 for six years of service, and remains between 2.3 and 5.0 for all greater lengths of service.

On the one hand, these results (and others presented in the article) confirm that the salary-to-value index has the expected relationship to seniority and bargaining power. On the other hand, the prevalence of SVIs well above 1 makes it clear that players' salaries exceed the revenues available from fans who attend the actual games. Figures for 1991 show that 13 of the 26 teams paid their players more than the total of all spectator receipts. The bulk of the salaries, particularly for players with four or more years in the major leagues, must come from broadcast revenues.

The Marginal Broadcast Revenue Product

Broadcast revenue is a large and growing part of the income of major league baseball teams. National television rights fees are shared equally, amounting to about $13 million per team in the early 1990s; local media revenues, which are kept by the respective clubs, averaged about $11 million per team in 1992. Performance has no effect on national broadcast revenue; each player's marginal national broadcast revenue is precisely zero.

Potentially, there could be a positive marginal local broadcast revenue, if winning more games attracted a larger viewing audience and justified higher television fees. However, multi-year broadcasting contracts, such as the Yankees' 12-year cable television deal, hide the effects of yearly changes in performance. Estimates of the marginal broadcast revenue from winning an

additional game are small and often statistically insignificant. In broadcasting, "the most important determinant of rights fees is clearly potential audience size; winning plays at best a minor role." (38)

If salaries were based simply on marginal revenue products, therefore, broadcast revenue would not be a factor in salary determination. If this were the case, team salaries would be closely related to spectator revenue but unrelated to broadcast revenue. Yet in fact, salaries and broadcast revenue are highly correlated. Over time, salaries have kept almost perfect pace with broadcast revenues. From 1976 to 1986, the first decade of free agency, salaries rose at an average annual rate of 20.8 percent, while broadcast revenues rose by 18.2 percent. In the same years, average ticket prices rose only 6.2 percent annually, and attendance grew by 3.9 percent per year. Spectator revenue cannot explain the growth of salaries; and the marginal revenue product approach cannot account for the relationship between salaries and (non-marginal) broadcast revenue.

"How do players receive a share of broadcast revenue? ... Only by credibly threatening a general shutdown of the industry can players induce owners to increase salaries to a level that fairly reflects [broadcast revenue] ... Labor discord in baseball arises from the players' need to force owners to disclose the true private value of a jointly-held asset -- national broadcast revenues." (39)

Alternatives to Strikes

Unfortunately, repeated strikes and threats of strikes over multi-million-dollar pay packages have a side effect, leading to growing public disgust with both labor and management. Are there alternatives to strikes as a means of sharing broadcast revenues? One avenue would be to pool broadcast revenues and distribute them to teams on the basis of the number of games they win, thereby creating a well-defined marginal broadcast revenue which owners might be willing to pay to the players. Another proposal, briefly considered and rejected in the 1980s, is to establish a salary schedule based on performance. A more palatable alternative, modeled on the practices of the National Basketball Association, is to limit the range of aggregate salaries. The NBA salary cap sets a minimum and maximum range of salaries as a percentage of all revenues, including broadcasting.

Yet to date, none of these plans has been adopted. "As long as baseball owners have an incentive to pay players based only on marginal performance, while some revenues are performance-insensitive, labor strife may become a permanent fixture on the baseball scene." (40)