RACIAL DISCRIMINATION IN ORGANIZED BASEBALL

Anthony H. Pascal and Leonard A. Rapping
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PREFACE

Suppose it were possible to find an occupation for which the quality of formal schooling and the general cultural background of an aspirant made relatively little difference in his ability to succeed, in which ability was clearly apparent to interested observers, and in which the link between ability and reward could be observed. Then differences in earnings for individuals of equal ability but different color would be a relatively unambiguous measure of discrimination in the labor market. The professional athlete follows such an occupation. This study explores the impact of race on salary, assignment, and promotion in major league baseball.

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Leonard Rapping is Professor of Economics, Graduate School of Industrial Administration, Carnegie-Mellon University. His research time has been made available by a Ford Foundation grant to study racial discrimination, of which this study is one part. Anthony Pascal's work has been sponsored by The Rand Corporation from corporate funds.
SUMMARY

Of all major league baseball players in 1968, 22 percent were black and about 15 percent were North American black. Both black and white players seem representative of the U.S. population in education and regional origin.

There is some evidence that teams treat players as economic resources since player performance affects team standing and standing affects attendance by fans.

When we estimated the parameters of a model of salary determination in which the independent variables included measures of player performance and experience, of alternative earnings potential, and of race and a trend factor, we succeeded in explaining from one half to three fourths of the variation in individual salaries paid pitching and non-pitching players during 1968. Generally, race had no significant impact on salary when considered in conjunction with "objective" measures of player value.

Bonus payment differentials by race, though significant in earlier years, seem to have just about vanished. This phenomenon may be attributed either to a decline in prejudice or to an improvement in the quality of information in a monopsonistic industry.

Position by position, black players in the big leagues tend to outperform their white counterparts on the basis of objective measurements. This holds for veterans and rookies and at all ages. There is little reason to attribute the observed racial ability differential to the relatively poorer non-baseball alternatives of blacks.

The two major leagues differ significantly in the proportions of black players on their constituent teams; differences among teams within a league are not statistically significant, however, at customary test levels.

Blacks are underrepresented as pitchers and catchers and overrepresented as outfielders and first basemen in the major leagues.
Very few blacks are found among big league managers, coaches, and umpires; they held only 3 percent of these supervisory slots in 1969.

Rather ironically, our study indicates that since on average black salaries in major league baseball are higher than white salaries, significant prejudice exists in the industry. The irony, of course, stems from the joint occurrence of two phenomena: (1) major league clubs tend to pay players as a function of their demonstrated ability, and (2) baseball appears to restrict major league opportunities to those blacks who are demonstrably superior to their white counterparts. Thus there seems to occur equal pay for equal work but unequal opportunity for equal ability. In addition, we find that once inside major league baseball, players are allocated to positions, including supervisory as well as playing positions, in a manner that is difficult to explain on grounds other than racial bias.

We feel that the findings we derive for baseball are characteristic also of the situation in other parts of the economy. Baseball, after all, is an industry composed of wealth-maximizing firms. It differs merely in being highly public and, since 1948, in being highly prone to praise its own "enlightened" racial attitudes. In fact, taking at face value the public relations rhetoric of baseball spokesmen, if racism is as subtly pervasive as it appears to be on the diamond, it is likely to be exceedingly powerful in the plants, offices, and stores where discriminatory treatment can still be masked by complaints about the absence of qualified applicants.

The ethical tenets of official American culture as well as the difficulties of sustaining patently unjust salary treatment means that in baseball and in other fields racism will be expressed through less obvious forms of discrimination. Our study shows that basing entry, promotion, and assignment on race rather than merit is one important form.
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I. INTRODUCTION

Whether it is because we are growing richer as a nation, because urban disorders have frightened us, or simply because of fashion, the problem of inequality of economic opportunity in American society receives increasing attention. Inequality of economic opportunity means, in the simplest terms, that some people start out in life with poorer chances for economic success than others. Disadvantage is caused both by inadequate work preparation and by bias in hiring and promotion, and further, a man's opportunities are importantly affected by the color of his skin.

There have been numerous studies of wage discrimination in the American economy.¹ Empirical studies have typically failed to overcome a series of problems in definition, measurement, and data retrieval. By way of illustration, it is commonly observed that members of minority groups earn lower incomes than do their counterparts in the majority population. Naturally enough, attempts have been made to explain the observed income differences on the basis of variation between the minority and majority work forces in age and sex composition and in educational attainment. Finally, however, there remains an unexplained difference. Recognizing that it is invalid to attribute this residual difference in earnings entirely to the existence of prejudice in the labor market, analysts have tried to refine their measures further. They take into account that members of disadvantaged minorities typically receive a lower quality of education per year of schooling attained and that their families and neighborhoods may instill in them a set of attitudes and perceptions uncondusive to conventional economic success. But it is exceedingly difficult to control adequately for such things as attitudes, motivation, and educational quality. This difficulty makes the residual approach to measuring market discrimination extremely treacherous.²

¹The classic study of this subject is Becker [1967], but see also Hanoch [1967], Welch [1967] and Arrow [1970].
²What all of this says is that such factors as age, sex, amount and quality of education, and personal attitudes are expected to affect
If one sets out then to study the role of discrimination, it is essential to design experiments in which the true sources of inequality can be separated. Since in the social sciences researchers must analyze data generated in human interactions rather than in laboratories, this separation is exceedingly difficult. However, suppose it were possible to find an occupation for which the quality of formal schooling and the general cultural background of an aspirant made relatively little difference in his ability to succeed, in which ability was clearly apparent to interested observers and in which the link between ability and reward could be observed. Then, differences in earnings for individuals of equal ability but different color would be a relatively unambiguous measure of discrimination in the labor market. The professional athlete follows such an occupation. In this study we explore the impact of race on salary, assignment, and promotion in major league baseball.

Managers and team owners, anxious for success in the pennant race because of its effects at the gate, presumably judge a potential player largely on the basis of his achieved batting, fielding, or pitching ability, and not on where he received his college degree or high school diploma, or even whether he received one. These abilities are clearly indexed and generally available. A player might suffer from the effects of prejudice in the past as indicated, say, by lower levels of health, or less adequate coaching when young; these, however, would be expected to exert an influence on his measured batting, fielding, or pitching performance. We can sum up by stating the major hypotheses we wish to test in this study. They are: (1) Salaries paid to baseball players are a function of ability and of alternative earnings, but not of the race of the player. (2) Assignment of players to league,

ability or productivity on the job and will, therefore, have "legitimate" effects on earnings, meaning that an employer who pays a lower wage to a poorly educated, poorly motivated worker may be "maximizing" but is not necessarily discriminating. Research on discrimination has centered on the attempt to separate out the impact of such factors, leaving a residual that could then more confidently be attributed to market prejudice.
team, and position is also independent of race. The chief assumption in testing these hypotheses is that the management of a baseball team acts as if it were managing an ordinary wealth-maximizing firm.

We shall refer to discrimination as the discrepancy in treatment between candidates who are identical in all "relevant" characteristics. Among the "irrelevant" characteristics that call forth unequal treatment, the most interesting for our purposes is race. Discrepancies may be manifested in unequal compensation to persons with the same relevant characteristics or through unequal opportunity in entry, promotion, or assignment for people with the same relevant characteristics.\(^1\)

Prejudice, on the other hand, is one of the chief and most interesting causes of discrimination. The market manifestation of prejudice may emanate from any of the following sources: owners or their agents, such as managers; complementary workers such as coaches; customers in the ballpark or T.V. audience; or white baseball players who are substitutes for black players. A prejudiced person may feel contempt toward those of other races or may merely believe in stereotypes. A stereotype results from the assumption of a correlation between the relevant and irrelevant characteristics of a person, usually to the discredit of the person in question. (The notion that a stereotype may be as much an information-economizing device as a reaction to "differentness" has some interest from a theoretical standpoint but is of little empirical significance in this study.)

In terms of the above discussion, measuring the amount of racial salary or bonus discrimination in organized baseball requires that at any point in time we consider the stock of all baseball players and measure ability \(A_i^*\) for the \(i\)th player) and salaries \(S_i\), and then compare the two variables to determine whether discrimination occurs. Discrimination is indicated when blacks receive lower salaries than whites, ability equal, at each (or some) level of the occupational hierarchy (minor and major leagues) or when it is more difficult for

\(^1\)If occupations are defined narrowly enough, of course, entry barriers become the only expression of discrimination.
blacks to transit from a lower to a higher league status (salary generally rises as one moves up the hierarchy).

The absence of salary data for minor league players and the difficulty of measuring ability for these players have forced us to concentrate our efforts on major league players only. In particular, we restrict the focus of our study to racial salary discrimination in major league baseball rather than organized baseball in general. Though we do try to derive some implications about the larger industry, in effect we are defining the relevant occupation for purposes of our study as major league baseball players rather than organized baseball players. Since most occupations are arbitrarily defined anyway, this is not a particularly restrictive point of view.

To estimate the extent of racial discrimination in major league baseball, we examine the problem in four steps. First, we study the relationship among major league salaries, ability, and race in the years 1968 and 1969. Included here is an exploration of major league bonus payments over the period 1950-1968. Then, we examine whether there is an entry barrier that makes it more difficult for blacks than whites to transit from the minor to the major leagues. This part of our study covers the year 1968. We conclude with an exploration of the implications of racial assignment practices in major league baseball. In particular, we study the distribution of blacks by league, club, and playing position. Finally, we briefly examine the opportunities for blacks in supervisory positions in baseball (umpires, managers, and coaches).
II. THE BASEBALL INDUSTRY

"Organized" baseball refers to the collection of baseball clubs bound together by a complex set of rules and regulations contained in a collection of constitutional documents. In 1968 organized professional baseball consisted of two major leagues of 10 clubs each and a total of 145 minor league clubs in 20 leagues classified into the categories AAA, AA, A, and Rookie. During the regular 1968 playing season these clubs were allowed to maintain on their permanent playing rosters a total of about 3,000 players of whom 500 players were on the major league rosters.

The minor league clubs are either "independent" or "farm" teams of a major league club.\(^1\) The farm club may be owned outright by the major league club or some of its players may be controlled by the major league club by "working agreements." These agreements provide the major league club with access to a specified number of the farm club's players in exchange for financial or other assistance.

Organized baseball rules grant each club an exclusive monopoly to a particular market area. These "territorial rights," coupled with the rules governing the allocation of players among clubs, are the heart of the agreements among organized baseball clubs.

With regard to players, it is useful to follow Rottenberg's distinction among three separate sets of rules governing activities in what is effectively three separate baseball player labor markets.\(^2\) Before his first contract, a young high school or college player is a free agent; prior to the winter of 1964 when a free agent draft was instituted, there was heavy inter-team bidding for their services. Bonuses for signing ranged anywhere from a few hundred dollars to over $100,000. Once having signed a "uniform contract" the player is restricted to the club that owns his contract, and he cannot freely solicit offers from other clubs nor can other clubs attempt to negotiate

---

\(^1\) The farm system of a major league club usually consists of one AAA club, one AA club, two or three A clubs, and a Rookie club.

\(^2\) Rottenberg [1956].
with a player already under contract. This restriction is covered by a contractual arrangement known as the "reserve clause" which permits the club to renew a player's contract for the following year at a price negotiated between the club and the player whose alternative employments are necessarily out of baseball. This clause is enforced by extra-legal sanctions provided for in the rules of organized baseball. Finally, and unlike in other labor markets, the player is an asset owned by the club because of the reserve player clause. This gives rise to a third market in which player's contracts are sold or traded among clubs at prices determined by the clubs participating in the transaction.

This study will be restricted to major league players, defined following the *Baseball Register*, as one who appears on the spring roster. This choice permits us to study a list of players for which considerable data are available in a convenient form. In 1968, 784 major league players were listed on the spring rosters. It appears that this list approximately covers the 40 man reserve lists on the 20 major league teams.\footnote{During a playing season anywhere from 30 to 40 players per club may participate in at least one major league game, and there are many players in the minor leagues who have in prior seasons appeared in major league games. Yet, between June 1 and September 1 the club is restricted to a 25 man roster, and the June 1 roster is one obvious definition of a major league player. However, each club may protect a total of 40 players from being drafted in the annual player draft, and thus the 40 man protected list is an alternative definition. We have chosen a definition that comes reasonably close to the 40 man definition.}

In subsequent analyses we separate our sample into "veterans" and "nonveterans," but for purposes of this section we utilize the entire sample of 784 major league players. The distribution of all 784 major league players by age, race, and national origin is shown in Table 1. The median age of major league baseball players in 1968 was 25 years. Of the 784 players, 17 were Latin whites, 58 were Latin blacks, 116 were American blacks, and the remaining 593 players were \footnote{*Baseball Register* [1968].}
Table 1
DISTRIBUTION OF 784 MAJOR LEAGUE PLAYERS BY AGE, RACE, AND ORIGIN, 1968

<table>
<thead>
<tr>
<th>Age</th>
<th>U.S. Black</th>
<th>U.S. White</th>
<th>Latin Black</th>
<th>Latin White</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 and Under</td>
<td>9</td>
<td>25</td>
<td>3</td>
<td>2</td>
<td>39</td>
</tr>
<tr>
<td>21-23</td>
<td>23</td>
<td>149</td>
<td>9</td>
<td>2</td>
<td>183</td>
</tr>
<tr>
<td>24-26</td>
<td>35</td>
<td>192</td>
<td>11</td>
<td>3</td>
<td>241</td>
</tr>
<tr>
<td>27-29</td>
<td>20</td>
<td>113</td>
<td>22</td>
<td>6</td>
<td>161</td>
</tr>
<tr>
<td>30-32</td>
<td>10</td>
<td>77</td>
<td>11</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>33-35</td>
<td>16</td>
<td>22</td>
<td>2</td>
<td>3</td>
<td>43</td>
</tr>
<tr>
<td>36 and Over</td>
<td>3</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>593</td>
<td>58</td>
<td>17</td>
<td>784</td>
</tr>
</tbody>
</table>

Source:
Baseball Register [1968].

Table 2
EDUCATIONAL ATTAINMENT OF 784 MAJOR LEAGUE BASEBALL PLAYERS, 1968 (percent)

<table>
<thead>
<tr>
<th>Player's Race</th>
<th>Attended or Graduated from High School</th>
<th>Attended College</th>
<th>Graduated from College</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Black</td>
<td>47</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>Latin Black</td>
<td>77</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>White</td>
<td>39</td>
<td>47</td>
<td>14</td>
</tr>
</tbody>
</table>

Source:
Baseball Register [1968].
American whites.\(^1\) In percentage terms, 2.2 percent were Latin white, 7.3 percent were Latin black, 14.7 percent were American black, and 75.8 percent were American white. Of the comparable age/sex group in the U.S. population as a whole, as of August 1968, approximately 12 percent were nonwhite.\(^2\)

In regional origin, both white and nonwhite baseball players appear to reflect general demographic patterns; the players appear to have completed about the same number of years of school as the comparable U.S. population in age and sex. In Table 2 we give data for three levels of educational attainment for baseball players classified by race and origin. Well over half of the whites have attended or graduated from college and slightly over half of the American blacks have had some college experience. These data suggest that the median years of school completed for American black players was about 12 years and for whites probably about 13 years. In March of 1967 the median years of school completed by the entire U.S. male population between 18 and 34 years of age was about 12.5 years.\(^3\)

\(^1\) A player's color was easily identified by pictures in the Register. Latins were classified by their country of origin -- these were mainly Caribbean -- and not by their citizenship status. Thus players born in Puerto Rico were counted as Latin. Except for a few Latin players for whom color was difficult to identify, the classification of players by color is in our view quite accurate in terms of common visual standards.


\(^3\) Manpower Report [1968:216].
III. A MODEL OF SALARY DETERMINATION IN BASEBALL

Clearly, to test for the presence of salary discrimination against black major leaguers it is necessary to control for factors other than race that determine a player's annual salary. Stated differently, we need a theory of annual salary determination in baseball.

Under the reserve clause, each player is required to sell his services to the club that has reserved him unless the club releases, sells, or trades him, or he chooses to retire from organized baseball. This peculiar institutional arrangement generates two questions with which a useful model of salary determination must deal. First, does the resulting allocation of players among clubs tend toward optimality in the sense that players are assigned to those clubs in which their contribution to team revenues is the greatest?\(^1\) Second, how are salaries determined in the absence of competition among buyers which, coupled with the willingness or unwillingness of sellers to change jobs, simultaneously determines the allocation of labor among jobs and salaries in most other industries? With the reserve clause the allocation and salary questions are determined by institutional arrangements peculiar to baseball (and a few other professional sports).\(^2\)

The optimal distribution of players among clubs is constantly changing in response to changing conditions, such as in the tastes of fans, growth of cities, preference of owners, development of technology, and so on. The player draft, player trades, and player purchases serve to reallocate players among clubs in response to these changes. Although the rules governing trading, releases, and sales are complex, they nevertheless guarantee considerable reshuffling of players among

\(^1\)It should be obvious that an individual player's value differs among clubs. For example, a club with one first rate catcher will generally find a second one less valuable than a club without a good catcher or, to take another common example, a power hitter may be more valuable to one club than another because of differences in playing field dimensions.

\(^2\)Basketball, football, and hockey have arrangements similar to those in baseball. See, for example, Jones [1969].
clubs, and there are strong economic incentives for clubs to trade in players. At the annual player draft major and minor league clubs are permitted to acquire the contracts of players owned by other clubs. A major league club usually has control of several hundred players who are either owned outright by the major league club or controlled through "working agreements" with minor league clubs. Of all these players, a major league club may protect 40 players -- 25 of whom play regularly for it and 15 of whom are on option to minor league clubs -- from the annual player draft. In November of 1967 (prior to the 1968 season) major league clubs drafted a total of 23 minor league players at the annual player draft. Draft prices are fixed at $25,000 for regulars and $8,000 for first year picks.

Supplementing the player draft there was considerable player movement resulting from trades, sells, and the signing of free agents. The Baseball Guide lists a total of 140 players who were traded during the calendar year 1967, 35 players who were purchased, 6 free agents who were signed, and 30 players who were released. Excluding released players the above list involves 181 players in 1967. Of this total, 90 appeared in the 1968 Baseball Register, 17 of whom we had classified as nonveterans and 73 as veterans. Since our total veteran sample was 453 players, the proportion of these veterans who changed clubs between 1967 and 1968 was about 16 percent (73 + 453). This statistic is an estimate of the probability that a major league player chosen at random will move between clubs in any given year.

As a further indication of the amount of player movement among major league clubs, we computed the distribution of players in our 1968 veteran sample (453 players) by number of major league organizations with which the player had been associated. These figures do not imply the number of major league teams for which the players have played since many of the trades, sells, and drafts obtained while the player was a minor leaguer. The distribution is shown below.

<table>
<thead>
<tr>
<th>Number of organizations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of players</td>
<td>117</td>
<td>113</td>
<td>74</td>
<td>28</td>
<td>10</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>
The data suggest quite strongly that the economic incentives for clubs to trade, buy, and sell players are pervasive and do indeed cause substantial movement of players among teams. The results of the free agent draft are thus altered by subsequent transactions. About 16 percent of the 453 veteran players in the sample we describe below changed clubs between 1967 and 1968; the average player had been associated with over 1.7 baseball clubs in his career. All in all, the trading mechanism probably results in a distribution of players among teams not too different from what would obtain in the absence of the reserve clause.  

1 Economists and others have often deplored the reserve player clause because they contend that it is a device for collusively lowering the salaries of baseball players (and by the same token increasing the profits of club owners). For these arguments see Rottenberg [1957] and the brilliant statement by L. M. O'Conner, former President of the Pacific Coast baseball league [U.S. Congress, 1958]. The owners, on the other hand, have traditionally argued that the reserve clause is essential in helping to equalize team strengths, an objective that is of relevance to the league. But there is compelling reason to believe that the club owners' argument is specious.

The owners argue that without the reserve clause, the richest club will outcompete poorer clubs for talent and, hence, unbalance the league. There are several arguments against this position. First, as Rottenberg [1957] has correctly argued, there are economic forces that place limits on the willingness of the richest club to purchase all or most of the best players. The addition of high quality players will eventually begin to contribute only marginally to club success in winning games, and furthermore, at some point attendance will not increase sufficiently to justify the purchase price of additional high quality talent.

Aside from diminishing returns there is, we think, a far more important consideration. Indeed, there is reason to suspect that with the reserve player clause clubs will be more unbalanced than without this clause. Under present arrangements clubs can trade or sell players independently of the player's desire to remain in one location, and economic incentives for players to be reallocated among clubs is not eliminated by the reserve clause, a point emphasized by Rottenberg [1957]. Rather, the reserve clause only shifts the moving decision from the player to the club owner; it does not eliminate the incentive for movement to occur. The reserve player clause is by no means a sufficient condition for preventing the richest club from dominating a league. Between 1946 and 1984 the New York Yankees won 15 of 19 American league pennants.
Baseball player salaries are individually negotiated prior to each season.\textsuperscript{1} Because of the reserve player clause, the determination of salaries is best thought of as a problem in bargaining theory. We know that for such problems there is no neat, theoretical solution, and so we have opted for a simple but intuitively pleasing approach. As a first approximation we assume that a player's salary for the upcoming season depends on two factors, his expected playing ability in that season and the salary he can earn in some relevant alternative occupation. This formulation assumes that a player's expected ability is proportional to his expected contribution to club revenues because individual ability draws fans and contributes to overall club performance, which also attracts customers. A player's contribution to club revenues is the maximum salary that a skillful bargainer could extract from a club. We assume that his salary will be higher the greater his contribution to club revenues.\textsuperscript{2}

\textsuperscript{1} Insofar as our analysis is restricted to player salaries we are ignoring several fringe benefits, such as World Series and league standing monies as well as the more traditional health and medical insurance, severance pay, life insurance, and most important, pensions.

\textsuperscript{2} At a subsequent point we will introduce the assumption that expected ability is related to past performance on the playing field. We performed a crude analysis to satisfy ourselves that a player's performance does indeed affect his club's revenue. Aside from the obvious fact that exceptional players can attract fans (and TV viewers) quite independently of their contribution to their team's performance, players also contribute to overall team performance. Team batting average is simply a weighted (by times at bat) average of individual batting averages. Under these circumstances we might reasonably ask what effect team batting average has on gate and TV receipts. Consider a simple, two equation attendance model in which season's attendance or gate (C) measured in thousands of people (with TV receipts assumed to be related to total attendance), is assumed to depend on the percent of total games that the club wins during the season (V) and the size of the ball park (P), measured in thousands. We follow the usual baseball reporting practice of taking the ratio of wins to total games played and then multiplying by 1,000.

Assume further that the percent of games won depends on team batting average (T), on the earned run average of pitchers (ERA), and on team fielding averages (F). We then have:

\[ G_j = \gamma_0 + \gamma_1 V_j + \gamma_2 P_j + \epsilon_j, \quad (a) \]

and
The second argument in the salary function is the player's alternative earnings which represent the minimum salary a club owner

\[ V_j = \beta_0 + \beta_1 T_j + \beta_2 ERA_j + \beta_3 F_j + v_j, \quad (b) \]

where \( j = \text{club index} \) and \( e_j \) and \( v_j \) are error terms.

We have estimated (a) and (b) above separately for the years 1967 and 1968 and for American and National leagues separately. This gives us four sets of estimates of the coefficients in (a) and (b). Least squares point estimates and estimated standard errors of these coefficients are reported below. The asterisk indicates one-tail statistical significance at 5 percent or better.

**American League, 1967**
\[
\begin{align*}
G_j &= -730 + 4.2 V_j - 4.3 F_j, \\
V_j &= 4754 + 4.6 T_j - 1.5 ERA_j - 4.9 F_j, \quad R^2(adj) = .45
\end{align*}
\]

**American League, 1968**
\[
\begin{align*}
G_j &= -706 + 5.6 V_j - 19.2 P_j, \\
V_j &= -17276 + 3.2 T_j + .6 ERA_j + 17.6 F_j, \quad R^2(adj) = .59
\end{align*}
\]

**National League, 1967**
\[
\begin{align*}
G_j &= -1840 + 2.6 V_j + 43.0 F_j, \\
V_j &= -7291 + 2.9 T_j - 1.3 ERA_j + 7.7 F_j, \quad R^2(adj) = .79
\end{align*}
\]

**National League, 1968**
\[
\begin{align*}
G_j &= -1925 + 2.5 V_j + 43.2 F_j, \\
V_j &= 50.7 + 2.1 T_j + .6 ERA_j + 1.1 F_j, \quad R^2(adj) = .17
\end{align*}
\]

Given our choice of the dependent variable, two statistical problems arise. First, the error terms cannot be statistically independent and hence the ordinary least squares estimates are inefficient. Second, the error terms cannot be normal and the small sample t test is at best approximate. Despite these difficulties, the point estimates suggest that aggregate player performance as indexed by our batting and pitching measures influences the gate through its influence on percent of games won. The reader should keep in mind, however, that these estimates are reported only to provide some casual numerical support for the proposition that a player's measured performance is linked to club revenues. We recognize that a full analysis of the relationship between attendance and an individual player's performance would require a more careful and comprehensive specification of the relevant equations.
skilled in bargaining would offer the player. We assume then that the appropriate salary model can be approximated by a linear model of the form

$$S_i = \gamma_0 + \gamma_1 A_i^* + \gamma_2 W_i + \epsilon_i,$$

(1)

where $S_i$ = the $i$th player's salary for the forthcoming season, $A_i^*$ = the $i$th player's expected ability in the forthcoming season, $W_i$ = the alternative salary that the $i$th player can earn outside of baseball, and $\epsilon_i$ = a random error term assumed to have a mean of zero and constant variance. Among other things, the error term in (1) is assumed to reflect individual differences in bargaining ability.

In predicting ability we assume that both players and club owners process past player experience, including measurable and nonmeasurable. As a first approximation we assume that the relevant measurable experience for nonpitchers is the past batting performance in the major leagues, and that the most recent experience is weighted more heavily than that of the distant past. This says that the most recent experience is taken as an indication of an upward or downward trend in the projection of past experience. (We later introduce other statistical performance measures, but in the interests of expositional simplicity we temporarily ignore these complications.) Further, we assume that players improve with years of experience and that this improvement is not reflected fully in measured statistical performance. Years of experience, for example, might be expected to increase the certainty with which a past performance measure is projected into the future. Stating these assumptions algebraically we have

$$A_i^* = \beta_0 + \beta_1 \bar{C}_i + \beta_2 B_i + \beta_3 y_i + u_i,$$

(2)

where $\bar{C}_i$ = cumulated batting average of the $i$th player over his entire major league experience at the time of salary negotiations,

$B_i$ = the $i$th player's batting average in his major league season immediately prior to salary negotiations,

$y_i$ = years of major league experience for the $i$th player,

$u_i$ = a random error term with a mean of zero and constant variance.
In (2) if \( \beta_2 = 0 \) then the same weight is given to all previous experience while if \( \beta_2 > 0 \) then the most recent past has a greater weight than the more distant past. In the latter event the most recent past is extrapolated, so to speak.

For estimation purposes we replace the years of experience variable with a variable measuring a player's calendar age (Y) which more precisely indexes his overall baseball experience. We also replace the variable, \( W_i \), by several dummy variables indexing country of origin and education. Because Latins have poorer alternatives than North Americans, we express \( W_i \) as a zero-one dummy variable (L), where zero is Latin and one is North American. We also assume it to depend on a zero-one high school variable, \( (E_1) \), which is zero for having gone beyond high school and one for having only attended or graduated from high school; on a zero-one attended college variable, \( (E_2) \), which is one for having attended college but not graduated and zero otherwise; and on a zero-one graduated college variable, \( (E_3) \), which is one for having graduated from college and zero otherwise. Mathematically we have

\[
W_i = \alpha_0 + \alpha_1 L_i + \alpha_2 E_{1i} + \alpha_3 E_{2i} + \alpha_4 E_{3i} + v_i ,
\]

(3)

where \( v_i \) = a random error term assumed to have a mean of zero and constant variance.

If there is prejudice on the part of fans, white coaches, managers, or club owners, black player salaries may be lower than that of white players, other things equal. We test for this possibility by introducing an additive zero-one dummy variable in (1), zero for whites and one for blacks (R). We recognize, however, that a significant finding for this coefficient is subject to either of two interpretations. First, there is the obvious prejudice interpretation. On the other hand, the dummy variable may be viewed as an additional control for alternative earnings, which on average are poorer for blacks than for whites, in both North America and the Caribbean. Under this interpretation, the effect of race stems from the reserve player clause which disadvantages those with the poorest opportunities outside of baseball -- blacks in general and Latin blacks in particular -- because it prevents inter-club competition from equalizing salaries by race.
Substituting (2) and (3) into (1) and adding the race variable we have:

\[ S_1 = (v_0 + \beta v_1 + c_0 v_2) + \gamma_1 (v_1 + \beta v_2) c_1 + (v_1 \beta_2) [b_1 - c_1] + (v_1 \beta_3) v_1 + (v_2 \alpha_1) l_1 + (v_2 \alpha_2) e_1 + (v_2 \alpha_3) e_2 + (v_2 \alpha_4) e_3 + \gamma_3 r_1 + (v_1 u_1 + v_2 v_1 + \epsilon_1) \]  

(4)

where under our assumptions the error term has an expected value of zero and constant variance.

The explanatory variables in model (4) are not an exhaustive specification of variables affecting inter-player salary variation. Indeed, in models subsequently considered, variables measuring home run producing ability, playing position, fielding percentage, and club standing last season were introduced in addition to the variables in (4). It is of course clear that there also exist characteristics of players, "star quality" field leadership are examples, that are virtually impossible to measure in quantitative terms.

THE SALARY SAMPLE

The salary data used in this study were obtained from reported salaries contained in twenty local newspapers and The Sporting News. We have reason to believe that the data are fairly accurate and, equally important, there is no a priori reason to think that reporting errors, if any, are systematically related to any of the variables used in our analyses.\(^1\) Our nonrandom sample includes the salaries of 87 players in 1968 and 61 players in 1969. The 1969 figures include 41 players for whom we also had 1968 salary information so that our sample includes a

\(^1\)This is not only our judgment but is also the judgment of Marvin Miller, head of the Major League Baseball Players' Association, who examined our salary data. Although Miller does not have individual salary data, he does have general knowledge of what baseball players are paid and he was kind enough to point out that several of the figures in our original sample were grossly out of line. These data were deleted from our sample.
total of 107 nonrepeat salary figures and a total of 148 salary figures including repeats. The mean 1968 salary for our sample of 87 players was $44,400, and the mean 1969 salary for our sample of 61 players was $53,400.

We believe our nonrandom sample is biased toward the upper tail of the entire major league (25 man rosters) salary distribution. The distribution of major league salaries is truncated at a minimum annual salary agreed upon by players and owners; $10,000 in 1968 and $12,000 in 1969. In figures reported for 1966, the mean salary for all major league players was $22,000. Projecting this mean to 1968-1969 at a reasonable compound growth rate and comparing it with our sample means indicates that the sample is biased toward the upper tail of the major league salary structure. However, our purpose is to estimate the effect of different variables on salary and not to estimate population means. For this, it is important that our salary sample embrace the entire actual salary range, and it does meet this criterion. The salary observations vary from $10,000 to $125,000; 34 of the 148 observations are below $25,000.

REGRESSION RESULTS FOR NONPITCHERS

Estimates of the parameters of the nonpitcher model (4) and several variants of this model are shown in Table 3. All of the reported regressions are linear in the original variables and relevant dimensions are given at the bottom of the table. The regressions reported in this table were also run in log linear form but this transformation did not appreciably alter any of our conclusions. For ease in interpreting the estimates and not because of any statistical superiority we report the results for arithmetically linear models.1

1In estimating coefficients we used two separate data sets. One sample consisted only of the nonrepeat salary observations, of which there were 67 for nonpitchers. The second sample included repeat salary data as well and had 93 observations. When we had data on a player's salary for both 1968 and 1969, we treated the 1969 figure as a new observation. We adjusted the repeat player's age, his cumulated batting average, and so on. Using a player's salary in two separate years as two separate observations raises an important statistical problem. It can no longer be assumed that the error terms are independent since the
### Table 3
REGRESSION RESULTS FOR MAJOR LEAGUE PLAYERS, 1968–1969

| Number | Constant | \( \bar{C} \) | B-\( \bar{C} \) | HR | BT | Y | L | E₂ | E₃ | t | R | \( R^2(\text{adj}) \) |
|--------|----------|---------------|--------------|----|----|---|---|----|----|---|---|---|-----------------|
| 18     | -221.7   | .678          | .129         |    |    |   | 2.342 | 22.381 | 7.581 | -1.824 | 7.967 | -2.892 | .68 |
| S (22.0)*** | (.068)*** | (.066)* |          |    |    |   | (.546)*** | (6.523)*** | (3.983)* | (5.301) | (3.538)* | (3.983) | |
| 28     | -195.6   | .600          | .147         | .396 |    |   | 2.149 | 16.977 | 8.383 | -2.575 | .69 |
| S (21.6)*** | (.067)*** | (.067)* | (.390) |    |    |   | (.541)*** | (6.635)*** | (3.525)*** | (3.926) | |
| 38     | -188.1   | .540          | .151         | .016 |    |   | 2.385 | 14.847 | 4.473 | -2.914 | .69 |
| S (21.7)*** | (.074)*** | (.066)*** | (.009)** |    |    |   | (.549)*** | (6.646)** | (4.004) | (3.877) | |

<table>
<thead>
<tr>
<th>Pitchers b</th>
<th>( \bar{G} )</th>
<th>( \bar{I} )</th>
<th>( G )</th>
<th>( I )</th>
<th>s</th>
<th>( P - \bar{G} )</th>
<th>( P_I - \bar{I} )</th>
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<tbody>
<tr>
<td>48</td>
<td>-56.8</td>
<td>2,873</td>
<td>1.419</td>
<td></td>
<td></td>
<td>2.721</td>
<td>-4.403</td>
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<tr>
<td>S (27.0)**</td>
<td>(.660)***</td>
<td></td>
<td>(.615)**</td>
<td>(.748)***</td>
<td>(10.141)</td>
<td>(5.720)</td>
<td>(10.965)</td>
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<tr>
<td>S (27.6)*</td>
<td>(.051)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.052)***</td>
<td>(.743)***</td>
</tr>
<tr>
<td>68</td>
<td>17.4</td>
<td>.646</td>
<td>-3.420</td>
<td>.507</td>
<td></td>
<td>5.539</td>
<td>(6.654)</td>
</tr>
<tr>
<td>S (8.2)**</td>
<td>(.077)***</td>
<td></td>
<td>(1.035)***</td>
<td>(.408)</td>
<td></td>
<td>(3.583)*</td>
<td>(4.747)*</td>
</tr>
<tr>
<td>78</td>
<td>27.1</td>
<td>.036</td>
<td>-2.576</td>
<td>.072</td>
<td></td>
<td>-.787</td>
<td>5.357</td>
</tr>
<tr>
<td>S (9.6)***</td>
<td>(.006)***</td>
<td>(.1245)***</td>
<td>(.041)**</td>
<td>(7.780)</td>
<td></td>
<td>(4.276)</td>
<td>(6.604)*</td>
</tr>
</tbody>
</table>

** Notes: **

- ** One-tail significance at \{ .10 \}
- ** One-tail significance at \{ .05 \}
- *** One-tail significance at \{ .01 \}

- #3 major league players including repeaters.
- #4 major league players including repeaters.
Notes to Table 3 (continued)

**Key to Variables**
(Figures in parentheses refer to pitchers' sample, others to nonpitchers' sample.)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>52.5 (41.5)</td>
<td>21.1 (26.1)</td>
<td>$1000</td>
</tr>
<tr>
<td>C</td>
<td>267</td>
<td>32</td>
<td>hits per 1000 times at bat</td>
</tr>
<tr>
<td>B−C</td>
<td>-0.005</td>
<td>28.2</td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>17.9</td>
<td>10.6</td>
<td>HR per 550 times at bat</td>
</tr>
<tr>
<td>BT</td>
<td>463</td>
<td>147</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>11.2</td>
<td>(4.1)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>(179.0)</td>
<td>(55.0)</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>(62.0)</td>
<td>(48.6)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>(982.0)</td>
<td>(739.0)</td>
<td></td>
</tr>
<tr>
<td>s</td>
<td>(5.5)</td>
<td>(3.4)</td>
<td></td>
</tr>
<tr>
<td>P−G</td>
<td>(2.0)</td>
<td>(4.5)</td>
<td></td>
</tr>
<tr>
<td>P−I</td>
<td>(15.0)</td>
<td>(56.2)</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td>29.6 (28.4)</td>
<td>3.7 (4.0)</td>
<td>years</td>
</tr>
<tr>
<td>L</td>
<td>.90 (.91)</td>
<td>fraction N. American</td>
<td></td>
</tr>
<tr>
<td>E&lt;sub&gt;2&lt;/sub&gt;</td>
<td>.34 (.47)</td>
<td>fraction</td>
<td></td>
</tr>
<tr>
<td>E&lt;sub&gt;3&lt;/sub&gt;</td>
<td>.05 (.07)</td>
<td>fraction</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>.42 (.40)</td>
<td>fraction 1969</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>.59 (.80)</td>
<td>fraction white</td>
<td></td>
</tr>
</tbody>
</table>
In regression 1 the overall goodness of fit is remarkably high. The adjusted \( R^2 \) is .68, meaning that 68 percent of the sample variance is explained by the explanatory variables.\(^1\)

The three coefficients for the measures of a player's contribution to club revenues are statistically significant at the one-tail 10 percent test level or better. In particular, the coefficient for lifetime cumulated major league batting average (\( \bar{C} \)) is highly significant, and the point estimate indicates that a player receives $678 per year for each point added to this average. The estimated coefficient for \( (B - \bar{C}) \), also significant at the 10 percent test level, suggests that when a player's performance is unusually good it is extrapolated. Thus an unusually good season increases a player's salary by $129 for each batting point in excess of his "normal" performance. The age coefficient \( (Y) \) implies that each year of player experience increases his salary by about $2,300. Although we interpret this to be an ability effect, on the assumption that players learn from experience, we cannot rule out the possibility that the coefficient also contains a pure seniority effect, that is, that internal team morale may require that salary increase with age.

Since we measure education in a trichotomous fashion, it was necessary to delete one of the education variables, impounding the effect of the deleted variable into the estimated constant term. The two included variables are zero-one dummies for attended college \( (E_2) \) and graduated from college \( (E_3) \). The dummy variable for attended or graduated from high school is omitted. Under these circumstances the error terms are assumed to summarize omitted factors such as individual bargaining ability. Although this error dependence leaves our estimates unbiased, the simple least squares estimating procedure is no longer efficient. However, because the qualitative and quantitative conclusions were almost precisely the same regardless of which sample we used, we restrict our presentation and discussion to the augmented sample results only.

\(^1\)Experienced analysts will recognize that when the observation unit is an individual and the data cross sectional, an adjusted \( R^2 \) of this magnitude is rather rare. But of course our interest centers on individual coefficient estimates, and not on \( R^2 \).
estimated coefficients for \( E_2 \) and \( E_3 \) are interpreted as estimates of the marginal salary contribution for college attendance or college graduation as opposed to attending or graduating from high school. The estimated coefficients for these two variables raise some question as to whether formal years of school completed is a relevant bargaining variable. Although the estimated \( E_2 \) coefficient is statistically significant and quantitatively large, the point estimate for \( E_3 \) is negative, indicating that college graduates are at a bargaining disadvantage in comparison with high school graduates, a rather peculiar finding.\(^1\) Apparently we have not obtained very sharp statistical control of alternative earnings and in subsequent regressions we abandon the use of education dummies.

The Latin-American dummy variable has a statistically significant negative effect on salaries which is consistent with the view that Latins are at a bargaining disadvantage compared with North Americans because of their poorer earnings alternatives outside of American baseball. However, the size of the estimated effect of Latin origin is probably overstated in this regression. It is difficult to believe that, other things equal, Latins earn on average $22,000 less per year than North Americans. We suspect that this dummy variable is picking up some other unspecified effect.

The time coefficient is statistically significant and the point estimate indicates that between 1968 and 1969 salaries rose by about $7,600. We are not entirely convinced that this estimate reflects the effect of inflation and productivity advance on salaries; in an identical regression, using only nonrepeat salary data, the estimated time coefficient was a small negative number and statistically insignificant.

The main objective of our analysis is to estimate the effect of race on salaries. The estimated race coefficient is statistically insignificant, however. Apparently, there was no salary discrimination against black baseball players who have achieved major league status.

---

\(^1\)One reasonable interpretation of this result is that those players who graduate from college may be somewhat inferior in ability to players who are signed while still in college.
In regression (2) we have omitted the unsatisfactory education variables and have replaced them with a home run variable. This variable is measured by total major league home runs divided by an estimate of the number of full seasons played (home runs per 550 times at bat). In broad outline the estimates in regression (2) are similar to those reported in regression (1). In addition, the home run variable yields a statistically significant and quantitatively important coefficient. The mean number of home runs per season is about 18 for players in our sample. Such players as Killebrew, Robinson, Maris, Mays, McCovey, and Mathews can generate an extra 14 to 22 home runs per season compared with the mean value for players in our sample. Regression (2) tells us that a player who can consistently add 20 home runs to the home run average can also add $7,920 (.396 \times 20)$ to his annual salary.

We added a variable measuring the number of times at bat for each player in the season immediately preceding the salary observation. A player with relatively few appearances who trades off playing with another player or who cannot hit against both left and right handed pitchers would be worth less to clubs than more regular players. We could expect, then, a positive effect from times at bat last season. The estimated effect on salaries of this variable, regression (3), is positive and statistically significant. The point estimate suggests than an extra 100 times at bat is worth about $1,600.

We have experimented with several additional variables which were separately added to regression (2). The variables were: 1) fielding ability as measured by reported fielding percentages; 2) a zero-one position variable which dichotomized infielders and outfielders; and 3) the team's league standing in the season prior to salary negotiations. None of these variables made a significant contribution to the explanation of salary variation. We also added a multiplicative variable, \((\bar{C}Y)\), which was significant but when added did not alter the conclusion with regard to race.

**REGRESSION RESULTS FOR PITCHERS**

For pitchers we again use the salary model as in model (4) except that we now use performance variables relevant for pitchers. Several
different measures were considered. Because of the common practice of ranking pitchers during a season by either earned run average or percent of games won (ratio of games won to total decisions) we experimented with these two variables. We computed the lifetime major league ERA and the percent of games won over a player's major league lifetime (P) for each of the 55 pitchers in our salary sample. Surprisingly, neither of these variables correlated well with the reported salary variable and they were both statistically insignificant in our multiple regression analyses.\(^1\) We therefore sought alternative pitching performance measures.

Two alternative measures were considered, average games won per major league season (\(\overline{G}\)) and average innings pitched per major league season (\(\overline{I}\)). A season is defined as any one year period in which the player appeared in ten or more games. The use of games won per season assumes that owners place considerably more weight on a pitcher's ability to win games than on the number of games he loses. Furthermore, the number of wins reflects the ability of a player to be a consistent starter; it also is related to whether the player is a starter or a reliever. Starters and particularly consistent starters might be more valuable to clubs than relievers. The number of total innings pitched per season reflects many of the durability and consistency characteristics of games won per season, as well as reflecting a manager's assessment of durability; and indeed the two variables are highly correlated.

Regression equation (4) in Table 3 contains the same variables as regression (1) except that cumulated lifetime batting average is replaced by games won per season and last year's batting average is replaced by games won in the season immediately preceding the one covered by the salary observation (\(P_{\overline{G}}\)). This regression is based on the augmented sample of 55 players. To aid in interpreting our findings we report in the notes to Table 3 the means and standard

\(^1\)The simple r(n=55) between salary and lifetime percent of games won was only .38 and between salary and lifetime ERA it was small and, curiously, a negative, -.26.
errors of the variables used in regression (4) and subsequent regressions.

The equation provides a reasonably good explanation of inter-player salary variation with the included variables accounting for 49 percent of the sample variance as evidenced by the adjusted $R^2$. When compared with our nonpitcher results, the only important difference is the insignificance of the Latin variable, suggesting perhaps that the Latin effect reported for nonpitchers is spurious. We also find a negative race coefficient significant at the 10 percent level indicating that on average blacks receive higher salaries than whites. However, this finding is quite sensitive to the specification of the model utilized. In particular, if the dependent variable is the log of salary, the coefficient on race becomes statistically insignificant at any reasonable test level, but the significance of the other coefficients is not appreciably affected. For interpretive simplicity we continue to discuss the model in arithmetic terms. The effect of games won per season on salaries is $2,873 per game, at least according to the highly reliable point estimate in regression (4). We find, in addition, that the most recent pitching experience of a player is extrapolated. Thus a player who in the preceding season wins two games more than indicated by his lifetime average can increase his salary by about $2,800 (2 \times 1.419) for the upcoming season. Finally, age continues to produce a large and statistically significant effect on salary.

When innings pitched per season is substituted for games won per season -- regression (5) -- the general qualitative findings are not too different from those reported in regression (4). Based on overall goodness of fit the two variables perform equally well. Regression (5) has an adjusted $R^2$ of .47 which is only slightly smaller than that of regression (4).

Although the variables games won per season and innings pitched per season work reasonably well in a statistical sense, they were not suggested by anything more than casual speculation. It seems no less reasonable to introduce games won and seasons pitched as separate
variables than to introduce them in ratio form. Similar remarks apply to the variable innings pitched per season. When we use the same model as that in regression (4), but introduce cumulated lifetime major league games won (G) and major league seasons played (s) as separate variables, and omit the age variable, because of its obvious high correlation with s, as well as the education variables, which have proven rather uninteresting, we obtain the results shown in regression (6).

First we note a significant improvement in overall goodness of fit in regression (6) as compared with the games per season model, regression (4), and in this sense one might have greater confidence in the findings based on regression (6) than those based on regression (4). Similar remarks apply to regression model (7) which employs total lifetime innings pitched and seasons pitched as separate variables rather than using these variables in ratio form as was done in regression (5). Because the pattern of estimated coefficient signs and the statistical significance level of these estimates are so similar between regression (6) and (7), we restrict our discussion to the results based on regression (6).

Holding seasons pitched constant, the effect on annual salaries of total games won is positive with the point estimate indicating that each game won is worth $646. The negative effect of the seasons pitched variable should not be surprising. It simply means that the more seasons it takes a pitcher to win a specified number of games the lower his salary. The racial estimate is negative in both (6) and (7), again indicating that whites receive lower salaries than blacks. On the other hand, the Latin estimate is now positive but not statistically significant. The time coefficient indicates that salaries rose by about $5,700 between 1968 and 1969. But for this variable, as well as the race and Latin variables, we do not place much confidence in the estimates, the standard errors being simply too large.¹

¹We added a league standing variable (taking on values of 1 to 10) to the variables in regression (7), but the results indicated that playing for a winning club does not affect individual annual salaries.
BONUS PAYMENTS TO BLACK AND WHITE PLAYERS

In the years immediately following the Second World War, two seemingly unrelated events occurred. First, baseball's racial entry barrier was broken when Branch Rickey of the Brooklyn Dodgers recruited Jackie Robinson in 1947. Second, unbridled free agent bonus competition broke out among clubs mostly because attendance was rising rapidly and the pool of high quality players had been seriously depleted during the war.

By the early 1950s the open payment of large bonuses -- some in six figures -- for high school and college athletes had become a common practice. Yet owners were reluctant to enter into an arrangement to prohibit bonus competition because of the legal uncertainty surrounding such a move. Indeed, the adoption of the free agent draft in late 1964 followed eight years of extensive Federal lobbying activities on the part of the clubs which eventually succeeded in getting Congress to clarify its willingness to sanction a free agent draft.¹

To fully appreciate the financial importance of free agent bonus payments, let us consider the year 1958. Although complete bonus data are unavailable, there is some indication that by 1958 the total bonus payments to free agents by major league clubs might have been as high

¹The Court in 1922 ruled that baseball was not subject to the antitrust laws and this decision was reaffirmed in 1953. But subsequently, the issue of antitrust exemption was clouded by the court's decision in 1955 and again in 1957 that boxing and football were businesses subject to antitrust legislation and the court suggested that Congress should legislate uniform treatment of all sports.

In 1958 a legislative drive for uniform antitrust legislation began. In 1965 the Senate passed a bill subjecting baseball as well as football, basketball, and hockey to the antitrust laws. However, the bill exempted from antitrust action activities relating to: 1) the equalization of player strengths; 2) the employment, reservation, and selection of players; 3) the right to operate in specific geographic areas; 4) the "preservation of public confidence in the honesty of sports contests." The Senate bill never passed the House. However, prior to the Senate action in 1965 a large number of bills with provisions similar to the 1965 Senate bill were introduced in the Congress.
as 5 million dollars or about 80 percent of total compensation of major league players in that year.

Table 7 below indicates a steady growth in the percent of American blacks who were on the 25-man rosters between 1953 and 1965. (The decline of the black fraction shown after 1965 is probably mostly due to the way team membership is defined.) The Robinson experience undoubtedly demonstrated to other club owners that blacks could be profitably integrated into organized baseball without a player or fan boycott. But a complete explanation of the growth in the percent of black players requires reference to events other than the unique and insightful decision by Rickey to hire Robinson. There were in fact compelling economic factors that made it profitable for other clubs to imitate the integrationist policy of the Brooklyn Dodgers. In light of the mounting bonus costs, black players, who were available for modest bonuses or none at all, probably seemed more attractive to club owners than would have been the case in the absence of bonus competition.¹ Large bonus payments were rare for American blacks during the period 1948-1958 (see Table 4), and clubs that could successfully recruit blacks for small bonuses expected substantial player cost savings. Apparently, there were powerful economic incentives to recruit blacks.

Bonuses are of course an important part of the player compensation package. We shall examine bonus payments by race to further test our hypotheses on salary discrimination in organized baseball. In Table 4 we show the percent of major league players in the 1968 Baseball Register who received bonuses in excess of $20,000, black and white Latins excluded. The data are cross-classified by year of entry into organized baseball.

Ignoring for the moment the time pattern of the white-black differential in the percent of players receiving large bonuses as indicated in Table 4, we can interpret the data as supporting the view that

¹Not only were bonus costs high, but many bonus players never successfully became major league players. In 1958 the probability that a player who received a bonus in excess of $25,000 would in fact become a major leaguer was only about one in three.
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<thead>
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<td>Percent Black Bonus</td>
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<tr>
<td>Total White Bonus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent White Bonus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year of Entry</td>
<td>1949</td>
<td>1950</td>
<td>1951</td>
<td>1952</td>
<td></td>
</tr>
<tr>
<td>Bonus Black</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total White</td>
<td>125</td>
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<td>148</td>
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</tr>
<tr>
<td>Bonus White</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>Percent Black Bonus</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Total White Bonus</td>
<td>125</td>
<td>136</td>
<td>148</td>
<td>160</td>
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</tr>
<tr>
<td>Percent White Bonus</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Year of Entry</td>
<td>1953</td>
<td>1954</td>
<td>1955</td>
<td>1956</td>
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<tr>
<td>Bonus Black</td>
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<td>154</td>
<td>134</td>
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<tr>
<td>Bonus White</td>
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<td>10</td>
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<tr>
<td>Percent Black Bonus</td>
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<tr>
<td>Total White Bonus</td>
<td>125</td>
<td>136</td>
<td>148</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Percent White Bonus</td>
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<tr>
<td>Year of Entry</td>
<td>1957</td>
<td>1958</td>
<td>1959</td>
<td>1960</td>
<td></td>
</tr>
<tr>
<td>Bonus Black</td>
<td>26</td>
<td>38</td>
<td>40</td>
<td>42</td>
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</tr>
<tr>
<td>Total White</td>
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<td>4</td>
<td>3</td>
<td>3</td>
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</tr>
<tr>
<td>Bonus White</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>3</td>
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</tr>
<tr>
<td>Percent Black Bonus</td>
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<td></td>
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<td></td>
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<tr>
<td>Total White Bonus</td>
<td>26</td>
<td>38</td>
<td>40</td>
<td>42</td>
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</tr>
<tr>
<td>Percent White Bonus</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year of Entry</td>
<td>1952</td>
<td>1953</td>
<td>1954</td>
<td>1955</td>
<td></td>
</tr>
<tr>
<td>Bonus Black</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Total White</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>Bonus White</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Percent Black Bonus</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Total White Bonus</td>
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<tr>
<td>Percent White Bonus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Includes only those players who appeared in the Register for 1968.

**Source:** Baseball Register, 1968.
prejudice against black athletes on the part of either fans or club owners makes entering blacks less valuable to clubs than whites. This argument is compelling, particularly with respect to large bonuses which clubs must pay in the search for the baseball hero who can draw fans to the parks.

But the time pattern of the white-black differential adds considerable information and suggests an alternative interpretation of the data. Under combined assumptions of competition, reasonably good information, and no prejudice on the part of club owners or fans there is no reason to expect bonus payments to differ systematically by race. A club would not continue to pay large bonuses to whites when blacks of equal predicted ability were available for less money. Competition among buyers would equalize bonuses by race even if black athletes had poorer alternatives than white athletes. If, however, we abandon the assumption of perfect information on the part of buyers, bonus payments might indeed differ systematically by race, since whites do have better alternatives outside of baseball than blacks. For that subset of players who are scouted by a single club, and the size of this subset is directly related to the amount of information available in the market, bonus payments are determined by a bargaining process between the prospect and the club. Except for the potential competition from activities outside of baseball, clubs that uniquely identify a baseball prospect are free from competitive pressures. Under these circumstances, we would predict that blacks on average would receive smaller bonuses than whites for reasons independent of any prejudice within baseball.

The time pattern of the racial bonus differential is consistent with the view that clubs had some monopoly power. The difference in the percent of whites and the percent of blacks who received large bonuses was substantial and statistically significant prior to 1958. But after that date, the difference began to narrow; and by the period 1965-1967, it was almost totally eliminated. This pattern suggests that as clubs developed their black scouting systems, information spread, and competition among clubs eliminated the racial bonus differential despite the poorer non-baseball alternatives of blacks.
In our sample of 784 players, of which 75 were Latins, not one of the Latins was reported to have received a bonus in excess of $20,000. Latins have unusually poor alternatives outside of organized American baseball.

What, then, can we conclude about direct pecuniary discrimination against American blacks in big league baseball? The evidence we have examined suggests that it does not exist. Black pitchers, black catchers, black infielders and outfielders in the major leagues appear to receive compensation commensurate with their demonstrated abilities in the same way that white players do. The original racial differentials in the receipt of bonus payments can reasonably be interpreted as stemming from a combination of information lag and monopolistic practice rather than bigotry, per se. Currently there is no evidence that even the obviously poorer non-baseball alternatives of black major leaguers have been sufficient to bring down their relative compensation. Before concluding that baseball is a prejudice-free industry, however, we need to examine entry, promotion, and assignment practices for evidence of systematic racial bias.

ENTRY BARRIERS: THE RELATIVE ABILITY OF BLACK AND WHITE PLAYERS

The purpose of this section is to examine whether it is more difficult for blacks than whites to enter the major leagues. Stated differently, we ask whether a black minor league player must have more baseball playing ability than a white minor leaguer in order to have an equal chance of being promoted from the minors to the majors. In order to examine the racial entry barrier issue, we compare black and white playing ability among those already in the major leagues. From these comparisons we draw an inference about entry barriers.

To compare the ability of blacks relative to whites we need to have statistical measures that will constitute an index of ability. For nonpitchers a wide variety of statistics readily suggest themselves -- batting averages, fielding averages, slugging percentages,
runs batted in -- to name but a few of the more obvious candidates.\textsuperscript{1} These measures could be combined into an infinite number of overall ability indexes, but we have not attempted to pose the question of what is "the" correct ability measure. Instead, we have chosen measures that meet two criteria. First, we wanted measures that knowledgeable baseball observers would readily agree are important in relationship to something called "ability." Second, our measures should be highly correlated with an individual player's earning capacity, since it is the playing characteristics that owners and managers deem important.

For nonpitchers, we index ability by the player's lifetime batting average; for pitchers we use games won per season. To compare capabilities we used a sample consisting of 784 major league players listed in the 1968 Baseball Register. This sample represents an almost complete enumeration of each club's 40-man protected list. We then divided this sample into two subsamples. Since many of the listed players had no or very limited major league experience, we classified players as either veterans or nonveterans. A veteran nonpitcher was defined as any player who had appeared in 75 or more major league games and a veteran pitcher was defined to include all players who appeared in 25 or more major league games. This definition yielded two subsamples, one consisting of 453 veterans and the other embracing 331 nonveterans.\textsuperscript{2} Then for veterans we collected statistics for lifetime major league experience. However, for nonveterans our data covered the latest (usually 1967) minor league season in which a nonpitcher the player appeared in 25 or more games, or as a pitcher in 4 or more games.

\textsuperscript{1}Fielding average: A fielder's total number of assists and outs divided by his total number of chances, to 3 decimal places.

Slugging percentage: Batter's total bases divided by his times at bat.

\textsuperscript{2}Since the June 1 to September 1 major league rosters must consist of only 25 players or a total for 20 teams of 500 players, our veteran group apparently covers most of the 25-man rosters.
Players were categorized into seven subgroups — pitchers, catchers, first and third basemen, second basemen and shortstops, outfielders, utility infielders, and miscellaneous players.¹

For each nonpitcher subgroup separately we have computed the mean difference in black (Latin plus American) and white cumulated major league lifetime batting averages using our sample of veterans only. In this computation we assume that the basic observation unit is the individual player. Therefore, the figures shown in Table 5 are the arithmetic averages of individual lifetime major league batting averages.

Position by position, the arithmetic average of black lifetime batting averages exceeds that of whites. And in four of the six categories the differences are statistically significant at customary test levels.² Equally important, the differences are quantitatively interesting. They range from 1 to 32 points. As a basis of comparison, we note that in 1967, the highest team batting average in the American League was 255 (Boston) and the fifth highest team batting average was 238 (California), a difference of 17 points. In the National League, the first (Pittsburgh) and fifth (Cincinnati) place teams in terms of batting performance were separated by 29 points.

Similar calculations for nonveteran nonpitchers are shown in Table 6. The data indicate a consistent tendency for black nonveterans to outperform their white counterparts, position by position.

For veterans we have computed the mean batting average for Latin blacks, American blacks, and all whites separately by position. These figures are shown in Table 7. The data indicate that the previously reported black-white differences are not the result of including Latin

¹Miscellaneous players were generally those who had played in so many positions during their careers that they were difficult to classify.
²We performed an additional test in which the performance differences were standardized for age differences between the black and white subsamples on the assumption that age tends to improve performances. This adjustment did not appreciably alter the results by race and position.
Table 5
BLACK AND WHITE INDIVIDUAL CUMULATED LIFETIME
BATTING AVERAGES, NONPITCHER VETERANS,
THROUGH 1967

<table>
<thead>
<tr>
<th>Position</th>
<th>Sample Size</th>
<th>Average of Batting Averages</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black</td>
<td>White</td>
<td>Difference</td>
</tr>
<tr>
<td>Catcher</td>
<td>N = 35</td>
<td></td>
<td>260</td>
<td>228</td>
<td>32**</td>
</tr>
<tr>
<td></td>
<td>3 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First and third</td>
<td>N = 30</td>
<td></td>
<td>272</td>
<td>253</td>
<td>19**</td>
</tr>
<tr>
<td></td>
<td>10 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second and short</td>
<td>N = 44</td>
<td></td>
<td>245</td>
<td>244</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>13 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outfielders</td>
<td>N = 83</td>
<td></td>
<td>267</td>
<td>255</td>
<td>12**</td>
</tr>
<tr>
<td></td>
<td>47 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other infielders</td>
<td>N = 27</td>
<td></td>
<td>258</td>
<td>252</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>5 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>N = 40</td>
<td></td>
<td>255</td>
<td>244</td>
<td>11**</td>
</tr>
<tr>
<td>players</td>
<td>12 blacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \( P < .10 \)
** \( P < .05 \)
*** \( P < .01 \)
Table 6
BLACK AND WHITE INDIVIDUAL BATTING AVERAGES,
NONPITCHER NONVETERANS,
VARIOUS YEARS

<table>
<thead>
<tr>
<th>Position</th>
<th>Sample Size</th>
<th>Average of Batting Averages (^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>Catcher</td>
<td>N = 29</td>
<td>206</td>
</tr>
<tr>
<td>First and third</td>
<td>N = 17</td>
<td>307</td>
</tr>
<tr>
<td>Second and short</td>
<td>N = 32</td>
<td>202</td>
</tr>
<tr>
<td>Outfield</td>
<td>N = 49</td>
<td>201</td>
</tr>
<tr>
<td>Utility infielders</td>
<td>N = 19</td>
<td>319</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>N = 24</td>
<td>233</td>
</tr>
</tbody>
</table>

Notes:
\(^a\) All estimates are adjusted for player's age. The adjustment procedure was based on a multiple regression analysis.

\(^*\) One-tail significance at \(p = .10\)
\(^**\) One-tail significance at \(p = .05\)
\(^***\) One-tail significance at \(p = .01\)
### Table 7

**LATIN BLACK, NORTH AMERICAN BLACK, AND WHITE INDIVIDUAL CUMULATED LIFETIME BATTING AVERAGES, NONPITCHER VETERANS, THROUGH 1967**

<table>
<thead>
<tr>
<th>Position</th>
<th>Average of Individual Lifetime Batting Averages</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latin Black</td>
<td>N. Amer. Black</td>
</tr>
<tr>
<td>Catcher</td>
<td>252</td>
<td>264</td>
</tr>
<tr>
<td>First and third</td>
<td>309</td>
<td>268</td>
</tr>
<tr>
<td>Second and short</td>
<td>236</td>
<td>278</td>
</tr>
<tr>
<td>Outfield</td>
<td>281</td>
<td>262</td>
</tr>
<tr>
<td>Utility infielder</td>
<td>248</td>
<td>273</td>
</tr>
<tr>
<td>Miscellaneous player</td>
<td>255</td>
<td>256</td>
</tr>
</tbody>
</table>
blacks with American blacks. American blacks were invariably superior to whites; Latin blacks only sometimes.

To measure the ability of pitchers, we have chosen games won per major league season in preference to variables such as major league ERA or percent of total major league decisions won (winning percentage).\textsuperscript{1} We restrict our discussion to veteran pitchers only. For this sample of pitchers we computed total games won for the last season in which the player appeared in 10 or more games. In almost all cases this was the 1967 season.

For 19 black pitchers the mean number of games won was 10.2; for 175 whites it was 7.5 games. This mean difference, 2.7, is significant at the 5 percent one-tail test level. On the basis of supplementary tests we conclude that controlling for age will not account for the mean black-white difference in games won.

What conclusions can be drawn from these data? Under certain assumptions the results are consistent with the proposition that there is an entry barrier against blacks. This means that on average a black player must be better than a white player if he is to have an equal chance of transiting from the minor leagues to the majors. It is essential to spell out the underlying assumptions that generate this conclusion and then to ask whether these assumptions are plausible.

Assume some distribution of ability for all players in organized baseball. Further, assume that depending on the number of players required by the major league clubs there is some cutoff ability below which players are not promoted. If we assume perfect information about ability (and this argument holds if information is imperfect but there is no systematic error in predicting ability by race) the cutoff value is entirely determined by the required number of players. This is shown in Figure 1. In this figure $A_0$ is the cutoff ability and all players for which $A \geq A_0$ are chosen for the majors. Now if ability is

\textsuperscript{1}Earned Run Average: The total number of earned runs off a pitcher divided by the total number of innings he has pitched.
indexed by cumulative lifetime batting average, the mean of the individual lifetime batting average will be the mean for the normalized distribution of ability above $A_o$. On the other hand, if, because of racial prejudice on the part of fans or owners, blacks were less valuable than whites of equal ability, it would be likely that the cutoff value $A_o$ would be higher for blacks than whites, $A_o^B > A_o^W$. Under these circumstances, a higher mean ability of blacks than whites, position by position, is evidence consistent with discrimination against blacks. However, this conclusion requires the prior assumption that the ability distributions of blacks and whites defined over all major and minor league players be the same. If for any reason the black distribution had a higher mean than the white ($\mu_B > \mu_W$) or if the black distribution had more variance ($\sigma_B^2 > \sigma_W^2$) then we could not interpret differences in mean major league ability as evidence of racial discrimination.

In general, three arguments might lead one to predict that, on average, the baseball playing ability of blacks within baseball would be greater than that of whites. There is a pervasive man-on-the-street argument to the effect that blacks have a genetic advantage in athletics. In our view there is neither physiological nor anthropological evidence
in unambiguous support of this view. In the absence of evidence we choose to be agnostic with regard to this genetic interpretation of our ability findings. Similarly, we are skeptical of the rather facile assertion that blacks are more highly motivated than whites to acquire athletic abilities. We know of no generally accepted measure of motivation, and this makes the argument even less interesting. On the other hand, we are somewhat more sympathetic to the argument that endemic societal wage discrimination in most callings and lesser discrimination in baseball may result in a systematic difference in the ability distributions of black and white baseball players through the process of occupational choice. We consider the problem of occupational choice under the simplifying assumption that there is general societal wage discrimination but an absence of wage discrimination in baseball. Our objective is to determine whether under these circumstances there is reason to suspect that the process of occupational choice will systematically affect the ability distribution of black as compared with white candidates for baseball.

General societal wage discrimination against a minority group will redirect its members into those occupations where discrimination is less prevalent. Although this implies that, other things constant, the proportion of blacks will be highest in those occupations where wage discrimination is least prevalent, it does not imply that the average ability of blacks relative to whites will be highest in the nondiscriminatory occupations. The discrimination-free occupations will not only attract a higher percentage of very able blacks, but will also attract those that are relatively less able. The net effect on the black ability distribution as compared with the white distribution is unpredictable.

Assume that the present value of the expected income stream from choosing baseball as an occupation is linearly related to actual playing ability. Assume further that although it is undoubtedly difficult

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1 See, for example, Maher [March 26, 1968, pp. 1,7].
2 More generally the baseball income stream as well as alternative income streams may contain nonpecuniary as well as pecuniary components -- prestige, adventure, arduousness, and so on.
for an individual to estimate his future ability, this difficulty is no greater (or less) for blacks than whites. The \( f(A) \) function shown in Figure 2 is the assumed relationship between the expected present value of baseball income and actual ability. We assume no one below the ability level \( A' \) would even consider a career in baseball. Assume further that the ability to play baseball is uncorrelated with some index of ability to perform or learn other tasks in the society. Let the expected present value of wages outside of baseball be \( w^* \), which by the above assumption is independent of baseball playing ability.\(^1\) In the absence of societal wage discrimination, let \( w^* \) be given by \( w_1^* \) in Figure 2. Wealth maximizing individuals will choose that occupation

\[\text{Present Value of Expected Income} \]

\[f(A)\]

\[w_1\]

\[w^*_2\]

\[A' \quad A_2 \quad A_1 \quad A = \text{Ability}\]

\text{FIGURE 2

in which the present value of their expected income streams is greatest. This means that everyone below ability \( A_1 \) will enter some occupation other than baseball and everyone above \( A_1 \) will enter baseball. Depending on the distribution of \( A \) defined above \( A_1 \), this will yield some ability distribution of baseball players. If there are no genetic or

\(^1\) Although we could have assumed that for any given baseball playing ability, \( A \), there exists a distribution of \( w^* \) with a mean, \( \bar{w}^* \), independent of \( A \), this assumption would not alter our conclusions and would only complicate our discussion. Ease of exposition, then, led us to posit a simple deterministic model.
motivational differences between blacks and whites, then the ability distribution of white and black baseball players should be about the same.

Now, introduce wage discrimination elsewhere in the economy but not in baseball. This is shown in Figure 2 as an alternative wage, \( w_2 \). For blacks, the ability cutoff value into baseball is now \( A_2 \), and the result is a lower mean ability of black baseball players than in the nondiscriminatory case. Under these assumptions, the principal impact of general wage discrimination is to reduce the mean ability of black baseball players relative to whites although it does increase the proportion of black baseball players.

Once we recognize that baseball playing ability may be correlated positively with performance ability elsewhere in the economy, the problem becomes somewhat more complicated.\(^1\) In particular, it depends on how wage discrimination elsewhere in the economy varies with baseball playing ability. Under the assumption that baseball playing and other abilities are perfectly correlated, it can be shown that racial discrimination outside of baseball will augment the proportion of the minority that offers itself to baseball but not the average quality of the candidates relative to the majority population.

Under these rather plausible assumptions, racial wage discrimination outside of baseball will not improve the distribution of ability for blacks relative to whites. But it is clear that one could make assumptions about the occupational choice process that would lead to the conclusion that discrimination outside of baseball increases the proportion of exceptionally able blacks who choose baseball more than it increases the proportion of those who are somewhat less able. Our purpose was not to rule out this logical possibility, but rather to demonstrate that the effect of racial wage discrimination in one sector does not entitle one to predict confidently the effect of this phenomenon

\(^1\)The ability to play baseball requires, among other things, physical health, diligence, motivation, concentration, promptness, and dependability, all of which are traits commanding a premium in many occupations. In a recent article [Shafer and Armer, 1968] it was shown that for high school students, participation in organized athletics was positively correlated with academic performance.
on the ability distribution in the nondiscriminating sector. The only
unambiguous implication is that it systematically alters the proportion
of blacks in the two sectors.

ENTRY BARRIERS OVER TIME, 1953-1967

Rosenblatt [1967] reports data on the percent of black American
major league players and mean difference in batting performance of
American blacks and whites for the 25 man rosters, 1953-1965. These
data are reproduced in Table 8. There is no evidence of a secular
decline in racial batting performance differences although over the
period there has been a large increase in the percent of black players
(see Table 8). These appear to be conflicting facts. The stability
of batting performance differences is interpreted as evidence that the
major league entry barrier is unchanged, and the growing percent of
blacks is often interpreted as evidence of a decline in entry restric-
tion. This apparent paradox stems from the assumption that data on the
percentage participation by blacks in a particular jurisdiction indicate
the degree of racial wage discrimination in that jurisdiction.

Assume that baseball salaries are commensurate with ability within
both the minor and major leagues but that all of the discrimination
arises from a racial barrier between the minor and major leagues. The
barrier takes the form of a "discount" on black ability so that for
clubs to be indifferent between promoting blacks or whites, blacks must
be x percent better than whites. If the discount is independent of
the relative number of blacks in the game, then obviously the observed
ability difference could remain constant while the fraction of blacks
increased if there was a secular increase in the relative supply of
black players at every ability level.

This appears to us as rather convincing evidence that a real and
important entry barrier prevents equally qualified black players from
moving up into the major leagues. If salaries are generally higher in
the majors than in the minors, black minor league players are receiving
lower salaries than their abilities would warrant. The racial entry
barrier to the major leagues, in other words, results in salary dis-
 crimination against black professional baseball players as a whole.
Table 8
SEASON BATTING AVERAGES OF AMERICAN BLACKS AND WHITES,
1953-1965 AND 1967,
AND PERCENT BLACK AMERICAN PLAYERS

<table>
<thead>
<tr>
<th>Year</th>
<th>Blacks</th>
<th>Whites</th>
<th>Difference</th>
<th>Percent American Black Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953</td>
<td>288</td>
<td>257</td>
<td>31</td>
<td>5.4</td>
</tr>
<tr>
<td>1954</td>
<td>262</td>
<td>244</td>
<td>18</td>
<td></td>
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<tr>
<td>1955</td>
<td>271</td>
<td>251</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>1956</td>
<td>270</td>
<td>248</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td>264</td>
<td>252</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>1958</td>
<td>274</td>
<td>249</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>1959</td>
<td>265</td>
<td>246</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>264</td>
<td>248</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td>264</td>
<td>247</td>
<td>17</td>
<td>14.5</td>
</tr>
<tr>
<td>1962</td>
<td>276</td>
<td>250</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>262</td>
<td>238</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>255</td>
<td>238</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>252</td>
<td>234</td>
<td>18</td>
<td>17.2</td>
</tr>
<tr>
<td>1967</td>
<td>262</td>
<td>245</td>
<td>17</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Sources:
1953-1965: Transcribed from Rosenblatt [1967]. His data are based on 25 man rosters.
1967: Based on veteran sample used in this study (453 players). These data are not entirely comparable to Rosenblatt's. Data not computed for 1966.
IV. RACIAL SEGREGATION IN BASEBALL

The effects of race prejudice need not be exhibited so blatantly as to violate the equal pay for equal work rule in which Americans profess belief. In an industry where candidates are denied opportunity to enter, to advance, and to choose specialties because of color, then race prejudice is surely generating discrimination, even though no black worker receives lower compensation than whites of identical ability and working at the same level in the hierarchy. Having reviewed evidence on possible racial entry barriers in major league baseball we now go on to evidence on bias in assignment. Surveying the evidence on assignments by color to team, league, and position in major league baseball permits us to draw some inferences on the existence of racial segregation in the industry. We also present some fragmentary evidence on the existence of nonplaying employment alternatives by race.

SEGREGATION BY TEAM AND LEAGUE

In Table 9 we show the distribution of American and Latin blacks among the twenty (1968) major league clubs. The difference in the means for the National and American leagues supports the common observation that there are more blacks on National than American League clubs. On the other hand, there appears to be some within-league variation. These observed differences between and within leagues bear on the problem of segregation, but have no necessary implications for the presence or absence of salary discrimination against blacks since there is no observable league effect on salaries.

A $\chi^2$ test of within-league differences failed to uncover any significant intra-league differences at reasonable test levels in the proportion of black players. On the other hand, a proportions test did indicate a significant between-league difference in the proportion of blacks.

It is instructive to explore further the question of why the proportions differ among clubs. We could assume that the percent of black players on a particular club depends on the attitude of fans,
Table 9
LATIN AND NORTH AMERICAN BLACKS BY CLUB
AND LEAGUE, 1968, 784 PLAYERS
(Percent)

<table>
<thead>
<tr>
<th>National League</th>
<th>Percent Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta</td>
<td>37</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>28</td>
</tr>
<tr>
<td>Houston</td>
<td>34</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>22</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>27</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>30</td>
</tr>
<tr>
<td>San Francisco</td>
<td>31</td>
</tr>
<tr>
<td>Chicago (Cubs)</td>
<td>14</td>
</tr>
<tr>
<td>New York (Mets)</td>
<td>17</td>
</tr>
<tr>
<td>St. Louis</td>
<td>29</td>
</tr>
<tr>
<td>League percentage</td>
<td>26.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>American League</th>
<th>Percent Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago (White Sox)</td>
<td>20</td>
</tr>
<tr>
<td>Baltimore</td>
<td>17</td>
</tr>
<tr>
<td>Detroit</td>
<td>12</td>
</tr>
<tr>
<td>Kansas City</td>
<td>17</td>
</tr>
<tr>
<td>Washington</td>
<td>16</td>
</tr>
<tr>
<td>Minnesota</td>
<td>26</td>
</tr>
<tr>
<td>Boston</td>
<td>25</td>
</tr>
<tr>
<td>Cleveland</td>
<td>22</td>
</tr>
<tr>
<td>New York (Yankees)</td>
<td>14</td>
</tr>
<tr>
<td>California</td>
<td>6</td>
</tr>
<tr>
<td>League percentage</td>
<td>17.5&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Note:
<sup>a</sup> Arithmetic average of the individual club proportions.

Source:
Baseball Register, 1968.
the attitude of white co-players and on the location of the club farm system, since it may prove awkward for a major league club with Southern farm teams to hire black players. As an admittedly rough approximation we index each of these factors by: 1) the percent of blacks in the Standard Metropolitan Statistical Area in which the club has its home \(X_1\); 2) the percent of 1968 white players who were Southern born on each club \(X_2\); 3) the percent of the club's farm system players who play for minor league clubs located in the South \(X_3\). Letting \(p\) represent the percent of major league blacks on a club, we regress \(p\) on \(X_1, X_2,\) and \(X_3\) and a zero-one (American League-National League) dummy \(X_4\). The results are

\[
p = 24.5 + .01 X_1 - .10 X_2 + .09 X_3 - 8.9 X_4,
\]

standard error \((31.6) (.32) (.28) (.08) (3.4)\)**

where ** indicates one-tail 5 percent significance. Apparently inter-club variation is unrelated to every independent variable except the league variable. Therefore, we conclude that for reasons independent of farm club location, percent of Southern white players, and percent of whites in the SMSA in which the club is located, there is a difference between the two leagues. Perhaps this difference reflects the behavior of club owners or perhaps it simply reflects the fact that the American League was a relative latecomer in acquiring black players.

An alternative explanation of the league-only effect lies in the competitive pressures. Since the clubs in a given league must compete against each other in games, we can surmise that no single club can afford to depart too far from the overall league average in (potential) player ability. Given our tentative identification of a racial entry barrier and the consequent higher average ability of black players, any competitor in the league will find it necessary to hire a fraction of blacks approximately equal to the average proportion in the league. This average proportion may be related to the mean of the prejudice levels, from whatever source, across teams. Since the typical team plays about 160 games against the other members of its league and less than 0.7 games (expected value of number of World Series games for any team) against teams from the other league, the fractions black within
a league will be constrained, yet there will be no necessary relationship of the fractions between leagues. Moreover, to the extent that the league rather than the team is the basic decision unit in the baseball business, these conclusions would also be expected.\footnote{See O'Neale [1964].}

**SEGREGATION BY PLAYING POSITION**

In Table 10 we show the percentage of blacks by playing position. The conspicuous absence of black pitchers and catchers has often been noted by other writers [Rosenblatt, 1967]. One interpretation of this phenomenon is that blacks are purposely excluded from the key positions of pitchers and catchers because they are important decisionmaking positions and blacks are not trusted with this kind of responsibility. It is difficult to verify this hypothesis and of course there are other explanations for the phenomenon. One explanation centers on the fact that pitchers require more coaching and minor league experience than other players, and white coaches and managers may prefer not to interact with blacks. This latter hypothesis seems even more valid when we notice the lower representation of black players in some of the infield positions, where fielding skill is important. Such skills may also require frequent access to coaching and instruction. Segregation by position will be reinforced as black youngsters concentrate on positions in which black stars are most notable. If our argument is correct, blacks will continue to concentrate in the outfield and at first base, positions in which the primary quality demanded is hitting ability, a more "natural" talent.

We might ask whether our findings with respect to ability differences among black and white players by position are consistent with the evidence on segregation by position. A reasonable view would hold that if the races are distributed equally with respect to innate ability, then in those positions with fewest blacks the greatest black-white ability difference will be found. The interpretation we suggest here is that as the assignment barrier against blacks rises, only the
Table 10
LATIN AND NORTH AMERICAN BLACKS BY PLAYING POSITION, 1968, 784 PLAYERS
(percent)

<table>
<thead>
<tr>
<th>Position</th>
<th>Percent Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitcher</td>
<td>9</td>
</tr>
<tr>
<td>Catcher</td>
<td>12</td>
</tr>
<tr>
<td>First</td>
<td>40</td>
</tr>
<tr>
<td>Second</td>
<td>30</td>
</tr>
<tr>
<td>Third</td>
<td>14</td>
</tr>
<tr>
<td>Shortstop</td>
<td>26</td>
</tr>
<tr>
<td>Outfield</td>
<td>53</td>
</tr>
<tr>
<td>Utility infield</td>
<td>19</td>
</tr>
<tr>
<td>Not specified (misc.)</td>
<td>33</td>
</tr>
</tbody>
</table>

Total 22

Source: Baseball Register [1968].
more superior blacks can scale it. Thus we should find the observed edge for black players relatively highest for pitchers and, descending through catchers and infielders, lowest for outfielders. A comparison of the data for nonpitchers in Tables 5, 6, and 10 does not support this proposition however.

NONPLAYER OPPORTUNITIES BY RACE

Because baseball players usually retire as active players in their mid-thirties, post-retirement employment opportunities are of major concern to them. One important employment source for ex-players is within organized baseball itself as managers or coaches. That employment opportunities in these supervisory positions are less available to blacks than whites is readily apparent from the data. At the start of the 1969 season none of the 24 major league managers were black and only 4 of the 100 major league coaches were black (Luke Easter, Junior Gilliam, Elston Howard, and Satchell Paige). In 1969 only one of the 49 major league umpires was black. Apparently, successful black baseball players are not yet considered qualified for the most important supervisory positions in organized baseball.

There are sources of pecuniary discrimination against black players that are quite independent of any decisions made by club owners or managers. Successful black players may find it more difficult than comparable white players to capitalize on their athletic reputation in activities outside of baseball. This includes off season or post-retirement employment opportunities, T.V. and other endorsement opportunities, as well as speaking (luncheon clubs, lodges, and so on) and related opportunities. That these disadvantages are real is indicated by one survey which alleged that although blacks made up 30 percent of major league baseball players, 26 percent of major league football players, and 44 percent of basketball players, they appeared in only five percent of 351 T.V. commercials associated with New York sports events in the fall of 1966.¹

V. CONCLUSIONS

Let us at this point review our findings with respect to the impact of race on the player market in organized baseball. They include the following:

- Of all major league baseball players in 1968, 22 percent were black and about 15 percent were North American black. Both black and white players seem representative of the U.S. population in education and regional origin.

- There is some evidence that teams treat players as economic resources since player performance affects team standing and standing affects attendance by fans.

- When we estimated the parameters of a model of salary determination in which the independent variables included measures of player performance and experience, of alternative earnings potential, and of race and a trend factor, we succeeded in explaining from one half to three fourths of the variation in individual salaries paid pitching and nonpitching players during 1968. Generally, race had no significant impact on salary when considered in conjunction with "objective" measures of player value.

- Bonus payment differentials by race, though significant in earlier years, seem to have just about vanished. This phenomenon may be attributed either to a decline in prejudice or to an improvement in the quality of information in a monopsonistic industry.

- Position by position, black players in the big leagues tend to outperform their white counterparts on the basis of objective measurements. This holds for veterans and rookies and at all ages. There is little reason to attribute the observed racial ability differential to the relatively poorer non-baseball alternatives of blacks.
The two major leagues differ significantly in the proportions of black players on their constituent teams; differences among teams within a league are not statistically significant, however, at customary test levels.

Blacks are underrepresented as pitchers and catchers and overrepresented as outfielders and first basemen in the major leagues.

Very few blacks are found among big league managers, coaches, and umpires; they held only 3 percent of these supervisory slots in 1969.

Rather ironically, our study indicates that since on average black salaries in major league baseball are higher than white salaries, significant prejudice exists in the industry. The irony, of course, stems from the joint occurrence of two phenomena: (1) major league clubs tend to pay players as a function of their demonstrated ability, and (2) baseball appears to restrict major league opportunities to those blacks who are demonstrably superior to their white counterparts.

Thus there seems to occur equal pay for equal work but unequal opportunity for equal ability. In addition, we find that once inside major league baseball, players are allocated to positions, including supervisory as well as playing positions, in a manner that is difficult to explain on grounds other than racial bias.

We feel that the findings we derive for baseball are characteristic also of the situation in other parts of the economy. Baseball, after all, is an industry composed of wealth-maximizing firms. It differs merely in being highly public and, since 1948, in being highly prone to praise its own "enlightened" racial attitudes. In fact, taking at face value the public relations rhetoric of baseball spokesmen, if racism is as subtly pervasive as it appears to be on the diamond, it is likely to be exceedingly powerful in the plants, offices, and stores where discriminatory treatment can still be masked by complaints about the absence of qualified applicants.
The ethical tenets of official American culture as well as the difficulties of sustaining patently unjust salary treatment means that in baseball and in other fields racism will be expressed through less obvious forms of discrimination. Our study shows that basing entry, promotion, and assignment on race rather than merit is one important form.
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