

Pay Discrimination in Baseball: Data from the Seventies

STUDIES IN THE LATE SIXTIES AND EARLY SEVENTIES (Gwartney and Haworth, 1974; Pascal and Rapping, 1972; Rosenblatt, 1967; Scully, 1974) concur that substantial barriers to entry into major league baseball still exist for black athletes. However, investigations of pay discrimination have yielded no uniform conclusions. Pascal and Rapping (1972) analyzed 1968 and 1969 salary data and concluded that pay discrimination against blacks did not exist; but Scully (1974), using the same data set, found positive evidence of discrimination.

This study takes another look at discrimination in major league baseball using data from the seventies.¹ The question of barriers to entry is re-examined, and the issue of pay discrimination is analyzed using compensation data from 1976. While our data show a higher proportion of blacks in the outfield, there is little evidence that this concentration is the result of racial barriers. Compensation determination models estimated in both linear and logarithmic formats for pitchers and for hitters yielded only small wage differentials between black and white players attributable to discrimination. Further analysis did not substantially alter that finding.

Barriers to Entry

Previous studies (Gwartney and Haworth, 1974; Pascal and Rapping, 1972; Rosenblatt, 1967; Scully, 1974), noting that blacks outperformed whites on average at every position, concluded that barriers to entry existed for black players. A black player needed to possess greater ability than a white player in order to gain entry into the major leagues.

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In Table 1, 1976 career performance measures for blacks and whites are listed according to position.² While the offensive figures indicate that blacks were more productive than whites at each position except third base, analysis shows that in only three of ten cases is the mean of the black players' statistics significantly higher than that of their white counterparts. In the case of third base, the mean of the white players' career batting average is significantly higher than that of the blacks. For pitchers, the earned run averages of white players are lower than blacks', but the difference is not significant. Fielding statistics results (not reported here) failed to show any significant differences between the two groups. These findings do not support a claim to the overall superiority of black players in major league baseball.

Past discrimination studies have also emphasized that blacks were far more likely to be outfielders than infielders, and infielders than pitchers. Scully's (1974) study, covering 1960–1971, shows that the percentage of outfield positions filled by blacks ranged from a low in 1960 of 33.3 per cent to a high of 61.7 per cent in 1971, with an average of 49.8 per cent. Figures from the seventies confirm the continued and growing concentration of blacks in outfield positions. Data collected from the June issues of *Ebony*, 1972–1978 show that the same statistic ranges from a low of 62.5 per cent in 1976 to a high of 80 per cent in 1975, with an average over 1972–1978 of 69.1 per cent.³ For the percentage of infield positions filled by blacks, Scully's figures range from a low of 15 per cent in 1962 and 1964 to a high of 26.7 per cent in 1969, with a mean of 19.6 per cent; our figures show a low of 19.2 per cent in 1975, a high of 26.9 per cent in 1977, and a mean of 23.3 per cent. Lastly, Scully's figures on the percentage of pitcher positions filled by blacks indicate a low of 5.0 per cent in 1961, a high of 11.3 per cent in 1969, and a mean of 8.7 per cent for the period; our figures indicate a low of 7.3 per cent in 1978, a high of 12.5 per cent in 1973, and a mean of 9.1 per cent.

Several hypotheses have been advanced to explain why blacks are found predominantly in the outfield. Pascal and Rapping (1972) and Scully (1974) suggest that (1) less coaching and poorer fields in their early playing years cause the hitting skills of blacks to develop more rapidly than their fielding abilities, and/or (2) racial prejudice among coaches causes blacks to be placed in the outfield where less intensive coaching and less responsibility and leadership are needed. Scully also hypothesized that perhaps blacks are relegated

²As in previous studies (e.g., Scully, 1974), we group Latin American players with black players, unless otherwise specified.

³Available playing positions per club were divided up into five positions for outfielders, ten for infielders, and ten for pitchers to form a 25 man roster. This is the same division Scully used. Additional statistics on the per cent of outfield, infield, and pitcher positions held by blacks between 1972 and 1978 are available from the authors upon request.

TABLE 1
 PERFORMANCE DIFFERENTIALS FOR BLACKS VERSUS WHITES BY POSITION
 FOR MAJOR LEAGUE BASEBALL AS OF 1976^a

Position	Sample size	Average of runs scored per year in majors			Average of career slugging averages			Average of career earned run averages		
		Black	White	Difference	Black	White	Difference	Black	White	Difference
Catcher	N = 54 4 blacks	24 (21.880)	21 (16.576)	3	383 (57.488)	334 (57.459)	49			
Second and short	N = 77 28 blacks	35 (22.219)	31 (19.833)	4	320 (54.855)	309 (44.526)	11			
Third	N = 30 9 blacks	32 (17.549)	45 (22.816)	-13	337 (63.421)	379 (45.963)	-42*			
First	N = 41 18 blacks	47 (18.611)	35 (16.614)	12*	441 (40.542)	386 (33.323)	55**			
Outfield	N = 124 72 blacks	43 (21.454)	34 (20.090)	9*	391 (52.675)	380 (61.155)	11			
Pitcher	N = 190 28 blacks							3.56 (.685)	3.46 (.558)	-.10

Source: The data were obtained from baseball statistics books.
^aThe figures are based on career performance statistics through the 1976 season. Hitters with less than 30 at bats in 1976 and pitchers with less than 30 innings pitched in 1976 were deleted. The figures in parentheses are standard deviations.
^bA player's slugging average is his total bases on hits divided by his number of at-bats.
 *Significant at the .05 level. **significant at the .01 level.

to outfield positions so they will be further away from the expensive seats and the general focus of the television cameras.

If racial barriers do exist at certain positions, then the highest performance differential between races should be found at positions with the lowest representation by blacks. This follows from Scully's and Pascal and Rapping's hypothesis that only blacks with exceptional ability would be given the chance to play at a white-dominated position. The statistics in Table 1 do not support this hypothesis. The only positions at which blacks significantly outperformed whites are outfield and first base. Blacks represented 44 per cent of the sample at first base and 58 per cent of the sample in the outfield.

An alternative explanation for the concentration of blacks in the outfield may be found in the theory of comparative advantage. While this study can not verify that the average black player in the majors is faster than the average white player, figures on stolen bases tend to support this hypothesis. For example, for the period 1969–1975, whites averaged only five stolen bases per 550 at bats; latins averaged 11 stolen bases per 550 at bats; and blacks averaged 16 stolen bases per 550 at bats (*The Sports Encyclopedia: Baseball* [1976]). If it is true that black players are faster than white ones, it is then easy to understand the concentration of blacks in the outfield, where speed can best be utilized to improve a team's defensive capabilities.

Compensation Determination Models

Figures on 1976 salaries, bonus payments, and other forms of remuneration for 523 players were obtained from a confidential source. The validity of these figures rests on an assurance that the data were obtained from the players' actual contracts. To maintain the confidentiality of the data, no salary or compensation figures are disclosed for an individual player by name. Salary figures and additional payments were combined to form a measure of total compensation, which is the dependent variable in our regression equations (for computational details, see Hill and Spellman [1983]).

Compensation determination models for hitters and pitchers were developed using various measures of productivity and experience. For hitters, career runs scored per year (R) was selected as the performance measure.⁴ For pitchers, career earned run average (CERA) was selected. To weight this measure, career innings pitched per year (IP) was added to the model to separate starters from relief pitchers. To capture the effect of experience on compensation, years in the major leagues (Y) was inserted in both the hitter

⁴For a discussion of the different variables tried, see Hill and Spellman (1983). Ideas for the development of the models were obtained from articles by Scully (1974), Pascal and Rapping (1972), and Medoff (1976). The models chosen most closely resemble Medoff's.

and pitcher models. The regressions were estimated in linear and logarithmic formats.⁵

In the regressions, 21 players who were playing out their options in 1976 were deleted. These players did not sign a contract prior to the start of the season and thus had their contracts renewed subject to a 20 per cent salary cut (as stipulated in the 1976 Basic Agreement). The logarithmic format automatically removed players who had zeros for one of the independent variables, thus dropping all rookies.⁶ The same restrictions were placed on the sample for the linear regressions. The compensation models were run for black and white players separately and combined.

Empirical Results

Table 2 contains the means and standard deviations for the variables in the 1976 regressions. The figures indicate that the average compensation was substantially higher for black hitters than for white hitters. This does not prove that discrimination in pay did not exist, however, because the black hitters in the sample outperformed the white hitters by a wide margin and also had more years of experience, on average. Black pitchers, on the other hand, were paid about \$1,300 less on average than white pitchers. But the white pitchers in the sample had a slightly lower career earned run average, larger number of innings pitched per year, and more experience, on average, than the black pitchers.

The logarithmic regression results in Table 3 indicate that the model explains a good deal of the variation in player compensation. The linear regression results (see Table 4) also reveal good explanatory power for cross-sectional data. Regardless of the format of the model (i.e., logarithmic, linear, or log-linear), the following differences are noted between the black and white equations. For the hitter regressions: (1) the intercept term is higher for the white equation than for the black; (2) the coefficient of the performance measure (R) is almost identical in both models; and, (3) the coefficient of years in the majors is higher in the black equation. For the pitcher regressions: (1) the intercept term and the coefficient of years in the majors are higher in the white equations; but, (2) the coefficients of innings pitched per year and career earned run average are higher for blacks.

⁵The models were estimated in a log-linear format as well. We report here the logarithmic format because the R^2 of the pitcher models was much higher in two out of three cases using the logarithmic format. In the hitter models and the black pitcher model, the fit of the regression to the sample data was very similar using either a logarithmic or log-linear format. We report the linear regression results to provide a basis for analyzing the difference in mean compensation in whole dollar terms.

⁶Deleting the rookies improved the model's fit because there is no information available on rookies. Moreover, since almost all rookies in 1976 earned the league minimum of \$19,000, including these players would lower the mean compensation for the sample as a whole.

TABLE 2
 COMPENSATION REGRESSION MEANS AND STANDARD DEVIATIONS
 FOR MAJOR LEAGUE HITTERS AND PITCHERS, 1976^a

Position and race	Compensation (dollars)	Runs scored per year R	Years in majors Y	Innings pitched per year IP	Career ERA CERA
Hitters	59,698 (40,506)	35.83 (20.35)	6.04 (3.57)		
White	55,258 (38,641)	31.95 (19.67)	5.82 (3.55)		
Black	66,590 (42,516)	41.84 (20.01)	6.38 (3.60)		
Pitchers	63,934 (54,301)		5.81 (3.50)	137.07 (158.34)	3.46 (.54)
White	64,098 (55,619)		5.87 (3.53)	137.95 (168.20)	3.46 (.55)
Black	62,816 (45,620)		5.42 (3.35)	131.10 (59.35)	3.49 (.51)

Sources: The compensation figures were received from a confidential source. The player statistics were taken from various baseball statistics books.

^aStandard deviations are in parentheses.

TABLE 3
 LOGARITHMIC REGRESSION RESULTS
 FOR HITTERS AND PITCHERS, 1976^a

Position and race	Constant	Performance measure	Years in the majors	Innings pitched per year in the majors	Adjusted R ² and degrees of freedom
Hitter	8.7266 (88.96)**	.4450Ln(R) (15.19)**	.3682Ln(Y) (10.71)**		.65 265
White	8.8835 (73.55)**	.4319Ln(R) (11.77)**	.2990Ln(Y) (6.90)**		.61 160
Black	8.3699 (48.35)**	.4802Ln(R) (9.51)**	.4987Ln(Y) (9.18)**		.72 102
Pitcher	10.1508 (32.61)**	-1.4064Ln(CERA) (-7.73)**	.4560Ln(Y) (10.90)**	.3678Ln(IP) (7.73)**	.68 144
White	10.2352 (30.24)**	-1.4195Ln(CERA) (-6.99)**	.4567Ln(Y) (9.86)**	.3520Ln(IP) (6.77)**	.66 125
Black	9.1475 (12.48)**	-1.1965Ln(CERA) (-3.11)**	.4425Ln(Y) (5.31)**	.5350Ln(IP) (4.97)**	.84 15

Sources: See Table 2.

^aSee text for explanation of the variables. The numbers in parentheses are t-statistics.

**Significant at the .01 level.

To examine the wage differentials between black and white players, we use Blinder's (1973) means-coefficients analysis. According to Blinder, the difference in the average compensation between two groups (T) can be decomposed into three parts: the portion attributable to differing endowments, E; the portion attributable to differing coefficients, C; and the unexplained portion, U, or the portion attributable to differing intercept terms. The amount of the wage differential attributable to discrimination, D, is said to equal C + U.

TABLE 4
 LINEAR REGRESSION RESULTS FOR
 HITTERS AND PITCHERS, 1976*

Position and race	Constant	Performance measure	Years in majors	Innings pitched per year in majors	Adjusted R ² and DF
Hitter	-2961.2346 (-.80)	1250.2746 (14.73)**	2957.62 (6.11)**		.58 265
White	4020.2848 (.85)	1260.0690 (10.98)**	1885.3024 (2.96)**		.52 160
Black	-15445.9000 (-2.58)**	1257.0218 (9.78)**	4614.1773 (6.45)**		.68 102
Pitcher	106766.66 (4.09)**	-26014.6800 (-3.75)**	6965.5334 (6.51)**	49.2681 (2.10)*	.33 144
White	109838.26 (3.81)**	-26447.7960 (-3.45)**	6751.3201 (5.69)**	44.1577 (1.79)*	.30 125
Black	24303.363 (.57)	-13712.440 (-1.29)	6180.2608 (3.53)**	403.3112 (4.00)**	.81 15

Sources. See Table 2.

*See text for explanation of the variables. The regressions were run in a simple linear format. The numbers in parentheses are t-statistics.

**Significant at the .01 level; *significant at the .10 level.

Using the results of the linear compensation regressions in Table 4 and Blinder's methodology, we have disaggregated the difference between average compensation levels for black and white players.⁷ Among hitters, blacks have a 20.5 per cent wage advantage over whites; among pitchers, whites have a 2.04 per cent advantage over blacks (see Table 5). The figures for hitters indicate that if blacks kept their same endowments and regression coefficients, but had the white intercept term, they would have enjoyed a 55.74 per cent wage advantage. A 27.18 per cent wage differential is attributed to blacks for their superior endowments; most of this amount is accounted for by the higher scoring average of the black hitters. A 28.74 per cent wage advantage in favor of blacks is attributable to the higher valuation of years in the majors for black hitters. However, given the same regression coefficients and endowments, whites would possess a 35.23 per cent wage differential over blacks due to the higher intercept term in the white regression. Overall, the analysis reveals that despite the higher mean compensation for black hitters, they still may be subject to some pay discrimination. The portion of the wage differential attributable to discrimination, however, is less than seven percentage points.

Among pitchers, whites have endowments slightly superior to blacks; a 6.58 per cent wage advantage in favor of whites is attributable to the edge

⁷We use the linear regressions' results because such a decomposition with a logarithmic format would have little interpretive value. If we used log-linear results, we would be analyzing the difference between the mean values of the natural logs of compensation. Since the mean of the natural logs of player compensation is not equivalent to the log of the mean of player compensation such an approach would be very confusing. Using the linear regression results yields wage differentials in whole dollar terms.

in endowments. However, the regression coefficients indicate that blacks hold a 140.79 per cent advantage over whites in the valuation of equal endowments. In particular, CERA and IP are valued higher for blacks by 70.76 per cent and 74.96 per cent, respectively. Again, however, the white regression has a higher intercept term. All else held constant, the higher intercept would account for a 136.17 per cent wage advantage for white pitchers. The portion of the wage differential attributable to discrimination is less than five percentage points and indicates discrimination against whites.

Overall, the results of the means-coefficients analysis for 1979 data reveal little or no evidence of pay discrimination against blacks. Furthermore, covariance analysis tests (see Johnston [1972] for details) of the regression coefficients across groups indicate that in only one case is there any difference, significant at the .01 level, between the black and white models. The test statistics show that the coefficient of years in the majors is significantly higher in the black hitter model. In all other cases, the null hypothesis that the coefficients for the black and white models are equivalent cannot be rejected.

Discussion

A recent article by Henry Raimondo (1983) also examines the topic of racial discrimination in pay in the major leagues. Using 1977 salaries collected from newspaper articles, Raimondo fails to find any statistically significant differences between the coefficients of black vs. white salary regres-

TABLE 5
ANALYSIS OF THE BLACK-WHITE WAGE DIFFERENTIAL
FOR HITTERS AND PITCHERS, 1976^a
(IN PER CENT)

Variable	Amount attributable	Amount attributable to endowments	Amount attributable to coefficients
Hitters			
R	-22.32	-22.50	+0.18
Y	-33.42	-4.68	-28.74
Subtotal	-55.74	E = -27.18	C = -28.56
Intercept	U = +35.23		
Total	T = -20.51	D = C + U = +6.67	
Pitchers			
CERA	-69.5	+1.26	-70.76
Y	+9.77	+4.84	+4.93
IP	-74.48	+ .48	-74.96
Subtotal	-134.21	E = +6.58	C = -140.79
Intercept	U = +136.17		
Total	R = +2.04	D = C + U = -4.62	

^a(+) indicates advantage for whites; (-) indicates advantage for blacks.

sions. These results support our 1976 findings.⁸ However, Raimondo draws some conclusions from his research which are questionable.

First, comparing the regression results for black free agent outfielders with those of both black and white nonfree agent outfielders, the author concludes that the free agent rule has enabled talented blacks to reduce the effects of racial discrimination in salary determination. Unfortunately, Raimondo lacks sufficient data to estimate a salary equation for white free agent outfielders. Therefore, his conclusion concerning the effects of free agency on pay discrimination seems unwarranted. His results do support our conclusion that the compensation determination models of free agents were significantly different from those of nonfree agents in 1977 (see Hill and Spellman, 1983); free agents apparently received higher compensation than did comparable nonfree agents.

Second, Raimondo's study implies that the changes in the reserve clause enacted before the 1977 season are responsible for the limited evidence of racial discrimination in pay. The 1976 compensation data used here pre-date the enactment of the reserve clause, but reflect no consistent evidence of pay discrimination. Therefore, if pay discrimination existed in the late sixties, as Scully (1974) suggests, it may have largely disappeared before the introduction of free agency.

Overall, the evidence from our investigation and from Raimondo's provides little support for the hypothesis of wage discrimination in major league baseball in the late seventies. Tests of the equivalence of regression coefficients across the black and white samples in our study found only one statistically significant difference between groups and that favored blacks. Similarly, our analysis does not confirm the existence of racial barriers to entry in the majors.

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⁸We also had 1977 compensation figures and performed the same analysis as presented here for 1976. The results for 1977 were essentially the same.

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