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Professional Baseball: The Reserve Clause and Salary Structure

IN JULY 1976, a new Basic Agreement between the American and National Leagues and the Major League Baseball Players Association (MLBPA) took effect. This agreement was the direct result of a grievance arbitration decision won by the MLBPA on behalf of two players who worked the 1975 season with unsigned contracts, and an indirect result of years of discontent among players over the existing reserve (i.e., contract renewal) system.[1] The new basic agreement has had a marked impact on the baseball industry. A report from the Commissioner of Baseball shows that the average player's salary rose from $51,501 in 1976 to $76,349 in 1977, the first year the new reserve system was in effect. Moreover, the number of multiyear contracts has increased significantly with the implementation of the new reserve system.

This article focuses on the recent changes in the compensation structure of professional baseball due to the agreement's alterations in the reserve clause.[2] The scope of the analysis is limited to the period 1976-1977. In 1977, the first free agent market was conducted under the new reserve system and the majority of major league players had an opportunity to test the market. Here we examine the effects of the revised system on the length of player contracts and average compensation levels; develop compensation determination models for professional baseball players in 1976 and 1977; and analyze the extent of changes in the compensation determination models from 1976 to 1977. Our results show that the new reserve clause increased the number

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[1]Formed in 1952, the Major League Baseball Players Association was originally dominated by team owners. The MLBPA began to take on the appearance of a union in 1966 when Marvin Miller, the present leader, took over as president. In 1968, the MLBPA negotiated the first of a series of "basic agreements" with the two major leagues concerning a broad range of issues.

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of multiyear contracts; that free agents in 1977 received higher levels of compensation than nonfree agents of similar ability and experience; and, lastly, that pay was, overall, more positively correlated with performance in 1977 than in 1976.

Historical Background

Prior to the 1976 agreement, a player was a free agent until he signed his first contract with a major league team or its minor league farm system affiliate. Bidding for these players' services could be undertaken by any and all baseball clubs. The contract each player signed was a one-year (unless otherwise specified) "uniform contract," the details of which were specified by organized baseball (see the Baseball Blue Book, 1955). The most crucial feature of this uniform contract was the renewal clause, popularly known as the reserve clause.[3] The clause allowed the team to renew the player's contract for the next season at a salary fixed by the club, but not less than 75 per cent of the player's current salary. Thus, once a player was signed by a club, his services became the sole property of that club for his entire stay in organized baseball, unless his contract was sold or traded to another club. If sold or traded, the player's services then became the property of his new club, and he was obligated to join the new team.

Player options under this system were restricted. If a player was dissatisfied with his salary, wanted to be traded to another team, or did not want to be traded, his only available form of protest was to withhold his services. Often, the only result of this action was the player's loss of salary during the holdout time.[4] Players did receive some individual negotiation privileges when, following a 1972 player strike, a new agreement was reached between the MLBPA and the owners. Under the terms of the 1973 basic agreement, a player's salary dispute with a club was resolved by a neutral arbitrator using final-offer arbitration. Also in the new pact was a provision which prohibited a club from trading a ten-year veteran (who had been with his present club at least five years) without his consent. Although these measures were a significant step toward greater player freedom, the essence of the reserve system remained.

[3]The reserve clause received its name because clubs originally were allowed to reserve a certain number of players who could not be contracted by other teams. The number of "reserved" players grew from five to 40 over the years.

[4]In 1969, Curt Flood tested the legality of the reserve clause by refusing to report to the Philadelphia Phillies after the Saint Louis Cardinals sold his contract to that club (see Fimrite, 1980). Furthermore, Flood filed suit against Bowie Kuhn, the Commissioner of Baseball, in January 1970, charging that the reserve clause was in violation of U.S. anti-trust laws. Flood lost the case when the U.S. Supreme Court supported a lower court ruling against Flood and held that anti-trust laws did not apply to baseball. After not playing major league baseball for the 1970 season, uncompensated, Flood was allowed to return as a free agent.

The strike which led to the agreement (and an earlier boycott of spring training in 1969)[5] did, however, indicate the growing unity and force of the players' union.

On December 23, 1975, the old reserve clause was finally eliminated. Arbitrator Peter Seitz, ruling on a grievance brought by the MLBPA on behalf of Andy Messersmith and Dave McNally, stated that since those players had played one year without a contract, they should be declared free agents (see Fimrite, 1980). An appeal to the courts by the owners in February 1976 was unsuccessful. With the old reserve system rendered ineffective and the basic agreement between MLBPA and owners due to expire on December 31, 1975, negotiations began on a new reserve clause. In July 1976, a new basic agreement was reached.

Under the new pact, players are no longer permanently tied to a team. For contracts signed before August 9, 1976, the club can renew for one additional year after the expiration of the contract.[6] Then, if the player is still unsigned, he becomes a free agent. For contracts signed on or after August 9, 1976, any player with six or more years of major league service at the end of his contract date may become a free agent merely by giving notice to the MLBPA.

Total Compensation Levels and Length of Player Contracts

The impact of the agreement on player compensation has been substantial. On a minor note, it raised the minimum salary from $16,000 in 1975 to $19,000 for the 1976 and 1977 seasons and $21,000 for the 1978 and 1979 seasons. The real influence of the agreement, however, is measured in terms of its effect on average total compensation. We calculated total compensation figures for a salary sample of 1,183 observations, 660 of which are for 1977 salaries and 523 for 1976. All of the players in the 1976 sample appear in the 1977 sample. The compensation adjustments, as well as the players' actual salaries, were received from a confidential source, and thus no salary or compensation figures are mentioned for an individual player by name.[7]

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[5]In 1969, 125 players boycotted spring training as the MLBPA sought to increase pension benefits for players. An agreement was later reached in 1970 and pension funds were substantially increased. For details, see the "Basic Agreement . . ., Effective January 1, 1970." The 1972 strike was also primarily concerned with players' pension benefits. For details of the settlement, see the "Basic Agreement . . ., Effective January 1, 1973."

[6]This additional year is called the option year. The player must accept a salary reduction if management desires to impose it. The agreement restricts the maximum allowable salary reduction to 20 per cent of the player's previous year's salary or 30 per cent of his salary two years previous.

[7]The validity of these figures rests on an assurance that the data were obtained from the players' actual contracts. Items included in some contracts but not included in this study in terms of total compensation are: (1) single rooms on the road; (2) interest on deferred salary to be paid at the end of the contract rather than yearly; (3) deferred salary based on performance after the contract year; (4) salary guarantee provisions; (5) no-trade provisions; and (6) individual gratuities, such as college education for children, maid service, mortgage payments if the player dies, and expense accounts over the collective minimum contract.

Total compensation was determined as follows: first, signing bonuses and deferred salary were averaged over the length of the player's contract and added to the salary figures for each year. Thus, a $100,000 bonus for signing a five-year contract accounted for $20,000 a year in extra compensation, which was discounted at 10 per cent to obtain the present value. Second, money paid directly to the player's agent was counted as compensation for only the first year of the contract. Third, since some clubs agreed to pay a player or his estate $25,000 per year for 25 years commencing the year following termination of his active major league playing career, the present value of this sum was calculated and adjusted for a 10 per cent rate of yearly inflation. The result was then divided by the length of the contract and added to the player's total compensation. Fourth, loans from the club to the player, that were forgiven by the club, were divided by the length of the contract and counted as compensation. Fifth, air fares included in contracts for a player's family were estimated at prevailing rates. Sixth, bonuses for high levels of home attendance were added to a player's compensation in the year they were earned. Lastly, insurance policies were calculated as compensation over the length of the player's contract.

According to our data, average player compensation, salary plus the fringe benefit adjustments outlined above, was $54,330 in 1976, and $77,292 in 1977. This represents a 42 per cent increase in average compensation in a one-year period. The Consumer Price Index rose by only 6.5 per cent for the same period. Apparently, the changes in the reserve system improved the competitiveness of the market and therefore increased average compensation.

Multiyear contracts. The alterations in the reserve system produced another significant transformation in the players' labor market: the appearance of multiyear contracts. Prior to the 1976 season, multiyear contracts were extremely rare. In fact, in 1975, the only multiyear contract was Catfish Hunter's pact with the New York Yankees.[8] Club owners have always been able to sign players to multiyear contracts by adding a special covenant to the uniform contract, as was done in Hunter's case, but prior to 1976, clubs had no need to do so. The reserve clause guaranteed that a player could be retained until the club desired to terminate the contract or sell or trade it to another franchise. Under those conditions, a multiyear contract would have been wasteful if a player's performance level dropped significantly over the length

[8]Hunter's contract was the result of an arbitration decision concerning a dispute between Hunter and the Oakland Athletics' owner, Charlie Finley. The major league arbitrator ruled that Finley had breached Hunter's 1974 contract; therefore, Hunter was declared a free agent in 1975. The competition for this star pitcher caused many owners to offer him a multiyear contract. Eventually, he signed a five-year pact with the Yankees.

of the contract or if the player suffered a severe injury. Therefore, under the old reserve system, baseball management preferred to negotiate salaries annually.

With Seitz's ruling on the Messersmith and McNally arbitration cases, owners and players alike recognized the imminent downfall of the old reserve rule. Anticipating the changes, some owners signed players to multiyear contracts before the 1976 season—in all, 57 players signed such pacts, 36 hitters and 21 pitchers. Of these 57 contracts, 26 were for two years, 18 for three years, 7 for four years, and 6 for five years.

The 1977 season was preceded by baseball's first free-agent re-entry draft. All the re-entry players had played the 1976 season without a signed contract and were thus able to declare free agency status following the 1976 season. Here we include compensation figures for 22 of these free agents: 16 hitters and 6 pitchers.[9] The rest of the major league players, except those who signed multiyear contracts in 1976, faced the prospect of playing out their options in 1977 and declaring free agency at the end of the season. Undoubtedly this influenced the number of multiyear contracts signed in 1977. In all, 281 players, including free agents, signed contracts of more than one year. Of these contracts, 111 were for two years; 105 for three years; 21 for four years; 33 for five years; 10 for six years; and 1 for ten years. Of the free agents' contracts, 14 were for five years or more (under the terms of the 1976 agreement, once a player becomes a free agent, he cannot become eligible for free agency again until he completes five additional years of service).

The data in Table 1 suggest that average compensation generally rose with the length of the contract. Apparently, in 1976 and 1977 clubs mainly sought to sign higher-salaried or star players to multiyear contracts. In many cases, it appears that management was trying to dissuade players from turning free agent. In other cases, clubs sought to lure free agents to their franchise with the security of a long-term contract and high salary.

The Compensation Models

In order to discern more precisely the effects of the change in the reserve system, we searched for a useful model of compensation determination. Many different variables and combinations of variables were tried as well as different formats. We initially ran regression models which assumed a simple linear relationship. We next tried estimating the regressions logarithmically, following Scully (1974b) and Medoff (1976). The use of logarithmic

[9]Of these 16 hitters, only 15 appear in the free-agent hitter regression. Eric Sonderholm, who signed as a free agent in 1977, had not played the 1976 season due to injury. The logarithmic format of the model removed him from the free-agent sample.

TABLE 1

1976 AND 1977 AVERAGE COMPENSATION BY LENGTH OF CONTRACT

Length of contract	1976[a] Average compensation Hitters	Pitchers	Number of observations Hitters	Pitchers
1 year	$ 49,443	$ 47,259	288	177
2 years	82,183	80,077	18	8
3 years	102,222	146,250	9	8
4 years	99,000	88,333	4	3
5 years	157,000	165,000	5	1
Length of contract	**1977[b] (excluding free agents) Average compensation Hitters**	**Pitchers**	**Number of observations Hitters**	**Pitchers**
1 year	$ 40,450	$ 36,195	185	130
2 years	62,796	66,545	68	42
3 years	97,234	105,190	69	35
4 years	155,000	123,666	9	12
5 years	204,366	172,545	15	11
6 years	265,250	——	4	—
Length of contract	**1977 (free agents only) Average compensation Hitters**	**Pitchers**	**Number of observations Hitters**	**Pitchers**
1 year	$ 55,875	$ 65,000	5	1
2 years	39,000	——	1	–
3 years	200,000	——	1	–
5 years	379,360	261,500	5	2
6 years	248,438	263,000	4	2
10 years	——	333,500	–	1

[a]Andy Messersmith and Catfish Hunter were excluded from the 1976 observations. Hunter was excluded because he had a contract in progress in 1976; Messersmith was excluded because he signed a three-year contract as a free agent in 1976.

[b]The observations exclude all players who signed multiyear contracts prior to the 1976 season.

format significantly improved the results of the models tested in all cases, regardless of the variables included or the data sample employed. There are two possible reasons, in addition to those offered by Scully,[10] why the logarithmic form improved the model's fit or R^2. When the logarithmic format was applied to a model, all observations were deleted in which one of the logged independent variables equaled zero. Most of the players omitted from the models in this fashion were rookies making the minimum league salary. Thus, the logarithmic format improved the R^2 by: (1) dropping observations where little or no information was present; and (2) eliminating these players' small compensations which were responsible for lowering the sample mean.

The specific variables forming our model fall into four categories: (1) past performance indicators; (2) experience measures; (3) information about the

[10]Scully (1974b, p. 926) explained his use of logarithms by noting that "the stars and the superstars command salaries apparently in excess of their relative contribution to the team. This introduces a nonlinearity into the salary equations. The nonlinearity may be explained by the greater bargaining strength of these players. There are very few substitutes for star players. Alternatively, the marginal revenue products of star players may be higher than their performance would strictly warrant."

player; and (4) information about the player's contracting team. Studies by Pascal and Rapping (1972), Scully (1974a, 1974b), and Medoff (1976) were particularly useful in suggesting appropriate variables.

Hitters. First, an attempt was made to measure the offensive contribution of hitters. Four past performance indicators (drawn from the studies cited above) were tried initially: career batting average; career slugging average; average career runs scored per year; and average career runs batted in per year.[11] Although all the measures proved highly significant, their pairwise correlation prevented the use of more than one. In the absence of any a priori theory for choosing among them, average career runs scored per year was chosen because it was slightly more significant than the others.

In order to supplement this single performance measure, a variety of dummy variables were added to capture the additional effect of an outstanding or above-average season. Only two were significant: (1) being among the top 15 finishers for the batting championship the previous season (equal to 1) and (2) being selected for the all-star team the previous season (equal to 1).

Many players had low career runs scored averages because they spent much time on the bench before obtaining a starting position. Their career runs scored average would not reflect this transition immediately. On the other hand, some players were injured for part of the previous season and this could have affected their subsequent salaries by more than just the lowering of their career runs scored averages. To account for these effects, the player's number of at-bats the previous season is included in the hitter compensation model. (Pascal and Rapping [1972] include this variable in their model as well.)

The hitter model includes no defensive performance variables because none proved statistically significant. While fielding is not unimportant to an individual hitter's compensation, it is generally true that players must satisfy some minimum levels of defensive ability before being seriously considered for promotion to the major leagues. Thus, variations in fielding percentages and errors were small for players who performed regularly, and defense did not have a distinguishable effect on player compensation. This is consistent with the previous findings by Pascal and Rapping (1972).

Likewise, the model does not include any indicator for a hitter's race. Although two dummy variables were tried (one for Latin American players

[11]Some different forms of these variables were also tried. For example, the career statistics were lagged two years and the previous season performance was entered separately. However, the simple career statistics proved more significant.

and one for black players), neither proved significant.[12] Of course, the insignificance of the racial dummy variables does not mean that racial discrimination in compensation did not exist. Conclusive evidence would necessitate estimating separate salary regressions for different racial groups, a project beyond the scope of this study. The final player variable included was years in the majors (following Scully [1974a, 1974b] and Medoff [1976]), to capture experience.

The hitter model also contains two team information variables. Medoff (1976) found the coefficient of a dummy variable for National League teams to be positive and significant. Although Scully (1974b) found the coefficient of such a dummy variable insignificant, we include it here. In most cases, it is significant (exceptions are noted later). Secondly, since teams bargain individually with each player, a team's financial position is important. Scully (1974b) used the size of the metropolitan area of the team and a variable supposedly capturing the intensity of fan interest in an attempt to discern the effect of the revenue generating ability of the team on player compensation. Here, we use the previous season's home attendance to account for the financial outlook of the team.[13]

These variables form the following compensation equation:

$$(1)\ \ln TC_t = \alpha_1 + \alpha_2 \ln Y + \alpha_3 \ln CRPY + \alpha_4 \ln AB_{t-1} + \alpha_5 \ln ATTEN_{t-1} + \alpha_6 NL + \alpha_7 AS_{t-1} + \alpha_8 BC_{t-1} + u_1$$

where TC_t = total compensation for season t;

Y = the hitter's years in the majors prior to season t;

$CRPY$ = the hitter's average career runs scored per year, prior to season t;

AB_{t-1} = the hitter's at-bats in season t-1;

$ATTEN_{t-1}$ = the attendance of the hitter's team in season t-1;

NL = a dummy variable for National League teams;

AS_{t-1} = a dummy variable for all-stars in season t-1;

BC_{t-1} = a dummy variable for hitters in the top 15 finishers for the batting crown in season t-1;

[12] Pascal and Rapping (1972) used two similar dummy variables in their study. They found that the coefficient of the Latin American variable was significant and indicated lower pay for hitters of Latin American heritage but the coefficient of the black variable was insignificant. Scully (1974a) estimated separate salary regressions for black and white players and found evidence of salary discrimination among black hitters.

[13] Attendance seems to be a good indicator of a team's revenue-generating ability, but the addition of Toronto and Seattle to the American League in 1977 presented a problem since these teams did not have any attendance the previous year. Therefore, players from these teams were dropped from the 1977 hitter sample.

and

u_1 = a random disturbance term assumed to be normally distributed with:
$E(u_1) = 0$
$E(u_1^2) = \sigma^2_{u_1}$
$E(u_1 u_x) = 0$ for $\times \neq 1$.

Pitchers. As with the hitter model, past studies guided the selection of a career performance measure for pitchers. Career earned-run average (Medoff, 1976), career strikeout-to-walk ratio (Scully 1974a, 1974b), and career games won (Pascal and Rapping, 1972) each proved highly significant. The pairwise correlation between these terms prevented the use of more than one of them. Career earned-run average was chosen because it had the highest level of significance.

To weight the career earned-run average performance measure, career innings pitched per year was added to the model. This variable proved to be more significant than games pitched per year, because innings pitched per year separated starters from relief pitchers. (Similar weighting terms can be found in past studies.) As with hitters, dummy variables reflecting the previous season's performance are included to supplement the performance measure. These are (1) making the all-star team the previous season (equal to 1); (2) finishing among the top 15 contenders for the lowest earned-run average the previous season (equal to 1); and (3) placing among the top 15 relievers in games the previous season (equal to 1).

The number of innings pitched in the previous season is included to account for injuries to pitchers, as well as players who moved up from substitute or relief pitching roles to starting roles. (Pascal and Rapping [1972] used a similar variable.) And, following Scully (1974a, 1974b), Medoff (1976), and Pascal and Rapping (1972), years in the major leagues is used as the experience measure.

Dummy variables for Latin American players and blacks were tested, but proved insignificant and were therefore dropped. As with the hitter model, these results do not conclusively indicate a lack of discrimination.[14] Also dropped for reasons of insignificance was a dummy variable for National League teams.[15] Finally, the home attendance of the team the previous season did not have

[14] Using dummy variables, Pascal and Rapping (1972) found evidence that blacks received higher salaries than whites for pitching, but noted that this finding is quite sensitive to the model specification. They found no statistically significant evidence that Latin American heritage affected pitchers' salaries. Comparing the coefficients of separate salary regressions for black and white pitchers, Scully (1974a) could not draw any definite conclusions about the presence of salary discrimination among black pitchers.

[15] Scully's (1974b) National League dummy variable was similarly insignificant, but Medoff's (1976) did achieve significance.

a significant influence on pitcher compensation, nor did other measures designed to capture the club's revenue-generating ability.

The pitcher compensation model is:

$$(2) \quad \ln TC_t = \beta_1 + \beta_2 \ln Y + \beta_3 \ln CERA + \beta_4 \ln CIPPY + \beta_5 \ln IP_{t-1} + \beta_6 AS_{t-1} + \beta_7 LERA_{t-1} + \beta_8 SV_{t-1} + u_2$$

where TC_t = the pitcher's total compensation for season t;

Y = the pitcher's years in the majors prior to season t;

CERA = the pitcher's career earned-run average prior to season t;

CIPPY = the pitcher's average career innings pitched per year, prior to season t;

IP_{t-1} = the pitcher's innings pitched in season t-1;

AS_{t-1} = a dummy variable for all-stars in season t-1;

$LERA_{t-1}$ = a dummy variable for the top 15 finishers for the lowest earned-run average in season t-1;

SV_{t-1} = a dummy variable for the top 15 relief pitchers in number of saves for season t-1;

and

u_2 = a random disturbance term assumed to be normally distributed with:

$E(u_2) = 0$

$E(u_2^2) = \sigma^2_{u_2}$

$E(u_2 u_x) = 0$ for $x \neq 2$.

Empirical Results

In addition to the regression equations presented here, covariance analysis was performed (see Johnston, 1960; Fischer, 1970) to test for evidence of significant changes in the regression coefficients between the 1976 and 1977 equations. Covariance was also used to help decide if free agents represented a separate class of players in terms of compensation determination in 1977. In the interest of brevity, most of the regression equations used in the covariance analysis and the calculation of the F-statistics are not shown, but are available from the authors upon request.

It should also be noted that the data sets used to calculate the regression equations are not random samples, but represent instead either the entire population or a restricted population. Therefore, the estimation technique might best be termed a curve-fit. (Restrictions of the populations are noted where appropriate.)

TABLE 2

REGRESSION RESULTS FOR HITTERS: 1976–1977*
(T-VALUES ARE IN PARENTHESES)

Independent variables	Dependent variable Eq. (1) $\ln TC_{1977}$ (Dummy variable for free agents)	Eq. (2) $\ln TC_{1977}$ (Free agents only)	Eq. (3) $\ln TC_{1976}$	Eq. (4) $\ln TC_{1977}$ (No free agents)
Constant	5.87 (6.16)**	7.75 (1.24)	7.44 (11.22)**	6.56 (7.00)**
lnCRPY	.36 (7.42)**	.39 (1.27)	.24 (6.49)**	.37 (7.80)**
lnY	.24 (5.68)**	-.24 (-0.72)	.34 (11.48)**	.26 (6.23)**
$\ln AB_{t-1}$	.11 (2.95)**	.37 (1.60)	.07 (2.28)*	.09 (2.44)*
$\ln ATTEN_{t-1}$	.21 (3.07)**	.11 (0.24)	.11 (2.35)*	.16 (2.42)*
NL	.11 (2.04)*	-.45 (-1.33)	.03 (0.80)	.15 (2.88)**
AS_{t-1}	.43 (4.76)**	-.32 (-0.64)	.38 (5.56)**	.35 (3.64)**
BC_{t-1}			.33 (4.65)**	.36 (3.22)**
FA_{1977}	.80 (7.07)**			
R_a	.70	.80	.76	.69
Degrees of freedom	242	8	269	227

*Significant at the .05 level; **significant at the .01 level.

*See text for the population restrictions for each regression. Player statistics were obtained from baseball statistical record books.

1977 free agents. Free agents would seem to be placed in a separate salary category, for they are allowed to negotiate with half the teams in the major leagues plus their former clubs. Players who are not free agents are allowed to negotiate their salary or compensation with only one club. Economic theory implies that the added competition for the free-agent players should drive their salaries above levels received by comparable players who are not free agents (see Rottenberg, 1956). When we tested this hypothesis using 1977 total compensation figures for hitters, the covariance analysis results suggested that free-agent hitters faced a different compensation model, with a different, higher intercept and a different set of slope coefficients than did other hitters (see Table 2). The individual tests of the coefficients did not reveal any signs of significant change among the variables. Presumably the low degrees of freedom hampered the covariance analysis of the individual coefficients.

Equation 1 in Table 2 indicates that free-agent hitters received more pay in 1977 than did other comparable players. In equation 1, FA_{1977} is a dummy

variable equal to one for players who were free agents prior to signing a contract for the 1977 season. The other variables are the same as defined previously; BC_{t-1}, the dummy variable for batting championship contenders, was dropped because none of the 15 free agents was a contender. The coefficient of FA_{1977} in equation 1 is positive and highly significant. Furthermore, the coefficient of FA_{1977} was highly significant in all the models tested regardless of the variables chosen or the functional form utilized.

The evidence strongly indicates that the free-agent hitters should be treated as a separate class of players in the determination of their compensation. Therefore, the compensation figures of 15 hitters who signed as free agents in 1977 were used to estimate equation 2 in Table 2. While the R^2 is high (.80), none of the coefficients of the variables is significant at a commonly acceptable level because of the limited degrees of freedom.

Free-agent pitchers also seem to have faced a different compensation model, with a higher intercept term, in 1977 than did other pitchers. The small sample size (six) prevented a test for a common set of slope coefficients and tests of the coefficients of the individual variables. Given the limited number of free-agent pitchers, no model devoted exclusively to estimating their compensation was constructed. Instead, these six observations were added to the other 1977 observations and a dummy variable, FA_{1977}, equal to one for those pitchers who signed as free agents, was added to the model. The results of this regression are shown in equation 1 of Table 3. Note that the coefficient of FA_{1977} is positive and highly significant. Again, the coefficient of FA_{1977} was highly significant in all alternative specifications of the model. However, as with the free-agent hitters, the limited number of observations hinders the determination of more detailed compensation differences. To adequately examine the free-agent market for both hitters and pitchers, more observations would have to be obtained from later years.

1976 and 1977 nonfree agents. All major league players in 1976, except those who signed multiyear contracts prior to the 1976 season, either turned free agent after the 1976 season or had the chance to play out their options in 1977 and then turn free agent. It seems likely that the threat of playing out their options would place players in a stronger bargaining position prior to the 1977 season as compared to the previous year. We tested this hypothesis with information provided from covariance analysis and a comparison of the separate regression equations for 1976 and 1977.[16]

[16]Many of the same players appear in both the 1976 and 1977 samples. Theoretically, the error terms for the same player's compensation estimation in the two years should be correlated. To correct for this correlation, a generalized least squares model could have been used. However, this estimation procedure would not have left any degrees of freedom for the intercept test or individual slope parameter tests of the covariance analysis. Therefore, it was deemed best to use the ordinary least squares estimators, perform the covariance analysis, but note that the results may be of questionable validity.

To obtain a homogeneous group of observations in both years, the following groups of players were deleted: (1) those playing out their options in either 1976 or 1977; (2) free agents in 1976 or 1977; and (3) players in the second year of a multiyear contract. The players playing out their options had their contracts automatically renewed subject to a 20 per cent salary cut. Players in the second year of a multiyear contract in 1977 had bargained for their 1977 salaries in advance of the 1976 season. Deleting these two groups restricted both the 1976 and the 1977 samples to players who had negotiated and signed a contract prior to the respective season. Dropping free agents from the 1977 sample has already been discussed. The logarithmic format of the models automatically removed players who had zeros for one of the independent variables of which the log was taken. This included all rookies in 1976 and 1977, any players who did not play the preceding season, and hitters with Seattle or Toronto in 1977 (these teams had no 1976 attendance figures).

These restrictions narrowed the sample populations used in the models to 277 observations for the 1976 hitter regression (equation 3, Table 2) and 235 observations for the corresponding 1977 hitter regression (equation 4, Table 2). For pitchers, the 1976 regression contained 165 observations and the 1977 regression contained 151 observations. The 1976 pitcher regression is equation 2 in Table 3; the 1977 pitcher regression is equation 3 in Table 3. Information about the ranges, means, medians, and standard deviations of all the samples used for the regression equations are available from the authors.

For both hitters and pitchers, the intercept term (and t-value) are lower in the 1977 regression than they are in the 1976 version, and the difference in the intercept terms is statistically significant (as demonstrated in the covariance analysis). For hitters, the coefficient and t-value of lnCRPY, career runs scored per year, rose from 1976 to 1977; for pitchers, the coefficient and t-value of lnCERA, career earned-run average, decreased from 1976 to 1977. Also, both the coefficient and t-value of lnCIPPY, career innings pitched per year, increased from 1976 to 1977. These data suggest that career performance had a larger impact on compensation and explained more of the variation in compensation in 1977. (In the covariance analysis, the coefficient of lnCRPY emerged as significantly different between the 1976 and 1977 models, but the coefficients of lnCERA and lnCIPPY did not show signs of significant change.) The coefficient of lnY, years in the majors, and its t-value diminished substantially from 1976 to 1977 for both hitters and pitchers. This suggests a lessening of seniority-based compensation as the more competitive 1977 market realigned pay and performance relative to the 1976 monopsonistic market wage structure. (The results of the covariance analysis indicated that

TABLE 3

REGRESSION RESULTS FOR PITCHERS: 1976–1977[a]
(T-VALUES ARE IN PARENTHESES)

Independent variables	Dependent variable Eq. (1) $\ln TC_{1977}$ (Dummy variable for free agents)	Eq. (2) $\ln TC_{1976}$	Eq. (3) $\ln TC_{1977}$ (No free agents)
Constant	9.66 (27.05)**	9.93 (40.92)**	9.57 (27.32)**
lnCERA	−.87 (−4.33)**	−.51 (−3.73)**	−.80 (−4.07)
lnY	.19 (3.28)**	.43 (9.85)**	.19 (3.26)**
lnCIPPY	.35 (5.04)**	.18 (2.46)*	.35 (5.23)**
$\ln IP_{t-1}$	.12 (2.08)*	−.01 (−0.14)	.11 (2.03)*
AS_{t-1}	−.02 (−0.17)	.31 (2.49)*	−.05 (0.35)
$LERA_{t-1}$	.37 (3.42)**	.25 (2.64)**	.39 (3.43)**
SV_{t-1}	.45 (3.98)**	.22 (1.97)*	.49 (4.19)**
FA_{1977}	.65 (3.88)**		
R^2	.70	.70	.69
Degrees of freedom	148	157	143

*Significant at the .05 level; **significant at the .01 level.

[a]See text for the population restrictions for each regression. Player statistics were obtained from baseball statistical record books.

the coefficient of lnY is significantly different from 1976 to 1977 for pitchers but not for hitters.)

Table 4 illustrates the effects of the differing intercepts and sets of slope coefficients in the 1976 and 1977 models (excluding free agents). The logarithmic estimates are converted to standard, whole numbers. The performance levels and their classification ratings are based on observed levels of play during the period in question. Finally, the estimates of hitter and pitcher compensation in the table were subject to a variety of restrictions.[17] When comparing the

[17]For hitters: (1) the years of experience was held constant at five; (2) the National League dummy variable was set equal to one; (3) team attendance was set equal to 1,380,000 in 1975 and 1976; (4) the batting championship dummy variable was set equal to zero; (5) at-bats the previous season was set equal to 250 for levels of CRPY from 20 through 40, 400 for levels of CRPY from 50 through 70, and 550 for levels of CRPY from 80 through 110; (6) the all-star dummy variable was set equal to one for levels of CRPY of 80 and up.

For pitchers: (1) the years of experience was held constant at five; (2) the dummy variable for leaders in saves the previous season was set equal to zero; (3) for levels of CERA from 4.4 through 3.8, CIPPY and IP_{t-1} were set equal to 145, and AS_{t-1} and $LERA_{t-1}$ were set equal to zero; (4) for levels of CERA from 3.5 through 3.2, CIPPY and IP_{t-1} were set equal to 205, and AS_{t-1} and $LERA_{t-1}$ were set equal to zero; (5) for levels of CERA from 3.0 through 2.4, CIPPY and IP_{t-1} were set equal to 260, and AS_{t-1} and $LERA_{t-1}$ were set equal to one.

TABLE 4

ESTIMATED COMPENSATION FIGURES
BY PERFORMANCE LEVELS FOR 1976 AND 1977

Hitters:[a]

Performance		Estimated compensation		
Classification	Career runs per year	1976	1977	Per cent change
Below average	20	$ 43,395	$ 59,682	37
Below average	30	47,830	69,342	45
Below average	40	51,249	77,131	50
Average	50	55,877	87,388	56
Average	60	58,376	93,487	60
Average	70	60,576	98,974	63
Star	80	93,526	151,855	62
Star	90	96,207	158,619	65
Star	100	98,671	164,924	67
Star	110	100,954	170,844	69

Pitchers:[b]

Performance			Estimated compensation		
Classification	Career ERA	Innings pitched	1976	1977	Per cent change
Below average	4.4	145	$ 44,913	$ 58,677	31
Below average	4.2	145	45,991	60,902	32
Below average	4.0	145	47,150	63,326	34
Below average	3.8	145	48,400	65,979	36
Average	3.5	205	53,533	82,633	54
Average	3.4	205	54,331	84,572	56
Average	3.3	205	55,164	86,616	57
Average	3.2	205	56,037	88,775	58
Star	3.0	260	105,565	146,505	39
Star	2.8	260	109,346	154,819	42
Star	2.6	260	113,557	164,275	45
Star	2.4	260	118,289	175,138	48

[a]These are derived from regression results of equations 3 and 4 of Table 2.
[b]These are derived from the regression results of equations 2 and 3 of Table 3.

compensation estimates for 1976 and 1977 for the same level of performance, everything is held constant except the coefficients of the variables and the intercept terms of the models. The figures in Table 4 indicate that the compensation of comparable players was much higher in 1977 than in 1976. Also, in general, the percentage differences between the 1977 and 1976 estimates increase with the level of performance.

One notable exception in Table 4 is the percentage change in compensation for pitchers which falls substantially from average to star performance levels. An explanation may be found in money illusion by the star pitchers and their agents.[18] Due to the magnitude of the absolute salary increase compared to the traditional compensation levels under the old reserve system, the true market value of the exceptional pitcher may have been underestimated. With

[18]This finding of money illusion is sensitive to the specification of the model. In particular, if the model is run in a simple linear format, there is no evidence of money illusion.

additional time to adjust expectations to the new market conditions, this relative wage compression would likely be corrected. Overall, however, the data in Table 4 indicate that pay was more positively related to past performance in 1977 than in 1976. All the players in the 1977 sample could have chosen to play out their options. It seems reasonable to assume, therefore, that owners were more anxious to please their star or above-average performers in order to persuade them not to play out their options.

Conclusions and Implications

Our analysis of the effects of the new reserve system on the length of player contracts and player compensation lead to the following conclusions: (1) changes in the reserve clause caused a substantial rise in multiyear contracts, particularly for higher-salaried players with above-average ability; (2) the compensation determination models of free agents were significantly different from those of nonfree agents in 1977. Free agents in 1977 apparently received higher pay than did players with comparable ability and experience; (3) evidence suggests that the compensation determination models of hitters and pitchers were different in 1977 from those in 1976. In general, pay was more positively correlated with past performance in 1977. Also, the evidence indicates that seniority-based compensation was lower in 1977 than in 1976, particularly for pitchers.

These conclusions imply the existence of a dual labor market for professional baseball players in 1977—one for free agents and one for the remaining players. Moreover, the presence of structural change in the compensation model from 1976 to 1977 implies that a three-tier pay scale could emerge in later years. Recall that all major league players, except those who signed multiyear contracts in 1976, could have played out their options in 1977. Therefore, they negotiated their 1977 salaries using the threat of free agency to enhance their bargaining power. The results indicate that this threat did indeed gain players a higher pay scale in 1977. Players coming into the leagues after 1977, however, will have to wait six years before they can declare free agency. Without the threat of free agency, players in the first five years of major league service will obviously be at a disadvantage at the bargaining table. Their salaries should reflect this fact and conform to a separate, lower pay scale.

Furthermore, as long as competition for free agents remains high, these players should receive more pay than those who only threaten free agency. If it is assumed that players threatening to become free agents base their salary demands on the remuneration of free agents the previous season, the start of an upward wage spiral can be seen. The rumored salaries of professional

baseball players since the first free agent market in 1977 lend credence to this hypothesis.

Club owners seem worried about the upward wage spiral. When the 1976 basic agreement expired at the end of 1979, the owners sought changes in the new reserve system. In particular, they demanded additional compensation for the loss of a premier free agent. Under the terms of the 1976 agreement, a team losing a free agent was compensated with an amateur draft pick from the free agent's new club. Club owners proposed that the team losing the premier free agent be allowed to select a player from the free agent's new club, provided the latter could reserve 15 players from the selection (see Fimrite, 1980). The owners argued that the added compensation measure would slow the rapid rise in player salaries and boost the profits of many clubs in financial trouble. The Major League Baseball Players Association steadfastly opposed the owners' proposal on the grounds that the revised compensation plan would limit the mobility of many players. The players maintained that few teams would be willing to risk losing valuable replacements or potential star rookie players to obtain some veteran free agents (Fimrite, 1980).

The negotiations for the 1980 basic agreement reached an impasse over this free agent compensation issue. Players threatened to strike if the owners pressed for the revised compensation plan. A compromise agreement was finally reached in May 1980. A joint committee of owners and players was formed to study the question of compensation for free agents. Further, the compromise allowed the owners to implement their compensation plan in February 1981. If the owners took that option, however, players had the right to strike anytime before June 1, 1981 (see Chass, 1980). In essence, the agreement postponed the strike and any final settlement of the compensation issue until 1981.

In 1981, the owners decided to execute their compensation plan; the players went out on strike at the end of May. Eventually, a compromise was reached on the compensation issue (for a summary of the settlement, see Chass [1981]). While the new agreement represents concessions on both sides, the revised compensation plan probably does not go far enough to stop the escalation of wages in professional baseball. First, only compensation for type A free agents will involve the selection of a professional player by the team losing the free agent. This replacement player will be chosen from a pool of players to which all clubs contribute. For type B free agents, only amateur draft choices are granted to the teams losing the players. Second, the number of type A ranking free agents is so small (a maximum of eight in 1981 and nine in 1982 and 1983) that the overall effect on the salary levels should be minimal. Third,

teams are allowed to reserve 24 players (26 if they do not sign a type A free agent) from the compensation pool. The major league roster limit is 25 players from opening day through August 31, and 40 players from September 1 through the end of the season. Therefore, the players in the compensation pool will probably be minor league players with very limited major league experience. Fourth, the club signing the free agent may not even lose a player. Further, teams losing a player from the pool for the first time receive $150,000 from a fund to which all teams contribute.

These considerations suggest that the major conclusions of this study will not be affected by the recent changes in the reserve system following the 1981 player strike. Thus, the hypothesized three-tier pay scale should prevail in the upcoming years and salary levels should reach new heights. Furthermore, Cassing and Douglas (1980) have suggested that the auction bidding mechanism in the free agent market results in wage offers above a player's marginal revenue product. Therefore, in the absence of other controls, the only mitigating element in the bidding for free agents may be the size of the owners' pocketbooks.

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