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Robert C. Dolan
University of Richmond, rdolan@richmond.edu

Robert M. Schmidt
University of Richmond, rschmidt@richmond.edu

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LEAGUE BASEBALL'S REENTRY DRAFT

Robert C. Dolan

Robert M. Schmidt*

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* Assistant Professors
E. Claiborne Robins School of Business
University of Richmond, Virginia 23173

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Introduction

Major League Baseball's reentry draft was instituted under the Basic Agreement of 1976. This contract marked the end of a roughly ten-year period of increasing dispute between baseball owners and players[1], and the beginning of a significant modification in the labor market arrangements that governed the sport. Prior to the 1977 season, 'the reserve clause left players' mobility, and thus bargaining strength, entirely to the discretion of the team with which they had signed as rookies. Revision of the reserve clause under the 1976 Agreement created a competitive auction market for the services of veteran players. To the public eye, the important consequences of this reentry market have appeared twofold: 1) escalating player salaries; and 2) player reallocations, possibly to the detriment of competitive balance.

That the free agent market has produced some extraordinary player contracts is not surprising, perhaps not to baseball fans, and certainly not to economists. For more than twenty-five years the economic literature has been unswerving in its judgment that the original reserve clause was a potent source of monopsony power for owners.[2] As such, the recent era of "staggering" free agent contracts largely represents the redistribution of Ricardian rents that were previously garnered by owners under the reserve clause but now accrue to players since the 1976 Agreement. This process of rent redistribution is firmly supported by recent empirical studies.[3]

In contrast, the related issue of free agency and league balance seems less clear. The belief of the Commissioner, some owners, and many fans has been that the reentry draft will in time lessen competition. Advocates of the reserve clause often claim that larger urban areas, due to their greater revenue base, are better positioned to offer lucrative free agent

contracts. The implications are increasing disparity in relative team performance, and the likely dissolution of marginal teams in the long run. Economic theory, on the other hand, almost uniformly rejects this popular argument.[4] The theory views the original reserve clause as a mechanism which permanently assigns the property rights of players to owners. In the absence of recontracting, the original reserve' clause could assure convergence to equal team strength due to the reverse-order rookie draft procedure. However, without restrictions on player-cash transactions, there was nothing in the original reserve system implying that player allocations, and thus team balance, should differ from that of a competitive labor market. Less technically stated, when George Steinbrenner wanted Dave Winfield to play for the Yankees, it was immaterial from a competitive standpoint whether millions of dollars had to be paid to San Diego or directly to Dave Winfield. It is in this sense that the revision of the reserve system implies rent redistribution, from the Padres to Winfield in this case, but not necessarily a different distribution of talent.

While the economic literature lays a solid theoretical foundation for this conclusion, tests of the model's prediction are rare.[5] To date, empirical verification has been precluded by the short historical time frame of the post free-agent period. However, the conclusion of the 1983 season marks seven years of baseball under the free-agent regime. Further, this time span is roughly comparable to 1969-1976, another unique structural period in baseball defined by the introduction of four league divisions yet predating the reentry draft. For this reason, we would argue that relevant intertemporal comparisons can now be drawn between these periods to test whether league balance has in fact remained unaffected by free agent activity.

This paper presents the results of several statistical tests comparing competition in the pre- and post-free-agent eras. These tests include classical as well as non-parametric techniques and we apply them with two distinct concepts of competitive balance in mind. One measure of competition, and certainly this is the fans' concern, is on-field performance. Therefore, one series of tests examines team winning percentages and league standings. Our second measure of competition focuses on team revenue-shares in the industry. The rationale here is simply that name-players, over and above their contribution to team performance, can be a turnstyle draw and thus an asset to a profit-maximizing firm. This revenue perspective is useful because it opens up a wide menu of traditional market-structure measures by which to assess changes in competition. It is also problematic, however, because very few teams disclose financial information. This data limitation requires that annual team revenues be estimated for the 1969-1983 period. Though merely facilitating to the broader purpose of this paper, we believe that the revenue results, and the estimation procedure contained therein, are themselves notable.

The paper is organized as follows. Section I describes the estimation of team revenues. Section II discusses methodological issues. Section III outlines the indices of competition we apply to team revenues and presents the empirical results comparing the pre- and post-free-agent periods. Similarly, Section IV discusses tests and results for team field performance. A summary and concluding remarks appear in Section IV.

I. Team Revenue Estimation

The keystone of our estimation procedure is an industry study done by Markham & Teplitz (1981). This description of baseball's financial structure forms the basis of our team revenue model, but more importantly, the study contains detailed financial data for the 1974-1980 seasons. Though these annual data are aggregated to protect team confidentiality, they provide a useful base for several parameter estimates as well as a cross-check for some of our revenue results. Following Markham & Teplitz, our team revenue model is specified:

$$\text{REVENUE} = (\text{AREV, BREV, CREV, PREV}) \qquad (1)$$

where AREV is receipts from attendance, BREV is broadcasting revenue, CREV is concession revenue net of expenses, and PREV is receipts attributable to post-season play. Consider each in turn.

The algorithm for obtaining attendance revenue is conceptually straight-forward--each team receives a share of its home and road gates. A team's revenue thus depends upon its home and road attendance (HATT & RATT), average ticket sales price (TKP) across stadiums, and the league proportions for gate splits. Formally, HOME and ROAD revenues are estimated as:

$$\text{HOME}_{ij} = (\text{SPLIT}_j)\,(\text{HATT}_{ij} * \text{TKP}_{ij}) \qquad (2)$$

$$\text{ROAD}_{ij} = (1-\text{SPLIT}_j)\Big[\sum_{k \neq i}(\text{HOME}_{kj})\,(\text{RATT}_{ij} \,/\, \sum_{l \neq k}\text{RATT}_{lj})\Big] \qquad (3)$$

where i,k, and l represent 1-12 teams and j denotes the American or National League. While the home revenue equation follows from a factual definition, road revenues could only be approximated indirectly. This is done by dividing each team's revenue pool for visitors $[(1-\text{SPLIT}_j)(\text{HOME}_{kj})]$ among

the remaining teams in the league proportionately by their road attendance $[RATT_{ij}/ \sum_{1 \neq k} RATT_{1j}]$.

All of the variables shown in equations (2) and (3) are readily available with the exception of teams' average ticket sales price.[6] The difficulty in obtaining this parameter is that, even though stadium configurations by listed ticket price are known for each year, the average sales price need not be a simple weighted average. Such an average would only be accurate if teams sold the same proportion of every seating type. Generally, the weighted average understates the actual average price because a greater proportion of the higher-priced box seats tend to be filled at sub-capacity attendance.[7] To account for this fact, our estimated average sales prices are computed under the assumption that the best 30 percent of a stadium's seats sell at a rate 15 percent higher than the team's season attendance rate. For example, if season attendance for a team represents 60 percent of seating capacity, 69 percent of the better seats would be filled as compared to roughly 56 percent of the cheaper seats.[8]

Broadcasting revenue (BREV) is comprised of a local and a network component. Network contracts covering Game-of-the-Week, Monday-Night Baseball, the All-Star Game, and all post season play are negotiated through the Commissioner's Office and are held in the Major League Central Fund. After deducting the expenses of the Commissioners Office, the Fund is distributed between the players' pension fund and the clubs.[9] Local television and radio contracts are drawn independently by each team and there is no revenue sharing condition, either with players or between clubs. The values of all local rights and the network broadcasting contract are reported in an annual feature article of Broadcasting Magazine.[10]

Concession revenue (CREV) is extrapolated from a trend line fitted to real per-capita concession revenue for the 1974-1980 period. The estimating equation for team concessions is then obtained as:

$$CREV_{it} = [HATT_{it}] [PCREV_{it}] \tag{4}$$

where PCREV is the predicted per-capita concession value of the trend regression in nominal dollars, i reflects 1-24 teams, and t goes from 1969-1983.[11]

Post-season revenue (PREV) is comprised of attendance and concession receipts from the two League Championship series and the World Series. Post-season concessions are obtained in the same manner as the regular season estimates except the per-capita concession values used in the trend regression are calculated from post-season financial and attendance data. Post-season attendance revenue is also obtained in a manner similar to the regular season estimates but is more accurate for two reasons. First, since the League Championship and World Series games are generally sold out, a simple weighted average ticket price is appropriate in figuring total gates receipts. Second, there are strict formulas for distributing post-season revenue to the participating clubs. These formulas were provided to us by the Commissioner's Office.[12]

Estimation of equation (1) for each team in each year yields a reasonable approximation of the revenue picture in baseball since 1969. Though obviously imperfect for the reasons noted above, various comparisons of our revenue estimates with Markham & Teplitz's study suggest that we are well within a tolerable margin of error. A statistical summary of the team revenue results appears in an Appendix for the interested fan.

II. Methodological Considerations

In formulating statistical tests, two historical facts had important methodological implications for our study. The first is that 1977, in addition to being the first season of free agent services, was an expansion year in the American League. The addition of Seattle and Toronto is troublesome because it represents a second contemporaneous shock to the competitive environment. This shock is especially nettlesome because the competitive impact of new firms in baseball is ambiguous. While more participants in an industry generally suggests greater competition, expansion clubs tend to be "cellar-dwellers" for an indeterminate length of time. Therefore, the influence of the expansion teams has been netted out. Mechanically, this is done by ignoring wins and losses against the expansion clubs and recalculating the American League winning percentages from 1977-1983. Though the need for this adjustment is regrettable, our examination of the revised standings confirms our suspicion that conducting the analysis with expansion teams would have unduly attributed noncompetitive effects to free agency.

A second event falling within the free agency period is the 1981 player strike. The important implication here is not simply that a full third of the regular season was lost, but more critically, there was not the uniformity of opposition across teams which a full-season schedule purposefully assures. In short, the team standings for 1981 are incommensurate with other seasons. For this reason, we dropped 1981 from statistical tests conducted with team winning percentages. Regarding revenue tests, however, we would argue that 1981 remains a viable datum. All of the revenue tests focus on shares rather than totals. Although the

shortened season clearly implies lower total revenues per club, it does not follow that relative shares are predictably affected.

In a statistical vein, the question arises that the data for our empirical tests may represent the population, rather than a sample drawn from a larger population. If one defines the universe as those twenty-four teams since the leagues were split into four divisions, then our data represent the populations for pre- and post-free agency. Statistical tests of significance are irrelevant in this case. The issue is simply whether the magnitude of the observed differences denote substantial change. To the contrary, one might consider the data as two samples; one representing the several decades over which the original reserve system developed prior to the 1976 Agreement, the other representing the period of free agency extending well into the future. Under this interpretation, the periods 1969-1976 and 1977-1983 are appropriate because of a certain homogeneity, but issues of statistical significance are relevant. We conduct significance test on our results for those readers inclined to the latter interpretation.

III. Revenue Test and Results

Industrial organization theory offers a number of summary measures of market structure. For purposes of comparing baseball's pre- and post-free agent periods, we calculate six concentration indices: 1) four-firm concentration ratio, 2) marginal concentration ratio, 3) Gini coefficient, 4) entropy index, 5) Herfindahl index, and 6) numbers equivalent index. All of these indices emphasize to varying degrees the number and/or relative size of firms in an industry. The specification and brief interpretation

of each index is presented in Table 1, although the unfamiliar reader may wish to consult any of several good summary discussions of concentration measures.[13]

The results for these indices are reported in Table 2. In terms of format, several aspects of the table are noteworthy. First, results are presented for the Major Leagues, and individually for the American and National Leagues. These distinctions are drawn to allow for the fact that the American League has shown greater free agent activity. Second, for purposes of meaningful comparisons, we present the values for each index representing the extremes of perfect equality and inequality. Third, two pairs of results are reported for each index -- "annual average" statistics versus "period" statistics. These pairs reflect two distinct conceptual approaches in calculating a given index. In the former, an index value is computed for each year and then averaged over the period. In the latter, each team's average market share for the period is computed, and then those shares are used in a single index calculation. Using the Herfindahl Index as an example, the distinction between the annual average versus period approach is formally expressed:

$$\text{Annual Average} = \frac{\sum_{j=1}^{t} \left[\sum_{i=1}^{n} (REV_{ij}/TREV_{j})^2 \right]}{t} \tag{5}$$

$$\text{Period} = \sum_{i=1}^{n} \left[\frac{\sum_{j=1}^{t} (REV_{ij}/TREV_{j})}{t} \right]^2 \tag{6}$$

where i denotes a team, j is a year, n is the number of teams, and t is the number of years in either the pre- or post-free agent period. The

Table 1: Concentration Indices Based on Team Revenue

Index	Specification	Interpretation
Four-Firm Concentration Ratio (CR4)	Simple summation of the market shares of the four largest firms.	Indicates percentage of the market held by four largest firms. Index value rises with greater concentration.
Marginal Concentration Ratio (CRM)	Summation of the market shares of fifth through eighth largest firms.	Indicates percentage of the market held by second four largest firms. Index value rises with concentration.
Gini Coefficient	Ratio of the area between a Lorenz curve and a diagonal line to the area below the diagonal.	Reflects degree of market share inequality without regard to number of firms. Index rises from 0 to 1 with greater inequality.
Entropy Index (E)	$E = \sum_{i=1}^{n} P_i \log\left[\dfrac{1}{p_i}\right]$ where p_i = i team's share and n = number of teams.	Weights larger shares more heavily by taking the natural log of the firm's share. The index rises nonlinearly from 0 with greater equality.
Herfindahl Index (H)	$H = \sum_{i=1}^{n} (p_i)^2$ where p_i = i team's share and n = number of teams.	Also weights larger share, but more heavily than the E index. H rises from 0 to 1 with greater inequality.
Numbers Equivalent Index (N)	$N = 1/H$	The number of equal-sized firms that would render a given H value. For example, perfect equality in either league implies H = 0.083 and N = 12.

conceptual importance of examining both results is that the period approach adjusts for changes in team rank between years while the annual-average basis does not. A priori, if team revenue ranks change substantially across years, we expect the period-based indices to reflect greater equality. On the other hand, roughly equal values under each method suggest team ranks are relatively stable. Finally, note that t-statistics for difference tests are reported for the annual-average results. However, also recall our prior discussion regarding the appropriateness of t-tests if one is dealing with populations rather than samples.

Careful examination of the findings in Table 2 suggest one general, though at this point tentative, conclusion. Within each population, the indices consistently show a less equitable distribution of league revenue in the post-free-agent period. However, considering the magnitude of changes involved, this first impression should be qualified somewhat. For example, observe that for the Major Leagues as a whole, the changes are neither large nor, in the case of annual-average indices, statistically significant. Examining the leagues separately, however, does suggest that the American League revenue pie has been significantly redistributed toward greater inequality since free agency. Though preliminary, it is noteworthy that the results for the American League, the more active free agent league, tend to contradict the economic model's prediction of no change in competitive balance.

Though a provocative initial perspective, the revenue redistribution revealed in Table 2 intimates, rather than tests, a direct relationship between free agent activity by teams and shifting market shares. To address this issue, we have constructed indices of free agent activity by team from a comprehensive tracking of player movements through the reentry

Table 2: Revenue Concentration Indices Before and After Free Agency

	CR4	CRM	Gini	F	H	N
MAJOR LEAGUES						
Equality	16.67	16.67	0.000	3.178	0.042	24.00
Inequality	100.00	0.00	1.000	0.000	1.000	1.00
Annual Ave.						
1969-76	26.37	19.50	0.173	3.129	0.046	21.71
1977-83	26.95	19.72	0.186	3.122	0.047	21.46
(t-value)	(-0.64)	(-0.55)	(-1.48)	(1.17)	(-0.92)	(0.93)
Period						
1969-76	25.09	18.72	0.146	3.144	0.045	22.36
1977-83	26.04	19.06	0.164	3.135	0.046	21.95
AMERICAN LEAGUE						
Equality	33.33	33.33	0.000	2.485	0.083	12.00
Inequality	100.00	0.00	1.000	0.000	1.000	1.00
Annual Ave.						
1969-76	41.79	31.75	0.117	2.461	0.068	11.42
1977-83	45.53	31.76	0.176	2.433	0.092	10.84
(t-value)	(-2.91*)	(-0.02)	(-4.32*)	(3.99*)	(-2.70*)	(3.75*)
Period						
1969-76	40.61	30.97	0.091	2.091	0.086	11.66
1977-83	44.16	32.27	0.157	2.444	0.091	11.03
NATIONAL LEAGUE						
Equality	33.33	33.33	0.000	2.485	0.083	12.00
Inequality	100.00	0.00	1.000	0.000	1.000	1.00
Annual Ave.						
1969-76	46.12	29.84	0.179	2.432	0.092	10.84
1977-83	47.62	29.24	0.190	2.425	0.094	10.65
(t-value)	(-1.06)	(1.41)	(-0.78)	(0.78)	(-0.92)	(0.93)
Period						
1969-76	44.47	31.17	0.149	2.450	0.089	11.20
1977-83	46.01	29.72	0.165	2.440	0.091	10.94

* The difference in means is significant at the 99 percent level.

draft since 1976. The indices are obtained by ranking players acquired and lost in the reentry draft within three categories: superstar (A), everyday player (B), or spot player (C). The resulting indices reflect cumulative activity in the free agent market through the 1983 season. We consider separately each team's cumulative gains, losses, and net changes by player classification. A summary of these measures of free agent activity appears in Table 3.

To examine more thoroughly the impact of free agency in the revenue picture, Spearman rank correlations are performed. Specifically, our activity indices are tested for rank correlation with a team's change in average revenue-rank between the pre- and post-free agent period. A positive coefficient for acquisitions and net changes indicates that teams which have acquired the most free agents, gross or net, have improved their revenue ranks most dramatically. Similarly, if there is a relationship between free-agent activity and revenue gains, a negative coefficient would be anticipated for player losses. The results are presented in Table 4. Generally, the implications of the rank correlations are rather striking, though not necessarily startling. Note the strong positive and significant correlations for both cumulative "A" player acquisitions and net "A" player changes, while the influence of all other types of acquisitions appears to be innocuous. It is especially interesting that "A" player losses do not significantly affect revenue rank. Several explanations suggest themselves for these asymmetric revenue implications of superstar transactions. One possibility is that teams shop by position. They enter the free agent draft to fill a need and certainly would not allow themselves to lose a superstar unless they already had a viable backup. Alternatively, the very infusion of new superstar blood may generate much more fan excitement than is lost by the transfer of a superstar with whom the fans have become jaded.

Table 3: Summary of Free Agent Activity Indices

	Mean	Std. Dev.	Min.	Max.	Sum
AMERICAN LEAGUE					
Cumulative "A" player acquisitions	1.58	2.39	0	7	19
Cumulative "B" player acquisitions	3.08	2.19	0	7	37
Cumulative "C" player acquisitions	2.17	1.40	C	5	26
Cumulative "A" player losses	1.33	1.61	0	5	16
Cumulative "B" player losses	3.67	2.06	1	7	44
Cumulative "C" player losses	2.25	1.91	0	5	27
Cumulative net "A" player change	0.25	3.16	-5	6	3
Cumulative net "B" player change	-0.58	3.34	-6	6	-7
Cumulative net "C" player change	-0.08	2.15	-4	3	-1
NATIONAL LEAGUE					
Cumulative "A" player acquisitions	0.67	0.98	0	3	8
Cumulative "B" player acquisitions	3.50	1.73	1	7	42
Cumulative "C" player acquisitions	1.00	0.60	0	2	12
Cumulative "A" player losses	0.92	1.00	0	3	11
Cumulative "B" player losses	2.75	2.45	0	8	33
Cumulative "C" player losses	1.00	1.21	0	4	12
Cumulative net "A" player change	-0.25	1.54	-3	2	-3
Cumulative net "B" player change	0.75	2.53	-3	4	9
Cumulative net "C" player change	0.00	1.13	-3	1	0

Table 4: Spearman Rank Correlations between Change in Revenue
Ranking and Various Indices of Free Agent Activity

Cumulative "A" player acquisitions	0.45909**
Cumulative "B" player acquisitions	0.20728
Cumulative "C" player acquisitions	0.20313
Cumulative "A" player losses	-0.03253
Cumulative "B" player losses	0.16323
Cumulative "C" player losses	-0.08554
Cumulative net "A" player change	0.37589**
Cumulative net "B" player change	-0.00746
Cumulative net "C" player change	0.33077*

* Significant at the 95 percent level.
** Significant at the 99 percent level.

IV. Field Performance Test and Results

Though certainly correlated, revenue shares are not necessarily a one-to-one mapping of field performance. Therefore, in addition to the revenue picture presented above, it is appropriate to examine how free agent acquisitions influence competitive balance. Our first premise is that, if league balance is affected, one likely manifestation will be greater inequality, or more accurately, greater dispersion in team standings. To test for this possibility, we present F-statistics and Gini coefficients based on league and division standings in the pre- and post-free agent periods.

The nature of sports competition lends a particularly intuitive meaning to both of these measures. First consider the F-test. Team contests are zero-sum games implying that the average winning percentage for a league or division is necessarily 500. Indeed, this average winning percentage is a common reference point for fans, assessing their team's

performance as the degree to which they are doing better or worse than average. From a statistical standpoint, greater inequality in team sports implies greater dispersion around the mean performance of 500. Therefore, a comparison of variance in team standings is one method of detecting a lessening of competition in the post-free-agent period. The application of the Gini coefficient is conceptually similar. Intuitively, perfect equality implies that each team wins, as well as loses, an equal percentage of total games played, thus implying a Lorenz curve coincident with the 45° diagonal and a Gini coefficient of zero. The Gini is actually just another measure of dispersion where deviations from the mean are weighted equally.

Table 5 contains the test statistics. The F-test is formulated under the null hypothesis of no decline in competitive balance. Defining the F-statistic as the ratio of post- to pre-free agent variances, the critical value of F at the 95 percent significance level is 1.65. Regarding the mean Gini statistics, these are computed by the annual average approach to accommodate t-tests. Turning to the table, the reader may confirm that the results uniformly support the null hypothesis of no decline in field competition between the two periods. These findings are thus consistent with the predictions of the traditional economic model that the free agent market has not reduced competition as measured in terms of greater dispersion in league standings.

The preceding tests are developed from the premise that, if the reentry draft is noncompetitive, the measurable affect will be winning teams increasing their margin of dominance over losers. However, an equally plausible effect is that free agency influences the order rather than the dispersion of team standings. To test this hypothesis, we again use the Spearman rank technique and the indices of free agent activity

Table 5: Team Competition Measures Before and After Free Agency

	Std. Div. of Standings (F test)	Mean Gini Coefficient (t test)
AMERICAN LEAGUE		
1969-76	71.42	0.078
1977-83	75.14	0.082
(test stat.)	(1.11)	(-0.50)
EAST		
1969-76	73.80	0.077
1977-83	68.20	0.066
(test stat.)	(0.85)	(0.91)
WEST		
1969-76	69.18	0.073
1977-83	74.72	0.081
(test stat.)	(1.17)	(-0.90)
NATIONAL LEAGUE		
1969-76	73.99	0.080
1977-83	62.79	0.070
(test stat.)	(0.72)	(1.46)
EAST		
1969-76	67.28	0.067
1977-83	66.04	0.069
(test stat.)	(0.96)	(-0.16)
WEST		
1969-76	80.63	0.084
1977-83	60.27	0.062
(test stat.)	(0.56)	(2.79)

Note: A one-tailed test was employed where the alternative hypothesis
states that competition lessened. Had a two-tailed test been used,
competition in the National League West would have been demonstrated
to increase at the 95% level for both measures.

Table 6: Spearman Rank Correlations between Change in Team
Standings and Various Indices of Free Agent Activity

	Division	League
Cumulative "A" player acquisitions	0.55867**	0.58353**
Cumulative "B" player acquisitions	0.14086	0.09462
Cumulative "C" player acquisitions	0.03763	-0.04663
Cumulative "A" player losses	-0.22067	-0.26117
Cumulative "B" player losses	-0.18334	-0.14338
Cumulative "C" player losses	-0.36881*	-0.42546**
Cumulative net "A" player change	0.48704**	0.51999**
Cumulative net "B" player change	0.18382	0.12598
Cumulative net "C" player change	0.48823**	0.48656**

developed in Section III. Specifically, we examine the rank correlation
between the activity indices and the change in teams' average order of
finish between the pre- and post-free agent periods. The results of this
test are presented in Table 6. Contrary to the traditional economic
prediction, free agent acquisitions appear to have played an important role
in improving team performance. For example, observe that the correlation
coefficients for "A" player-gains, cumulative and net, are high and signi-
ficant in both the league and divisional context. However, it is curious
that "C" player losses and net gains also appear highly and significantly
correlated with improved field performance. This seems especially odd
considering that neither "C" player-gains nor "B" player transactions in
general appear to have any impact. In any event, considered broadly, the
results suggest a greater interaction between the free agent market and
performance than the traditional model predicts.

V. Summary and Conclusions

This paper has examined the effects of the players' reentry draft on the competitive structure of Major League Baseball. Viewed from either a field performance or revenue perspective, we find that free agent activity does track structural shifts in baseball since the 1976 Basic Agreement. Specifically, revenue shares and changes within league standings are shown to be positively and significantly correlated with "A" player acquisitions. Though our test methodology does not allow other explanatory variables to enter the analysis, the empirical results are nevertheless strong and markedly at odds with the traditional economic model's prediction of no change in competitive balance.

In a theoretical context, our results seem to suggest that where the traditional model breaks down is that the level of cash-player transactions under the original reserve system was apparently insufficient to bring about the competitive market result. A strong justification for this possibility has been suggested by Daly and Moore [1981]. They maintain that cash transactions were indeed rare prior to the draft, a fact they attribute to a strong implicit anti-raid contract between owners which was facilitated by the reserve-player rule. However, the revision of the reserve clause, and the rent redistribution that it has clearly wrought, has perhaps reduced the benefits of cooperation while raising the costs. If so, the subtle yet critical effect of a well-organized auction market for top personnel may have been to strain the limits of an implicit cartel agreement. Though preliminary, our findings clearly indicate that there are ample performance and revenue incentives to defect from such an implicit contract in the post-free agent period. In a popular sense, the defectors are those owners who have been especially active in the free agent market.

Appendix: Estimated Gross Revenue--Rankings by Team and Year;
Means, Minima, and Maxima ($ millions) by Year

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Balt	13	15	15	19	21	22	20	21	19	20	11	13	13	15	7
Bost	6	9	10	9	10	6	4	5	5	4'	4	6	5	8	13
Clev	23	21	23	21	23	16	19	17	22	22	21	20	18	22	23
Detr	8	7	9	4	7	13	12	8	12	7	14	9	8	10	12
Milw	19	19	22	24	20	21	11	20	20	11	10	11	15	7	5
NykA	9	12	13	14	14	9	7	3	2	2	2	1	2	2	1
Calf	17	13	17	17	17	19	14	16	11	10	6	10	11	5	6
ChiA	20	22	18	13	15	18	21	14	8	12	16	16	14	17	8
K.C.	18	24	21	23	12	12	10	6	6	6	7	5	10	9	14
Minn	10	14	19	18	19	23	22	22	15	23	20	23	23	23	24
Oakl	14	18	16	8	8	10	9	18	24	24	24	24	6	14	21
Tx/W	16	17	20	20	22	15	13	12	17	14	17	18	17	20	15
ChiN	7	10	11	11	11	17	16	11	9	9	13	15	19	19	16
Mont	11	8	12	12	13	14	17	23	10	16	8	7	3	3	4
NykN	1	1	1	1	2	4	5	7	13	17	22	17	16	12	10
Phil	22	20	3	6	4	3	3	2	3	3	1	2	4	4	3
Pitt	21	6	4	7	9	8	8	13	14	19	12	12	20	24	22
St.L	5	4	7	10	6	5	6	9	7	13	15	14	12	6	9
Atla	4	11	14	16	18	11	23	15	21	21	23	21	21	11	11
Cinc	15	2	5	2	1	2	1	1	4	5	5	8	9	16	20
Hous	3	5	8	5	5	7	18	19	16	18	9	4	7	13	18
L.A.	2	3	2	3	3	1	2	4	1	1	3	3	1	1	2
Sn.D	24	23	24	22	24	20	15	10	18	15	18	22	24	18	17
Sn.F	12	16	6	15	16	24	24	24	23	8	19	19	22	21	19
Mean	4.7	5.2	5.5	5.3	5.9	5.8	6.2	6.9	8.3	9.6	10.9	12.3	9.3	15.2	17.8
Min.	2.8	3.2	3.1	3.2	3.2	3.7	3.8	4.3	4.2	4.7	4.2	7.0	5.2	9.8	9.8
Max.	8.4	10.5	9.1	8.8	9.7	11.2	12.3	13.2	15.8	18.9	17.8	21.9	18.6	24.2	30.7

1. For a concise historical account of the developments leading up to the 1976 Basic Agreement, see J. R. Hill & W. Spellman [1983, pp. 1-21].

2. This point was first discussed by Rottenberg [1956] and given more formal exposition by El-Hodiri & Quirk [1971]. Crude estimates of the rate of exploitation under the reserve system were obtained by Scully [1974].

3. For example, see Cassing & Douglas [1981], Sommer & Quinton [1982], and Hill & Spellman [1983].

4. Again, Rottenberg and El-Hodiri & Quirk provide the most comprehensive treatments of the issue. However, Hunt & Lewis [1976] develop an interesting concept of the optimal degree of dominance by a profit-maximizing team. They conclude that there are no profit incentives for a level of team dominance greater than that experienced in major league baseball between 1969-1974, thus predicting that a free agent market would not produce a flurry of recontracting likely to alter competitive balance. In a different vein, Holahan [1978] presents a theoretical discussion of the impact of free agency on the marginal franchise.

5. To our knowledge, only Daly & Moore [1981] examine the issue of player reallocation since the reentry draft. Though they only examine three years of free agent activity, they find that roughly two-thirds of the players signed with teams in SMSA regions larger than the team they left. However, they do not examine any issues related to subsequent team performance.

6. Home and road attendance is reported in the American League Red Book and the National League Green Book. Annual ticket prices and stadium configurations are contained in the Official Baseball Dope Book. In the American League, the home/visitor gate split is 80/20, respectively. In the National League, the gate split is a fixed amount per turnstyle count on tickets over $1.00. Since 1969, this distribution has ranged from 38-54 cents per head. Historically, however, the gate split has amounted to a roughly 90/10 percentage split (see Markham & Teplitz, p. 92).

7. This point was stressed by several teams' ticket managers with whom we corresponded during our data collection. Across teams, season attendance as a percentage of stadium capacity ranged roughly from a low 30 to a high of 90 percent.

8. While attendance revenue figures are not available by team, Markham & Teplitz (pp. 148, 160) provide total Major League attendance revenue for each of the years 1974-1980. We employed a least-squares technique for these seven years to estimate the fill-rate parameters.

9. Over the period 1975-1977, network broadcasting contracts totaled
    $21.7 million. The Commissioner's expenses consumed 10 percent, with
    40 percent of the residual allotted to the player pension fund and 60
    percent being split equally among the clubs (Markham & Teplitz, p. 45).
    In the subsequent years, however, the network contracts have soared.
    It thus seemed inappropriate to set the Commission's share at a con-
    stant 10 percent. Instead, the Commission's expenses were allowed to
    rise at the annual rate of the GNP deflator and this amount was
    allotted out of the network contract with the residual being disbursed
    according to the 40/60 rule.

10. Cross-checking the actual local broadcasting totals reported by
    Markham & Teplitz (p. 148, 160) with those in Broadcasting Magazine
    indicated that local contracts tended to be slightly over-reported.
    Comparisons suggested a factoring of 0.86.

11. This procedure is apparently flawed by the fact that concession
    arrangements are known to vary across clubs. For example, Markham
    & Teplitz note that some clubs exchange all or part of their
    concession rights for lower stadium rent. This fact implies that
    our value for PCREV is biased downward because the per capita con-
    cession figure is based on baseball attendance, including clubs that
    report no concession revenue. Multiplying team attendance by PCREV
    will then understate accounting revenue for franchises with full
    concession rights and clearly overstate the others. However, this
    procedure is really only flawed from an accounting perspective.
    We are focusing on revenue figures primarily because expenses are
    even more zealously guarded. Since we cannot net stadium rent out
    of every team's revenue, we believe it appropriate to impute con-
    cession revenue to those teams which forsake this revenue source for
    better rent arrangements which other teams do not enjoy.

12. For the League Championship Series, the two participating clubs in
    each league split equally 40 percent of the gate receipts for the
    first three games and 100 percent of the gate when a fourth or fifth
    game is necessary. In the World Series, the two clubs split 17 per-
    cent of the gate for the first four games and 42.5 percent of the gate
    in the event of a fifth through seventh game.

13. See Asch (1983, pp. 125-134) or Scherer (1980, pp. 56-60).

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