# Competitive Balance and Free Agency in Major League Baseball

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## Abstract

In 1976, the Basic Agreement introduced free agency to Major League Baseball; previously, the reserve clause gave a team indefinite monopsonistic rights to a player's services. Owners claimed that the new system would enable large market teams to destroy Major League Baseball's competitive balance. Coasian logic, however, would suggest that player allocation would not be affected by free agency. Because player distribution would not change, the Coase Theorem implies that free agency should have no effect on competitive balance. My paper tests this claim by developing an econometric model of competitive balance in Major League Baseball.

## Section I: Introduction

According to James Quirk and Rodney Fort, "Sports leagues are in the business of selling competition on the playing field." It is, therefore, not surprising that competitive balance is important in keeping fan interest. But, as Andrew Zimbalist notes, "There has always been some degree of competitive imbalance in baseball… Viewed as a business, baseball or any other sport would rather have teams from bigger cities win more frequently than teams from smaller cities."

In 1970, Curt Flood sued Major League Baseball (MLB) to become a free agent.[2] Owners supporting the reserve clause, a system that allowed teams to retain a player's rights indefinitely, argued that free agency would lead to league domination by teams with the largest markets, destroying competitive balance.

The owners' argument is directly contradicted by the economic theory proposed by Ronald Coase, which asserts that in the absence of transaction costs and other economic distortions, the bargaining process will produce the same outcome regardless of how property rights are originally allocated.[3] Under the Coasian argument, a player would end up on the team where his marginal revenue product is greatest regardless of the bargaining system – free agency or the reserve clause.[4] The only theoretical difference between free agency and the reserve clause system would be that under free agency players accrue a significantly greater part of their value; rents would transfer from owners to players rather than a change in player allocation.

This discrepancy between economic theory and the claims of owners has provoked my research into the effect of the 1976 Basic Agreement, which brought about free agency, on competitive balance. "The assumption that the market is free of transaction costs and other distorting factors makes the application of the Coase Theorem and the Invariance Proposition to most real world markets [such as Major League Baseball] rather precarious" (Bowen). This paper tests the claim that free agency has had no effect on competitive balance. Section II of the paper provides an overview of the previous literature on this topic. Section III examines

[2] Free agency gives players the rights to their services, allowing them to play for any team.
[3] This argument, known as the Invariance Proposition, was originally applied to the baseball labor market by Simon Rottenberg in 1956 (even before Coase's 1961 publication on property rights).
[4] Under the reserve clause, an owner could sell players' rights to other teams.

historical influences on competitive balance and Section IV proposes an empirical model. Section V presents the results of the model drawing on data from 1950-2001, and Section VI offers conclusions about the subject.

## Section II: Previous Research

A 1985 article by David Besanko and Daniel Simon addressed the effect of free agency on competitive balance using National League data from 1970-1983 (seven years of pre-free agency [1970-1976] and seven years of post-free agency [1977-1983]). These researchers measured competitive balance using the standard deviation of team winning percentages (with a smaller standard deviation representing a greater degree of competitive balance). This methodology has been the most common measurement of competitive balance in subsequent literature.

Besanko and Simon surprisingly found that standard deviation has decreased (greater competitive balance) since the Basic Agreement. Besanko and Simon's result, however, was not statistically significant. Based on this observation, Besanko and Simon concluded that free agency has had no significant effect on competitive balance, as suggested by the Coase Theorem. Other researchers, like Christopher Drahozol and Fort and Quirk, expanded on Besanko and Simon's sample and controlled for confounding factors such as team expansion, but all their research further supported the null hypothesis (that free agency does not affect competitive balance) not being rejected.

"While the near unison of [the previous literature's] conclusions lends substantial support to [the] argument that free agency has not harmed competitive balance, the robustness of this argument has still yet to be proven" (Bowen). In his Duke University undergraduate thesis, Todd Bowen expanded on previous models of competitive balance.[5] In "Empirical Study Into Free Agency and Competitive Balance in Major League Baseball," Bowen found that after including more controls in his model there was a significant, harmful effect on

[5] Written in 1997, using data from 1950-1994.

competitive balance in the American League attributable to free agency, but (like other researchers) found the effect to be insignificant for the National League.[6]

## Section III: Competitive Balance History and Possible Explanations

"Past researchers have been correct to assert that competitive balance has generally increased since the advent of free agency" (Bowen). A rudimentary regression using data from 1950 to 2001 of standard deviation of team winning percentages on time shows a decrease in standard deviation over time (associated with higher competitive balance):

| Variable | Coefficient |
|---|---|
| Intercept | 1.19359<br>(5.18)[a] |
| Time | -0.00057<br>(-4.85)[a] |

t-stat values appear under the corresponding parameter estimate
Adjusted R-squared value .3202
a – statistically significant at the 1 percent level

These results, however, should not necessarily lead to the conclusion that free agency improves (or has no effect on) competitive balance. Bowen's paper identifies possible causes of this trend aside from free agency: the introduction of a reverse order draft in 1965 and the compression of player talent.

Since 1965, Major League Baseball has required all amateurs to enter the league through a yearly draft, where selection order is determined by the reverse order of the team's previous year's finish in the standings.[7] Thus, the team with the worst record for the prior season gets the first pick in the draft; the team is granted exclusive rights to sign the player it selects for a one-year period. Applying a theoretical Coasian argument, players would be drafted, signed, and immediately sold to the team that values the player's services most. The draft could affect competitive balance if there were transaction costs associated with MLB player movement or restrictions on trades. Bowen discovered that accounting for the presence of the reverse order amateur draft "served to greatly reduce the correlation between a team's

[6] Significant results at the 5 percent level for a two-tailed t-test.
[7] Some foreign players with professional experience are exempt from the draft.

winning percentage rank and population rank." Bowen, therefore, decided to control for the reverse-order draft in his econometric model of competitive balance by including a dummy variable.

Zimbalist argues that, "Today's major league ballplayers are a smaller fraction of an increasingly prepared population. The difference between today's best, average, and worst players is much smaller than it was twenty or forty years ago. This results in greater difficulty in selecting dominating players." This narrowing range of player talent, which Zimbalist refers to as "talent compression," means that there are greater costs for a team to become superior; dominating players have become a more scarce and costly resource. With higher costs and unchanged returns, the league naturally becomes more competitively balanced. Therefore, talent compression, which Zimbalist approximated by the percentage of the U.S. population that plays professional baseball, could be a cause of increased competitive balance over time. Bowen's regression supported Zimbalist's assertion that talent compression affects competitive balance; as a result, it is an important variable to consider when attempting to extract the change in MLB competitive balance caused by free agency.

## Section IV: The Empirical Model

As with the previous research, I measure competitive balance using standard deviation of team winning percentages; this statistic is the model's dependent variable. The model also includes eight independent variables that estimate the effect of free agency and control for 1) the presence of a reverse-order amateur draft, 2) the compression of player talent, 3) short-term shocks caused by expansion and work stoppages, 4) the long-term effects associated with league expansion.

A dummy variable equal to one for years with a reverse-order amateur draft (years after 1964) controls for the influence of the draft on competitive balance. It follows that enabling teams who performed the worst in the previous year to have a higher draft choice (and thus the rights to the more desirable amateurs) would increase the competitive balance in the league. One would expect this dummy variable to have a positive contribution to competitive balance and, therefore, a negative coefficient (lowering the standard deviation).

Like Zimbalist, my model controls for player talent compression by including a measure of the percentage of the US population playing Major League Baseball. The greater the percentage of the population that plays professional baseball, the greater the disparity amongst players and the lower the cost of differentiating winning percentages. A positive coefficient would be expected for this type of measure; an increase in this statistic implies a decrease in competitive balance.

When league expansion occurs, it generally takes a couple of seasons before an expansion team can legitimately compete with the rest of the league. As in Fort and Quirk's model, a dummy variable equal to one for years in which there was league expansion would control for the impact of adding a lesser competitive team (expecting a positive coefficient). I also include two lagged dummy variables (equal to one for the first and second year after expansion) to account for the time phase for an expansion team to become competitive.

Statistically, a season of simply one game should produce the greatest standard deviation of winning percentages. For more games played, there would be a lower expected standard deviation (given an equal level of competitive balance); thus, a season with fewer games played such as 1981 would likely result in a higher standard deviation.[8] Therefore, my model includes a measure of games played to control for work stoppages.

League expansion or contraction could also produce a long-term effect on competitive balance. With fewer teams, the more a super-performance or sub- performance affects the overall standard deviation of team winning percentages. To control for the long-term effects of expansion, my model includes a count of the teams in the league.

In order to estimate the effect of free agency on competitive balance, the model includes an independent variable that counts the number of players who declared free agency in the previous year. The Coase Theorem would suggest that this variable have a coefficient of zero: the number of players who own their playing rights should not affect competitive balance. The owners would hypothesize that an increasing number of free agents gives greater buying power to large market teams and hence more competitive imbalance (positive coefficient).

[8] A labor strike shortened the season to an average of 107 games.

Previous literature has used a dummy variable equal to one for years where there has been a system of free agency. My own intuition is that in the early stages of free agency, the small number of players who became free agents (relative to today's standards) caused its effect to be minor (and return insignificant results). From this intuition, I, therefore, included a variable that counts the number of free agents (rather than a dummy variable) to measure free agency's effect on competitive balance.

The econometric model to be estimated is as follows:[9]

$STDWPT_i = f(NFRAG_i, DRAFT_i, POPPCT_i, EXPAN1_i, EXPAN2_i, EXPAN3_i, GAMES_i, TEAMS_i)$

Where:

$NFRAG_i$ = Number of players who declared free agency in year i-1.

$DRAFT_i$ = Dummy variable equal to 1 for the presence of a reverse order draft.

$POPPCT_i$ – Number of MLB roster positions / US population in year i.

$EXPAN1_i$ – Dummy variable equal to 1 if MLB expanded in year i.

$EXPAN2_i$ – Dummy variable equal to 1 if MLB expanded in year i - 1.

$EXPAN3_i$ – Dummy variable equal to 1 if MLB expanded in year i - 2.

$GAMES_i$ – Average number of games played by a team in year i.

$TEAMS_i$ – Number of teams in MLB in year i.

The DRAFT variable controls for the reverse-order amateur draft. The POPPCT variable controls for compressing talent. EXPAN1, EXPAN2, EXPAN3 are dummy variables that control for the short-term shocks associated with league expansion. GAMES is a variable that controls for shocks to competitive balance caused by work stoppages. The TEAMS variable accounts for the long-term effects on competitive balance attributed to league expansion. By controlling for these factors, this regression model should provide a more accurate and robust estimation of the effect of free agency competitive balance; this effect is measured by the NFRAG variable.

[9] The data on winning percentages and number of teams was compiled from baseball-reference.com. The data on free agents was compiled from *The Sporting News*. The data on US population was compiled from census.gov.

## Section V: Results

These are the results of the regression of standard deviation of MLB team winning percentages from 1950-2001 on the following variables:

| Variable | Coefficient |
|---|---|
| Intercept | -0.01882<br>(-0.46) |
| NFRAG | 0.00022<br>(2.74)[a] |
| DRAFT | -0.01437<br>(-1.69)[b] |
| POPPCT | 80612.2<br>(4.49)[a] |
| EXPAN1 | 0.00841<br>(1.68)[b] |
| EXPAN2 | -0.00057<br>(-0.12) |
| EXPAN3 | -0.00099<br>(-0.20) |
| GAMES | -0.00010<br>(-0.69) |
| TEAMS | -0.00448<br>(-2.94)[a] |

t-stat values appear under the corresponding parameter estimate
Adjusted R-squared value .5584
a – statistically significant at the 1 percent level
b – statistically significant at the 5 percent level

The variables NFRAG, DRAFT, POPPCT, EXPAN1, and TEAMS were all significant at the 5 percent level.[10] The coefficients of these variables follow their expected direction.

The estimated coefficient of the NFRAG variable was positive and highly significant ($p < .01$).[11] This implies that free agency does indeed have an effect on competitive balance.[12]

[10] The significance levels reported are for one-tailed t-tests.
[11] The p-value for NFRAG would represent the probability of getting a coefficient greater than the regression's coefficient given that the true NFRAG coefficient equals zero.
[12] The average standard deviation for the 52 data years was .076. The annual average number of free agents since the 1994 strike has been 134. When multiplying that number by the coefficient for NFRAG, it indicates

Specifically, the greater number of available free agents, the higher the standard deviation of winning percentages. The positive coefficient supports the owners' argument that free agency harms competitive balance.

The estimated coefficient of the DRAFT variable, similar to Bowen's findings, was negative and significant at the 5 percent level. These results are consistent with the intention of the draft; the coefficient indicates that the reverse-order amateur draft has had a negative effect on standard deviation and thus a positive effect on competitive balance.

The estimated coefficient of the POPPCT variable was positive and significant at the 1 percent level. As expected, the positive coefficient implies that as this statistic decreases, the league becomes more competitively balanced. This result gives strong support to Zimbalist's theory that player talent compression has brought about heightened competitive balance over time.

The estimated coefficient of the EXPAN1 variable was positive and significant at the 5 percent level. It follows that an expansion team would not be competitive immediately; thus the introduction of an expansion team should cause a higher standard deviation of winning percentages (and yield a positive coefficient). This result justifies Fort and Quirk's addition of this variable as a control and helps explain some of the competitive-balance shocks in the 1990's. As Bowen found, the lagged expansion variables, EXPAN2 and EXPAN3, were insignificant (p = .45 and p =.42 respectively) suggesting that while there may be an initial shock from league expansion, the effect on competitive balance may not last long (as evidenced by the Arizona Diamondbacks 2001 World Series Championship).

The estimated coefficient of the TEAMS variable was negative and significant at the 1 percent level, mirroring Bowen's American League regression results. Logically, with more teams, the less a single team's deviation from expected performance affects the overall distribution of team winning percentages. The GAMES variable, though not significant (p=.25) also had a negative

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that free agency has recently contributed about .030 annually to standard deviation. Namely, free agency has recently been a very important factor, which can be attributed to a standard deviation increase of roughly 40 percent.

coefficient; this indicates the expected result – the more games played the lower the standard deviation.

The results of the regression, aside from the insignificant variables of EXPAN2 and EXPAN3, all have coefficients that are consistent with the intuition behind their inclusion.

## Section VI: Conclusion and Related Issues

Previous research into the effect of free agency on competitive balance has used a dummy variable equal to 1 from 1977 onwards in econometric models of competitive balance. The result of this approach has been that most researchers have found the coefficient of this dummy variable to be insignificant; these results have suggested that the Coase Theorem, which would hold that ownership of playing rights should have no effect on competitive balance (in the absence of transaction costs and other economic distortions), applies to free agency in Major League Baseball. Bowen's study, which controls for many of the factors that may have an effect on competitive balance, dissented from the previous literature's conclusions. His model indicated that free agency has harmed competitive balance in the American League (though his regression returned insignificant results in the National League).

My intuition was that the number of free agents influences the effect of free agency. Namely, when 22 players declare free agency (as in 1977), it might not have a significant effect compared to when 136 players declare (in 2000). From this intuition, unlike any prior regression model, I included a variable that counts free agents (rather than a dummy variable) to measure free agency's effect. The high significance of this variable suggests that free agency does have an effect on competitive balance (harmful) and that (due to transaction costs or economic distortions) the Invariance Proposition does not perfectly hold for Major League Baseball.

Competitive balance has become a great concern of Major League Baseball; no team since the 1994 strike with a payroll outside the top quarter of the league has won a World Series game.[13] These regression results should give insights into the potential effectiveness of proposed

[13] In 1998, the New York Yankees swept the World Series against the San Diego Padres, who were in the top half (but not the top quarter) of payrolls.

remedies. Considering the demonstrated harmful effect of free agency, a salary cap or luxury tax would restrict the ability of large market teams to dominate the free agent market signings. Applying one of these measures would eliminate or at least lessen the effect of free agency.

After an 18-month study, "The Report of the Independent Members of the Commissioner's Blue Ribbon Panel [Levin, Mitchell, Volcker, and Will] on Baseball Economics" made a variety of suggestions designed to restore the financial well-being of the game and address competitive balance issues. One advocated measure would be to bolster the value of the reverse-order draft for teams who finished poorly. The Coase Theorem suggests that these measures would not necessarily affect competitive balance. The significance of the DRAFT variable and the demonstrated limitations of the Invariance Proposition to Major League Baseball imply that this measure should help competitive balance.

The proposed contraction resulting in fewer baseball teams would, according to my regression, have multiple effects. There would be an initial helpful stimulus to competition (the inverse of the expansion variable – assuming that the contracted teams were small market uncompetitive ones). There would be long-term harm to competitive balance indicated by the negative coefficient of the TEAMS variable.[14] But there would also be a more powerful positive effect caused by player talent-compression (indicated by the positive coefficient of the POPPCT variable).[15] With fewer teams, there would be a smaller percentage of the population playing professional baseball resulting in a smaller disparity of talent between players (causing greater competitive balance). The effect of talent compression would dominate the negative influences to competitive balance, netting a more competitive league after contraction.[16]

I leave further analysis of the proposed remedies for future research. My own econometric model of competitive balance indicates the validity of the intuition behind some of these measures and the effect free agency has had on competitive balance.

[14] The TEAMS effect would be (-2) * -.00448 = .00896.

[15] The POPPCT effect would be (-50/285 million) * 80612.2 = -.01415

[16] The net effect would be -.00519, which would represent approximately a 7 percent increase in competitive balance.

## Extensions

This section, which provides further analysis of competitive balance issues, was developed in response to comments I have received from several reviewers of my thesis. With each extension topic, I acknowledge the reviewer(s) who suggested the topic.

1) *Separate Regressions on Leagues – Fort, Grabowski*

Before 1997, teams from the American League (AL) and the National League (NL) did not face each other until the World Series; for the past five years, there has been some limited interleague play. My original regression pools winning percentages from these leagues in order to gauge the overall effect of free agency on MLB. Most of the previous literature separates the leagues, in that their products were independent of each other (as they never faced off in regular season play).

When dividing the sample into leagues, the AL regression returns very similar results to the pooled sample. NFRAG, EXPAN1, DRAFT, TEAMS, and POPPCT remain significant and have logical coefficients.[17] In the NL regression, the significance and, in some cases, the sign of the coefficient changes. Importantly, the NFRAG variable is insignificant (and negative) in the NL regression; the TEAMS and POPPCT variables also are insignificant in this regression.

In Bowen's study of competitive balance and free agency, his results indicated a free agency dummy variable in two models of competitive balance that was significant in the AL but not the NL. My results mirror Bowen's regression results when dividing the sample by leagues.

2) *New York Yankees Effect – Grabowski, Johnson*

One possibility for the discrepancy between the effect of NFRAG on the AL and NL would be a consistently unusually performing team. In the AL, the New York Yankees tend to have one of the highest payrolls and have the best overall winning performance over the duration of the sample. If the Yankees' winning percentages are removed from the sample, the average AL standard deviation drops significantly, -.00266 (t=-3.15).

[17] The NFRAG coefficient has a t-statistic of 1.54 (p=.064).

In the AL regression without the Yankees winning percentages, the effect of NFRAG is not significant (t=1.23). This change would indicate that the Yankees' performances have contributed to the observed positive effect of NFRAG on standard deviation, and it would imply that the Yankees have benefited (in terms of winning) from more free agents being available.

The New York Yankees also may be responsible for the apparent significance of the DRAFT variable. At just about the same time as the draft was instituted, CBS bought the Yankees and, according to Bruce Johnson, "turned them from a dynasty to an also-ran almost overnight." When George Steinbrenner's group took over in the 1970's, the Yankees turned around very quickly. "The demise of the Yankees due to incompetence of ownership may have more to do with the increase in competitive balance than did the introduction of the draft" (Johnson). The insignificance of the DRAFT variable in the regression without the Yankees furthers Johnson's point.

3) *Draft Lag – Zimbalist*

In 1965, MLB instituted a reverse order draft. In my original regression, I use a dummy variable equal to 1 for years after 1964. Zimbalist believes that it would take approximately three years before drafted amateurs would have an impact in the major league. A more appropriate model might be a lagged dummy from 1965 (e.g. a dummy equal to 1 for years after 1967). There are no significant changes in the regression coefficients after lagging the draft dummy variable.

4) *log NFRAG – Grabowski, Tower*

There has been an increasing number of free agents since 1977. There was an average of 27 free agents per year during the late 1970's compared to 122 annually during the 1990's. The players who declared free agency during the 1970's were generally of higher caliber than the average player (of the 122) who declared free agency in the 1990's. Given that higher caliber players have a greater effect on winning, this might suggest that a linear model for

NFRAG would not be appropriate. To adjust for the lower quality of the average free agent (as NFRAG increases), I ran a regression using the log of NFRAG.

Contrary to the intuition that higher caliber players as free agents would have a greater impact (because their play has a greater impact on winning percentages), the regression using the log of NFRAG returned an insignificant (but still positive) coefficient on the key variable. I attribute this decline in significance to a flaw with the intuition. If one considers transaction costs associated with trades to be the limitation to the Invariance Proposition, this could explain the fault of the above extension. The marginal revenue product (MRP) of "star" players dominates the MRP of lesser quality free agents. The transaction costs of the trade (though not necessarily constant) most likely represent a greater percentage of "lesser" free agents' MRPs. This would suggest that under the reserve clause a star player was much more likely than an average player to end up with the team that most valued his services. This logic implies the observed results from the regression – that a linear NFRAG model is more appropriate than a model with the log of NFRAG.

My regression model counted the number of free agents, but it did not assess the overall quality of the free agent pool from year to year.[18] Though the log of NFRAG model may not have been as appropriate as the linear model, total quality of the free agents most likely has an effect on competitive balance. I leave analysis of this topic for future investigation.

5) *Dummy Variable – Zimbalist*

My original regression measures free agency's effect on competitive balance by multiplying the regression coefficient by the number of free agents in a given season. That would imply that free agency's effect on competitive balance changes each year depending on the number of free agents. In order to estimate a constant, general effect of free agency, previous researchers have used a dummy variable. Using a free agency dummy in my pooled sample to gauge the effect of free agency returns positive (free agency causes a decline in competitive balance) but insignificant results.

[18] The quality of the free agent pool could be measured by salaries or previous years' statistics.

I do not feel that an unweighted dummy is an appropriate measure because the number of free agents “grows [during the] 1980s as the free market mechanism was honed through collective bargaining” (Fort). The intuition behind this paper is that as more players declared free agency, “a loosening of restrictions on player mobility,” the greater its effect. I ran a supplemental regression using a weighted variable equal to 0 for NFRAG$\leq$3, 1 for 3<NFRAG$\leq$50, 2 for 50<NFRAG$\leq$100, and 3 for NFRAG>100; the regression returned a positive and significant coefficient for this variable.

6) *POPPCT – Johnson, Meier*

To gauge talent compression, Zimbalist and my own regression use a percentage of the US population. The influx of Latin American, and now Asian, players and the populations of their home countries most likely have had a major effect on MLB talent level. In 1999, 21.2 percent of MLB's players on opening-day rosters and 40 percent of all major and minor league players who signed contracts with MLB during the season were born outside the United States. The greatest contributor to this non-American presence in MLB would be Latin players.

Adjusting for Latin players, I reran the regression with a new measure of talent compression. I multiplied the POPPCT variable by the fraction of non-Latin players to get AMPOPPCT.[19] Running the regression with this variable in place of POPPCT increases the significance of NFRAG, and it also increases the significance of the talent compression control.

7) *Strike and Games – Fort, Grabowski, Johnson*

Given equal levels of true competitive balance, shorter seasons should have the greatest standard deviation (and thus would be represented with a higher level of competitive imbalance). Applying the same logic, we would expect that the 154-game seasons (1950-1960 in my sample) would have greater standard deviations of winning percentages than a year with 162 games (for an equal “true” level of competitive balance). To control for the number of

[19] This fraction was approximated year to year using linear changes based on data from every 5 years.

games effect, my original regression included a GAMES variable. This variable attempted to control for the effects of shortened seasons due to labor strikes in my sample.

Running the original regression from 1962 onwards (the beginning of the 162 game season) increases the significance of the GAMES variable coefficient. I also ran a regression substituting out the GAMES variable for a strike dummy equal to 1 for years with a labor strike (1972, 1976, 1981, 1990, 1994, 1995); the strike dummy was positive but not significant. These regression results follow the logic that the number of the games is inversely correlated with standard deviation.

8) *Payroll – Fort, Grabowski*

Free agency does not change outcomes of baseball games. It may, however, affect player distribution and team payrolls. Fan-driven changes in the value of free agents would cause changes to the coefficient of variation of payrolls.[20] It is changes to payrolls, according to Fort, that causes the competitive balance effect observed with a growing number of free agents. Namely, "if the value of players is growing dramatically in a few already high revenue places relative to the rest of the league, then more talent will move there and competitive balance should decline" (Fort).

Since the introduction of free agency, there has been a general increase in the coefficient of variation for team payrolls.[21] There is also a significant, positive correlation between NFRAG and the annual coefficients of variation of payroll. Free agency (and in particular the number of free agents) likely causes changes to coefficient of variation of payrolls (in addition to merely increasing team payrolls).[22] The change in coefficient of variation of payroll, as Fort argues, may be the direct cause of changes in competitive balance. Free agency, then, could also be associated with a decline in competitive balance through affecting team payroll decisions.

[20] Standard deviation of team payrolls divided by mean payroll.
[21] A regression of this variable over time returns a significant and positive coefficient.
[22] This relationship could be explained by free agency decreasing the costs associated with player movement under the reserve clause system.

9) *Imbalance Creation – Tower, Zimbalist*

During the 1976 season, Charles Finley, owner of the Oakland Athletics tried to sell Rollie Fingers and Joe Rudi to the Red Sox and Vida Blue to the Yankees, and he did sell Paul Lindblad to the Rangers. Baseball commissioner, Bowie Kuhn, voided the sales of Fingers, Rudi, and Blue, determining that they were not "in the best interests of baseball." Kuhn later voided another sale of Blue to the Reds. MLB, soon after, established rules that set a maximum exchange of money for players.

Teams can improve through unbalanced trades or net positive free agent signings.[23] With the limitations on unbalanced trades since the 1976 season, teams' primary means of improvement would be through free agents. From this perspective, the number of available free agents would play a great role in teams' abilities to improve and in making the league less competitively balanced.

[23] This assumes constant production of the farm system.

# Regressions

| | Reg1 | AL | NL | AL - NYY | Draft Lag | Dummy | log NFRAG | Step NFRAG | AMPOP | 162 Games | Strike |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | -0.01882 | 0.01161 | 0.04217 | 0.00972 | -0.02627 | 0.01439 | 0.01492 | 0.00023 | -0.01656 | -0.01526 | -0.03314 |
| | (-0.46) | (0.17) | (0.83) | (0.14) | (-0.60) | (0.33) | (0.35) | (0.01) | (-0.42) | (-0.32) | (-0.78) |
| NFRAG | 0.00022 | 0.00024 | -0.00006 | 0.00020 | 0.00026 | | | | 0.00018 | 0.00002 | 0.00002 |
| | (2.74)[a] | (1.55) | (-0.30) | (1.23) | (3.45)[a] | | | | (2.95)[a] | (0.21) | (0.22) |
| DRAFT | -0.01437 | -0.01951 | -0.02403 | -0.00820 | -0.01390 | -0.02403 | -0.02078 | -0.01398 | -0.01334 | -0.01545 | -0.01608 |
| | (-1.69)[b] | (-1.74)[b] | (-2.55)[a] | (-0.69) | (-1.62) | (-2.70)[a] | (-2.25)[b] | (-1.60) | (-1.62) | (-2.48)[a] | (-2.54)[a] |
| POPPCT | 80612.2 | 63016.4 | 30262.0 | 62311.9 | 87618.6 | 45252.1 | 50650.1 | 75548.6 | | 41053.1 | 42070.6 |
| | (4.49)[a] | (2.62)[a] | (1.53) | (2.44)[a] | (4.77)[a] | (3.32)[a] | (3.43)[a] | (4.39)[a] | | (1.64) | (1.68)[b] |
| EXPAN1 | 0.00841 | 0.01502 | 0.02604 | 0.01317 | 0.00886 | 0.00994 | 0.01079 | 0.00996 | 0.01062 | 0.01327 | 0.01310 |
| | (1.68)[b] | (1.40) | (3.15)[a] | (1.16) | (1.78)[b] | (1.80)[b] | (1.96)[b] | (1.98)[b] | (2.28)[b] | (2.80)[a] | (2.76)[a] |
| EXPAN2 | -0.00057 | -0.00307 | -0.00254 | -0.00295 | -0.00010 | -0.00238 | -0.00111 | -0.00013 | 0.00037 | 0.00297 | 0.00329 |
| | (-0.12) | (-0.27) | (-0.29) | (-0.25) | (-0.02) | (-0.44) | (-0.20) | (-0.03) | (0.08) | (0.83) | (0.93) |
| EXPAN3 | -0.00099 | 0.00354 | -0.00517 | 0.00387 | -0.00024 | -0.00197 | -0.00066 | 0.00010 | 0.00045 | 0.00332 | 0.00313 |
| | (-0.20) | (0.33) | (-0.64) | (0.34) | (-0.05) | (-0.36) | (-0.12) | (0.02) | (0.10) | (0.92) | (0.87) |
| GAMES | -0.00010 | -0.00012 | -0.00020 | -0.00012 | -0.00013 | -0.00014 | -0.00012 | -0.00016 | -0.00012 | -0.00009 | |
| | (-0.69) | (-0.53) | (-1.05) | (-0.49) | (-0.88) | (-0.90) | (-0.76) | (-1.09) | (-0.85) | (-0.85) | |
| TEAMS | -0.00448 | -0.00626 | 0.00011 | -0.00679 | -0.00489 | -0.00090 | -0.00194 | -0.00436 | -0.00251 | -0.00008 | -0.00002 |
| | (-2.94)[a] | (-2.05)[b] | (0.04) | (-2.10)[b] | (-3.53)[a] | (-0.75) | (-1.27) | (-2.79)[a] | (-2.20)[b] | (-0.04) | (-0.01) |
| DFRAG | | | | | | 0.00117 | | | | | |
| | | | | | | (0.18) | | | | | |
| log NFRAG | | | | | | | 0.00176 | | | | |
| | | | | | | | (0.90) | | | | |
| SNFRAG | | | | | | | | 0.00929 | | | |
| | | | | | | | | (2.59)[a] | | | |
| AMPOPPCT | | | | | | | | | 70581.3 | | |
| | | | | | | | | | (5.26)[a] | | |
| Strike | | | | | | | | | | | 0.00228 |
| | | | | | | | | | | | (0.71) |

t-stat values appear under the corresponding parameter estimate
Adjusted R-squared value .5584
a – statistically significant at the 1 percent level
b – statistically significant at the 5 percent level
Significance levels for one-tailed t-test

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