

On the Nonoptimality of the Compensation System in Major League Baseball

Players are not paid according to their current or anticipated future performance; they are paid through a system of entitlement that rewards experienced athletes who have played well *at some time* in their careers.

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Major league baseball faces a problem that has confronted several industries: the public's perception of outrageous salaries. Many people believe that the salaries paid to players are not indicative of the athletes' performances and, moreover, that players' incomes are simply too high. In particular, a March 2001 Gallup poll found that 58 percent of respondents felt that the increase in salaries has been bad for baseball; additionally, 79 percent favored implementing a cap to control salaries.¹

Also of concern is the possibility that the escalation of baseball players' salaries will irrevocably damage the sport itself. Former Senator George Mitchell, in noting that playoff games are disproportionately won by the highest paying teams, stated that the current system of compensation threatens to make baseball "less competitive, therefore less exciting, less popular and ultimately less profitable."² In the past year, there has even been talk of eliminating two teams through contraction.

This article examines the compensation system of major league baseball and finds that players generally are not paid according to current performance or a realistic anticipation of future performance. These athletes are, rather, compensated based on what they have accomplished in the past. The specific measures of performance considered

here are batting average, home runs, runs batted in, wins, and earned run average; the first three items are used to evaluate position players, while the last two apply to (starting) pitchers.

The organization of the discussion is as follows: We begin with a basic description of the compensation structure of major league baseball, including some details related to payroll escalation. Then, we focus on baseball's highest earners and examine whether these players remain productive in the years following large payouts. The next section draws analogies between major league baseball and corporate America, with a particular emphasis on regulatory efforts. Finally, we offer some concluding remarks.

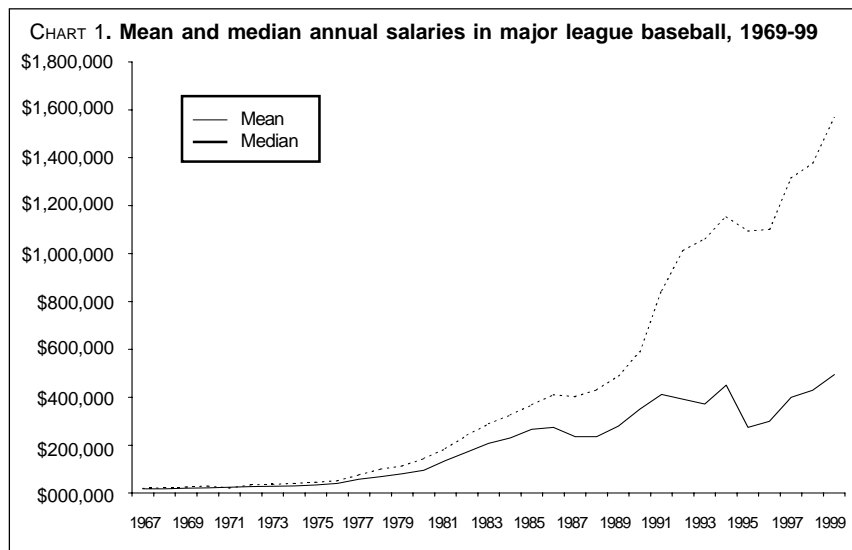
Compensation

The structure of compensation. The existing structure of player compensation in major league baseball assumed its current form in the mid-1970s when salary arbitration and free agency were established. Because bonuses based on individual performance statistics are specifically prohibited by the league,³ the overwhelming majority of compensation comes in the form of contractually fixed salary payments. This system, in fact, has been compared to a mix of capitalism and communism;⁴ the draft to which players are initially sub-

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The authors's views are their own and do not necessarily reflect those of the Bureau of Labor Statistics.



ject is analogous to communism, while the subsequent *free agent* status and availability of salary arbitration more closely reflect a capitalist system. The connection between these two economic extremes is a complex relationship between players and owners; guiding the actions of both sides are issues of the reserve clause, arbitration, and free agency.

Zimbalist⁵ clarified this complex relationship and categorized players into three separate labor markets: apprentices, journeymen, and masters. Apprentices, those new to the league (often acquired via the amateur draft), are tightly bound to their employing teams by the reserve clause and contractual obligations that do not include opportunities for arbitration. Under the reserve clause, a player's movement to another team during these early years can be accomplished only with the employing team owner's consent. The reserve clause, in effect, grants monopsony power to the team owner.⁶ Furthermore, while apprentices may, at the team owner's discretion, earn more, they are guaranteed only a minimum annual salary (currently \$200,000), which is arguably below market value for some players.

Journeymen are primarily those players with 3 to 5 years' major league experience. The important distinction between these more experienced players and apprentices is the availability of salary arbitration. With the opportu-

nity for arbitration, journeymen, even under contractual obligations and the reserve clause, are allowed some negotiating rights with respect to their employment contracts. When arbitration is employed, the process takes place during the off-season and allows each side (owner and player) to present a final contract offer to a neutral judge. The arbitrator then chooses, without compromise or adjustment, one of the offers; both parties are bound by that decision.⁷

The final category, the masters, is composed of players with 6 or more years' experience in the league. Masters can be free agents, not bound by reserve restrictions and allowed to negotiate with any team. Naturally, the category of masters includes baseball's highest earning athletes. While the reserve clause may work in the owners' favor to keep salaries low, both arbitration and free agency have been shown to benefit players by increasing annual compensation.⁸ Free agency, moreover, appears to serve players by fostering guaranteed, long-term contracts.⁹ The most dramatic salary increases, in fact, have occurred in the past 25 years, immediately following the establishment of the free agent (or master) status.

Figures on compensation in recent years.¹⁰ Only in the late 1970s did baseball salaries begin to stand out in earnest from normal occupational salaries

in the United States. As late as 1975, the median salary for baseball players was a fairly modest \$34,000 (still within an order of magnitude of the nationwide median income figure, \$5,664), while the mean salary was only \$44,676 (again, within an order of magnitude of the nationwide figure, \$7,705).¹¹ (See chart 1.) Both the median and mean salaries, however, increased substantially during the next decade. Then, about 10 years ago, the shape of the salary distribution began to change, becoming more skewed to the right. From 1989 to 1992, as a select group of master players began to prosper, the mean salary more than doubled, from about \$490,000 to \$1.01 million; the median salary, on the other hand, increased by only about 40 percent over this time, from \$280,000 to \$392,500.

The labor stoppage in 1994-95 may have temporarily slowed the growth of some salaries. For the first time in 8 years, both the median and mean salary declined; the former fell by nearly 40 percent, while the latter, buoyed by dozens of individuals who were earning very high salaries, dropped only slightly. Later, as disputes were resolved and expansion teams were added, players of various ability and experience levels began to enjoy higher salaries; notably, the minimum salary nearly doubled in the 3-year period from 1996 to 1999. By 1999, the median salary was \$495,000, and the mean had grown to \$1.57 million.

Although the median and mean provide useful information, they do not reveal the whole picture. A look at the proportions of players making more than certain amounts (table 1) and the high percentiles of the salary distributions (table 2) provides additional insight into the compensation structure in major league baseball, especially at the top, where it has provoked the most controversy.

As late as 1986, fewer than one-tenth (9.9 percent) of major league baseball players made \$1 million or more per year, and fewer than 1 percent made more than \$2 million. By 1989, more than 15 percent of players were earning in excess of \$1 million, while a grow-

TABLE 1. Numbers and percentages of players earning certain amounts annually, selected years, 1986-98 ¹

| | 1986 | | 1989 | | 1992 | | 1995 | | 1998 ² | |
|--------------------------------------|--------|---------|--------|---------|--------|---------|--------|---------|-------------------|---------|
| | Number | Percent | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| Total | 690 | 100 | 711 | 100 | 751 | 100 | 974 | 100 | 1,050 | 100 |
| Earning at least \$0.5 million | 244 | 35.4 | 257 | 36.1 | 361 | 48.1 | 345 | 36.2 | 429 | 40.9 |
| Earning at least \$1 million | 68 | 9.9 | 110 | 15.5 | 268 | 35.7 | 235 | 24.6 | 317 | 30.2 |
| Earning at least \$2 million | 3 | 0.4 | 24 | 3.4 | 176 | 23.4 | 167 | 17.5 | 216 | 20.6 |
| Earning at least \$3 million | 0 | 0 | 0 | 0 | 68 | 9.1 | 122 | 12.8 | 149 | 14.2 |
| Earning at least \$4 million | 0 | 0 | 0 | 0 | 22 | 2.9 | 78 | 8.2 | 98 | 9.3 |
| Earning at least \$5 million | 0 | 0 | 0 | 0 | 3 | 0.4 | 34 | 3.6 | 63 | 6.0 |

¹ The sum of the number of players or percentages by pay category will exceed the total because some players are counted in more than one pay category.

² The numbers in the 1998 column(s) are estimates. The list of salaries for 1998 did not include players who were not on opening day rosters; it thus omitted low-paid minor-league players who were called up during midseason.

TABLE 2. Top percentiles of major league baseball annual salaries, selected years, 1986-98

| Percentile | Annual salary (millions) | | | | |
|------------|--------------------------|--------|--------|--------|-------------------|
| | 1986 | 1989 | 1992 | 1995 | 1998 ¹ |
| 90th | \$0.98 | \$1.25 | \$2.87 | \$3.49 | \$3.75 |
| 95th | 1.16 | 1.68 | 3.50 | 4.67 | 5.05 |
| 99th | 1.83 | 2.34 | 4.50 | 6.35 | 7.98 |

ing number of big-name players were earning above \$2 million. In 1992, more than a third of the players earned at least \$1 million, while nearly a quarter earned \$2 million or more; furthermore, almost 10 percent of players were being paid at least \$3 million annually.

Even while the proportion of millionaires began to level off in the 1990s, the very top of the salary distribution continued to move rightward. In 1992, for example, only three players earned \$5 million dollars; in 1995, a \$5-million dollar salary would have placed below the 97th percentile; and, in 1998, it would have been near the 94th percentile. This is more dramatic than it may at first seem, because one percentile contains about 10 players, and the principle of “one-upmanship” seems to apply to big-name athletes as much as to anyone else. For instance, one player’s 1996 contract stipulated that his salary be adjusted so that he could remain one of the three highest paid players in the league.¹²

By 1998, the 90th, 95th, and 99th percentiles had increased to about 3.83, 4.35, and 4.36 times their values in 1986. During the intervening 12 years, the top of the salary distribution had clearly grown much faster than the middle, as the median salary did not even double. Finally, we note that the growth at the top end of the salary distribution has

remained unabated even in the last 3 years: as of January, 2002, 13 baseball players are contracted to receive average annual salaries of \$15 million or more; the highest figure is an astonishing \$25.2 million.¹³

Performances of high earners¹⁴

Characterizing the highest paid athletes. This section presents characteristics of the players who receive the highest salaries. Attention will be given to the seasons of 1992 and 1998, so that the players’ performances before, during, and after these years may be compared without the confounding factor of the season-shortening labor problems of 1994 and 1995.

In 1992, the first year in which the mean salary exceeded \$1 million, 31 players earned at least \$3.6 million. Of these, 23 had attained raises of at least 25 percent from the preceding season. Perhaps the simplest way to characterize this elite group of master players is by position played: almost all of these athletes were starting pitchers (10), outfielders (10), or first basemen (7). This phenomenon is not difficult to explain. Good starting pitchers have traditionally been important to the success of their teams, and the large, strong athletes who are most likely to excel in several offensive categories (such as home

runs and runs batted in) are less likely to be agile enough to play demanding defensive positions such as second base and shortstop.

It is interesting to observe, in table 3, that the median batting average in 1991 (the year prior to the one in which these athletes received \$3.6 million or more) was a pedestrian 0.282 for the 20 position players. Furthermore, the 25th and 75th percentiles in batting average were only 0.264 and 0.301, respectively. On the other hand, the median home run total was 25, while the 25th and 75th percentiles were 19.75 and 29.5; the median runs-batted-in (RBI) total was 97.5, whereas the 25th and 75th percentiles were 79.5 and 110, respectively. These home run and RBI totals, in context, are fairly impressive: 1991 predates the modern expansion era of major league baseball, in which offensive statistics—especially home runs—have surged to an unprecedented level.

As shown in table 4, the median number of wins in 1991 for the 10 starting pitchers in this group was 14.5. Three of these pitchers won exactly 18 games, which would have been considered outstanding, while the rest posted average to moderately above-average victory totals (between 12 and 15). The median earned run average (ERA) for these pitchers was 3.32, which, in 1991, would have been considered good but not outstanding. (Now, however, an ERA of 3.32 would be among the best in baseball.) Three of the ten pitchers posted ERAs below 3, while none finished above 4.¹⁵

Finally, we characterize the highest paid players of 1992 by the year in

TABLE 3. Selected performance indicators of 1992is highest paid position players, 1991-93 seasons

| Season | Batting average percentile | | | Runs-batted-in percentile | | | Home runs percentile | | |
|------------|----------------------------|-------|-------|---------------------------|-------|--------|----------------------|-------|-------|
| | 25th | 50th | 75th | 25th | 50th | 75th | 25th | 50th | 75th |
| 1991 | 0.264 | 0.282 | 0.301 | 79.50 | 97.50 | 110.00 | 19.75 | 25.00 | 29.50 |
| 1992 | .248 | .267 | .286 | 69.25 | 85.50 | 95.50 | 11.75 | 16.50 | 25.25 |
| 1993 | .253 | .280 | .293 | 60.75 | 79.50 | 101.25 | 12.25 | 19.50 | 31.50 |

TABLE 4. Selected performance indicators of 1992is highest paid starting pitchers, 1991-93 seasons

| Season | Wins percentile | | | Earned run average percentile | | |
|------------|-----------------|-------|-------|-------------------------------|------|------|
| | 25th | 50th | 75th | 25th | 50th | 75th |
| 1991 | 13.00 | 14.50 | 17.25 | 3.56 | 3.32 | 2.95 |
| 1992 | 10.25 | 13.00 | 17.25 | 3.71 | 3.22 | 2.80 |
| 1993 | 8.25 | 11.00 | 11.75 | 4.29 | 3.39 | 3.14 |

which they began their careers. It is not sufficient to merely identify these athletes as masters: some were much older than others. Specifically, we may note that 12 of the 31 made their debuts in 1986; these athletes commanded high salaries on the market as newly available free agents. Of the remaining 19 players, 14 were still relatively young, having made their first appearances between 1982 and 1985. One athlete in this group had begun his career before 1977.

We now consider another elite group of athletes, the 34 players who earned at least \$6 million for the 1998 season. There are both similarities and differences between the top earners of 1992 and of 1998. The first noticeable difference is that only a small minority of the highest paid players in 1998 received substantial raises from 1997: 7 out of the 34 earned raises of more than 25 percent from the previous year.

While starting pitchers (10) and outfielders (11) were again well-represented among the highest paid athletes in 1998, players at several other positions also achieved this distinction: in the group

were 4 first basemen, 3 second basemen, 2 third basemen, 2 catchers, and 2 designated hitters. Remarkably, one of the players did not take the field at all during 1997 or 1998, due to injury.

As depicted in table 5, the median batting average was 0.296 for the 23 (out of 24) position players who competed in 1997; the first and third quartiles in batting average were 0.272 and 0.323, respectively. The median home run total for these players in 1997 was 33, while the 25th and 75th percentiles were 18.5 and 40; also, the median RBI total was 101, whereas the 25th and 75th percentiles were 74 and 123.5, respectively. While we observe an upward shift in all three offensive categories when comparing these figures with those for 1991, it is worth noting that the most dramatic increases are at the tops of the distributions of these performance statistics. To be fair, we should also mention that the overall level of offense in major league baseball was somewhat greater in 1997.

As can be seen in table 6, the top-paid starting pitchers of 1998 also outperformed their peers from 1992; this

stands in contrast to the general decline in pitching performance between 1991 and 1997. The median win total for these pitchers in 1997 was 16, while the top three of these combined for 60 victories. As for ERA, the median value was a genuinely impressive 2.89; in fact, four of the pitchers posted ERAs below 2.30, about half of the league average in 1997.

We conclude our description of the highest earners of 1998 by looking at when they began their careers. Nine of these 34 made their debut in 1991 or 1992, and nine others made their first appearance in 1989 or 1990. This means that 16 of the players were well-established veterans when they earned their large salaries in 1998; the oldest had begun his career in 1981.

The evidence presented in this section shows that, in terms of position and experience level, the top-paid athletes in 1998 constituted a somewhat more diverse lot than did their counterparts of 1992. The 1998 group also had better prior offensive and pitching performances relative to their peers from 1992.

Do the top earners maintain their productivity? In the last subsection, the highest paid athletes of 1992 and 1998 were characterized in several ways; one was how well they had performed in the respective preceding seasons. To further illuminate the nature of baseball's compensation system, we now

TABLE 5. Selected performance indicators of 1998is highest paid position players, 1997-99 seasons

| Season | Batting average percentile | | | Runs-batted-in percentile | | | Home runs percentile | | |
|------------|----------------------------|-------|-------|---------------------------|-------|-------|----------------------|-------|-------|
| | 25th | 50th | 75th | 25th | 50th | 75th | 25th | 50th | 75th |
| 1997 | 0.272 | 0.296 | 0.323 | 74.0 | 101.0 | 123.5 | 18.50 | 33.00 | 40.00 |
| 1998 | .282 | .303 | .320 | 76.0 | 109.0 | 121.5 | 18.50 | 29.00 | 43.50 |
| 1999 | .289 | .301 | .324 | 78.5 | 114.0 | 125.5 | 18.75 | 33.50 | 39.75 |

TABLE 6. Selected performance indicators of 1998's highest paid starting pitchers, 1997-99 seasons

| Season | Wins percentile | | | Earned run average | | |
|------------|-----------------|-------|-------|--------------------|------|------|
| | 25th | 50th | 75th | 25th | 50th | 75th |
| 1997 | 14.25 | 16.00 | 18.50 | 3.08 | 2.89 | 2.22 |
| 1998 | 17.00 | 19.00 | 20.00 | 3.49 | 2.90 | 2.65 |
| 1999 | 12.25 | 14.00 | 17.75 | 3.98 | 3.47 | 3.24 |

TABLE 7. Changes in selected performance indicators of 1992's highest paid position players, 1991-93 seasons

| Item | 1991 vs. 1992 | | | 1991 vs. 1993 | | |
|---------------|---------------|-----------|-----------------|---------------|----------|-----------------|
| | RBI | Home runs | Batting average | RBI | Home run | Batting average |
| Change | -12.1 | -6.0 | -.012 | -16.2 | -3.7 | -.010 |
| p value | .034 | .004 | .077 | .032 | .248 | .382 |

TABLE 8. Changes in selected performance indicators of 1992's highest paid starting pitchers, 1991-93 seasons

| Item | 1991 vs. 1992 | | 1991 vs. 1993 | |
|---------------|---------------|-------|---------------|------|
| | Wins | ERA | Wins | ERA |
| Change | -1.60 | -0.06 | -3.90 | 0.52 |
| p value | .302 | .746 | .020 | .382 |

consider how well these players did during and after the seasons for which they received top dollar: do athletes who achieve the highest status in salary continue to perform at the same level? In answering this question, the following specific performance measures will again be considered: RBIs, home runs, batting average, wins, and ERA.

In 1992, as the numbers in tables 3 and 4 would suggest, the answer was clearly no. From table 7, one can see that there was a statistically significant decline in the mean number of runs batted in (12.1, $p = 0.034$)¹⁶ for the 20 position players who earned at least \$3.6 million in 1992. Moreover, there was a highly significant decline in the mean number of home runs (6.0, $p = 0.004$). There was also a mean fall of 12 points in batting average. Comparing the 1991 statistics with what the players accomplished in 1993, we see that there was a significant decline in the mean number of RBIs (16.2, $p = 0.032$); mean batting average and home run totals changed less dramatically, but also dropped from 1991.

As for the 10 starting pitchers who

earned at least \$3.6 million in 1992, their performances in 1992 were similar to their 1991 campaigns; however, their 1993 performances were of lesser quality. (See table 8.) The mean decline in wins from 1991 to 1993 was statistically significant (3.9, $p = 0.020$); the mean increase in ERA was a moderate 0.52. Surprisingly, only 2 pitchers out of the 10 were able to achieve more than 12 wins in 1993; 4 of the pitchers failed to post even 10 wins.

Looking at the players individually, we have determined that 17 of the 31 performed worse in 1993 than in 1991; on the other hand, 9 performed better while 5 posted comparable records.

What about the group of players who earned at least \$6 million in 1998? The 24 position players' performances in 1997, 1998, and 1999 were similar, as suggested by table 5. In particular, there were no statistically significant differences in the mean RBI and home run totals, or in batting average. (See table 9.)

However, as may be inferred from table 6, the 10 starting pitchers performed decidedly less well in 1999 than in 1997 and 1998. The mean ERA in-

creased by 0.34 from 1997 to 1998 and by 0.47 from 1998 to 1999; the overall change of 0.80 from 1997 to 1999 was statistically significant ($p = 0.017$). (See table 10.) It is surprising that only two pitchers in this elite group posted ERAs below 3 in 1999. Furthermore, while the 10 pitchers combined for 160 or more wins in both 1997 and 1998, they produced only 148 wins in 1999.

Individually, 17 of the 34 top-paid players of 1998 had more impressive campaigns in 1997 than they did in 1999, while 12 did better in 1999; 5 performed at about the same level in both seasons.

Taking the analysis one step further, for the 1992 group we may look at their whole careers and ask whether the players reached their peaks before, during, or after the 1992 season. This kind of assessment is possible because about half of these athletes have retired and almost all of the others are probably past their primes.

Upon examination, we found that 10 of the 31 players had peaked by 1987—a full five years earlier—while 14 had done their best work between 1988 and 1991. One athlete had his career-best performance in 1992, although his 1988 season was a very close second. Only six of the players became more productive after 1992.

To recapitulate, there is much evidence that well-compensated players—especially pitchers—more often perform better in the years before, rather than after, their high income seasons. There are at least three explanations for this phenomenon.

First, the players who can negotiate the largest salaries are the free agents who have been in the game for several years (that is, the masters). Most athletes reach their physical peaks in their twenties, so it may simply be unrealistic to expect an established player to attain the levels of his past performances.

Second, while expectations for many high-earning players are lofty, some of these athletes may, paradoxically, be asked to do less because they make more. For instance, starting pitchers are now carefully monitored (for ex-

TABLE 9. Changes in selected performance indicators of 1998's highest paid position players, 1997-99 seasons

| Item | 1997 vs. 1998 | | | 1997 vs. 1999 | | |
|---------------|---------------|------|-------|---------------|------|-------|
| | RBI | HR | BA | RBI | HR | BA |
| Change | 7.13 | 2.74 | -.003 | 6.55 | 3.05 | -.002 |
| p value | .140 | .186 | .701 | .336 | .221 | .836 |

TABLE 10. Changes in selected performance indicators of 1998's highest paid starting pitchers, 1997-99 seasons

| Item | 1997 vs. 1998 | | 1997 vs. 1999 | |
|---------------|---------------|------|---------------|------|
| | Wins | ERA | Wins | ERA |
| Change | 1.9 | .43 | -1.2 | .80 |
| p value | .146 | .042 | .456 | .017 |

ample, through pitch counts) to make sure that they do not overexert themselves; injuries are more potentially costly than ever to these players, who pitch perhaps 20 percent fewer innings than they might have a generation ago. In fact, the linear correlation between mean player salary and number of starts per complete game is a very high *positive* 0.9784 from 1969 to 1999; while other (game-specific strategic) factors besides compensation have been involved in the declining frequency of complete games, this correlation is still remarkable.¹⁷

Lastly, the system of compensation, in which current salary has very little direct dependence on current performance, does not provide much incentive for players to put forth their best effort; while some players have built a reputation on working hard every day, other players might perform better if they were given a monetary incentive to do so.

Comparing major league baseball with corporate America

The critical evaluation and public concern regarding compensation have similarly occurred in the corporate setting. While the compensation of major league baseball players is high, it has not yet reached the levels achieved by the chief executive (and other) officers of many large corporations. Recently, in fact, annual compensation of two CEOs exceeded \$1 billion.¹⁸ With regard to compensation, CEOs are most

similar to baseball's masters. Both are free to market their services to the employers of their choosing, and, once an agreement is reached, the contract could potentially be a multiyear, multi-million-dollar arrangement.

Players and CEOs are also both confronted with actions designed to limit their compensation. In baseball, the reserve clause, owner collusion, and a luxury tax have been employed as methods of reducing salaries. Baseball's luxury tax (a levy imposed by the league on salaries above certain threshold limits) most closely approximates the compensation restrictions imposed on U. S. corporations. In the corporate setting specifically, restrictions generally come in the form of income tax legislation. The most recent measure imposed was a law limiting the firm's annual deduction of CEO compensation to \$1 million (the Revenue Reconciliation Act of 1993). As with the luxury tax, compensation itself was not specifically restricted by this law; rather, those firms with very highly compensated officers were essentially subject to a greater tax.

Such regulatory attempts to lower compensation have not achieved their intended goal. For corporations, tax legislation has been shown to foster creativity in payment alternatives¹⁹ or even increase executive compensation.²⁰ Importantly, no instances of compensation decreases have been found. Similarly, in baseball, the luxury tax imposed on certain teams appears

to be sufficiently small so as not to act as a deterrent to salary increases. In 1999, for instance, the luxury tax imposed on the five teams with the highest payrolls averaged only about 3 percent of total compensation.²¹ To what extent—and even *whether*—regulatory forces should be involved in the compensation of major league baseball players has remained a subject of debate.²²

Conclusion

Public opinion of the system of compensation in major league baseball is often negative. In fact, as the analyses above have demonstrated, players are not compensated according to their current performance or realistic prospects for future performance; they are paid through a system of entitlement rather than incentive, a system that lavishly rewards experienced athletes who have played well *at some time* in their careers. And, as in the corporate setting, measures designed to control escalating salaries (that is, the imposition of taxes) have not been a deterrent.

In considering possible alternative systems of compensation, it is interesting to note that players do sometimes receive bonus payments based on criteria that *indirectly* reflect their performances, such as making the All-Star team and reaching the playoffs. One may then ask whether players who receive such bonus payments outperform other players and the league in general. In 1996 (the most recent year for which we have analyzed bonus data), players earning bonuses did perform better in several categories. (See table 11.)

The preceding analysis of bonus data suggests that athletes who have an incentive to play well may, in fact, do so. Therefore, one reasonable alternative that may be considered in the future is the removal of the existing restriction on offering bonus payments according to direct measures of players' performances. Incorporating a system of bonus payments based on such measures into a future compensation system may address some of the non-optimality of the current system. ■

TABLE 11. Comparison of performance indicators for players receiving bonus payments in 1996, players not receiving bonus payments, and all players

| Measure | Position players | | | Measure | Pitchers | | |
|-----------------------------------|------------------|----------|-------|---------------------------|----------|----------|-------|
| | Bonus | No bonus | Total | | Bonus | No bonus | Total |
| Batting average | 0.285 | 0.262 | 0.270 | ERA | 4.06 | 4.85 | 4.60 |
| Home run rate ²⁴ | 18.87 | 14.26 | 15.82 | Win rate ²⁴ .. | 10.99 | 9.63 | 10.06 |

¹ Tom Verducci, "Poll shows baseball is losing fans," Apr. 10, 2001. http://sportsillustrated.cnn.com/inside_game/tom_verducci/news/2001/04/10/verducci_insider/

² "Courteous competition," *USA Today*, July 18, 2000, p. 12b.

³ Andrew Zimbalist, *Baseball and Billions* (New York, HarperCollins Publishers, Inc., 1992).

⁴ M. Ozanian and S. Tuab, "Adam Smith faces off against Karl Marx," *Financial World*, Feb. 4, 1992, pp. 32-35.

⁵ Andrew Zimbalist, "Salaries and Performance: Beyond the Scully Model," *Diamonds are Forever* (Washington, The Brookings Institution, 1992); and Andrew Zimbalist, *Baseball and Billions*.

⁶ G. Scully, "Pay and Performance in Major League Baseball," *American Economic Review*, December 1974, pp. 915-30.

⁷ D. Frederick, W. Kaempfer and R. Wobbekind, "Salary Arbitration as a Market Substitute," *Diamonds are Forever* (Washington, The Brookings Institution, 1992).

⁸ L. Kahn, "Free Agency, Long-term Contracts and Compensation in Major League Baseball: Estimates from Panel Data," *Review of Economics and Statistics*, February 1993, pp. 157-64.

⁹ Andrew Zimbalist, *Baseball and Billions*.

¹⁰ The authors thank Doug Pappas of the Society for American Baseball Research for providing a list of median and mean player salaries from 1969 to 1999. Detailed infor-

mation about individual salaries (1985-98) was obtained from <http://baseball.com/c-economics.html>; computations involving these salaries (for example, percentiles and numbers of millionaires) were done by the authors.

¹¹ U.S. Census Bureau. 2002. Historical Income Tables.

¹² "1997 Top 40 Athletes," *Forbes*, Dec. 15, 1997 (via <http://www.forbes.com/forbes/97/1215/athletes>).

¹³ CNN / Sports Illustrated Web site. 2002. "Highest Baseball Salaries." Jan. 14, 2002.

¹⁴ Player statistics were obtained from John Thorn and others, eds., *Total Baseball*, 5th ed. (New York, Viking Penguin, 1997), David Neft and others, eds., *The Sports Encyclopedia: Baseball*, 19th ed. (New York, NY, St. Martin's Press, 1999.), the CNN/Sports Illustrated Web site <http://www.cnn.com>, and the Web site <http://www.majorleaguebaseball.com>. The authors performed the analyses of the statistics presented in this section.

¹⁵ Earned run average (ERA) is proportional to the number of (earned) runs surrendered divided by innings pitched; hence, the lower the ERA is, the better the performance.

¹⁶ A p-value is the probability of getting a result as extreme as the one observed merely by chance. A small p-value (especially one less than 0.05) is considered a "significant" finding inasmuch as the result is unlikely to have occurred by chance.

¹⁷ R. Charnigo, "Flourishing or Flounder-

ing? Relief Pitching in Major League Baseball," Presentation at American Statistical Association meeting in Cleveland, June 7, 2000.

¹⁸ G. Strauss, "The Billionaires Club, New economy rockets CEO pay into the stratosphere," *USA Today*, Apr. 5, 2000, 1b-2b.

¹⁹ T. Smith, "Tax Policy Effectiveness as Measured by Responses to Limits Placed on the Deduction of Executive Compensation," Working Paper (University of New Hampshire).

²⁰ D. Harris and J. Livingstone, "Federal Tax Legislation as an Implicit Political Cost Benchmark: The Definition of Excessive Executive Compensation," Working Paper (Penn State University, 1998).

²¹ "Orioles pay the most luxury tax." *The Sporting News*, January 22, 2000 and "Baseball Payrolls, List" http://www.canoe.ca/BaseballMoneyMatters/salaries_team.html Associated Press November 9, 1999.

²² M. Ozanian and B. Grabarek, "Foul! The owners say they need revenue sharing if baseball is to survive. The owners are wrong." *Financial World*, Sept. 1, 1994, pp.34 ff.

²³ Andrew Zimbalist, *Baseball and Billions*.

²⁴ Because many part-time players fall into both the Bonus and No bonus categories, we present the numbers of home runs per 500 at-bats and wins per 180 innings pitched in order to make a more meaningful comparison.