

A Historical Tracking of Parity in Baseball

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A young child's unparalleled belief in the invincibility of his hometown team, the palpable tension of a fanbase in anticipation of their ace's next pitch, the thrill of a late-August pennant race, these are the litany of sacrosanct moments etched onto the landscape of America's favorite pastime.

A century ago winning the pennant meant a berth in the World Series. Players were paid little, had other careers, and fans used such words as integrity to describe the game. Sometime between that era and this one, the game changed. Free agency, salary jumps, playoff expansion, lucrative media contracts, and instant replay; the modern era of baseball began. What follows is an examination of the consequences of free agency in the 1970's, playoff expansion in the 1990's, and the resulting effects on the equity of the game as measured through playoff parity between high, middle, and low-payroll teams. Data includes opening day payroll, playoff entry, and playoff success from 1969 to 2010.^{1,2}

A short history of the Modern era

In 1968 the major league baseball players union successfully negotiated the first collective bargaining agreement, including an increase in minimum salary from \$6,000, which it had been for two decades, to \$10,000. An arbitration agreement to resolve

¹ I exclude years after 2010 to focus on playoff entry before the introduction of the second wild card spot.

² Payroll data comes from http://bizofbaseball.com/index.php?option=com_wrapper&view=wrapper&Itemid=186. Playoff data come from www.baseball-reference.com/postseason/. Data limitations of this work include the discrepancy between opening day and ending day payroll and the exclusion of the 2nd wild card expansion years (2011-2014).

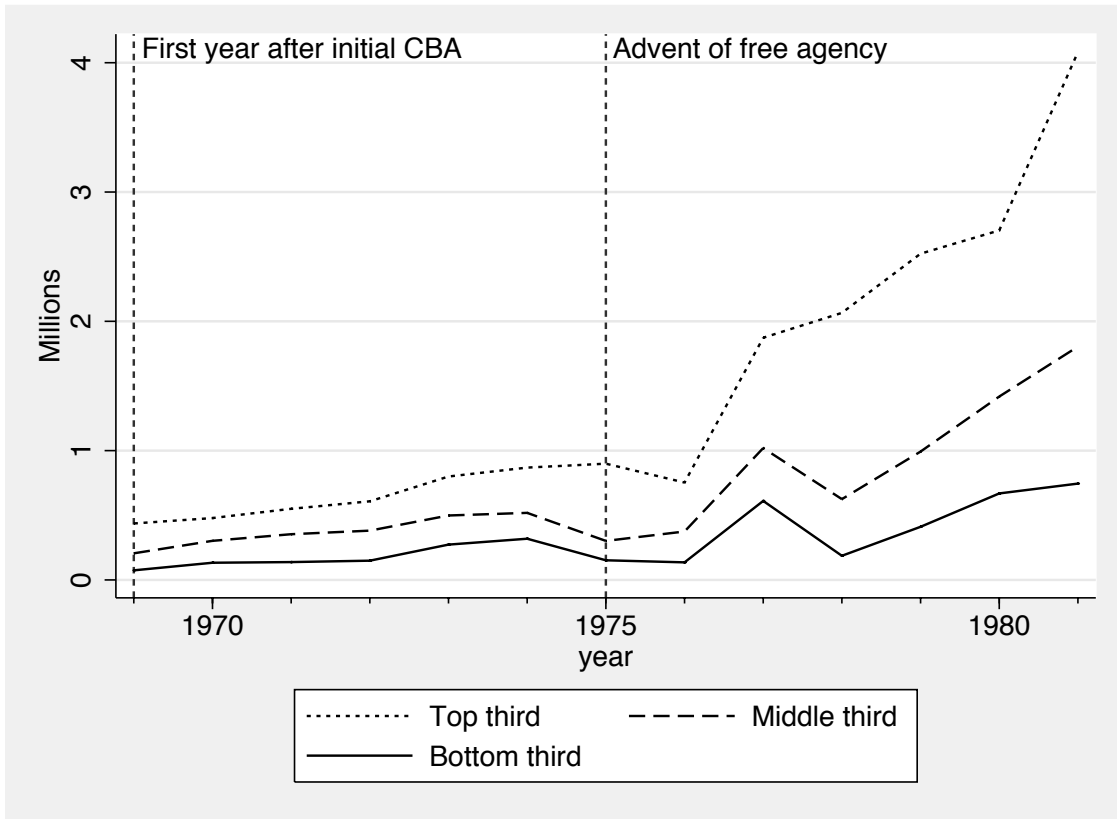
grievances followed in 1970. Then, in 1975, baseball players union chief Marvin Miller and pitcher Andy Messersmith challenged baseball's 'reserve' clause, which owners utilized to force players to renew their contract every year. Arbitrator Peter Seitz ruled that the 'reserve' clause of a player's contract only applied to a single year of additional service, at which point there was no contractual obligation between the player and owner. If players did not sign a new contract, they were therefore eligible to test their worth on the open market.³ Though Catfish Hunter was technically the first free agent after the end of the 1974 season (due to ownership breach of contract) and Andy Messersmith became a free agent at the end of the 1975 season after playing under the reserve clause, the first true free agent class was after the 1976 season, with such players as Reggie Jackson, Bobby Grich, Joe Rudi, Don Baylor, and Rollie Fingers testing their worth on the open market.⁴ In Figure 1 opening day payrolls of teams are split into terciles, with the top third representing the mean opening day payroll across all teams whose payrolls were in the top third of teams in that year. Similarly for the middle and bottom terciles.⁵

³ <http://mlb.mlb.com/pa/info/history.jsp>

⁴ <http://static.espn.go.com/mlb/s/2000/1120/891700.html>

⁵ For instance, assume there are 30 teams in the league in a given year. For a given year I rank teams by their opening day payroll. I assign the highest ten opening day payroll teams to the top third, the next ten to the middle third, and the bottom ten to the lowest third. Within each tercile I average the ten opening day payrolls. Figure 1 presents the results from 1969 to 1981. Note that a team is allowed to switch between terciles from year to year. A team that had the 11th highest opening day payroll in 2000 would be assigned to the middle tier for 2000. If in 2001 it had the 10th highest opening day payroll it would be assigned to the top tier for 2001.

Figure 1. Opening Day Payroll of Major League Baseball Teams by Tercile, 1969 to 1981¹



¹Each year major league baseball teams are ranked by opening day payroll and then split into top, middle, and bottom tiers.

In 1976, the last year before the free agency market took off, the top third of teams spent \$753,000 on average on their opening day payroll, compared to \$374,000 for the middle tier of teams, and \$136,000 for the bottom tier, a difference of \$379,000 and \$617,000, respectively. The next year, when star players such as Reggie Jackson tested free agency, payrolls spiked. The top third of teams spent \$1.87 million on opening day payrolls on average (a 2.5 fold increase), as compared to \$1.02 million (2.7 fold increase) for the middle third and \$611,000 for the bottom third of teams (a 4.5 fold increase), a difference of \$850,000 and \$1,259,000 respectively. While there was a relatively consistent gap in payroll between top, middle, and bottom payroll-spending teams from 1969 to the beginning of free agency, the gap diverges dramatically with its advent. A

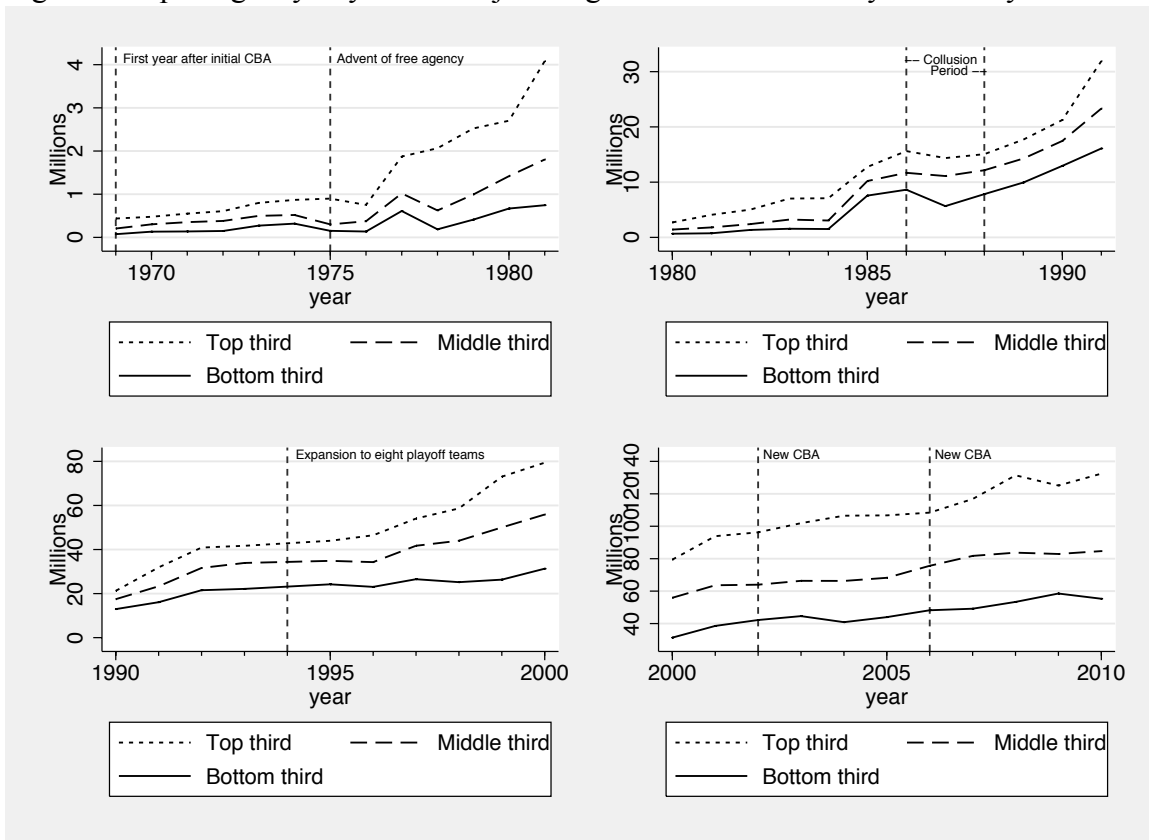
subset of teams transformed themselves into high-spenders, far out pacing the majority of ball clubs in their pursuit of free agent players.

Team ownership did not look favorably upon competing for players on the open market. Looking to undermine the newfound bargaining power of players, ownership colluded after the 1985, 1986, and 1987 seasons by not participating in the free agency market, refusing to hire free agents. As the top right panel of figure 2 shows, the rise in salaries from 1976 continued in the early 1980's but was curtailed for the 1986, '87, and '88 seasons.⁶ In reaction, players filed collusion grievances against ownership each year from 1986 to 1988. They prevailed in all three cases, winning over \$300 million in total damages.⁷ Since then a ball players' ability to engage in the open market has largely been unquestioned by ownership, with salaries continuing to rise in the 1990's (Figure 2 bottom left panel) and 2000's (bottom right panel).

⁶ Figure 2 traces the difference in opening day payroll by tercile across decades. The top left panel replicates Figure 1, the top right the 1980's, the bottom left the 1990's, and the bottom right the 2000's.

⁷ <http://mlb.mlb.com/pa/info/history.jsp>

Figure 2. Opening Day Payroll of Major League Baseball Teams by Tercile by Decade

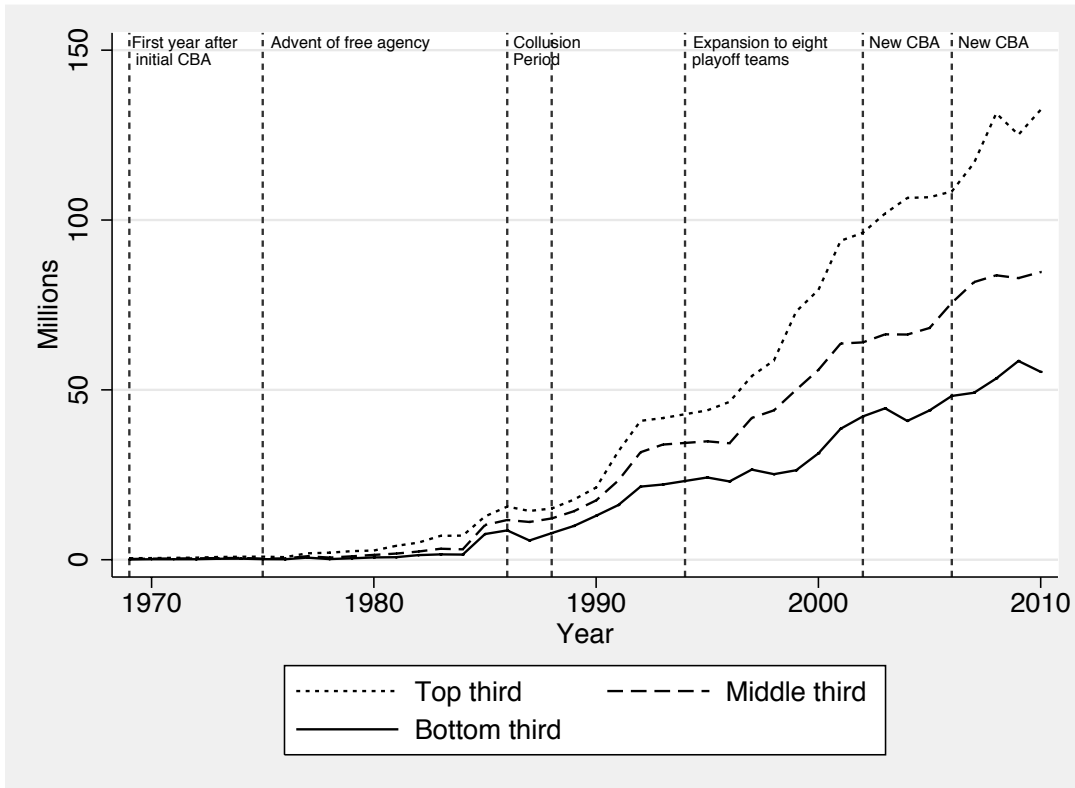


The growth in payroll has not been equal across teams, however. The initial trend of some teams paying more for free agents has continued, with the top third of teams far outpacing the growth of the rest of the league. Figure 3 shows a holistic picture of this growth from 1969 through 2010. Translated into 2010 dollars, in 1977 the top third of teams spent \$3,059,000 more than the middle third of teams and \$4,530,000 more than the bottom tier on opening payrolls.⁸ In contrast, in 2010 the top third of teams spent \$47.3 million more on their opening day payrolls than teams in the middle tier (\$132 million vs \$84.7 million) and \$76.7 million more than teams in the bottom tier (\$132 million vs \$55.3 million). Overtime the gap in payroll across big-spending, middle-spending, and low-spending teams has diverged drastically. To examine a consequence

⁸ Using the Bureau of Labor Statistics inflation calculator. Available at www.bls.gov/data/inflation_calculator.htm.

of this divergence on postseason success, I next turn to the expansion in the number of playoff spots in the mid 1990's.

Figure 3. Opening Day Payroll of Major League Baseball Teams by Tercile, 1969 to 2010



Playoff Expansion

In 1994 major league baseball expanded the number of playoff teams from four to eight.⁹

The extra slots allowed for each division winner and a wild card from each league to enter the playoffs, whereas prior to the change only two of three division winners could earn a playoff berth. Certainly the increase in the number of baseball franchises from 24 in 1969 to 26 in 1977 to 28 in 1993 was a motivating factor in playoff expansion.

Whether the increase in teams looking to recoup payroll expenses through playoff

⁹ The first year with expanded playoffs was 1995 due to the 1994 baseball strike. Playoffs were previously expanded from two teams to four in 1969. There were also eight spots in 1981 due to a mid-season strike.

revenues was another is unclear. What is certain, however, is that the extra playoff spots have not been randomly allocated across the opening day payroll distribution.

Table 1. Chance of Entering the Major League Baseball Playoffs (%) by Opening Day Payroll Tercile

Year	Bottom Tercile		Middle Tercile		Top Tercile
1969-1993	12.32	**	13.79	**	24.21
1995-2010	11.25	***	21.66	***	48.72
--	--	--	--	--	--
1969-1974	12.77		17.78		23.81
1975-1979	10.26	*	5.41	**	34.29
1980-1984	16.28		17.50		20.00
1985-1989	11.11		13.33		22.50
1990-1993	10.81		13.89		21.21
1995-1999	6.00	***	21.28	***	57.45
2000-2004	14.00	***	22.00	*	44.90
2005-2010	13.33	***	21.67	**	45.00

* p<0.05, ** p<0.01, *** p<0.001

Table 1 details the percent chance of entering the playoffs by opening day payroll tier. Aggregating all years prior to expansion in 1995, teams in the top tercile of opening day payrolls had a twenty-four percent chance of entering the playoffs from 1969 to 1993. In contrast, middle tercile teams had a fourteen percent chance and bottom tier teams had a twelve percent chance, which is statistically significant ($p<.01$), though the data violates the independent assumption for two-sample t-tests. This large difference likely reflects top-spending teams assumption that paying premiums for high-performing players increases the ballclub's chances of winning any single game and winning a greater number of games across the season, an assumption that recent work has empirically supported (Davis and Lopez 2015).

Playoff expansion exacerbated the playoff gap across the payroll distribution. Starting in 1995, the majority of new slots went to top-spending teams, with the chance

of playoff entry doubling to forty-nine percent for teams in the top tercile of opening day payrolls. The chances for the lowest spending tier dropped to eleven percent while middle-spending teams' chance rose to nearly twenty-two percent. Under an alternate five-year specification, the only period prior to playoff expansion in which the chance of playoff entry varied significantly across spending tiers was 1975-1979, while the other four periods of 1969-1974, 1980-1984, 1985-1989, and 1990-1993 were not statistically significant. After playoff expansion, however, and even with relatively small sample sizes within each of the five-year intervals, all three periods varied significantly and substantially across spending tiers. Figure 4 displays the growth in this discrepancy, with a discontinuity jump due to playoff expansion in 1995.

Figure 4. Probability of Entering the Major League Baseball Playoffs by Opening Day Payroll Tercile

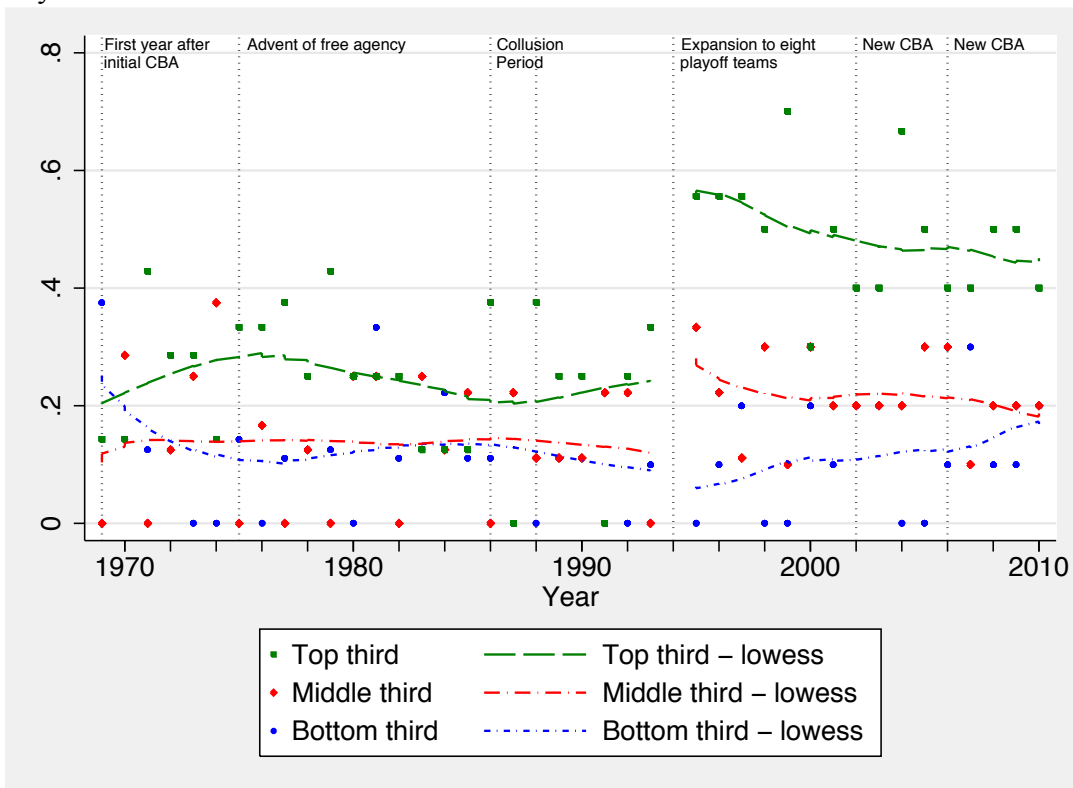


Table 2. Odds Ratio of Entering the Major League Baseball Playoffs¹

Covariate	Model 1			-	Model 2		
	Odds Ratio	95% CI			Odds Ratio	95% CI	
Bottom Tier Pre-1995	0.49	(.28-.85)	*		0.57	(.32-1.00)	+
Middle Tier Pre-1995	0.55	(.32-.94)	*		0.61	(.35-1.07)	+
Bottom Tier Post-1995	0.42	(.22-.78)	**		0.49	(.25-.95)	*
Middle Tier Post-1995	0.97	(.56-1.65)			1.12	(.64-1.97)	
Top Tier Post-1995	3.33	(2.07-5.38)	***		3.60	(2.22-5.84)	*
Constant	0.28	(.19-.41)	***		--		
Fixed Effects	N				Y		
N	1077				1071		

+ p<.1, * p<0.05, ** p<0.01, *** p<0.001

¹ The reference group is teams in the top tier of opening day payroll spending before 1995.

Table 2 describes the likelihood of playoff entry in a multivariate logistic panel data model. Teams are split into the three payroll terciles and years are divided into the pre- and post-expansion periods, or six categories in total. The omitted category is pre-expansion for top-spending teams. Model 2 includes team fixed effects. Both low and mid-spending teams had lower odds ratios of entering the playoffs than top-spending teams prior to playoff expansion (.57 and .61, respectively in model 2), consistent with the descriptive findings in Table 1. This difference is only significant at p<.1, however.

After playoff expansion, the lowest spending teams' odds of playoff entry is less than half that of top-spending teams in the pre-expansion period (odds ratio of .49, p<.05 in model 2), while top-spending teams odds post-expansion jump to 3.6 times that of top-spending teams in the pre-expansion period. The decline in playoff berths for teams in the bottom payroll tier paired with the large increase in playoff spots for teams in the top payroll tier created a far more uneven selection of playoff-bound teams than existed prior to expansion. Post-playoff expansion, the collection of teams entering the playoffs has been dominated much more strongly by teams with large opening day payrolls.

Playoff Outcomes

Ultimately pennants and rings, not playoff berths, measure the success of a season. Does the skewed distribution of playoff entrants change the types of teams finding success in the playoffs? Table 3 and Figure 5 describe playoff success conditional on playoff entry by opening day payroll tercile. Prior to playoff expansion there was no difference in the likelihood of making it to the World Series, with every tercile having over a forty percent chance of sending a team to the World Series. Nor was there a difference across payroll tier in the likelihood of winning the World Series. In fact, a slightly higher proportion of teams in the lowest spending tier won (31%) compared to top-spending teams (28%), though the difference is not statistically significant. The lack of a statistically significant difference in playoff berths or wins for the years prior to playoff expansion indicates that the chance of success in the playoffs is independent of payroll. That is, conditional on playoff entry, teams have an equal chance of succeeding in the playoffs.

Table 3. Major League Baseball Playoff Success (%) by Tercile, Conditional on Playoff Entry (n)

	<u>Year</u>	<u>Bottom Tercile</u>		<u>Middle Tercile</u>		<u>Top Tercile</u>
Enter Playoffs	1969-1993	12.32 (26)	**	13.79 (28)	**	24.21 (46)
	1995-2010	11.25 (18)	***	21.66 (34)	***	48.72 (76)
--	--	--	--	--	--	--
Enter World Series	1969-1993	46.15 (12)		46.43 (13)		52.17 (24)
	1995-2010	22.22 (4)		17.65 (6)		28.95 (22)
--	--	--	--	--	--	--
Win World Series	1969-1993	30.77 (8)		14.29 (4)		28.26 (13)
	1995-2010	5.56 (1)		8.82 (3)		15.79 (12)

* p<0.05, ** p<0.01, *** p<0.001

Yet, when the number of slots filled by teams in the top-spending tier jumps from 1/4 to 1/2 post-expansion and the number of slots filled by teams in the lowest-spending

tier remains relatively constant at eleven to twelve percent, the playoff landscape is far from even across the payroll distribution. As shown in Figure 5, the proportion of teams making it to or winning the World Series dropped for each payroll tier, which is consistent with greater competition post-expansion.

The drop was not uniform across the three tiers, however, with the decline most dramatic for teams in the bottom tier, falling all the way to 5.5%. In fact, only one team in the bottom tier of payroll spending has managed to win the World Series since playoff expansion – the Florida Marlins in 2003 with an opening day payroll of \$49.5 million. Three teams from the middle tier have won (the 2002 Los Angeles Angels, the 2005 Chicago White Sox, and the 2008 Philadelphia Phillies). In contrast, twelve teams from the top tier have won, or three times as many as the other two tiers combined. Indeed, only four teams from the bottom tier and six from the middle tier have made it to the World Series since playoff expansion (until 2010) as compared to twenty-two teams from the top tier. Prior to expansion, the number of teams per tier was twelve, thirteen, and twenty-four from the bottom to top tier, respectively. As to playoff berths, only eighteen teams from the bottom tier have made it to the playoffs compared to thirty-four in the middle tier and seventy-six in the top tier since 1995. The increase from four teams to eight, two rounds to three, and the over-representation of high-spending teams in playoff berths has crowded out the possibility of low-spending teams making a deep run in the playoffs.

Figure 5. Probability of Winning the Major League World Series by Opening Day Payroll Tercile, Conditional on Playoff Entry

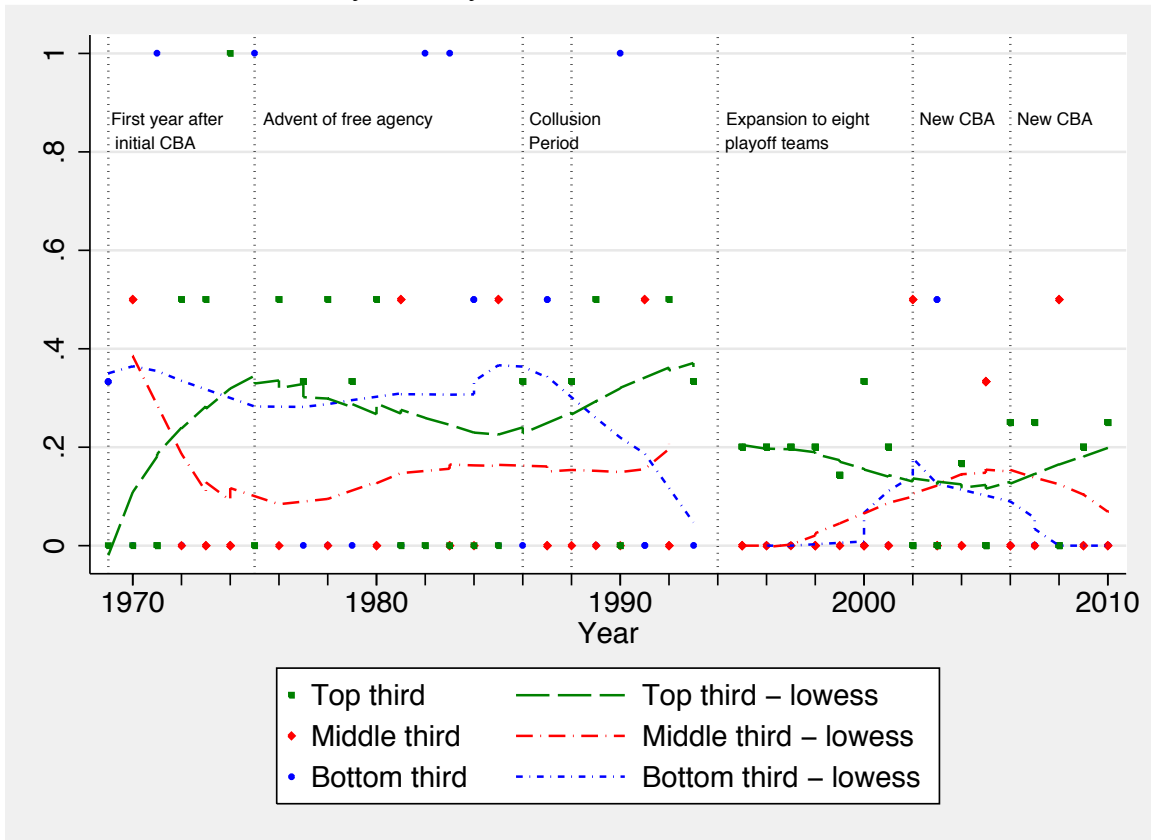


Table 4 displays results when playoff success is examined in a multivariate logistic panel data model. Entry into (Model 1) and winning the World Series (Model 2) are examined conditional on playoff entry. Prior to playoff expansion there was no significant difference in entry into or winning the World Series. After playoff expansion, however, the odds of making it to the World Series dropped for each tier, which is also consistent with increased competition in the playoffs. However, the drop is not even across tiers, with the odds ratio of a team in the lowest payroll making it to the World Series compared to a top-tier payroll team prior to expansion of only .26 ($p < .05$). The odds ratio for a middle-tier and a top-tier payroll team are .20 and .37, respectively (both $p < .05$). As to winning the World Series, the odds ratio drops for both the bottom-tier (.15, $p < .1$) and middle-tier teams (.25, $p < .05$). There is no statistically significant

difference in the odds ratio of top-tier teams winning the World Series post- versus pre-expansion. These results indicate that the sheer number of top-tier payroll teams entering the playoffs crowds out the ability of other teams to make it to, or win, the World Series.

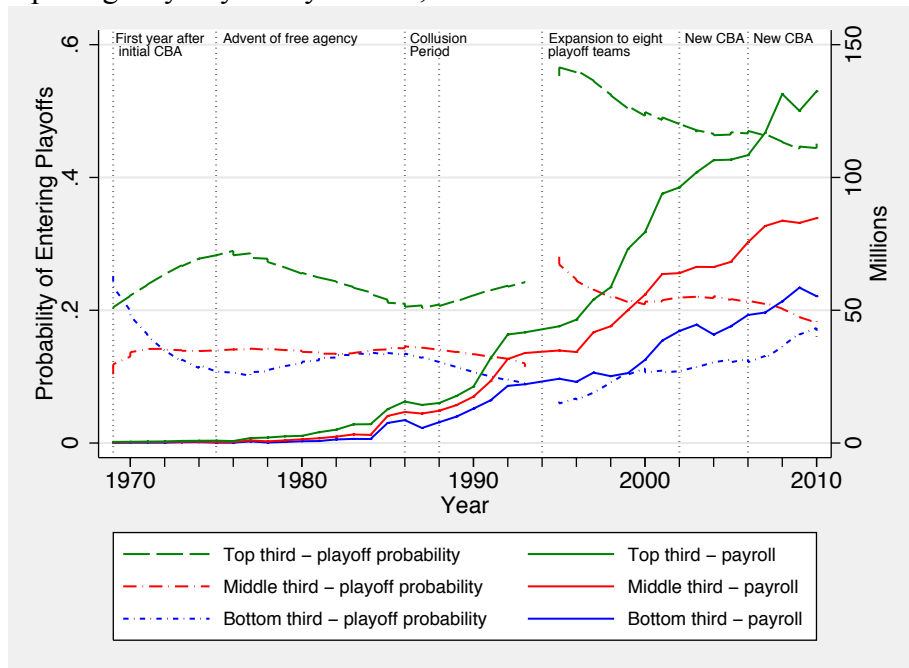
Table 4. Odds Ratio of Entering or Winning the Major League World Series, Conditional on Playoff Entry¹

<u>Covariate</u>	<u>Entering</u>			<u>Winning</u>		
	Odds Ratio	(95% CI)		Odds Ratio	(95% CI)	
Bottom Tier Pre-1995	0.79	(.30- 2.06)		1.13	(.39-3.23)	
Middle Tier Pre-1995	0.79	(.31-2.04)		0.42	(.12-1.46)	
Bottom Tier Post-1995	0.26	(.07-.92)	*	0.15	(.02-1.24)	+
Middle Tier Post-1995	0.20	(.07-.56)	**	0.25	(.06-.95)	*
Top Tier Post-1995	0.37	(.17-.80)	*	0.48	(.20-1.16)	
Constant	1.09	(.61-1.95)		0.39	(.21-.75)	**
N	228			228		

+ p<.1, * p<0.05, ** p<0.01, *** p<0.001

¹ The reference group is teams in the top tier of opening day payroll spending before 1995.

Figure 6. Probability of Entering the Major League Baseball Playoffs and Opening Day Payroll by Tercile, 1969-2010



Conclusion

Figure 6 graphically depicts the growth of payroll with the evolution of the probability of playoff entry. Far more teams with high opening day payrolls capture a playoff spot than did so prior to expansion in 1995. These high-spending teams crowd out both mid and low-spending teams in the playoffs, decreasing the odds of ballclubs with smaller salaries making it to or winning the World Series. From 1995 to 2010, three-quarters of World Series victors have been drawn from the top tier of payroll spending compared to one-quarter from the middle and bottom tiers. Indeed, the only bottom tier payroll team to win the World Series was the 2003 Florida Marlins, with a payroll of 49.5 million, slightly above a mean of \$44.5 million for teams in the bottom tier in 2003 and far lower than the \$102 million spent in 2003 by teams in the top payroll tier. Top tier teams were also far more likely to enter the World Series or the playoffs in general, than teams in the bottom tier.

Prior to playoff expansion, the playoff landscape was more evenly distributed across payrolls. From 1969 to 1993 thirty-one percent of bottom-tier teams that made it to the playoffs won the World Series. Top-tier teams did not fare better, with twenty-eight percent of teams drawn from the top tier of the payroll distribution winning the World Series. As well, across the same time period over forty percent of teams from each tier made it to the World Series.

While uneven playoff success across payroll tiers can be traced to playoff expansion in 1995, the legal framework that allowed for the rise in playoff expansion began with the 1975 ruling that the 'reserve' clause of a player's initial contract was limited to a single year of additional service. Since the advent of free agency, opening

day payroll, including all player acquisitions signed in the offseason, has dramatically diverged. In 1976, the average opening day payroll for the top third of teams was \$753,000 while it was \$136,000 for the bottom tier, or \$2.89 million and \$521,000 in 2010 dollars, respectively. In 2010, the average opening day payroll for teams in the top ten of spending was \$132 million. It was \$55 million for the teams in the bottom third of spending.

Players have benefited dramatically from the ability to demand a fair wage for their labor. The average salary for baseball players in the 2015 season is 4.25 million.¹⁰ If players were unable to participate in an open market, their salaries would be substantially lower and the money instead would go to ownership. This is the same time-old tension between workers and owners found throughout the labor market. Whether a greater share of the revenue belongs with the owners or with the players is a matter of personal belief. In a counterfactual world where players are still bound to a team under the 'reserve' clause, player salaries would be much lower but parity across teams would likely be higher. That said, free agency was almost certainly an inevitability given its implementation in other sports, such as the National Football League and European football, and because owners do vary substantially in their willingness and ability to pay higher wages to attract talent.

While free agency was a necessary condition that allowed teams to differentiate themselves by payroll, it was not a sufficient condition. Playoff expansion in 1995 created an additional reward to high-spending teams, doubling their likelihood of making the playoffs from $\frac{1}{4}$ to nearly $\frac{1}{2}$. Together these changes have decreased the level of

¹⁰ http://hosted2.ap.org/APDEFAULT/347875155d53465d95cec892aeb06419/Article_2015-03-31-BBO--Baseball%20Salaries/id-c2077ca00de847b7a9b7bf95d0f0ed2f

parity in baseball as measured by playoff entrance and success across small-, mid-, and large-market teams.

If an alternate state of the world is preferred in which there is greater parity across teams, one potential mechanism is a strict salary cap, as seen in the NFL and NHL. Alternatively, a salary floor could potentially serve a similar purpose. For instance, the lowest spending teams could be required to bring their payrolls in line with the 50th percentile of team payrolls from the previous year.

Every fan has their own preferred state of the world, be it one in which low-budget teams have as good of a chance of winning the Fall Classic as their high-spending rivals or one in which big-market high-spending teams regularly make the playoffs, crowding out small-market teams. This research shows that the onset of free agency and playoff expansion pivoted baseball from the former to the latter, fundamentally changing the nature of the game.

Further Reading

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