

Cardboard Fans in the Stands: COVID and Compensation in Major League Baseball

Anthony Krautmann 

Department of Economics, DePaul University

Chicago, IL 60604, USA

akrautma@depaul.edu

Received 23 May 2024

Revised 12 August 2024

Accepted 15 August 2024

Published 25 September 2024

The pandemic's impact on Major League Baseball (MLB) was especially dire. In 2020, a single player testing positive was enough to cancel the entire game, with a few teams sidelined for weeks. This paper looks at all free-agent contracts signed during the 2017–2023 off-season signing periods. Since this horizon spanned the pre-pandemic and post-pandemic seasons, we can examine the degree to which contract negotiations were affected by the pandemic. Using a sample of 643 free-agent signings, we found that contract compensation fell by as much as 20% during the pandemic. By 2022, however, player compensation had rebounded to pre-pandemic trends.

Keywords: COVID; compensation in MLB.

Introduction

On 10 January 2020, the World Health Organization (WHO) announced an outbreak in China caused by the 2019 Novel Coronavirus (aka COVID-19). By 23 January 2020, the city of Wuhan, China — a city of over 11 million — was placed under lockdown due to the virus. Two weeks later, the Department of Homeland Security directed all flights from China to be routed through one of 11 airports in the United States for enhanced screening procedures and possible quarantine; and foreign nationals who had travelled in China were denied entry

This is an Open Access article published by World Scientific Publishing Company. It is distributed under the terms of the [Creative Commons Attribution 4.0 \(CC BY\) License](https://creativecommons.org/licenses/by/4.0/), which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

into the United States. In late January, the first confirmed case of the pandemic was detected in Washington. By 2024, over one million Americans died of the virus.

The COVID pandemic hit the U.S. economy hard, resulting in one of the most severe (but short-lived) downturns since the 2008 recession. GDP in the U.S. fell by almost 9% in the second quarter of 2020, it was the largest single-quarter contraction in over 70 years. Several businesses closed because of the falloff in demand, and many have not returned, making this Black Swan one of the most severe disasters in recent memory. The economic recovery was equally as swift, thanks in large part to the actions of the federal government, with the recession lasting only one quarter. By the second quarter of 2022, the unemployment rate had returned to its pre-pandemic level.

From 2020 to 2021, the professional sports industry endured a particularly turbulent ride. At the beginning of the 2020 season, when the pandemic was new and vaccines were still many months away, just a single player testing positive for COVID was enough for Major League Baseball (MLB) to cancel the game. A few teams (e.g. Miami Marlins, St. Louis Cardinals) were sidelined for weeks.

The 2020 season was planned to begin on 26 March 2020, but MLB decided on 12 March to cancel the remainder of spring training. After several delays, MLB announced that it would follow CDC recommendations to restrict events of more than 50 people, causing the 2020 season to be postponed indefinitely. Finally, on 26 March, MLB and the Players Association reached an agreement which included player salaries to be pro-rated to the (ultimate) length of the season; in exchange, players would still receive a full service year (regardless of the length of the season). Player salaries being pro-rated to the length of the season resulted in an important distinction between what players were actually paid (actual salaries) and a player's salary derived from contract negotiations (contract salary).¹ Finally, on 22 June, the MLB owners unilaterally imposed a 60-game schedule for the 2020 season (with games beginning on 23 July) which came with a 60% reduction in players' 2020 salaries. Given the 60% reduction in games played in empty stadiums, losses by MLB over the 2020 season rose dramatically. To highlight the bizarre situation created by playing in empty stadiums, teams placed cardboard cutouts of fans in the stands.

The 2021 season saw a gradual increase in attendance to about 65% of the pre-pandemic total, partially as a result of satisfying CDC protocols and partially due to fan reluctance to attend mass events. By the start of the 2022 season, the COVID protocols in MLB had been greatly relaxed. According to Forbes, MLB surpassed

¹In this paper, we concentrate on the effect of the pandemic on contract negotiations. Hence, our concern here is on how COVID affected *contract* compensation, irrespective of its impact on *actual* compensation.

\$10 billion in revenue in both 2022 and 2023 for the first time since before the pandemic, with attendance returning to pre-pandemic levels.² Estimates of franchise valuations by Forbes bounced back as well, with the combined value of all 30 franchises at an all-time high of nearly \$70 billion by 2023. A new collective bargaining agreement, signed in March of 2022, ensures labour stability until at least 2026. MLB also finalised several new sources of revenues, including a contract with Apple and Peacock for streaming rights, as well as sponsorship fees, jersey patch deals, and new broadcast contracts with TBS and ESPN.

In this paper, we analyse the impact of the 2020–2021 pandemic by comparing contract terms of all free agent (FA) contracts negotiated during the three years before, to the two years after, the pandemic. By estimating a standard compensation model, we find that contract terms negotiated during the pandemic fell by nearly 30% during the pandemic years.

Risk and Contract Negotiations

FA contracts in MLB involve large, guaranteed contracts (often) paid out over long time periods. During the off-season signing period,³ owners and player agents engage in FA contract negotiations. The result of such negotiations is the contract terms which include the total contract size (SIZE), the contract length (LENGTH), and contract salary (SAL). Solow and Krautmann (2011) modelled FA negotiations within a Nash bargaining framework. This research outlined that when the team and FA maximise a joint surplus function, the FA's contract terms are a function of his threat point (i.e. the FA's next best alternative salary offer) plus one-half of the surplus generated by the player.

Given that FA contracts often span many years into the future, this surplus is a function of the *expected* present value of the future stream of Marginal Revenue Products (MRPs). This expectation is based on the player's future marginal product (MP), as well as the team's future marginal revenue (MR). How does an increase in risk affect the expected future MRP of a player? As discussed below, an increase in risk (e.g. the 911 attack, a player strike, the COVID pandemic) may affect both expected MP and MR, thus affecting the expected surplus. In this paper,

²While attendance in MLB did essentially return to the levels in 2019, attendance was trending down prior to 2019. In fact, attendance reached a peak in 2007 at 79.5 million; by 2019, attendance had fallen steadily to 68.5 million.

³Colloquially known as the 'Hot Stove' signing period, this period begins immediately following the World Series.

we look for empirical evidence of how the increased risk associated with the COVID-19 pandemic affected the contract terms of FAs.

In MLB, contracts are guaranteed meaning that the owner is committed to those terms until the contract terminates or the player is traded. On a few occasions, however, MLB has had to cancel part of the season.⁴ In the case of the COVID pandemic, owners unilaterally reduced the 2020 season by 60% (from 162 games to 60 games), which resulted in a cut in players' 2020 actual salaries by 60%. It is important to note that while *actual* salaries were cut by 60% in 2020, we are concerned here with how the increased risk associated with the pandemic affected FA contract negotiations, hence *contract* salaries.⁵

It is not a stretch to believe that the pandemic affected both the expected MP of players, as well as the expected MR of teams. While vaccines and medical advances have softened the health impact of COVID-19, expected MP could be adversely affected in several ways.⁶ For one, it was not until the Fall of 2022 that Canada finally ended its entry ban on unvaccinated visitors. This ban had a particularly adverse effect on a team like the Kansas City Royals who had ten ineligible players on their roster when they visited Toronto (giving Toronto a huge advantage in that series). According to the Collective Bargaining Agreement, banned players are placed on the restricted list and are neither paid nor do they accrue Major League service time for these games. Thus, not being able to play in Canada would make such a player less valuable to his team. Furthermore, recent research by trainers and physiologists suggested that some players infected with COVID (regardless of vaccination status) were having a difficult time coming back to professional athletic standards — even two to four weeks after testing negative for the virus (Sarris, 2022). Concerns about a lengthy post-COVID recovery like 'long COVID' could make signing an infected player to a long-term contract risky.

By December of 2020, in the middle of the 2021 Hot Stove signing period, no one had a good understanding of the long-term impact of the pandemic on the long-run viability of MLB. Even in the latter half of 2021, the country was still essentially locked down, with the possibility of an effective vaccine still months away. In addition, the emergence of numerous COVID variants created an even more pessimistic atmosphere of uncertainty regarding whether the pandemic

⁴The following seasons were truncated for a number of reasons: 1917, 1918, 1945, 1972, 1981, 1994, 1995, and 2020.

⁵Cutting contract salaries by 60% means that *actual salary* = (0.60) * *contract salary*.

⁶During "normal" times, it can be assumed that the owner's bid is based upon his/her knowledge of the player's MP. During "unusual" times, such as the pandemic, it is possible that the owner's expectations are different because he/she cannot know the player's future MP drawn from this distribution. If the owner is risk averse, then we would expect a lower bid for the player. I would like to thank an anomalous referee for this helpful suggestion.

would ever end. And with this grim vision came the perceived likelihood of a permanent decline in the demand for the MLB.

Altogether, the pandemic years created a credible vision of a reduction in both the MP of players as well as a fall in the MR of teams, with the obvious impact on player contract terms. By the beginning of the 2023 signing season, however, it was becoming obvious that vaccines were effective, and the pandemic was finally winding down. On *60 Minutes* (18 September 2022), President Biden declared an end to the COVID national emergency, and the country appeared to be returning to its former path. As the fear of the pandemic waned, the influence of risk on contract negotiations similarly declined, and MLB appeared to slowly return to its prior economic path.

Literature Background on Player Salaries

Research on the determinants of player salaries is extensive in the literature. The standard compensation model was provided by [Mincer \(1974\)](#), where compensation is a function of the worker's human capital. Human capital refers to intrinsic athletic skills as revealed by past performance. Such skills may be affected positively by age due to learning by doing, and negatively by the natural decline in physical ability. [Simmons \(2022\)](#) modelled wages as a function of the player's age or experience, arguing that this reflects the player's human capital accrued from learning by doing. Consistent with economic theory, the pay-for-performance literature associates wages to the player's economic value or MRP.

[Scully \(1974\)](#) model of pay-for-performance in MLB estimated players' MRPs using separate estimates of the team's MR and the player's MP. Scully then used this model to estimate the degree to which baseball players in the pre-free agency era (i.e. pre-1976) were exploited by monopsonistic team owners. Updating Scully's work by applying a similar framework in the post-free agency era, [Zimbalist \(1992\)](#) found that monopsonistic exploitation still existed for those players who were indentured to their team (i.e. those with less than 6 years of MLB service), while FAs were actually paid slightly more than their MRP.

To measure a baseball player's MP, sports economists have used a wide variety of metrics. [Scully \(1974\)](#) used the player's slugging average (SA) for hitters and strikeout-to-walk ratio for pitchers. Several studies use the metric OPS (equal to the sum of SA plus on-base percent) to measure a position player's MP (see [Zimbalist, 1992](#); [Krautmann and Oppenheimer, 2002](#); [Krautmann and Solow, 2009](#)). Others have focused on player-independent metrics of performance, such as Win Share ([Link and Yosifov, 2012](#)) and Wins Above Replacement (WAR) ([Krautmann, 2018](#); [Solow and Krautmann, 2020](#)).

A different approach to estimating MP is provided by the dynamic age-productivity model proposed by Fair (2008). In this model, Fair showed that a player's productivity first rises with age (or experience), reaching a peak somewhere around age 27, and then slowly falling off until the player is released. Solow and Krautmann (2020) used the Fair methodology to extrapolate a player's MP across the future years of long-term FA contracts. With this *ex-ante* estimate of the FA's productivity, the authors computed a player's expected MRP across the future years of those contracts and found that teams typically overpay on contracts beyond three years in length. The importance of this extension of the Fair model is that it focuses on how a player's age figures into the FA negotiation process. Other papers that include a consideration of age (or experience) in a salary model are Link and Yosifov (2012), Kahn (1993), and Krautmann and Solow (2009).

While much of the pay-for-performance literature deals with MLB, player compensation has been addressed in other sports as well. In Lucifora and Simmons (2003), the authors come up with a novel approach to estimating the MRP of a soccer player based on the extra price spectators are willing to pay to see a superstar. Simmons and Berri (2011) proxy the MP of an NBA player by Wins Produced, a metric derived from the team's production function. In Berri and Simmons (2009), the authors use Yards Gained as their measure of MP for an NFL player. Finally, Gregory-Smith (2021) measured the MRP of an NFL player based on the lost cap value to a team when the player ends up on the disabled list.

Empirical Model

In this study, we estimate the compensation function across *all FA contracts* signed from 2017 to 2023. We separated signings into three groups according to when they occurred: the pre-pandemic years of 2017–2019, the pandemic years of 2020–2021, and the post-pandemic years of 2022–2023. To formalise how contract salaries were affected during the pandemic years, we estimate a standard compensation model using two dummy variables to control for these three eras: PAND (to control for the pandemic years of 2020 and 2021) and POST (to control for the post-pandemic years of 2022 and 2023). This approach allows us to estimate how contract terms in these two eras were compared to the pre-pandemic era.⁷ Testing the significance of the coefficients on these dummy variables allows us to infer

⁷We ran a series of Chow (1960) tests to see whether the coefficients in the pandemic years of 2020 and 2021 were significantly different from the coefficients in the pre- and post-pandemic eras. The results of the *F*-tests were consistent with the hypotheses that the coefficients were different in 2020 and 2021, compared to 2017–2019 and 2022–2023.

whether a specific era deviated statistically from the pre-pandemic years, and if so, by how much. The model is given as follows⁸:

$$\text{CONTRACT}_{ijt} = f[\text{AGE}_{it}, \text{AGE}_{it}^2, \text{POP}_j, \text{EXProd}_{ijt}, \text{PAND}_t, \text{POST}_t], \quad (1)$$

where $\text{CONTRACT}_{ijt} \in \{\text{SALARY}_{ijt}, \text{LENGTH}_{ijt}, \text{SIZE}_{ijt}\}$ are the real contract terms for the i th FA signed by the j th team; SALARY_{ijt} is the annualised real (\$2017) contract salary; LENGTH_{ijt} is the contract length; SIZE_{ijt} is the total real (\$2017) contract size; EXProd_{ijt} is the i th player's one-period ahead forecast of expected productivity on the j th team (discussed below); AGE_{it} is the i th player's age⁹; POP_j is the market size variable, measured by metropolitan population¹⁰; $\text{PAND}_t = 1$ if season t is 2020 or 2021, and $= 0$ otherwise; and $\text{POST}_t = 1$ if season t is 2022 or 2023, and $= 0$ otherwise.

Data

FA negotiations for season t begin at the conclusion of the prior season's World Series, and continues up to the start of season t . The dependent variables used here are the annual real contract salary (SALARY), contract length (LENGTH), and real contract size (SIZE). The SIZE variable is the present value of the future stream of payments (discounted at a 5% interest rate) across the length of the contract, plus any signing bonus. The SALARY variable is SIZE divided by LENGTH. All real values are measured in constant 2017 dollars.

The sample consists of information on 643 FA contracts — essentially *every* FA contract spanning the 2017–2023 seasons. These contract data were obtained from *Cots Contracts*,¹¹ a website (compiled by *Baseball Prospectus*) with detailed financial data on every FA contract dating back to 1991.

⁸The three contract terms are Contract Size, Contract Salary, and Contract Length. We were not able to control for economic variables like attendance or revenues as there is little to no variation in these variables in 2020 (when stadiums were empty).

⁹To capture the return to human capital arising from learning by doing, one can use either AGE or EXPERIENCE. But since $\text{AGE} = \text{Rookie Age} + \text{EXPERIENCE}$ (where Rookie Age is typically about 24); thus AGE or EXPERIENCE are interchangeable (with a correlation coefficient greater than 0.8). We choose to use AGE as our human capital variable.

¹⁰Population is a common measure of market size effects on FA salaries — which in non-pandemic times sufficiently captures market-size effects. While an economic variable (like turnstile revenues) associated with market size differences would be an alternative, many important economic variables in 2020–2021 were essentially driven to zero because stadiums were closed down. Without variation, estimation would be impossible.

¹¹This website includes detailed information on things such as the player's agent, the team owner, the guaranteed size of the entire contract, and whether the qualifying offer was accepted or rejected.

The player's expected productivity, EXProd, is the one-period ahead forecast of his performance, measured by WAR. This metric is a holistic measure of the player's MP in that it accounts for the many offensive and defensive ways that a player impacts the number of team wins. The expected productivity of pitchers and hitters are treated the same in terms of how much they contribute to team wins.¹² Reported in the annual editions of *Baseball Prospectus*, these projections are based upon a complex model which generates a 10-year forecast of the player's projected future performances.¹³

Table 1 presents the summary statistics of the data used in this study. The average SALARY across the entire horizon was \$7.6 million — ranging from a

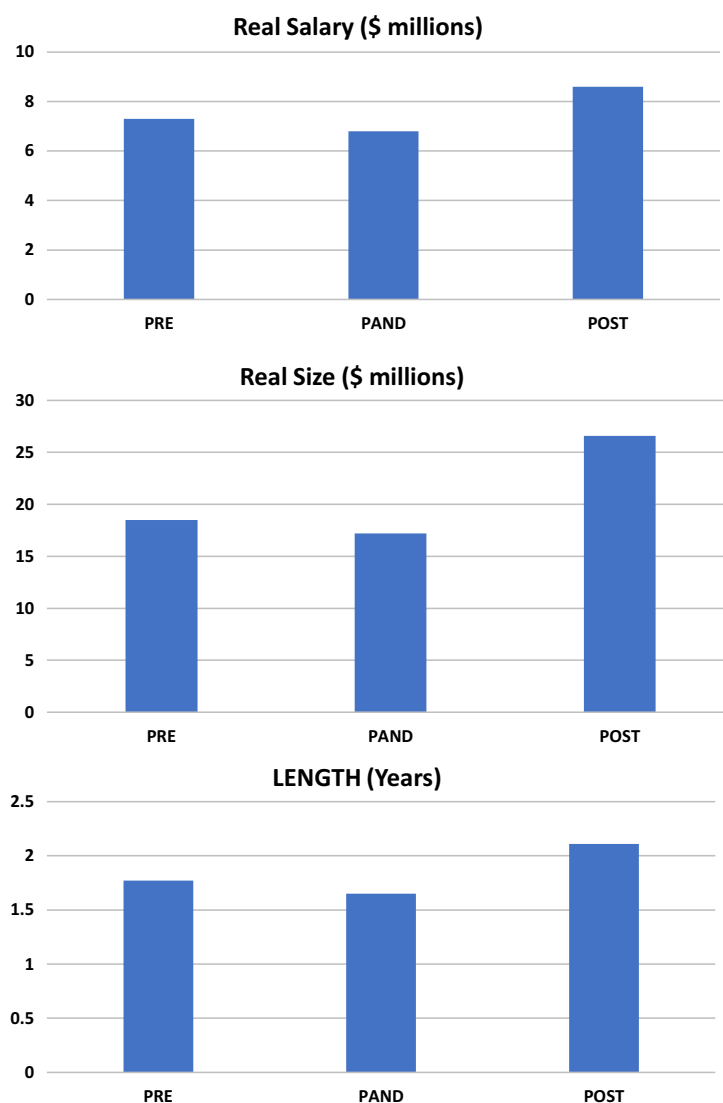
Table 1. Summary statistics.

Variable	2017–2023		2017–2019		2020–2021		2022–2023	
	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
Nominal SALARY	\$8.4 M	7.2 M	\$7.5 M	5.9 M	\$7.3 M	\$6.8 M	\$10.4 M	\$8.3 M
Real SALARY (\$2017)	\$7.6 M	\$6.4 M	\$7.3 M	\$5.7 M	\$6.8 M	\$6.4 M	\$8.6 M	\$6.9 M
Nominal SIZE	\$23.2 M	\$45.5 M	\$18.9 M	\$36.0 M	\$18.5 M	\$40.0 M	\$32.0 M	\$57.3 M
Real SIZE (\$2017)	\$20.8 M	\$40.3 M	\$18.5 M	\$34.7 M	\$17.2 M	\$37.7 M	\$26.6 M	\$47.4 M
LENGTH	1.86	1.54	1.77	1.15	1.65	1.28	2.11	1.84
EXPECT Prod.	1.14	1.16	0.98	1.02	1.30	1.20	1.20	1.24
AGE	32.90	2.90	32.74	2.92	32.80	2.80	33.18	2.95
AGE ²	1091	198	1081	200	1083	187	1110	203
POP (mil.)	7.20	5.12	7.19	5.20	6.95	5.07	7.44	5.10
PAND	0.29	0.45	—	—	—	—	—	—
POST	0.33	0.47	—	—	—	—	—	—
# obs.	643		245		185		213	

¹²This is why we did not separate the analysis into hitters and pitchers.

¹³The PECOTA model developed by Baseball Prospectus stands for Player Empirical Comparison and Optimization Test Algorithm. It essentially forecasts a player's upcoming performance by aligning his past statistics to the performance statistics of "comparable" Major League ballplayers at comparable points in their careers. Given that compensation is a function of future expected productivity, we relied on the Sabermetricians at Baseball Prospectus to give us unbiased estimates of a player's future productivity. While we assume that the pandemic could have an impact on the compensation of players, we see no reason why it would affect the output-productivity path of the player. That is, while diminishing returns might impact the production function, we would not expect to find diminishing returns affecting the compensation function.

minimum of \$561,000 to a maximum of over \$37 million. The mean SIZE was \$20.8 million, ranging from \$561,000 to \$326 million. The mean value of LENGTH was 1.86 years, ranging from 1 to 13 years. These variables changed dramatically across the eras (see Fig. 1). To illustrate, mean SALARY rose from \$6.8 million in the pandemic years to \$8.6 million after the pandemic, while the



Note: The three eras considered here are the pre-pandemic (2017–2019), the pandemic (2020–2021), and the post-pandemic (2022–2023).

Fig. 1. Contract compensation (evaluated at the sample means).

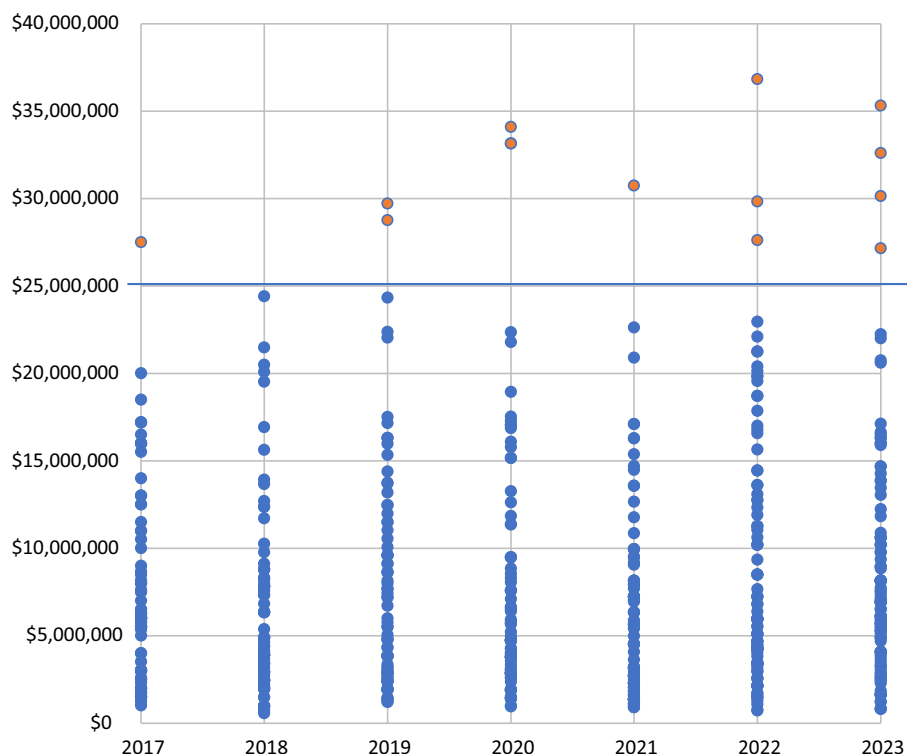
A. Krautmann

mean of SIZE rose from \$17.2 million during the pandemic to \$26.6 million in the post-pandemic years.

Empirical strategy

Contract data often contain extreme monetary values which can create estimation issues. Figures 2 and 3 contain scatter plots of the dependent variables SALARY and SIZE (with extreme outliers highlighted). These diagrams show that the sample contains numerous observations with values that far exceed the core of the data. To take just one example, the New York Mets paid Max Scherzer a (nominal) salary of \$43 million in 2022 — while the average FAs salary in 2022 was only about \$10 million.

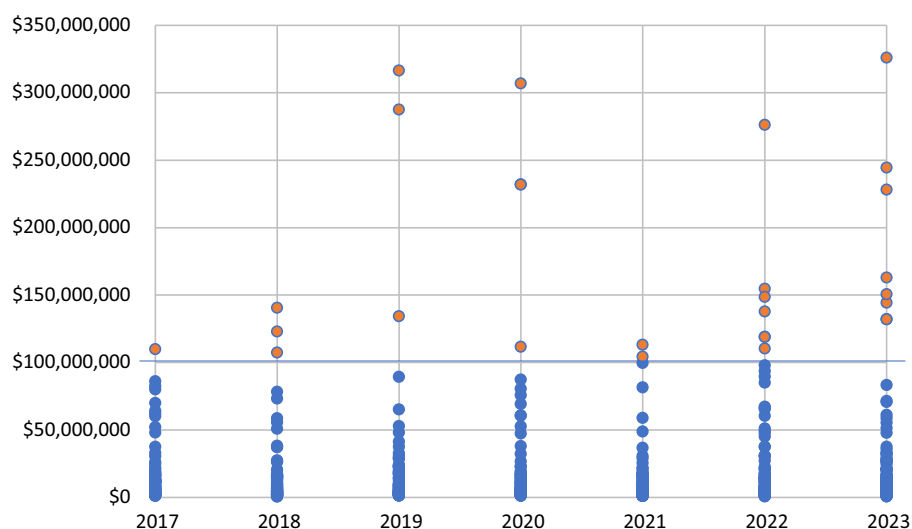
When a data set contains extreme outliers, ordinary least square estimation can be unduly affected. For example, an outlier with twice the error magnitude of a typical observation contributes four times as much to the squared error, and hence



Note: Those values above \$25 million/year are highlighted above the line.

Source: *Cot's Contracts* (various years).

Fig. 2. Distribution of real salary (\$2017).



Note: Those values above \$100 million/year are highlighted above the line.

Source: *Cot's Contracts* (various years).

Fig. 3. Distribution of real size (\$2017).

has a much greater impact on the estimated regression coefficients. This high degree of leverage can have a disproportionate effect on the regression estimates (Andersen, 2008). Since the Breusch–Pagan test rejected homoskedasticity in all three empirical estimations, we use the Huber–Cook iterative method provided in STATA to weight the data accordingly (Huber, 1964).¹⁴

Given that the 2020 off-season signing period ran from November 2019 to March 2020, and that the ramifications of the pandemic were just beginning to be realised by the spring of 2020, one might not expect to find too much of an effect on the 2020 FA contracts. But the 2021 FA negotiations opened in November 2020 — immediately after the disastrous 2020 season. As such, one would expect the most severe effects to show up in the 2021 contracts. Given that rumours of a rising respiratory disease in China began sometime in late 2019, we allow any effects of the pandemic on contract negotiations to begin in 2020 and continue into 2021 — these two years are what we define as the ‘pandemic years’. Regarding the 2022 and 2023 signing periods, however, our expectations are more agnostic. On the one hand, the continued impact of the pandemic — especially as it pertains to post-infection productivity (e.g. ‘long COVID’), as well as possible future COVID surges — suggests that we might still

¹⁴As an alternative to the weighting process incumbent with the Huber–Cook technique, we ran quantile regressions (evaluated at the median of the distribution), and our inferences were qualitatively equivalent to those coming from the Huber–Cook method.

find persistent divergences in the post-pandemic data. On the other hand, life seems to have returned to normal by the spring of 2022, allowing contract negotiations to revert to pre-pandemic trends. Thus, the 2022 and 2023 signing years constitute our designation of the ‘post-pandemic’ seasons.

Empirical results

To determine how much the pandemic years differed from the pre- and post-pandemic years, we estimated the following regression model:

$$\text{CONTRACT}_{ijt} = \alpha + \beta_1 \text{AGE}_{it} + \beta_2 \text{AGE}_{it}^2 + \beta_3 \text{POP}_j + \beta_4 \text{EXProd}_{ijt} + \beta_5 \text{PAND}_t + \beta_6 \text{POST}_t + \varepsilon_{ijt}. \quad (2)$$

Equation (2) is estimated using the entire time period 2017–2023. The sample also includes the two dummy variables: PAND for the pandemic years (2020 and 2021) and POST for the post-pandemic years (2022 and 2023).¹⁵ Since the coefficient on any one of the dummy variables estimates the difference (*ceteris paribus*) between that era compared to the pre-pandemic benchmark years of 2017–2019, this allows us to identify any statistical changes in the compensation function going into, and coming out of, the pandemic seasons. Our earlier discussion focused on how an increase in the risk associated with the pandemic might adversely affect SALARY; as such, we would expect the coefficient β_5 to be negative.

Consistent with much of the sports economics literature, we find that SALARY declines at an increasing rate with AGE (see Table 2). Further, market size and productivity are positively related to all three CONTRACT variables.

Of particular interest are the coefficients associated with the dummy variables PAND and POST. Table 2 indicates that all three contract terms negotiated during the pandemic years were significantly different (and below) from the pre-pandemic trend. For SALARY, the point estimates in Table 2 are consistent with the hypothesis that the growing uncertainty associated with the pandemic shifted the SALARY function downwards by about \$1.5 million. This corresponds to a more than 20% reduction from the pre-pandemic mean of \$7.3 million. The estimates for SIZE and LENGTH mirror those associated with SALARY. In particular, the point estimates on the PAND variable indicate that SIZE fell by \$2.1 million — an 11% falloff from the pre-pandemic years. Furthermore, the impact of the pandemic

¹⁵We also ran Eq. (2) using dummy variables for each individual year 2018 through 2023, as well as just the years 2020 and 2021 alone. As suspected, the negative pandemic effects were greatest in 2021, the year immediately following the disastrous 2020 season (i.e. the “cardboard fans in the stands” year). In general, however, the results were essentially identical to those reported here.

Table 2. Huber–Cook estimates of CONTRACT.

Variable	SALARY		SIZE		LENGTH	
	Coef.	T-stat	Coef.	T-stat	T-stat	T-stat
AGE	−3,633,000	−4.41**	−1,773,000	−1.3	−0.061	−0.37
AGE ²	49,100	4.08**	20,400	1.0	0.0001	0.04
POP	112,000	3.67**	167,000	3.2**	0.011	1.80*
EXProd	3,413,000	24.60**	3,421,000	14.3**	0.233	8.41**
PAND	−1,520,000	−4.01**	−2,131,000	−3.3**	−0.222	−2.93**
POST	512,000	1.41	659,000	1.1	0.005	0.06
Constant	68,700,000	40,300,000	40,300,000	1.7*	3.157	1.13
# obs.	643		643		643	
F-stat	142**		51.3**		22.7**	
Breusch–Pagan test ^a (χ^2)	153**		1218**		547**	

Note: ** $p < 0.05$; * $p < 0.10$.

^aThe Breusch–Pagan test is used to test for heteroskedasticity in the ordinary least squares estimation of each regression. All chi-square statistics are significant, implying that we can confidently reject the hypothesis of homoskedasticity.

on LENGTH implies that contracts negotiated during the pandemic were shorter by about one-fourth of a year — about a 10% falloff. (This is a relatively large decline given that over 60% of all contracts in the sample are single-year contracts.) Finally, given the insignificance of the coefficients on POST, all three contract terms appear to have returned to pre-pandemic trends.


Conclusion

In this paper, we estimate a standard compensation function for all FA contracts signed over the 2017–2023 seasons. These seven years are separated into three eras: the pre-pandemic years (2017–2019), the pandemic years (2020–2021), and the post-pandemic years (2022–2023). Using dummy variables, we estimate the impact on the contract terms in each of these eras to document how the pandemic affected contract compensation. Our interest here was whether the greater uncertainty arising from the pandemic had an adverse effect on contract negotiations.

While the statistical significance of these point estimates come with the standard caveats, our results are consistent with expectations about how risk affects the labour market in MLB. Our analysis indicates that contract terms fell off by 10–20% during the height of the pandemic. Furthermore, once the world realised that the pandemic was winding down, contract terms returned to the pre-pandemic

path. While an analysis of the 2024 FA contracts will have to wait until later in the year, it appears that the labour market has recovered from this Black Swan event.

ORCID

Anthony Krautmann  <https://orcid.org/0000-0003-2070-1966>

References

- Andersen, R (2008). *Modern Methods for Robust Regression*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-152.
- Berri, D and R Simmons (2009). Race and the evaluation of signal callers in the National Football League. *Journal of Sports Economics*, 10(1), 23–43.
- Chow, GC (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica*, 28(3), 591–605.
- Cot's Baseball Contracts. <https://legacy.baseballprospectus.com/compensation/cots/>.
- Fair, RC (2008). Estimated age effects on baseball. *Journal of Quantitative Analysis of Sports*, 4(1), 1–39.
- Gregory-Smith, I (2021). Wages and labor productivity: Evidence from injuries in the National Football League. *Economic Inquiry*, 59(2), 829–847.
- Huber, P (1964). Robust estimation of a location parameter. *Annals of Statistics*, 53(1), 73–101.
- Kahn, L (1993). Free agency, long-term contracts, and compensation in major league baseball: Estimates from panel data. *Review of Economics and Statistics*, 75, 157–164.
- Krautmann, AC (2018). Contract extensions: The case of baseball labor market. *Journal of Sports Economics*, 19(3), 299–314.
- Krautmann, AC and M Oppenheimer (2002). Contract length and the return to performance in major league baseball. *Journal of Sports Economics*, 3(1), 6–17.
- Krautmann, AC and JL Solow (2009). The dynamics of performance over the duration of major league baseball long-term contracts. *Journal of Sports Economics*, 10(1), 6–22.
- Link, C and M Yosifov (2012). Contract length and salaries compensating wage differentials in major league baseball. *Journal of Sports Economics*, 13(1), 1–19.
- Lucifora, C and R Simmons (2003). Superstar effects in sports: Evidence from Italian soccer. *Journal of Sports Economics*, 3(1), 35–55.
- Mincer, J (1974). *Schooling, Experience, and Earnings*. New York: National Bureau of Economic Research.
- Sarris, E (2022). How does COVID impact MLB players' performance? What athletes, trainers, and the stats say. <https://theathletic.com/3488516/2022/08/26/mlb-players-covid-return-effects/>.

- Scully, G (1974). Pay and performance in major league baseball. *American Economic Review*, 64(6), 915–930.
- Simmons, R (2022). Professional labor markets. *Journal of Sports Economics*, 23(6), 728–748.
- Simmons, R and D Berri (2011). Mixing the princes and the paupers: Pay and performance in the National Basketball Association. *Labour Economics*, 18(3), 381–388.
- Solow, JL and AC Krautmann (2011). A Nash bargaining model of the salaries of elite free agents. *Journal of Sports Economics*, 12(3), 309–316.
- Solow, JL and AC Krautmann (2020). Do you get what you pay for? Salary and ex ante player value in major league baseball. *Journal of Sports Economics*, 21(7), 705–722.
- Zimbalist, A (1992). Salaries and performance: Beyond the Scully model. In *Diamonds are Forever: The Business of Baseball*, P Sommers (ed.), pp. 109–133. Brookings Institute.