Has Money Ball Changed the General Spending Trends of the MLB?

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Executive Summary

This paper is an exploratory data analysis of a beloved topic of mine, Money Ball. I delve into data on MLB payrolls and winning percentage to see if the 2002 was a focal point on overall spending habits in the MLB. All visuals were created in Tableau, with all data cleaning and preprocessing being performed using python. After going over the data, it is clear that Money Ball had little to no impact on teams' overall spending habits. Team payrolls still grow year after year, and the higher spending teams produced far better than they had before 2002 in the decade that followed.

Introduction

Money Ball has had a huge impact on the culture of baseball. Analytics have become the true definer of player performance, not only in baseball but in all modern sports. The most important domino to fall for this revolution was the 2002 Oakland Athletics, better known as the Money Ball A's. The approach used by this team was first coined by Bill James as early as 1977. The idea relies entirely on analytics and favors statistics that were not seen as very important. The Money Ball A's, led by GM Billy Beane, used this approach to make a horribly poor team competitive even after losing their star players. After 2002, the rush began to analyze players in a much less traditional way. Instead of scouts being the true wizards on finding skill and value, number crunches tried to find value wherever they could. The Money Ball A's have become a part of the baseball zeitgeist, primarily due to the popular movie Money Ball featuring Brad Pitt released in

2011. A primary narrative in the movie is giving the little guys a competitive chance, i.e. leveling the playing field. So, I wanted to answer the question, “Has the playing field actually been leveled in any way since 2002?”

Data Preparation

The first phase for answering this question is to answer a simpler question first. That is “Have teams showed any change in spending on average?” We can quickly get an idea about this by looking at the average payrolls for around the MLB over the years that surround the 2002 Money Ball A’s. To generate this, I needed data for MLB payrolls. To keep this project simple and to the point, I found two data sets for MLB payrolls that range from 1985 to 2014 for the first, and 2011 to 2024 for the second. Both data sets needed to be cleaned and then made compatible. The earlier data set has estimated payroll, while the latter has total payroll once the season was completed. This leads to slightly inflated numbers for later years, but most of our analysis will be done with respect to the year, making the problem less relevant.

Spending Trends

Now I can answer the question regarding spending overtime. I used Tableau to generate a line graph, which shows the trend we are after. The graph a special emphasis on the year of focus for this project 2002, and makes sure to note discrepancy due to COVID in 2020.

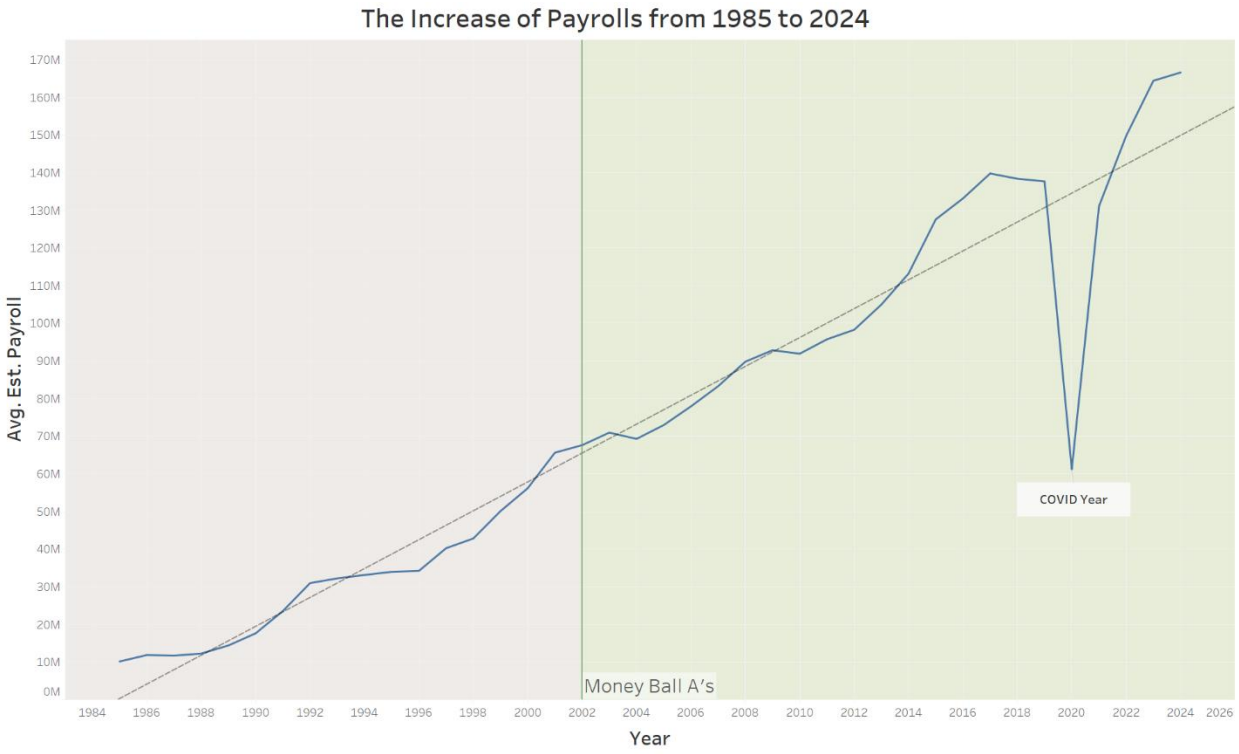

Figure 1: Line Plot of Average Payroll 1985-2024

As we can see, the average payroll has gone up at a gradual rate and did not see any oddity around the 2002 season. This is the first piece of evidence of Money Ball not having an impact. This information simply shows that teams did not change the amount they were spending due to analytics. They may have been changing how they spend their money, and on which specific players, but teams did not use analytics to reduce payroll costs. The COVID year stands as an obvious outlier, due to the regular season only being 60 games long. As mentioned before, the later payroll data is inflated a bit more due to the change in data source. This is the only piece of exploration that displays this discrepancy.

Variable Creation

Before the next step, I needed more data, specifically on the performance of teams. Luckily, the 1985 to 2014 dataset already has an attribute for win loss ratio. The second data set did not come with the same attribute, but did include wins and losses. This made it very easy to generate a win loss ratio column and move on. Another need was to normalize the payroll attribute. Figure 1 shows that the payroll changes over the years, which means comparing payroll to win loss ratio would yield bad results if looking at multiple years. To do this, I used Z scores to normalize the payroll data grouped by year and get it all on the same scale.

To get more in depth, I also wanted to see how far teams would under and over perform on average. To do this, I ranked the payroll and win loss ratio attributes, with them both being grouped by year. Then I could find the absolute value of the difference between those ranks, and get an idea on far their performance compared to their payroll. Once this was completed, I had the tools to explore further.

Winning and Spending Over Time

Unfortunately, I can't play the animation from tableau to show the evolution of how much spending impacts winning. To get the image, the next figure shows a single screen from the 2002.

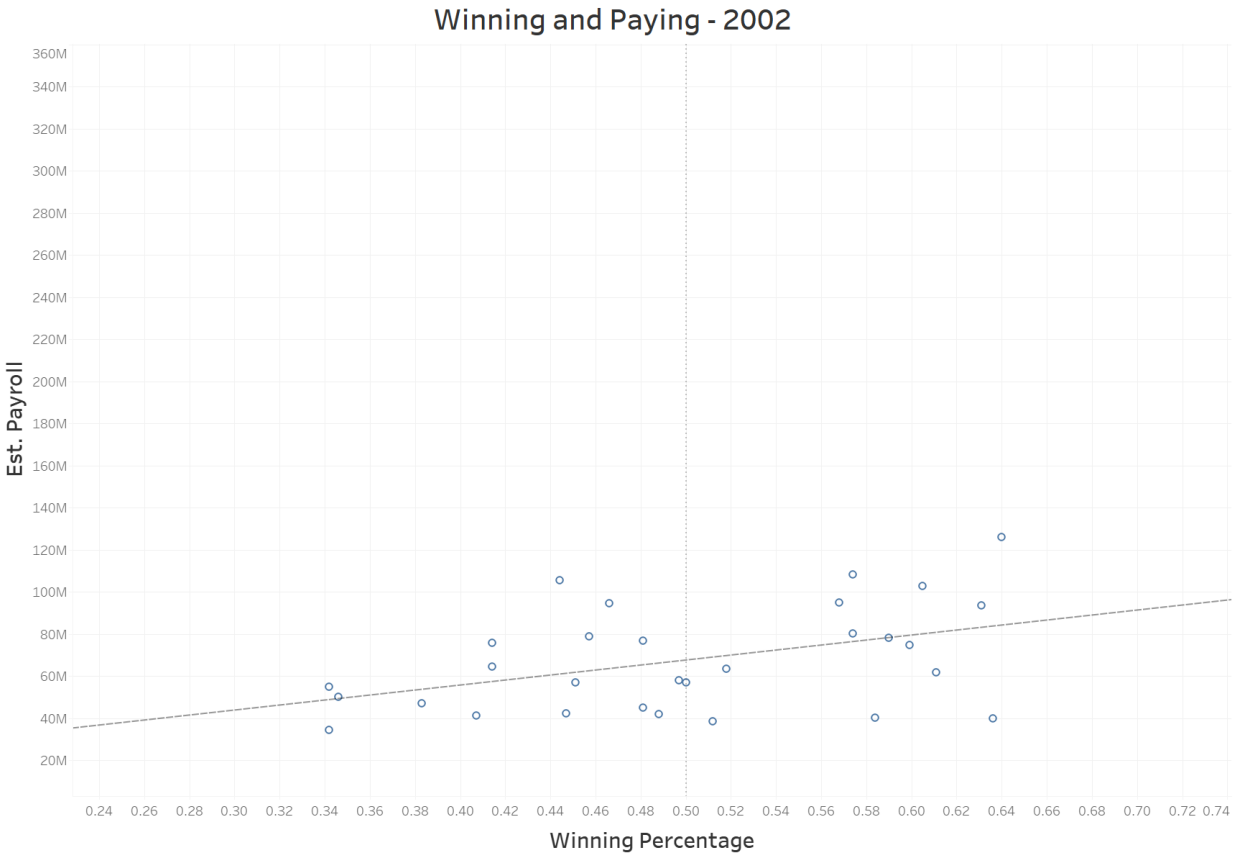

Figure 2: Single frame from Winning vs. Payroll Animation (2002)

The graph changes every year, with the most valuable piece of information being the changes in steepness to the trend line. In the late 1980s the trend line is quite flat, displaying that an increased payroll doesn't increase your winning percentage. However, it begins to grow a little in the 90s and shows that there is a positive relationship. It remains in the same range for a while, and then after 2002 starts getting steeper and steeper. For 5 years it grows and then remains around this new level of steepness until 2024. This forms the second piece of evidence that Money Ball had no impact or even the opposite of what would be anticipated. Teams with higher payrolls started performing better after the Money Ball A's. Which also means that low payroll teams got worse. Instead of leveling the playing field, it seems the general trends point to the opposite.

Now instead of looking at the evolution over the year, we can get an even better idea by looking at the decades before and after 2002 side by side. This will give us a direct comparison that will most likely reinforce what we just discovered.

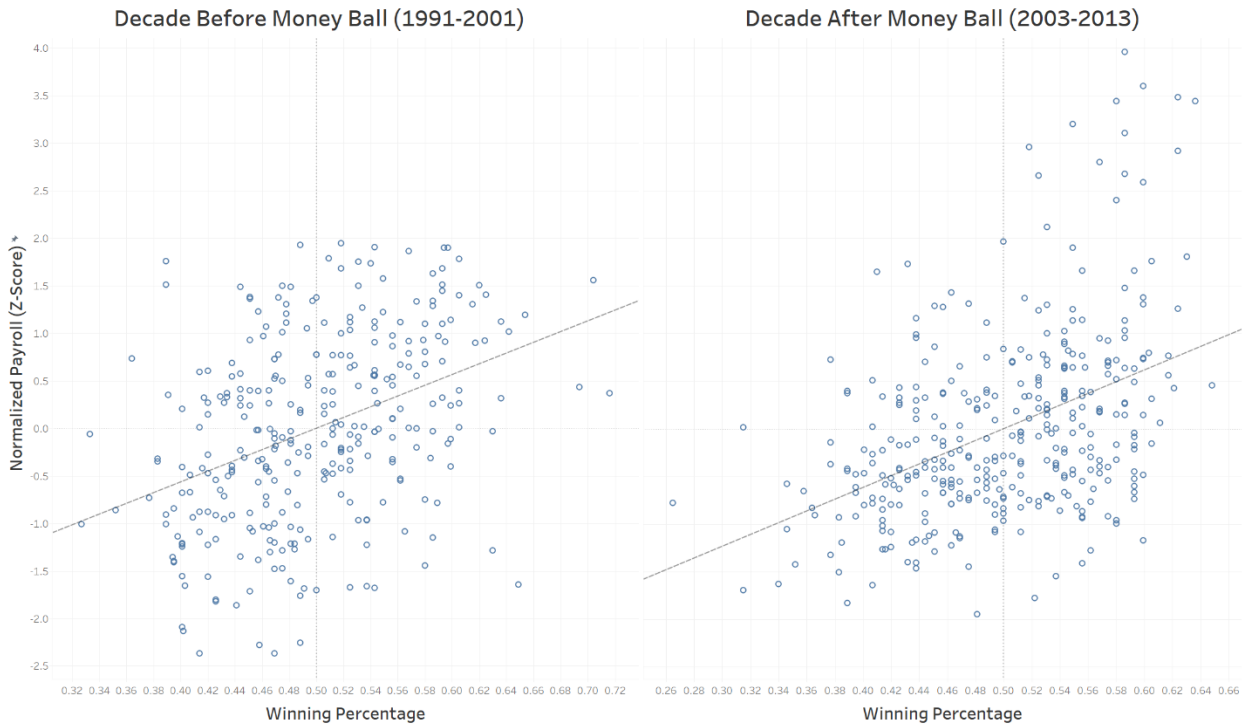

Figure 3: Normalized Payroll vs. Winning Percentage for the decade before and after 2002

The trend lines appear to be in the same ballpark for their slopes. Looking at the actual numbers, the slope for the decade after beats out the decade before by 9.4%. This gives us a better look at how Money Ball might not have had the effect we all thought. The little guy is at an even greater disadvantage than they used to be.

Performing at your Payrolls Level

The final piece of evidence I will present uses the rank proximity attribute that I created earlier. Its purpose is to see if a team is performing like someone would expect given their payroll. I wanted to see how this changed over the years and see if Money Ball led to greater variance in performance.

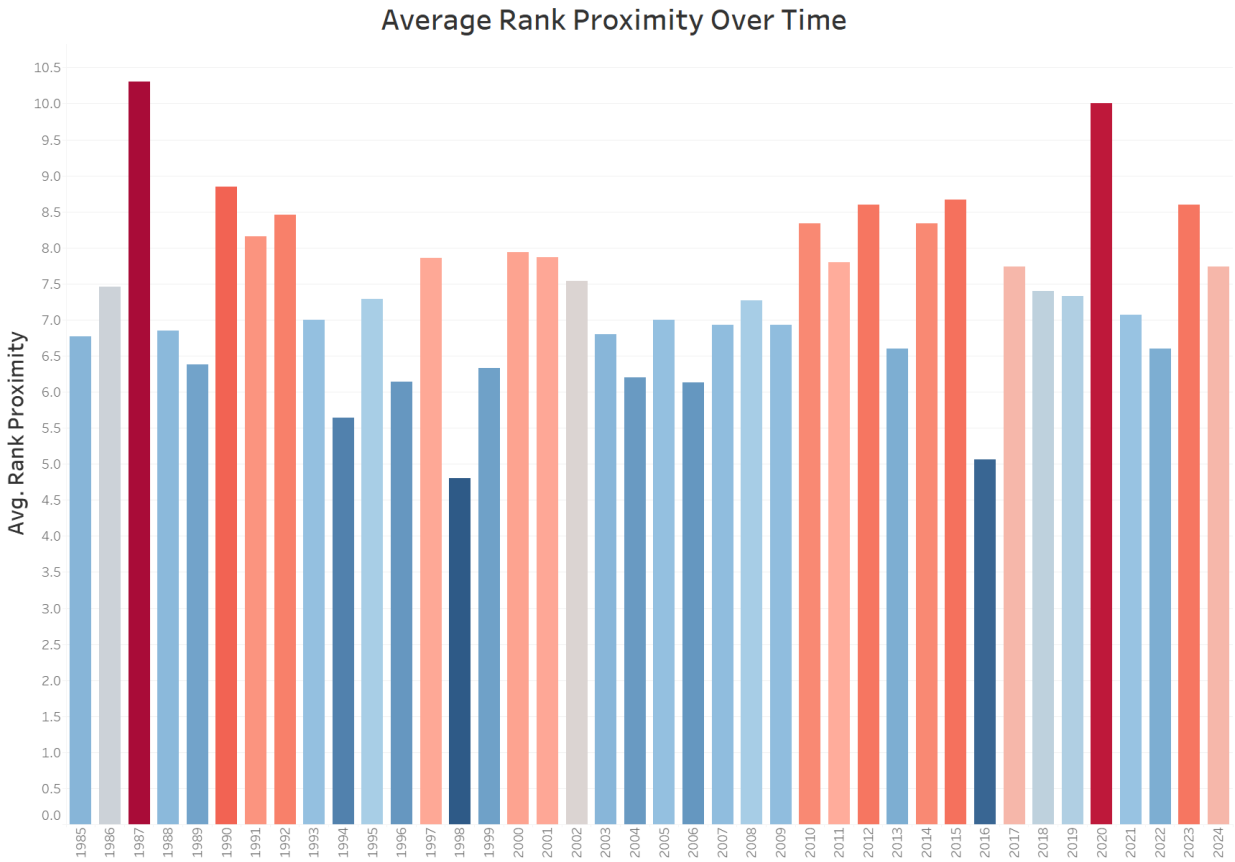

Figure 4: Average Rank of Payroll and Rank of Winning Percentage Proximity in the MLB from 1985 to 2024

There appears to be no true patterns in this graph. 2002 is even one of the closest years to the average. It is interesting to note that COVID led to the second highest rank proximity in this period. Most likely due to the smaller sample size of 60 games and luck being a bigger factor. This graph gives us our third piece of evidence for Money Ball not having an impact. There is no real pattern for average rank proximity over the years, meaning teams didn't start out playing their payrolls once analytics came into play.

Conclusion:

After looking over the general trends in payroll over the years, and the relationship between payrolls and winning percentage, I conclude that Money Ball had little to no

impact on overall spending. It is a great narrative of the little guy sticking up to the big guys in a new and innovative way, but much like the end of the Money Ball movie, the good little guys just get bought out by the big guys. The 2002 Oakland Athletics succeeded in their experiment led by Billy Beane, but the ones who could utilize the game plan best were the rich guys all along. This is why there is no general trend, but a very notable single point. A point that did not level the playing field of baseball, but did change how everyone approaches it.