

Building a Lorenz Curve for Major League Baseball

There are 30 professional teams in Major League Baseball divided into two leagues: the American League and the National League. Each league is divided into thirds and there are 5 teams in each division. Select one of the divisions from the end of this handout to analyze the inequality in that particular division.

A) Which division did you select?

B) In the table below, write the team names in the Team Name column and the payroll in the Payroll column. Sort your teams with the lowest paying team first and the highest paying team last:

Rank	Team Name	Payroll
Lowest Payroll		
Highest Payroll		

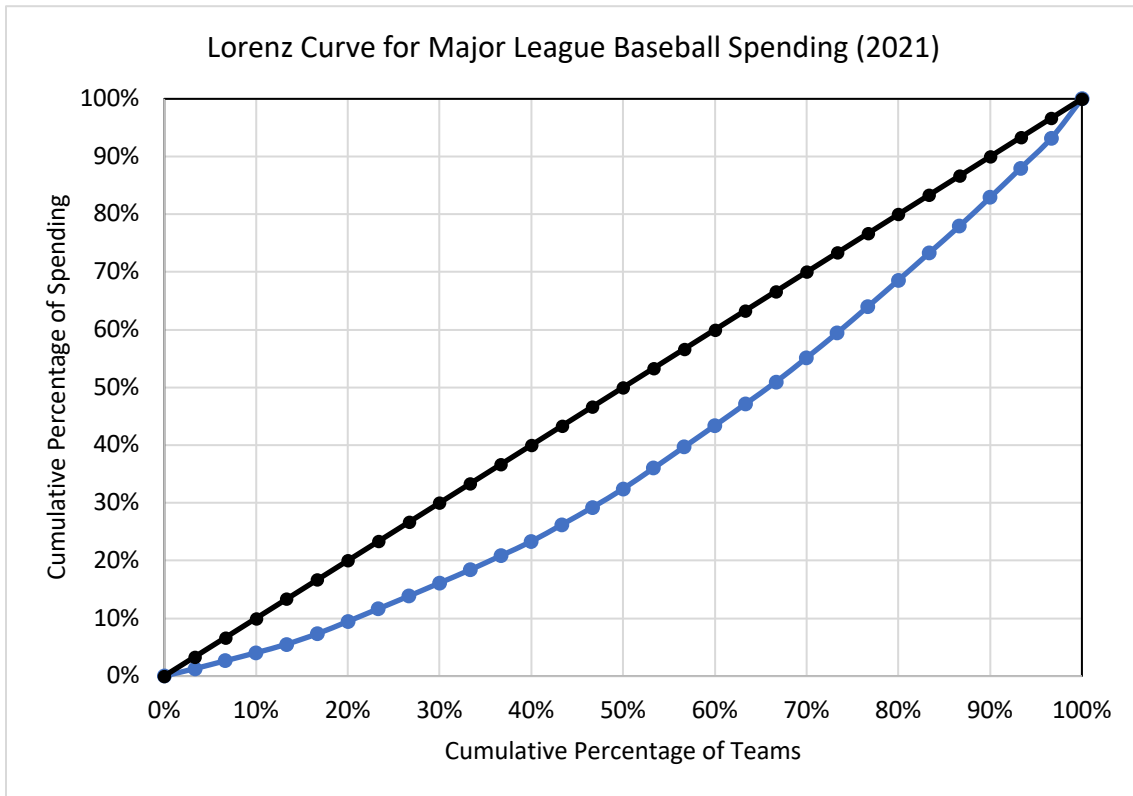
C) Note that your teams do not spend the same amount of money on players. What was the **total amount** of money your 5 teams spent on players this past year? If there was an equal distribution of spending, how much money would these teams spend?

D) In order to measure inequality, we need to calculate each team’s share of total spending for the year. In the table below, list your teams in the Team Name column and then the share of spending in the Share column. To calculate each team’s share of spending, divide the amount they spent by the total amount found in part C.

The final column represents the cumulative share of income going from the top the bottom of your table. All of the teams together represent 100% of the spending in that division. This is important in the graphing stage. The first team represents the cumulative share of only them. The second row is the combination of the shares from team 1 and 2.

Rank	Team Name	Share of Total Spending	Cumulative Share
Lowest Payroll			
Highest Payroll			

E) The following graph shows the Lorenz Curve for the entire Major League Baseball organization. What do you think the black line on the graph represents?



F) Using the data you calculated in Part D, plot your division's Lorenz Curve. The horizontal axis represents the cumulative percentage of teams in the sample and the vertical axis represents the cumulative percentage of spending in the sample. The larger the area between your curve and the 45-degree line, the larger the share of inequality in your division.

2021 Team Payrolls

American League East	2021 TOTAL PAYROLL
Baltimore Orioles	\$53,755,204
Boston Red Sox	\$184,529,110
New York Yankees	\$203,319,863
Tampa Bay Rays	\$70,836,327
Toronto Blue Jays	\$150,140,253

American League Central	2021 TOTAL PAYROLL
Chicago White Sox	\$140,926,169
Cleveland Indians	\$50,220,534
Detroit Tigers	\$86,348,945
Kansas City Royals	\$86,565,788
Minnesota Twins	\$117,533,551

American League West	2021 TOTAL PAYROLL
Houston Astros	\$194,472,041
Los Angeles Angels	\$180,349,558
Oakland Athletics	\$89,650,598
Seattle Mariners	\$83,837,448
Texas Rangers	\$95,636,948

National League East	2021 TOTAL PAYROLL
Atlanta Braves	\$147,487,625
Miami Marlins	\$58,157,900
New York Mets	\$199,789,189
Philadelphia Phillies	\$183,852,734
Washington Nationals	\$144,390,775

National League Central	2021 TOTAL PAYROLL
Chicago Cubs	\$144,607,670
Cincinnati Reds	\$125,902,769
Milwaukee Brewers	\$97,377,415
Pittsburgh Pirates	\$54,356,609
St. Louis Cardinals	\$168,969,994

National League West	2021 TOTAL PAYROLL
Arizona Diamondbacks	\$88,732,929
Colorado Rockies	\$114,408,966
Los Angeles Dodgers	\$267,200,832
San Diego Padres	\$178,264,272
San Francisco Giants	\$163,890,308

Example Key

A) Which division did you select?

American League West

B) In the table below, write the team names in the Team Name column and the payroll in the Payroll column. Sort your teams with the lowest paying team first and the highest paying team last:

Rank	Team Name	Payroll
Lowest Payroll	Seattle Mariners	\$83,837,448
	Oakland Athletics	\$89,650,598
	Texas Rangers	\$95,636,948
	Los Angeles Angels	\$180,349,558
Highest Payroll	Houston Astros	\$194,472,041

C) Note that your teams do not spend the same amount of money on players. What was the **total amount** of money your 5 teams spent on players this past year? If there was an equal distribution of spending, how much money would these teams spend?

Total Amount Spent:

$$\begin{aligned} & \$83,837,448 + \$89,650,598 + \$95,636,948 + \$180,349,558 + \$194,472,041 \\ & = \$643,946,593 \end{aligned}$$

Equal Distribution

Total Amount/# of teams

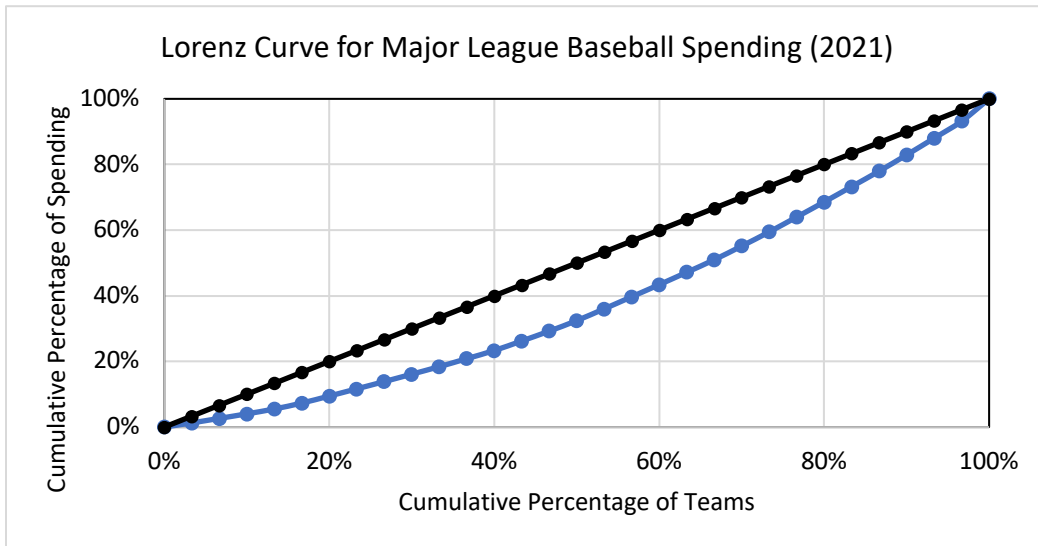
$$\begin{aligned} & \$643,946,593/5 \\ & = \$128,789,318.60 \end{aligned}$$

D) In order to measure inequality, we need to calculate each team's share of total spending for the year. In the table below, list your teams in the Team Name column and then the share of spending in the Share column. To calculate each team's share of spending, divide the amount they spent by the total amount found in part C.

The final column represents the cumulative share of income going from the top the bottom of your table. All of the teams together represent 100% of the spending in that division. This is important in the graphing stage. The first team represents the cumulative share of only them. The second row is the combination of the shares from team 1 and 2.

Rank	Team Name	Share of Total Spending	Cumulative Share
Lowest Payroll	Seattle Mariners	$\$83,837,448 / \$643,946,593$ =13%	13%
	Oakland Athletics	$\$89,650,598 / \$643,946,593$ =14%	27%
	Texas Rangers	$\$95,636,948 / \$643,946,593$ =15%	42%
	Los Angeles Angels	$\$180,349,558 / \$643,946,593$ =28%	72%
Highest Payroll	Houston Astros	$\$194,472,041 / \$643,946,593$ =30%	100%

- E) The following graph shows the Lorenz Curve for the entire Major League Baseball organization. What do you think the black line on the graph represents?



The black line represents perfect equality of spending and is often referred to as the “perfect equality line”. The bottom 10% of teams spend 10% of all the money in MLB. The lowest 20% of teams spend 20% of the money, etc.

- F) Using the data you calculated in Part D, plot your division’s Lorenz Curve. The horizontal axis represents the cumulative percentage of teams in the sample and the vertical axis represents the cumulative percentage of spending in the sample. The larger the area between your curve and the 45-degree line, the larger the share of inequality in your division.

