John Ostensen
Sports Analytics

**Question and Outcome:**

- **Question:** Would implementing a Salary Cap in MLB affect competitive advantage? How does excessive spending currently affect competitiveness in MLB? Do more valuable teams have an advantage?
- **Outcome:** The outcome to be analyzed will be the correlation between higher spending teams in MLB and teams with more playoff games played since 2010.

**Data Used:**

- **File (attached to submission):** Ostensen_John_CP4
- "DataDictionary" Tab
- Columns A-G, Rows 1-31

**Method Choice:** Regression Analysis: Regression analysis will show more than just correlation, such as how much one variable changes when the other changes, whether the relationship is statistically significant, how strong the relationship is overall, and how well one variable predicts the other.

**Analysis Spec:**
Independent Variable: Average Payroll (2011 - 2025)
Dependent Variable: Playoff Games Played (2011 - 2025)

**Results:**

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.618218769 |
| R Square | 0.382194447 |
| Adjusted R Square | 0.360129962 |
| Standard Error | 25.00032453 |
| Observations | 30 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1 | 10826.34565 | 10826.34565 | 17.32170332 | 0.000271809 |
| Residual | 28 | 17500.45435 | 625.0162268 | | |
| Total | 29 | 28326.8 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -21.77269059 | 15.71211727 | -1.385726074 | 0.176769696 | -53.95750382 | 10.41212264 | -53.95750382 | 10.41212264 |
| Avg. Payroll (2011 - 2025) | 4.77327E-07 | 1.14689E-07 | 4.161935045 | 0.000271809 | 2.42398E-07 | 7.12257E-07 | 2.42398E-07 | 7.12257E-07 |

**Checks:** Inputs are on the correct scale, no unnecessary variables were used. Since the payroll numbers are averaged over the last 15 years, removing outliers would be difficult considering there are not many. However, if we were to analyze by season, there would be clear outliers - for

example, 2020 Tampa Bay Rays made it to the World Series with one of the lowest payrolls in the league. However, this is not relevant to the average payroll number per team over the 15 year time span.

**Interpretation:**

- R-Squared = 0.382
    - This means 38.2% of the differences in playoff games played across teams over 2011–2025 can be explained by differences in team payroll.
    - This is very strong, as playoff success is influenced by injuries, front office decisions, schedule strength, randomness, etc.
    - If one variable, (payroll) explains 38.2% of postseason outcomes, that should be considered substantial.
- P-value for payroll = 0.00027
    - This means the probability that the relationship is due to random chance is near zero. Therefore, we can confidently conclude:
        - Teams with higher payrolls tend to play more playoff games
        - The model is statistically reliable
        - Payroll is a meaningful driver of postseason success
- Coefficient = $4.77 \times 10^{-7}$
    - On its own this number is tiny because payrolls are measured in tens of millions. Therefore, it must be scaled to typical payroll movements.
        - For a $10mn increase in payroll, teams can expect 4.8 more playoff games during the time period.
        - For a $50mn increase in payroll, teams can expect 24 more playoff games during the time period.
- Confidence Interval:
    - Lower Bound: $2.42 \times 10^{-7}$
    - Upper Bound: $7.12 \times 10^{-7}$
        - The entire interval is positive, suggesting that payroll has a positive impact on playoff games played and that, even in the most conservative cases, higher payroll still increases playoff games played.

**Limitations:** Possible limitations include injuries to key players, star players underperforming on certain years, etc. However, this data does suggest that excessive spending by richer teams does impact competitive balance in MLB, and that more valuable teams tend to have an advantage. Therefore, based on this initial analysis, it's possible that a salary cap in MLB would impact the current environment of valuable teams dominating the league.