Effect of Tempo on Team Performance in NCAA Men's Basketball

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Introduction

Tempo is a defining characteristic of many NCAA college basketball teams, whether the fast-paced North Carolina offense or the crawling pace of Virginia. Most often, teams with a fast pace are thought of as more aggressive, explosive, and higher scoring than their slower counterparts, who are considered to be more defensively minded. While both styles of play have proven successful, they have very different identities and are presumed to have different statistics that each would focus on. In this paper, we will examine the impact of tempo on a variety of metrics in NCAA basketball to determine how tempo may affect other elements of the box score.

Data

The data used for this analysis comes from Andrew Sundberg's College Basketball Dataset, retrieved from Kaggle. This dataset includes season statistics by team for the 2012-13 season through the 2018-19 season, with 355 teams over the 7 seasons totaling 2,455 unique observations. Variables of interest include:

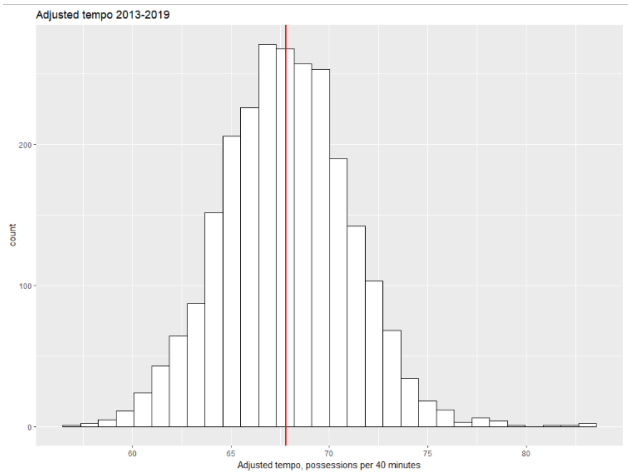
- Adjusted Offensive/Defensive Efficiency (estimate of the points scored/allowed per 100 possessions against an average D1 defense/offense)
- BARTHAG (power rating, the chance of beating an average D1 team)
- Effective Field Goal Percentage Shot/Allowed
- Turnover/Steal Rate
- Offensive Rebound Rate/Rate Allowed
- Free Throw Rate/Rate Allowed
- Two-Point Shooting Percentage/Percentage Allowed
- Three-Point Shooting Percentage/Percentage Allowed

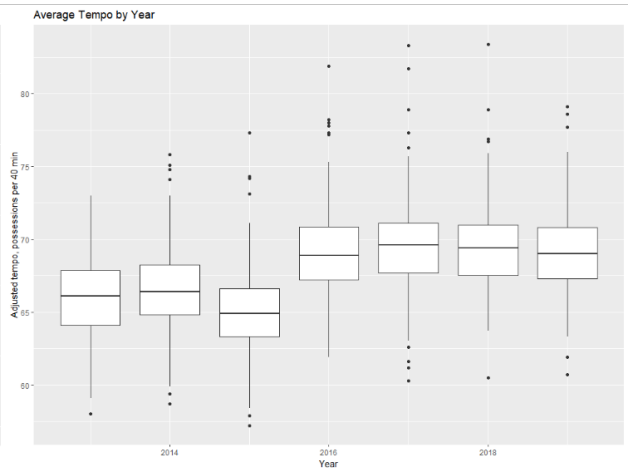
- Adjusted Tempo (estimate of the possessions per 40 minutes against a team playing at average D1 tempo)
- Win Percentage

Other descriptive data such as team and conference are included in the dataset but not used for analysis, only identification purposes. Of all observations, 18.25 percent are of Power 5 teams (teams belonging to one of the five most prominent athletic conferences) and 19.39 percent of teams made the NCAA March Madness tournament.

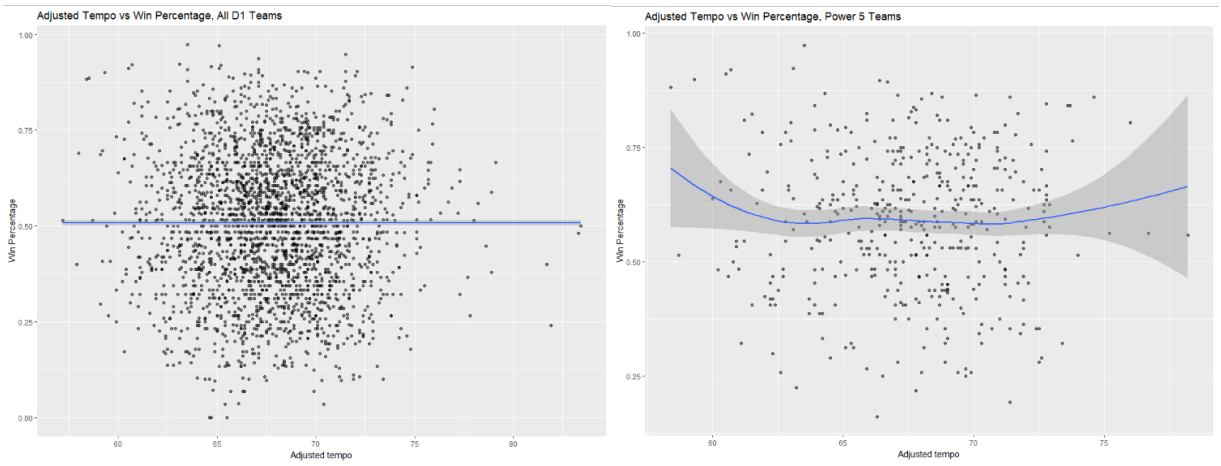
Analysis

Tempo, measured as the estimated possessions per 40 minutes against an average D1 team, can vary widely among NCAA college basketball teams. In the years surveyed for this analysis, the typical team averaged 68 possessions per 40 minutes over the course of the season, but tempo varied from 57 to 83 possessions, a difference of 26 possessions over the course of a single game. As seen in the histogram and boxplots below, adjusted tempo is relatively normally distributed and mostly consistent year-to-year, although trending up slightly over time.



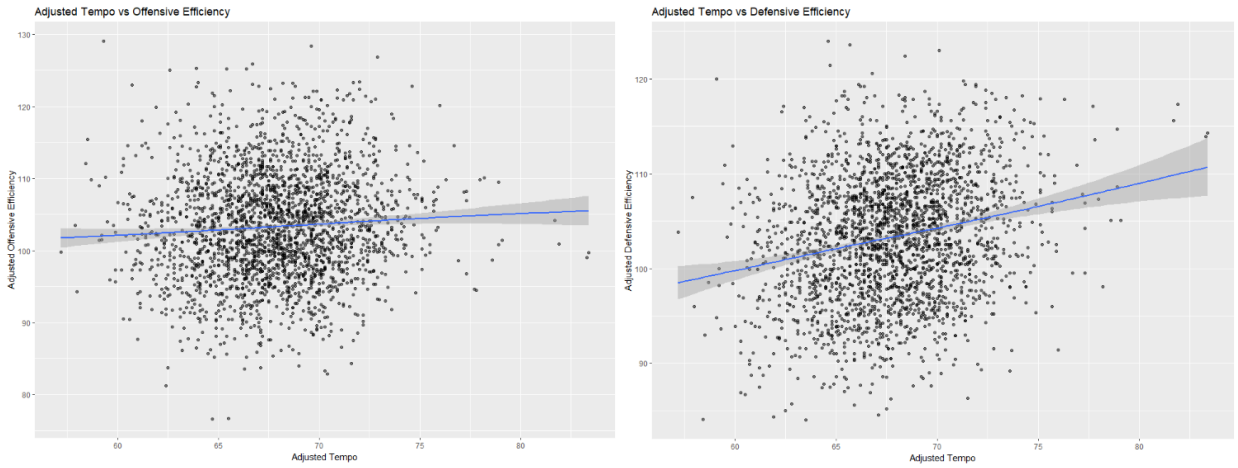


The first relationship we want to analyze is the relationship between tempo and win percentage. At the end of the day the goal is to win games, so if a faster or slower tempo is correlated with a higher win percentage that would certainly be preferred. However, regressing win percentage on adjusted tempo and the BARTHAG power rating – to control for team strength – results in a statistically significant but relatively small coefficient for adjusted tempo of 0.0038. For each additional possession per 40 minutes, expected win percentage rises by 0.38 percent, which is positive but not a large effect size given that the standard deviation for adjusted tempo is only 4 possessions per 40 minutes. In the two plots below, adjusted tempo is plotted against win percentage for all Division I teams as well as filtering down to Power 5 teams, in both cases not seeing any major correlation. Thus, we determine tempo does not have a large impact on win percentage.



Next, we look at the relationship between tempo and two metrics which have already been adjusted to account for differences in pace: adjusted offensive and defensive efficiency. Both estimate the number of points scored per 100 possessions against an average Division I opponent. Similar to the regression run for win percentage, we regressed both variables separately on adjusted tempo and power rating, finding similar coefficients of 0.325 for offensive

efficiency and 0.324 for defensive efficiency. These results show that not only does tempo give teams more opportunities to score, but they are more likely to score with each additional possession per 40 minutes, multiplying the effect of changes in tempo. This effect is seen on both ends of the floor almost equally, with faster tempos resulting in both more scoring and more points allowed per 100 possessions.



Conclusion

Tempo plays a very central role in the identity and play style of college basketball teams. Different coaching philosophies lead to drastic differences between the fastest and slowest teams each year. In this paper we explored how varying tempos can impact game results as well as team metrics. Teams who have more possessions per 40 minutes do not see a large boost to their chances of winning, but the faster tempo results in more points on both ends of the floor, even when controlling for team strength and using metrics that adjust to points per possession to factor out tempo. Further research could evaluate the impact of tempo on more focused statistics, such as shooting percentages, rebounds, and turnovers. Exploring these relationships using tempo free variables that measure box scores per possession or per 100 possessions can help isolate any effects found from adjusting tempo.