Pace and Success in the NBA

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As an avid basketball enthusiast and fan of a notoriously methodical offense in the Villanova Wildcats, I have been enamored with “pace” in basketball and its effect on winning. Pace is how fast or slow a team plays and is defined by the NBA as the “number of possessions per 48 minutes for a team or player.” In this project, I examined pace in the NBA with respect to a variety of variables associated with winning, specifically points per possession and net rating. I utilized box score data from the 2010-11 season through the 2020-21 season, as well as the current season (2022-23).

My overarching goal was to determine how pace relates to winning, points scored, and points allowed. Specifically, I wished to determine if it is more advantageous to be a faster or slower team in the current NBA, or if pace is inconsequential.

# Pace in the NBA: Should Teams Play Quickly or Slowly?

I began this expedition with some simple visualizations and summarizations of pace in the NBA.

Chart, histogram

Description automatically generated

Above is a histogram of each team’s number of possessions in every game of from the 2010-11 season through the 2020-21 season. As you can see, pace is approximately normally distributed and has a mean of 96.38 possessions per 48 minutes. Few games posted extremely slow games below 85 possessions per 48 minutes or extremely fast games above 110 possessions.

Chart, histogram

Description automatically generated

The distribution for the current season looks similar, however, the mean pace has increased from 96.38 to 100.05 possessions per 48 minutes. Now it is rare for games to have fewer than 90 possessions per four quarters. It is interesting to note that pace has increased throughout the past decade, as shown by the steadily increasing average pace in the table below.

Table

Description automatically generated

This season the fastest teams have been the Warriors, Lakers, Thunder, Kings, and Timberwolves while the slowest teams have been the Cavaliers, Mavericks, Heat, Raptors, and Suns. From this initial tabular look, it does not appear that being fast or slow changes your chances of winning dramatically, since both groups (fast and slow) contain playoff teams and non-playoff teams alike.

Table

Description automatically generated

A better way to determine if there is truly a relationship between pace and success in the NBA is to plot average pace per team by year versus comprehensive measures of success. I did this for Net Rating and Winning Percentage. The resulting graphs for the entire range of seasons are shown below.

Chart, scatter chart

Description automatically generated

Chart, scatter chart

Description automatically generated

It is immediately apparent that average pace does not have a strong positive or negative relationship with net rating. The correlation between these two average measures is -0.018, which is effectively 0. Unsurprisingly, plotting winning percentage versus pace shows the same lack of relationship. This indicates that teams’ overall success does not depend on how fast or slow they play.

Although speed of play on its own may not be a strong indicator of success, I wondered if a team’s ability to control the pace of the game is. I decided to explore the standard deviation of pace throughout the course of a year to operate as a proxy for control. The idea behind this is that teams with a smaller standard deviation of pace (i.e., less variation in the number of possessions per game) tend to have more games around the same pace than teams with larger standard deviations. I hypothesized that these teams with better “control” would be truer to their game-plan and, therefore, experience greater success.

Chart, scatter chart

Description automatically generated

I plotted every team’s end-of-season standard deviation of pace versus their average net rating to explore this hypothesis visually. In the graph above, you can see that variation in pace is very weakly correlated with average net rating. Much like with pace itself, this measure of pace control is not influential. Teams with high net ratings had a wide range of “control.” The same was true for teams with low net ratings.

It is possible that I defined pace control poorly, since teams could have played in many games with a similar pace of play that was not optimal for their personnel or style. For example, a team might have wanted to play methodically, but were consistently forced into fast paced games by their opponents. I would not consider this team to have control over the pace of the game, but they would have a small standard deviation because the pace of each of their games was similar. Therefore, my metric would incorrectly define them as a team with high pace control. This could be a reason behind the lack of connection between this metric and winning games.

Even though neither pace nor pace control appear to be strong predictors of NBA success, it is still interesting to visualize this relationship for each team. This can give fans, bettors, or anyone interested in the NBA an idea of how fast or slow a game might be and who might emerge victorious. The chart below relates net rating and pace for each team this season.

Chart, scatter chart

Description automatically generated

One example of an insight you could glean from this visual is this: As of February 15, 2023, the chart indicates that the Cavaliers are very strong and slow while the Heat are much closer to an average NBA team in terms of net rating, but still slower than all but two teams. If the Cavaliers played the Heat, then, we would expect this game to be very slow and we would predict a Cavaliers victory. Therefore, depending on the odds, it may be advantageous to bet on the Cavaliers moneyline or perhaps take the “under.”

However, the sportsbooks have likely adjusted for the pace and strength of these two teams so there may not be an edge to pursue. Likewise, without an actual predicted pace or point total for the game, this process is not exact and gives only a general prediction for game outcomes.

Creating a predictive model to forecast the points scored by both teams would make this process more scientific and allow bettors to find the edge over sportsbooks (assuming the model is accurate). This leads me into future research that I will conduct based on these findings.

# Future Research

The next three objectives build upon the research I conducted here but are beyond the scope of this project. I would like to use my knowledge of pace to create a predictive model for it and couple it with a predictive model for points per possession. I could then multiply the two predicted values together to obtain an accurate forecast for points scored in any NBA game. This has possible applications to sports betting if the resulting model is accurate.

The objectives for this future project are as follows:

1. Accurately predict pace in any game by determining which factors and metrics influence it most.
2. Accurately predict points per possession in any game by determining which factors and metrics influence it most.
3. Use predicted pace with predicted points per possession to predict points scored by each team in an NBA game.

# Conclusions

In conclusion, my analysis showed that over the course of the past decade, pace has very little association with winning. Pace was shown to be independent of winning percentage and net rating. This indicates that there is no superior pace to play the game of basketball. Coaches need not change their strategy to emphasizes fast or slow play simply because one style works more often or better than the other. They can base their strategy off of their personnel and preferences.

Likewise, based on my definition of pace control, having small variation in the pace of a team’s games does not give them a distinct advantage either. “Controlling the pace” is a phrase often delivered by commentators when describing teams’ keys to success, but this analysis could not conclude that controlling the pace has any effect on a team’s outcome in a game. Of course, as aforementioned, the lack of association between pace control and winning could be due to the metric I created not being indicative of pace control. In addition to the future research I will conduct to predict points in an NBA game, I will also work to refine this metric.