NCAA Women's Division I Advanced Stats Review

Introduction

This document will review which factors contributed the most to positive point margins(wins) and how those factors can be generated. Some takeaways from this document will be a 2019/2020 view of each of the four factors and how they affected winning, a rubric for identifying teams that under and overperformed, and some tips for evaluating future opponents.

Overview of correlations

Strong Positive (70%)	Positively correlated factors move in the same direction. For example, an increase in Points Per 100 Possessions correlates strongly with an increase in Net Rating.
Moderate Positive (50%)	
Weak Positive (30%)	
No Correlation (0%)	Factors in this category have little to no correlation
Weak Negative (-30%)	Negatively correlated factors move in the opposite direction. For example, an increase in Opponent Points Per 100 Possessions correlates strongly with a decrease in Net Rating.
Moderate Negative (-50%)	
Strong Negative (-70%)	

When reviewing the following datasets it is important to keep in mind that negative correlations are just as important as positive ones. The primary difference being that the goal with negative correlations is to avoid them while the goal with positive correlations is to focus on them. For example, turnover rate has a negative correlation with points per possessions(avoid TOs) while EFG% has a strong positive correlation. Additionally, by definition, highly correlated data like this is very often predictive in value. In other words, high offensive EFG metrics are predictive of high Net EFG metrics which are predictive of positive net ratings which are predictive of winning games.

Other Resources

Four Factors: www.pivotanalysis.com/post/what-are-four-factors-basketball
Offensive/Defensive Ratings: www.pivotanalysis.com/post/offensive-and-defensive-ratings

Winning Percentage and Net Rating Correlations

Winning % Correlations

Net Rating	91.29%
Points Per 100 Possessions	82.26%
Net EFG	78.74%
Net TOV	60.35%
Net ORR	58.18%
Net FTR	37.84%
Opponent Points Per 100 Possessions	-77.39%

Net Rating Correlations

Points Per 100 Possessions	92.42%
Net EFG	89.46%
Net ORR	68.30%
Net TOV	61.34%
Net FTR	44.71%
Opponent Points Per 100 Possessions	-87.69%

Winning Percentage and Net Rating Summary

As would be expected, net rating correlates very highly with winning percentage. Winning percentage tends to have a small percentage of luck so the 90% correlation is very standard. The net rating correlations tend to be more stable. The correlations here reveal that Net EFG is as important as Offensive and Defensive Points per 100. The Net Rating correlations also provide an indication of the importance of the other Four Factors.

Offensive and Defensive Per Possession Effectiveness Correlations

Points Per 100 Possessions	
Team EFG	89.37%
Team ORR	42.55%
Team FTR	35.45%
Team Assist %	29.45%
Team TOV %	-68.54%

Opp. Points Per 100 Possessions	
Opponent EFG	82.57%
Opponent ORR	65.11%
Opponent Assist %	30.70%
Opponent FTR	27.52%
Opponent TOV %	-44.79%

Offensive and Defensive Per Possession Effectiveness Summary

These correlations are potentially the most important for an overall understanding of what generates offense / defense. The Four Factors + Assist % help describe all outcomes of offense and defense. Breaking them out by how correlated they are with offensive and defensive ratings can illuminate their specific values. For example, EFG is always the most important for both and FTR is the least, but the differences between offensive rebounds (Team ORR) and defensive rebounds (Opponent ORR) is important as well as the difference between offensive and defensive turnover rates.

Effective Field Goal Percentage Correlations

Net EFG Correlations	
Team EFG	88.47%
At the Rim %	78.58%
Three Point %	67.73%
Mid Range %	50.10%
Team Assist %	40.05%
Opponent % of FGA (Mid Range)	33.56%
Team ORR	29.63%
Team FTR	25.43%
% of FGA (Three)	20.25%
% of FGA (At the Rim)	16.84%
Opponent TOV %	0.07%
Opponent % of FGA (Three)	-7.89%
Pace	-12.01%
Opponent At the Rim %	-19.60%
% of FGA (Mid Range)	-31.56%
Opponent FTR	-43.22%
Opponent Assist %	-43.33%
Opponent Mid Range %	-43.92%
Team TOV %	-45.44%
Opponent Three Point %	-57.96%
Opponent ORR	-61.87%
Opponent At the Rim %	-72.89%
Opponent EFG	-84.22%

Team EFG Correlations		Opponent EFG Correlations	
At the Rim %	84.06%	Opponent At the Rim %	85.76%
Three Point %	79.33%	Opponent Three Point %	69.22%
Mid Range %	56.02%	Opponent ORR	57.23%
Team Assist %	43.08%	Opponent Mid Range %	52.07%
% of FGA (Three)	30.42%	Opponent Assist %	39.12%
Team FTR	29.59%	Team TOV %	35.48%
Team ORR	20.85%	Opponent FTR	32.57%
% of FGA (At the Rim)	17.69%	Opponent % of FGA (At the Rim)	22.14%
Opponent TOV %	1.99%	Opponent % of FGA (Three)	9.43%
% of FGA (Mid Range)	-41.57%	Opponent TOV %	2.18%
Team TOV %	-42.62%	Team ORR	-31.15%
Opponent ORR	-50.31%	Opponent % of FGA (Mid Range)	-39.28%

Effective Field Goal Percentage Summary

The EFG correlations, from Overall (Net) to the Offensive and Defensive versions, can provide a good look into which shots and shooting efficiencies can provide the most value. Additionally, the other Four Factors(ORR, TOV, FTR) may play a role in EFG, but the most important metrics will always be the location and effectiveness of a team's shot profile. Shooting accuracy takes the cake in this competition. The ability to convert from three and at the rim are the two biggest indicators of effectiveness. In terms of shot location, the data is pretty clear that avoiding mid-range shots / forcing opponents to take mid-range shots is the most effective strategy. It is very difficult for a team to shoot an above average points per shot from that distance. It doesn't matter as much if the shot is at the rim or from three, either is a better option than from mid-range.