

How do NCAA Division I men's basketball conferences differ in key efficiency metrics and other statistics?

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Topic and motivation

Topic

"How do NCAA Division I men's basketball conferences differ in key efficiency metrics and other statistics?"

Our research topic aims to conduct analysis within NCAA Division I men's college basketball, focusing on the metrics which differ between conferences. Specifically, we hypothesize that certain conferences may be associated with distinct playing styles such as tempo, therefore this project will explore correlations between specific variables by conference.

Motivation

Inspired by Duke basketball and exposure to college competition

Passionate about connecting stats and data to a sport most of us watch and care about

Curiosity about whether different conferences have distinct patterns and playing styles

Introducing the data

Source

Source: "[College Basketball Dataset](#)" on Kaggle, which were [ethically scraped](#) and subsequently cleaned by user Andrew Sundberg.

The data were collected/are updated to 3/18/2025.

Each observation is for a college basketball team and their performance in a Division I season from 2013 to 2024 for a number of statistics about various aspects of basketball (rebounds, turnovers, etc).

Variables

The majority of our variables will be **numerical**

Key variables:

- adj_t: Adjusted Tempo - an estimate of the tempo (possessions per 40 minutes) a team would have against the team that wants to play at an average Division I tempo
- adjoe: Adjusted Offensive Efficiency
- adjde: Adjusted Defensive Efficiency
- barthag: Power Rating (chance of beating an average Division I team)
- ftr: Free-throw Rate

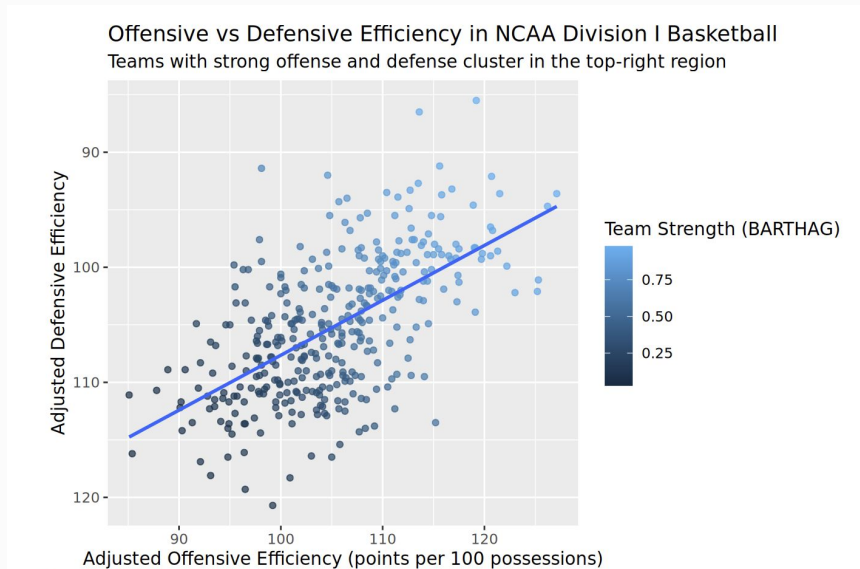
Some **categorical** like

- team: name of Division I college basketball school
- conf: the Athletic Conference participated in

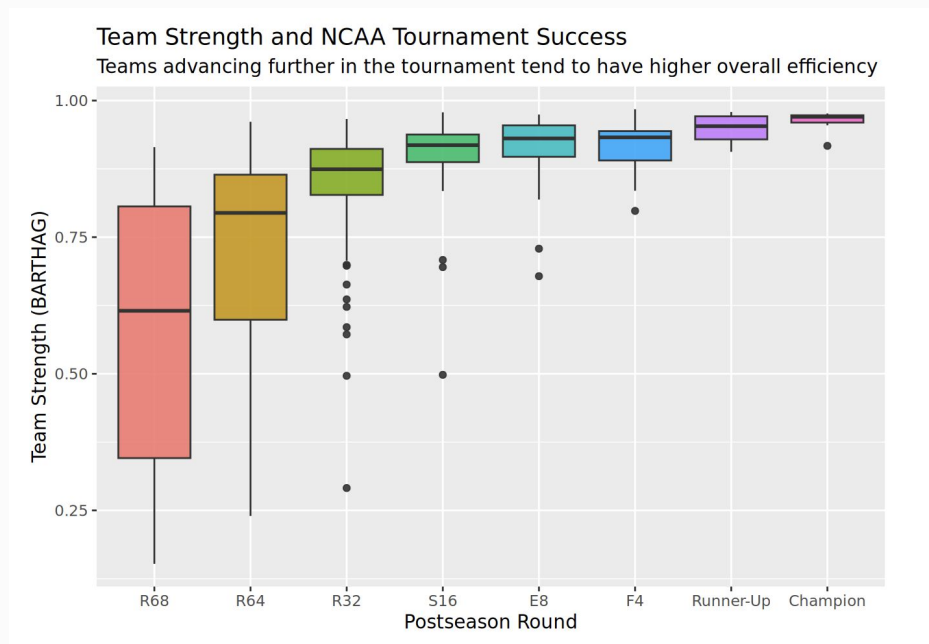
team	conf	g	w	adjoe	adjde	barthag
1 Houston	B12	34	30	119.2	85.5	0.9785
2 Connecticut	BE	34	31	127.1	93.6	0.9712
3 Purdue	B10	33	29	126.2	94.7	0.9644
4 North Carolina	ACC	34	27	116.8	93.2	0.9305
5 Iowa St.	B12	34	27	113.6	86.5	0.9583
6 Arizona	P12	33	25	121.5	93.6	0.9526
7 Tennessee	SEC	32	24	115.6	91.2	0.9382
8 Marquette	BE	34	25	118.9	94.6	0.9328
9 Creighton	BE	32	23	120.6	96.5	0.9289
10 Illinois	B10	34	26	125.3	101.1	0.9221
11 Baylor	B12	32	23	122.2	99.9	0.9103
12 Kentucky	SEC	32	23	123.0	102.2	0.8934
13 Auburn	SEC	34	27	120.7	92.1	0.9573
14 Duke	ACC	32	24	120.8	96.8	0.9272
15 Alabama	SEC	32	21	125.2	102.1	0.9126
16 Kansas	B12	31	22	113.5	92.7	0.9111
17 Saint Mary's	WCC	32	26	115.8	93.7	0.9198
18 Gonzaga	WCC	31	25	121.3	98.6	0.9151
19 Wisconsin	B10	35	22	119.8	98.8	0.9018
20 San Diego St.	MWC	32	24	111.5	93.9	0.8789
21 BYU	B12	33	23	120.6	99.0	0.9067
22 Texas Tech	B12	33	23	117.5	98.4	0.8846
23 Clemson	ACC	32	21	116.7	99.3	0.8647
24 South Carolina	SEC	33	26	114.4	98.9	0.8420
25 Texas	B12	32	20	119.0	98.3	0.9006
26 Florida	SEC	35	24	119.7	99.3	0.8951
27 Washington St.	P12	33	24	112.8	96.6	0.8556
28 Dayton	A10	31	24	117.4	100.7	0.8547
29 Nebraska	B10	33	23	115.7	95.6	0.8999
30 Mississippi St.	SEC	34	21	112.6	94.9	0.8772

Highlights from EDA

Short summary of key takeaways



- There is a strong positive relationship between adjusted offensive efficiency and adjusted defensive efficiency
- High-performing teams excel on both ends of the court
- Team quality is from both offensive and defensive efficiency rather than specialization in one or the other



[Figure 2](#) illustrates that teams advancing further in the NCAA tournament consistently have higher BARTHAG values, a measure of overall team strength. The upward trend across postseason rounds confirms that efficiency-based metrics are strong predictors of postseason success.

Highlights from EDA

Short summary of key takeaways

Conference Strength vs Tournament Performance
Color indicates performance relative to expectation

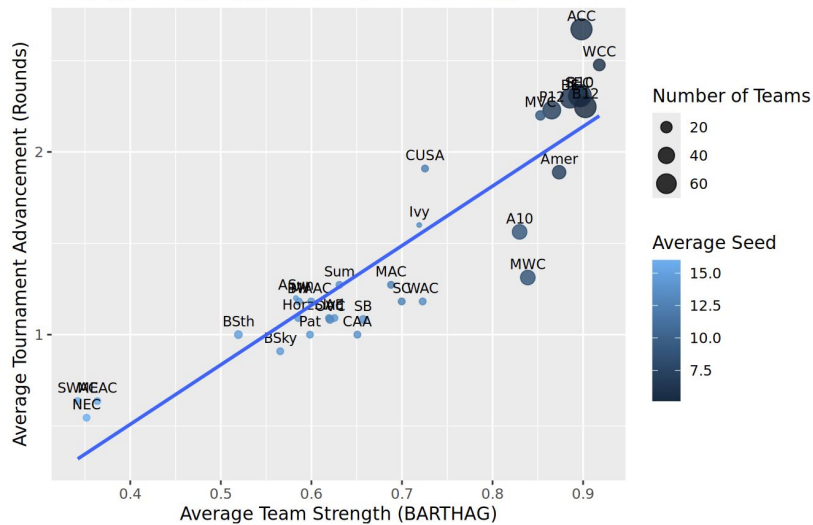
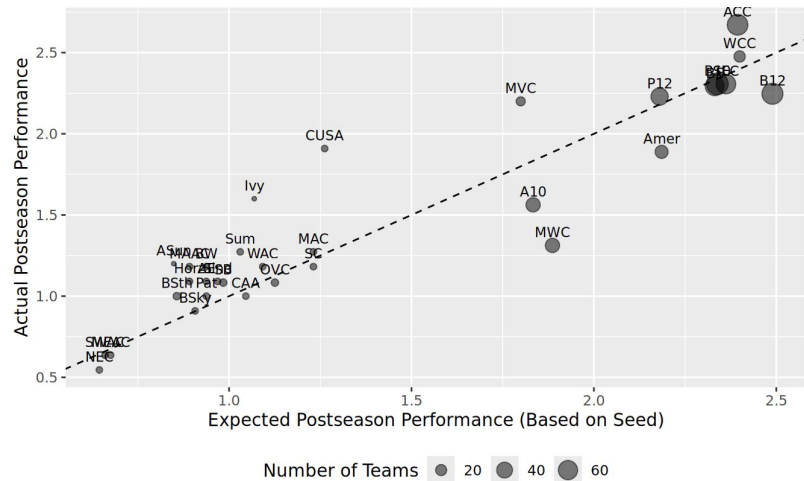


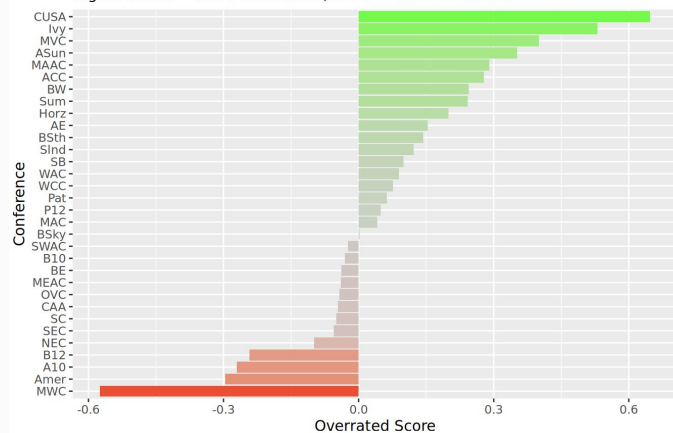
Figure 3 compares average conference strength (BARTHAG) with postseason performance, showing a general positive relationship between stronger conferences and better tournament outcomes. However, the variation around the trend suggests that conference strength alone does not fully determine actual postseason success.

Conference Performance Relative to Tournament Expectations
Above the line = outperformed seed expectations; below = underperformed



Expected performance is estimated using a regression model based on tournament seed.

Conference Performance Relative to Seed Expectations
Higher values = more underrated; lower = more overrated

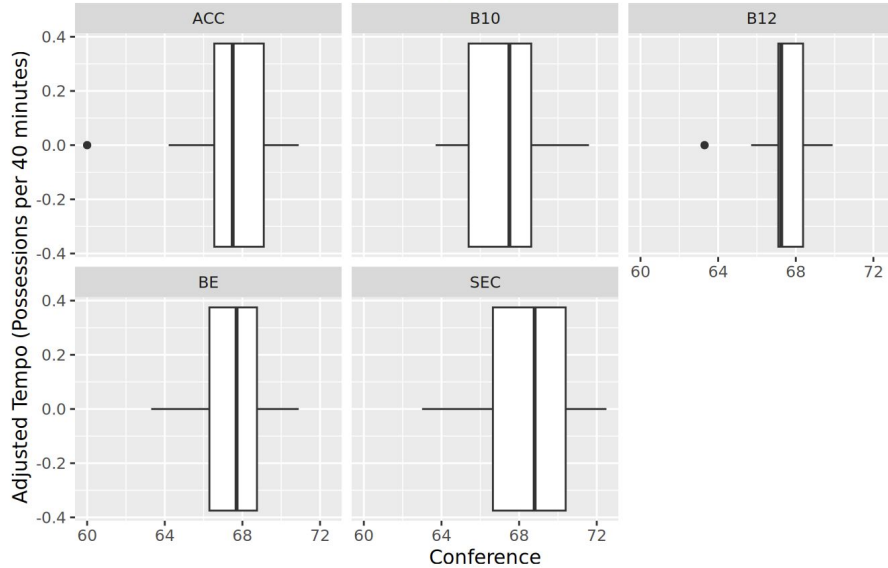


Highlights from EDA

Short summary of key takeaways

Tempo Differences Across Major Conferences

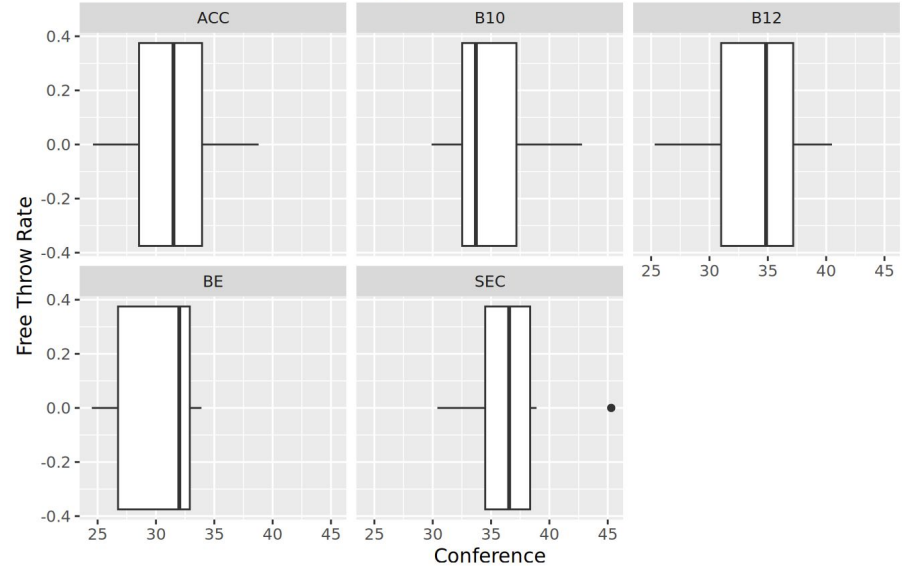
Conferences exhibit distinct pace-of-play profiles



- Major conferences have clear differences in pace of play.
- Some conferences exhibit faster and more variable tempos, while others are more tightly clustered

Physicality and Free Throw Rate Across Major Conferences

Higher values indicate more aggressive, contact-heavy styles of play



- Higher values and wider distributions suggest more contact-heavy styles of player
- Lower values may indicate more perimeter-oriented or less physical strategies.

Conclusions, discussion and critique

Conclusions

- **Success** in NCAA Division I men's basketball is mainly driven by **efficiency metrics**
- **Conferences differ more in style** (e.g., tempo, physicality, free throw rate) than in efficiency metrics
- No single playing style guarantees success in postseason outcomes, as no single style consistently outperforms others in postseason outcomes.
- Conference over/under-performance vs. seed suggests other factors (e.g., matchups, structure) also matter

**No single path to success
(except being Duke)**

Discussion and critique

Observational data

Higher efficiency is linked to success, but may simply reflect stronger teams overall, not a direct cause

Confounding variables

Variables like injuries and coaching quality are not considered

Simplified metrics

Play style is reduced to simple stats like tempo and free throws, which don't fully capture how teams actually play