E C O N O M I C S B U L L E T I N

Major Conference Bias and the NCAA Men's Basketball Tournament

Timothy Zimmer
Purdue University

Todd Kuethe
Purdue University

Abstract

The following paper examines the potential bias by the NCAA men's basketball selection committee in favor of major conferences. Employing data from the 1997 – 2006 tournaments, we find evidence for bias in the tournament seeding of teams from the six power conferences when judged against the remaining mid-major and minor conferences. More specifically, the analysis indicates members of the Southeastern Conference (SEC) are seeded two positions higher (better) than the model would predict. In addition, the results indicate that members of the Atlantic Coastal Conference (ACC) are commonly seeded to positions lower (worse) than predicted.

Citation: Zimmer, Timothy and Todd Kuethe, (2008) "Major Conference Bias and the NCAA Men's Basketball Tournament." *Economics Bulletin*, Vol. 12, No. 17 pp. 1-6
Submitted: December 23, 2007. **Accepted:** June 11, 2008.
URL: http://economicsbulletin.vanderbilt.edu/2008/volume12/EB-07L80004A.pdf

1. Introduction

Each spring, at the conclusion of the NCAA Division I Basketball season, a selection committee meets to decide which teams to invite to a yearly playoff tournament. The ten-member panel is also responsible for seeding the teams in the playoff brackets according to expected playing ability. The invitations and seeds are based on the accumulating accomplishments of the respective teams throughout the year, and reflect their expected level of play throughout the tournament. The seed brackets are designed such that the lower seeds (better teams) initially face higher seeds (worse teams). In essence, the selection committee rewards for an outstanding year by giving them an easier path to the later rounds of the tournament.

Since 2001, the tournament field is comprised of 65 teams of which 31 teams earn automatic bids by winning their conference tournaments, or conference regular season in the case of the Ivy League. This leaves an additional 34 teams whose participation is decided entirely by the selection committee. After the field is chosen, the selection committee divides the teams into four regions of equal ability with two teams competing in the "play in game" on the Tuesday preceding the tournament. Each of the four regions uses a single elimination format with the top seed facing the 16 seed, the second seed facing the 15 seed and so on. Prior to 2001, the tournament comprised of an identical 64 team format but did not include the "play in game."

The NCAA Basketball Tournament is a large enterprise which generates a significant revenue stream for the NCAA through event attendance, merchandising, and most importantly, television revenue. The possibility for increased revenue provides implicit incentive to ensure that teams with faithful and large fan bases are given better position to increase the chance that they will survive longer in the tournament. For this reason, there is the potential for selection bias in favor of major conference schools which provide greater name recognition, more fans, and a much larger pool of alumni than minor conference schools.

NCAA Basketball Tournament selection and seeding also has a large financial implication for participating conferences in two ways. First, the NCAA distributes a series of payments to each conference based on its performance in the tournament over a rolling six-year period. The conference receives a "one unit" payment for each school participating in each game, excluding the championship game. The unit value at the end of the 2005-2006 season was $164,000 totaling $128 million. The units at the end of the 2006-2007 were $177,000 for $132.6 million (National Collegiate Athletic Association). Thus, if a conference contains a team that was unfairly awarded a low seed in the tournament, the conference is given an easier opportunity to earn upwards of $177,000 for each game played as the team advances through the tournament field. Second, previous studies point to a correlation between athletic success and increased alumni donations. For example, Baade and Sundberg (1996) found that NCAA basketball tournament appearances result in higher alumni gifts to public universities.

There are a number of previous studies that examine the tournament seeding as a method to predict the eventual tournament outcome. A number of these studies find the tournament seeds alone are an accurate predictor of the margin of victory (Smith and Schwertman, 1999), the outcome of an individual game (Boulier and Stekler, 1999), and the eventual tournament champion (Kavman and Sokol, 2006). As a result, this study develops a model to examine whether the tournament seeding alone can predict the occurrence of an "upset" (a victory of a higher seed over a lower seed) and to test if upsets are more likely to occur when the lower seed is a member of one of the six major conferences: Big 10, Big 12, Big East , Pac 10, ACC, or

SEC. If conference membership significantly impacts the probability of an upset game, empirical evidence of bias in the selection process exists.

A number of studies have addressed the potential for corruption in NCAA basketball in other ways. Baldson, Fong, and Thayer (2007) demonstrated regular-season champions often performed poorly in their season-ending conference tournaments. The authors argued underperformance is motivated by the maximization of post season revenue collected by the conference tournament. For example, if the regular season champion has a high probability of receiving an at-large bid regardless of conference tournament performance, there is an incentive to have a lower-level conference team win the conference tournament. This would ensure an additional team's entrance to the NCAA tournament.

Wolfers (2006) demonstrates additional evidence of corruption in NCAA men's basketball. The author empirically demonstrates a systematic pattern that indicates a number of teams (or individual athletes) exhibit "point shaving" behavior. That is, a number of players are manipulating the margin of victory to influence legal and illegal gambling on NCAA basketball games.

In particular, this study can be observed as a continuation of research conducted by Sanders (2007). Sanders examined bias in college basketball's Ratings Percentage Index (RPI), which is a major instrument in assessing team performance by the tournament selection committee. Sanders (2007) concluded that the problems (Kerri, 2007; Scott, 2007) and outright bias (Harville, 2003) seen in team ranking by other studies are not random, but rather systemic in nature. The systemic bias punishes schools in high ability conferences, while rewarding those of relatively low ability conferences. This bias is shown to be present even when transitively compared.

The remaining sections of the paper are organized in the following manner. First, we develop a methodology to test for empirical evidence of biased seeding practice by the NCAA selection committee. Then, we present the results of our analysis and conclude with a discussion of the implications of our study.

2. Methodology

This study examines data of prior tournaments to investigate the potential of bias on the part of the selection committee. Tournament results for ten years (1997 to 2006) were compiled providing 636 games. The observations cover all rounds of the tournament play, and include the yearly "play-in" game for 2001 through 2006. Each observation matches a favorite with a lower seed. In the case of equal seeds, the significance of which team is the favorite is inconsequential. The favorites are tallied based on the largest six (or major) conferences, with remaining conferences accumulated into a single category (minor) which is used to represent the middle and smaller sized (or minor) conferences.

If the teams have been properly seeded based on expected level of play, then final scores will be correlated to the differentials in seeds, regardless of conference. The following equation was developed to test this hypothesis.

$$Score = \beta_0 + \beta_1(Seed) + \sum_i \beta_i(Conference) + \varepsilon \qquad (1)$$

The dependent variable, *Score*, represent the score differential computed as the value of the higher seed (favorite) mines the lower seed score. The differentials are calculated using the score at the end of regulation play (i.e. 40 minutes of play) where ties represent a score

differential of 0, as teams tied at the end of regulation are considered to be equally matched in terms of playing ability. Score differentials are positive or negative, with a negative score differential indicating an upset of seeded teams (the higher seeded team losing). The regressor, *Seed*, is computed as the absolute value of the higher seed minus the lower seed, or *seed differential*. For example, a 1 seed team playing a 4 seed team to an 80 to 70 victory will have a seed differential of +3 [absolute value (1-4)] and a score differential of +10 [(80-70)]. All seed differentials are positive and equal seeds having a 0 seed differential. There are six conference dummy variables (*Conference*) representing the six "power" conferences: Big 10, Big 12, Big East, Pac 10, ACC, and SEC. The omitted category is a composite dummy representing the remaining "mid-major" or "minor" conferences.

The estimated coefficient β_1 is expected to be statistically different than zero and positive. The failure to reject this hypothesis implies that the selection committee properly assesses the playing ability of teams when seeding the tournament. In addition, the remaining conference dummy coefficients are expected to take the value of zero. The failure to reject this hypothesis implies that the selection committee is not biased by major conference affiliation. If these variables are determined to be non-zero (confirmed through t-tests and joint F-tests) major conference bias is shown to be present in the selection and seeding process.

It is important to note that the dependent variable in (1) cannot be normal. By definition, the variable is integer-valued with a discrete distribution. To address this concern, it is possible to assume that the score differential (Y) is a manifestation of an underlying continuous variable (Z). Where Y is determined by rounding Z to the nearest integer, and to assume Z follows the model:

$$\begin{aligned} Z &= \beta_0 + \beta_1(Seed) + \sum_i \beta_i(Conference) + \varepsilon \\ \Pr(Y = Y^*) &= \Pr(Y^* - 0.5 < Z \le Y^* + 0.5) \end{aligned} \qquad (2)$$

However, previous studies show that for most purposes (1) provides an adequate approximation to the model determined by (2) (Harville, 2003). As a result, (1) is estimated using ordinary least squares (OLS).

3. Results

The estimation results are provided in Table I. The results provide two significant insights. First, generally speaking, the selection committee does an adequate job assessing ability, and correctly seeds team entering the tournament. The positive and highly significant seed-differential variable implies that a higher seeded team should beat a lower seeded team, thus reflecting a proper assessment and seeding of teams. A one seed differential implies an expected score differential of approximately 1.30 points. For example, based one the estimated model, a 3rd seeded team facing a 4th seed team should benefit from a lift of 1.30 points, and a 5th seeded team facing a 7th seed team should benefit from a lift of 2.60 points and so forth.

The second significant insight is that although the selection committee generally does an adequate job, the process is not entirely free of selection bias. The individual conference dummies show weak significance for the SEC and ACC conferences. The sign indicates the SEC may be associated with lower performance or "over-ranked," and the members of the ACC conference may be "under-ranked" based on previous tournament information. For example, a

better seeded team (favored to win) from the ACC will benefit by an approximately 2.56 lift in points. However, if the lower seeded team is from SEC, the team will be deflated by an approximately 2.19 discount in points. In practical terms, it appears that the selection committee is biased in seeding ACC teams approximately 2 seeds higher (worse) than play warrants, and SEC teams approximately 2 seeds lower (better) than play warrants.

Conference bias can be examined in terms of "major vs. minor" conferences. The possibility of conference size bias is examined further by jointly testing the individual conference coefficients. The results of Joint F-Test indicate bias may be present with an F-Value of 1.84 which is significant at the 90% level.

4. Conclusions

The selection committee process employed by the NCAA Division I Basketball Tournament generally did a good job of seeding teams according to their playing ability for the tournament from 1997 through 2006, but some evidence of bias does exist. The effectiveness of the selection committee is evidenced by team seeding being a highly significant indicator of a team's success and being worth approximately 1.3 points per seed differential.

However, some bias is evident for tournament seeding based on conference affiliation, within the large conferences. A bias in favoring Southeastern Conference (SEC) teams is shown, while a bias against Atlantic Coast Conference (ACC) teams are is shown. Generally speaking, SEC teams are shown to be slotted approximate 2 seeds lower (better) and ACC teams 2 seeds higher (worse) than play afforded. Throughout the observed time period (1997-2006), the ACC accounted for 10 of the 40 final four spots. However SEC conference teams occupied only 5 final four berths in the same period. Additionally, there is evidence of bias with respect to whether a not a team is a member of a power conference of a smaller conference.

The results align nicely with previous studies that show evidence of corruption in NCAA men's basketball (Baldson, Fong, and Thayer, 2007; Wolfers, 2006). Alternatively, selection committee seeding bias could be a function of false signals by shirking teams (i.e. slacking off or expanding effort inconsistent with group or organizational goals) working to manipulate their potential tournament position. Previous work by Sanders (2007) demonstrated a systematic bias against power conference teams in the RPI rankings employed by selection committee. This bias may describe, in part, the evidence suggesting a habitual under-seeding of ACC teams.

NCAA men's basketball is not the only athletic competition in which participation is determined by selection committee. The study we completed provides a simple framework for testing for evidence of biased selection decisions. However, seeding alone cannot predict game outcomes, so future research should explore other systematic differences in tournament positions.

5. References

Baade, R. and J. Sundberg. (1996). "Fourth Down and Gold to Go? Assessing the Link Between Athletics and Alumni Giving." *Social Science Quarterly* 77 (4), 789-803.

Balsdon, E., L. Fong, and M. Thayer. (2007) "Corruption in College Basketball? Evidence of Tanking in Postseason Conference Tournaments." *Journal of Sports Economics* 8 (1), 19-38

Boulier, B. and H. Stekler. (1999) "Are Sports Seedlings Good Predictors?: An

Evaluation." *International Journal of Forecasting* 15, 83-91.
Harville, D. (2003) "The Selection or Seeding of College Basketball or Football Teams for Postseason Competition." *Journal of the American Statistical Association*. 98, 17-27.
Keri, J. (2007) "Pac-10 emerging as toughest conference." *The New York Sun*. (www.nysun.com/article/46197)
Kvam, P. and J. Sokol. "A Logistic Regression/Markov Chain Model for NCAA Basketball." *Naval Research Logistics* 53, 788-803.
National Collegiate Athletic Association. 2006. *2006-07 Revenue Distribution Plan.* Retrieved December 6, 2007, from World Wide Web: http://www1.ncaa.org/finance/revenue_distribution_plan.
Sanders, S. (2007) "A Cheap Ticket to the Dance: Systematic Bias in College Basketball's Ratings Percentage Index." *Economics Bulletin*. 4 (34), 107.
Scott, J. (2007) "The ratings percentage index myth." Retrieved from the World Wide Web: hhtp://www.bigbluehistory.net/bb/rpi.html
Smith, T. and N. Schwertman. (1999). "Can the NCAA Basketball Tournament Seeding be Used to Predict Margin of Victory?" *The American Statistician* 53 (2), 94-98.
Wolfers, J. (2006, May). *Point Shaving: Corruption in NCAA Basketball.* AEA Papers and Proceedings.

6. Tables

Table I: Estimation Results (t-statics in parenthesis)

Variable	*Coefficient*
Constant	-3.016 **
	(1.280)
Seed-Differential	1.297 **
	(0.110)
Big 10	1.661
	(1.641)
Big 12	2.046
	(1.714)
Pac 10	1.852
	(1.762)
ACC	2.562 *
	(1.613)
SEC	-2.193 *
	(1.658)
Big East	0.634
	(1.688)
R-Squared	0.196

*Significant at the 20% level **Significant at the 5% level