

APPENDIX TO MARCH MADNESS, QUANTILE REGRESSION BRACKETOLOGY AND THE HAYEK HYPOTHESIS

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ABSTRACT. A quantile regression variant of the classical paired comparison model of mean ratings is proposed. The model is estimated using data for the regular 2004-05 U.S. college basketball season, and evaluated based on predictive performance for the 2005 NCAA basketball tournament. Rather than basing predictions entirely on conditional mean estimates produced by classical least-squares paired comparison methods, the proposed methods produce predictive densities that can be used to evaluate point-spread and over/under gambling opportunities. Mildly favorable betting opportunities are revealed. More generally, the proposed methods offer a flexible approach to conditional density forecasting for a broad class of applications.

1. PREDICTIVE DENSITIES FOR SCORING TOTALS

The predictive densities for total scores appear in Figures 1 to 3. The shaded region of the density represents the models preferred bet – shaded to the right that the score will be over, and shaded to the left that the score will be under the specified total. As for the point spread figures, we have indicated the estimated probability in the upper left corner of each plot color coded black for successful bets, black for unsuccessful ones. The vertical black line indicates the realized total score, so when it falls in the shaded region of the density the bet is successful and when not, not.

2. RATINGS

Table 1 reports estimated offensive and defensive ratings of the 2005 NCAA tournament teams based on the fitted quantile regression paired comparison model. Ratings based exclusively on the median (absolute error) model are reported in the first three columns, and mean ratings obtained by averaging over the estimated quantile ratings with respect to Lebesgue measure are reported in the last three columns. Teams are ordered according to the mean ratings. The columns headed “Total” represent simply the sum of the estimated offensive and defensive ratings and can be interpreted as the slightly bizarre outcome of hypothetical games in which teams “play themselves.”

Figure 4 displays a concise version of the full estimated quantile ratings for the tournament teams. Note that these teams constitute only about one quarter of the teams for which we estimated ratings for the regular season. The scale of the plot, modeled after Tufte’s (2006) sparklines, makes it difficult to discern too much in the way of fine detail, but it is evident that some teams are stronger defensively, others

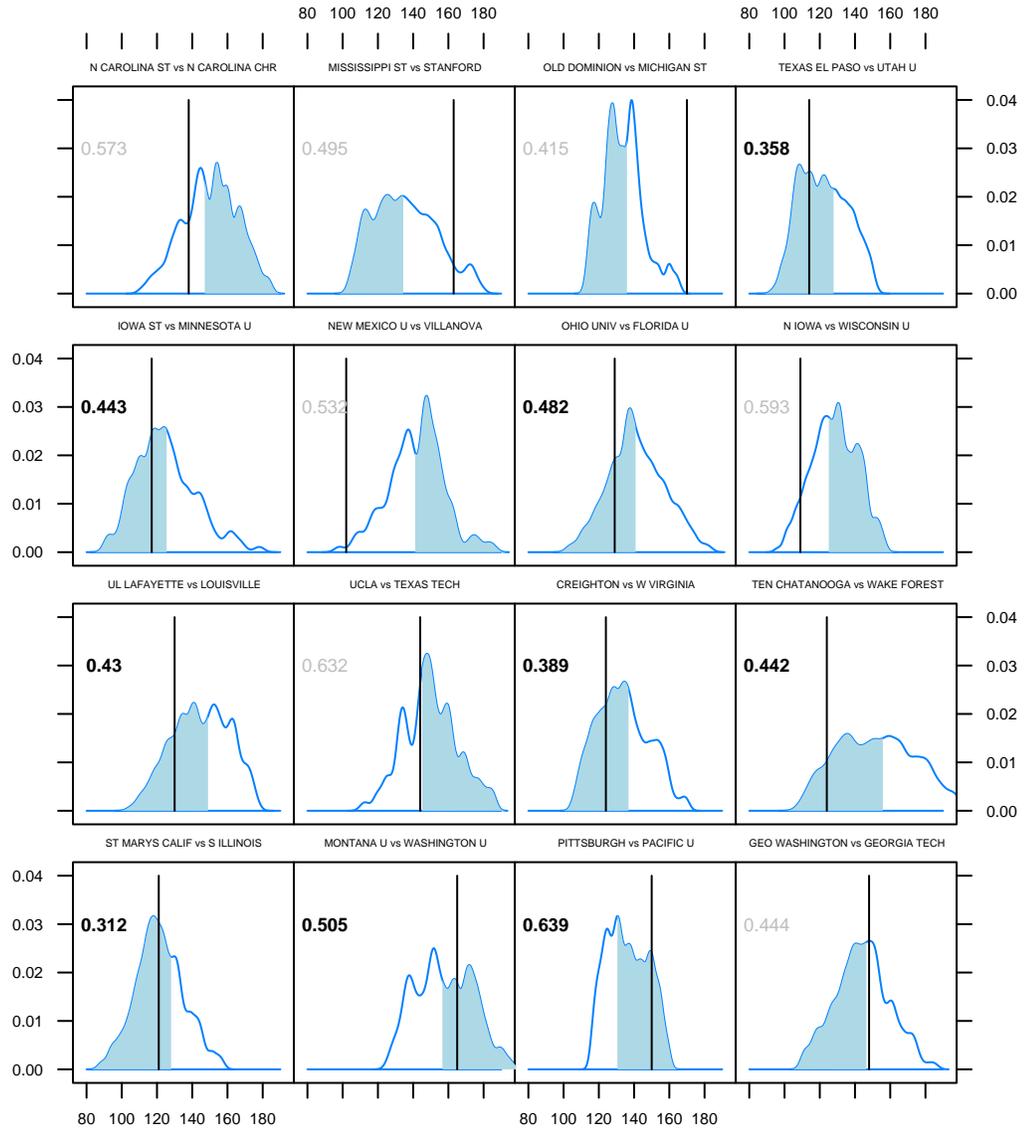


FIGURE 1. Predictive Densities for Total Score of 2005 NCAA Tournament Games

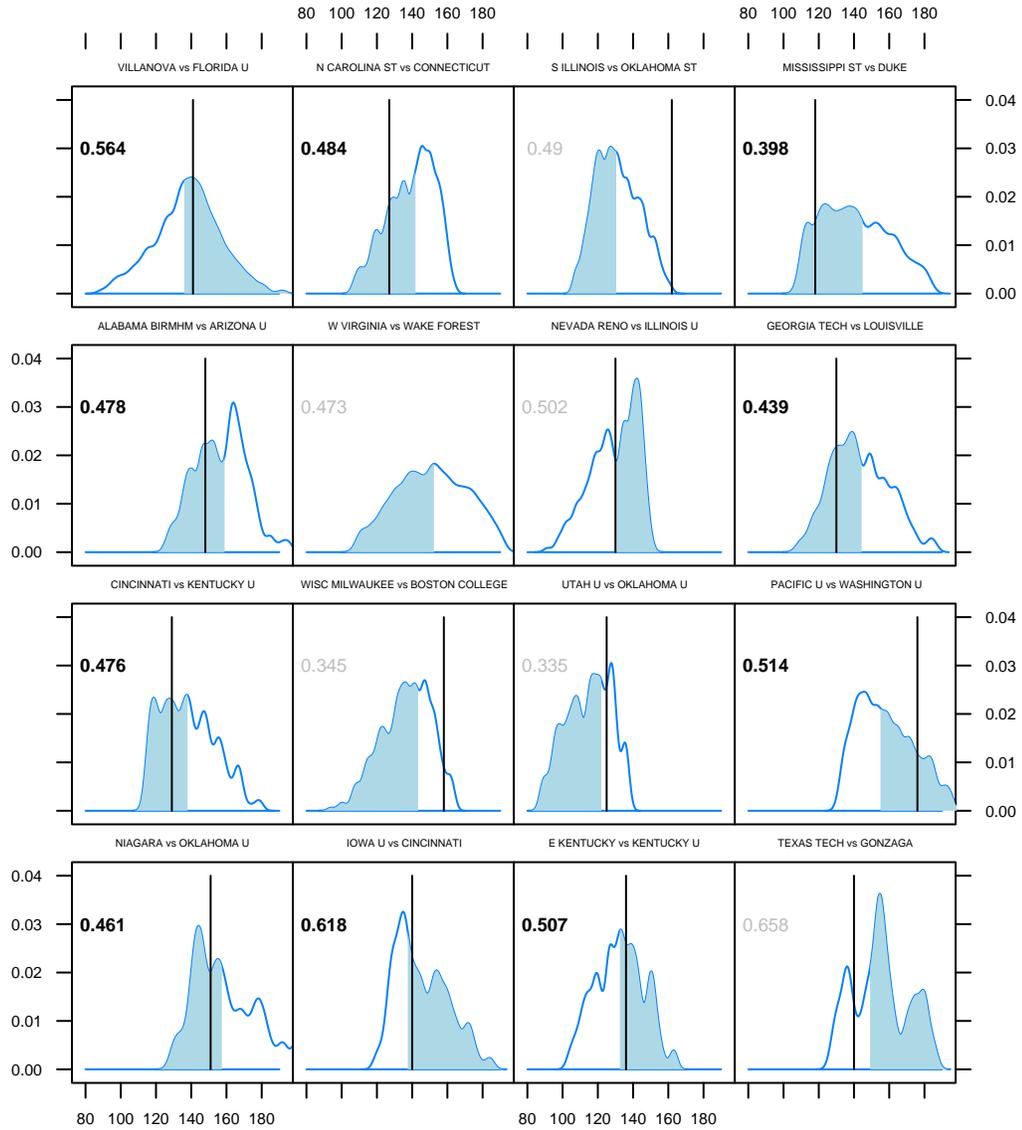


FIGURE 2. Predictive Densities for Total Score of 2005 NCAA Tournament Games

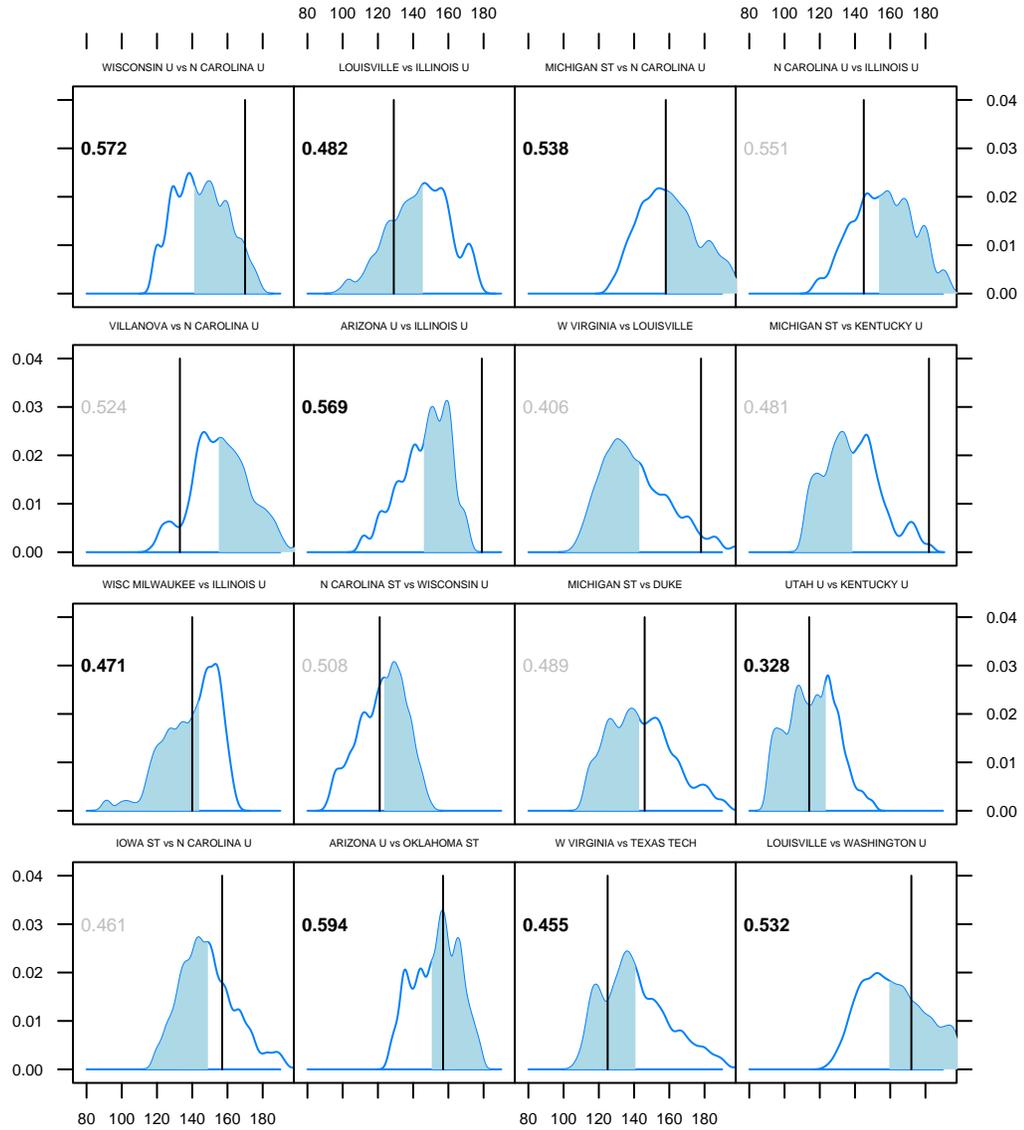


FIGURE 3. Predictive Densities for Total Score of 2005 NCAA Tournament Games

stronger offensively and balance is highly desirable. The mean ratings reported in Table 1 are simply the area under the quantile rating curves in Figure 4.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

UNIVERSITY OF ILLINOIS AT CHICAGO

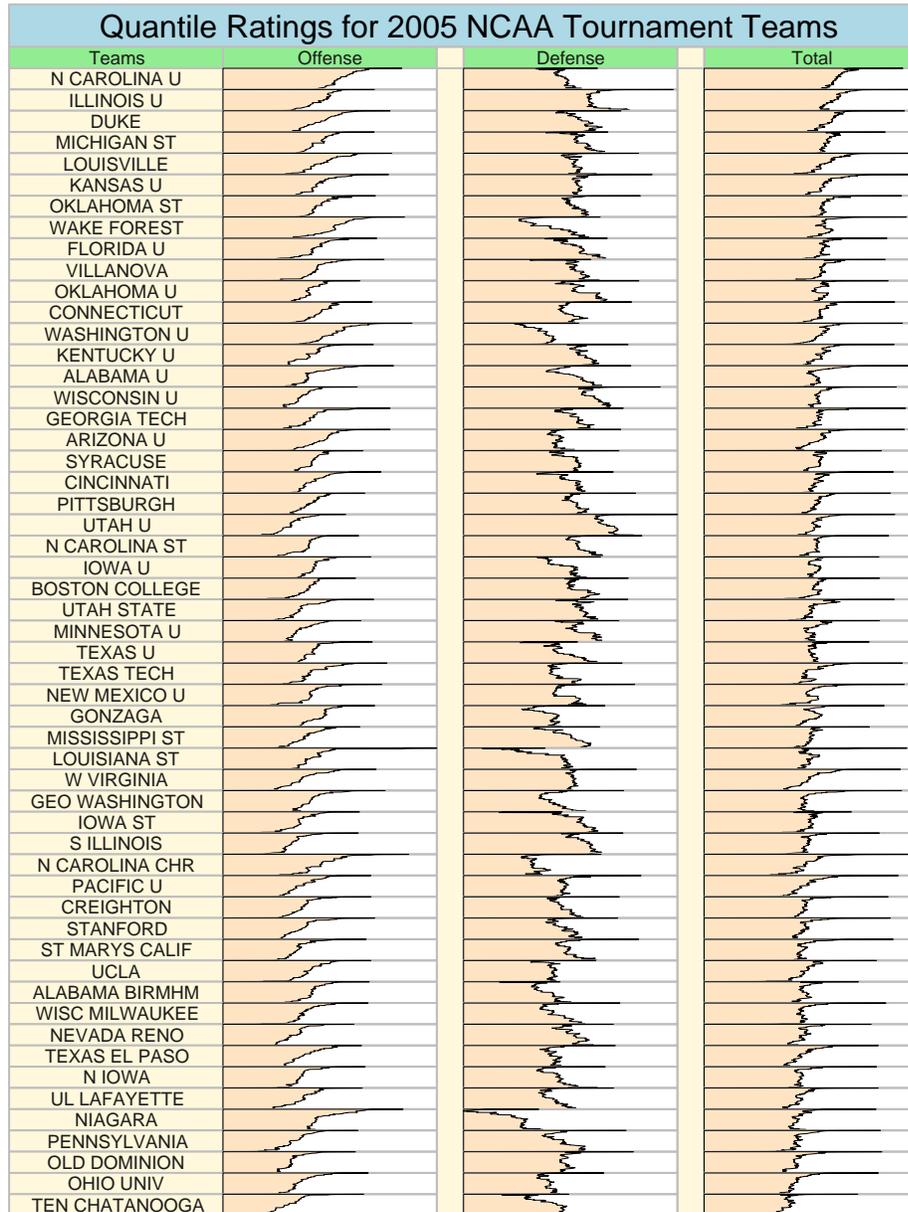


FIGURE 4. Estimated Quantile Ratings Functions for the Teams of the 2005 NCAA Tournament: The vertical axis in each plot represents the unit interval of quantiles, the horizontal axes are uniformly scaled to the range of the estimated coefficients. Offensive ratings, defensive ratings and their sums are plotted. The shaded area gives a visual representation of the mean rating for each team, and teams are ordered by the mean of the offensive plus defensive ratings. These estimates are based on the pre-tournament, regular season games only.

Teams	Median Ratings			Mean Ratings		
	Offense	Defense	Total	Offense	Defense	Total
N CAROLINA U	75.3	-10.7	64.6	75.9	-11.3	64.6
ILLINOIS U	67.4	-4.1	63.3	65.3	-2.1	63.2
DUKE	66.0	-4.3	61.7	66.0	-6.3	59.7
MICHIGAN ST	67.5	-7.7	59.8	64.9	-6.1	58.8
LOUISVILLE	66.2	-8.5	57.7	66.3	-7.9	58.4
KANSAS U	63.5	-7.3	56.2	65.2	-7.0	58.2
OKLAHOMA ST	63.7	-8.4	55.3	65.4	-7.7	57.7
WAKE FOREST	72.3	-14.9	57.4	72.2	-14.5	57.7
FLORIDA U	62.5	-5.6	56.9	62.9	-6.8	56.1
VILLANOVA	63.5	-7.9	55.6	63.3	-7.6	55.7
OKLAHOMA U	58.9	-8.4	50.5	60.7	-5.3	55.4
CONNECTICUT	65.7	-11.5	54.2	65.1	-9.8	55.3
WASHINGTON U	71.6	-16.1	55.5	72.1	-17.3	54.8
KENTUCKY U	60.1	-7.2	53.0	60.4	-5.7	54.8
ALABAMA U	59.5	-7.4	52.0	62.4	-8.3	54.1
WISCONSIN U	55.6	-2.5	53.0	56.5	-2.4	54.1
GEORGIA TECH	60.8	-7.2	53.5	61.3	-7.8	53.5
ARIZONA U	67.9	-13.3	54.6	65.8	-12.9	52.9
SYRACUSE	61.6	-7.2	54.4	61.9	-9.0	52.9
CINCINNATI	61.3	-7.6	53.6	62.3	-9.3	52.9
PITTSBURGH	60.8	-7.4	53.4	60.6	-7.8	52.8
UTAH U	51.8	0.8	52.6	51.3	1.2	52.5
N CAROLINA ST	60.2	-7.2	53.0	58.2	-6.2	51.9
IOWA U	62.4	-7.5	54.8	62.7	-11.1	51.6
BOSTON COLLEGE	59.7	-9.3	50.5	58.5	-7.1	51.4
UTAH STATE	55.0	-6.2	48.8	56.9	-5.9	51.0
MINNESOTA U	54.3	-8.2	46.2	56.6	-5.8	50.8
TEXAS U	61.7	-13.2	48.5	61.4	-10.7	50.8
TEXAS TECH	59.8	-15.1	44.7	62.4	-12.2	50.2
NEW MEXICO U	61.9	-13.1	48.7	60.4	-10.5	49.9
GONZAGA	67.8	-13.2	54.5	65.1	-15.5	49.6
MISSISSIPPI ST	58.3	-8.9	49.4	58.3	-9.6	48.7
LOUISIANA ST	60.8	-10.5	50.3	63.0	-14.7	48.3
W VIRGINIA	56.1	-8.2	47.9	56.9	-8.7	48.2
GEO WASHINGTON	60.9	-15.0	45.9	61.6	-13.6	48.0
IOWA ST	55.5	-7.4	48.1	55.2	-7.4	47.8
S ILLINOIS	51.8	-4.1	47.7	52.2	-5.3	46.9
N CAROLINA CHR	65.6	-19.5	46.1	66.2	-19.5	46.7
PACIFIC U	53.9	-11.0	42.9	57.0	-10.9	46.1
CREIGHTON	56.5	-12.0	44.5	57.0	-11.1	45.9
STANFORD	56.8	-10.5	46.3	56.6	-11.0	45.6
ST MARYS CALIF	54.7	-9.4	45.3	54.9	-9.3	45.6
UCLA	59.7	-14.3	45.4	60.2	-14.8	45.4
ALABAMA BIRMHM	61.4	-14.5	46.9	61.5	-16.2	45.4
WISC MILWAUKEE	56.6	-14.5	42.1	57.9	-12.8	45.1
NEVADA RENO	54.5	-8.0	46.5	53.1	-8.5	44.6
TEXAS EL PASO	56.8	-15.3	41.6	58.3	-14.0	44.2
N IOWA	55.8	-12.4	43.3	56.5	-12.9	43.7
UL LAFAYETTE	58.5	-14.0	44.6	56.5	-13.9	42.6
NIAGARA	64.1	-22.1	41.9	67.7	-25.7	42.0
PENNSYLVANIA	50.9	-11.2	39.7	52.8	-11.0	41.8
OLD DOMINION	51.5	-12.2	39.3	52.1	-10.7	41.3
OHIO UNIV	54.8	-15.1	39.7	56.2	-15.5	40.7
TEN CHATANOOGA	50.2	-13.1	37.1	50.1	-15.3	34.8
E KENTUCKY	48.7	-16.4	32.3	49.2	-17.1	32.1
MONTANA U	53.0	-20.2	32.8	49.4	-18.6	30.8

TABLE 1. Mean and Median Team Ratings for the 2005 NCAA Tournament: As estimated by the quantile regression paired comparison model. Teams are ordered by their mean rating.