

# A Combined College Football Ranking System

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This note summarizes in a non technical way the main results in Fair and Oster (2002) about college football rankings. During a college football season there are many rankings each week of the Division A teams. Some rankings are based on votes of sports writers, and some are based on computer algorithms. The computer algorithms take into account things like win-loss record, margin of victory, strength of schedule, and the strength of individual conferences. Since 1998 a subset of the computer rankings has been used in tandem with the Associated Press and ESPN/USA Today writers' polls by the NCAA and the Bowl Championship Series (BCS) to determine which two teams play in the national championship game.

One important question about the rankings is how good they are if used to predict the outcome of games. A related question is whether the rankings can be combined in such a way that the combined ranking predicts better than any individual ranking by itself. Both of these questions are considered in Fair and Oster (2002). A procedure is developed for converting rankings into predictions. This

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procedure also provides a way of estimating the size of the home field advantage. The rankings' predictions are then analyzed to see how well they do by themselves and to see if they can be combined to produce a more accurate combined prediction.

Data were collected for the Division A teams for four years, 1998, 1999, 2000, and 2001, and for ten weeks per year beginning with week 6. This resulted in a total of 1594 games, including bowl games. Nine ranking systems were compared: 1) Matthews/Scripps Howard, 2) Jeff Sagarin's USA Today, 3) Richard Billingsley, 4) Seattle Times/Anderson & Hester, 5) Atlanta Journal-Constitution Colley Matrix, 6) Kenneth Massey, 7) David Rothman, 8) Peter Wolfe, and 9) Dunkel. The first eight of these systems were used by the BCS in the 2001-02 season.

Each system uses a different algorithm, and since the introduction of the BCS by the NCAA, there has been much controversy concerning which is the best system for determining which teams play in the national championship game. Just recently the NCAA decided that any system that included margin of victory in its algorithm would be dropped for the upcoming 2002-03 season. The algorithms are generally fairly complicated, and there is no easy way to summarize their main differences. Each system more or less starts with a team's win-loss record and makes adjustments from there. An interesting system to use as a basis of comparison is one in which *only* win-loss records are used, and this system, denoted "win/loss," was also analyzed in the paper.

The results show that the systems perform similarly when each is considered by itself. The results also show, however, that some of the systems can be combined to produce overall more accurate predictions. The combination that gave the best results used Sagarin, Billingsley, Colley, Dunkel, and win/loss. The fact that

win/loss is in the combination means that there is useful predictive information in the win-loss records that is not being used by the other systems.

Because the combination dominates the individual systems in terms of predictive accuracy, the combination is of interest to use on a week to week basis. After Sagarin, Billingsley, Colley, and Dunkel make their rankings for the week, enough information is available to use the combination. It can be used to make predictions for the upcoming games and to produce its overall ranking. Again, these predictions should be on average more accurate than any predictions made from the individual systems because they are based on more information, namely the information in each of the individual rankings and in the win-loss records.

To give an example, the combination was used to rank the teams in the last week of 2001 (before the bowl games). This ranking is presented in Table 1. Also presented in Table 1 for each team are its win-loss record, its ranking by each of the four systems, and the ranking that the BCS chose.

In future work the predictions using the combination will be compared to the Las Vegas odds to see if they can on average beat the odds.

Fair, Ray C., and John F. Oster, 2002, "Comparing the Predictive Information Content of College Football Rankings."

**Table 1**  
**Combined Ranking**  
**Last Week of 2001 (before Bowl Games)**

Combined	win/loss	Sag.	Bil.	Col.	Dun.	BCS
1	Miami FL	11 - 0	1	1	1	1
2	Nebraska	11 - 1	3	2	2	5
3	Florida	9 - 2	2	7	8	2
4	Texas	10 - 2	4	10	9	3
5	Oklahoma	10 - 2	6	9	11	6
6	Colorado	10 - 2	5	4	5	4
7	Oregon	10 - 1	7	3	3	10
8	Maryland	10 - 1	11	5	10	15
9	Illinois	10 - 1	12	6	6	18
10	Tennessee	10 - 2	8	8	4	13
11	Washington State	9 - 2	10	12	12	20
12	Virginia Tech	8 - 3	24	18	27	11
13	LSU	9 - 3	18	14	13	8
14	Texas Tech	7 - 4	19	24	29	9
15	Stanford	9 - 2	9	11	7	23
16	Kansas State	6 - 5	14	36	30	7
17	Florida State	7 - 4	16	21	25	16
18	Georgia	8 - 3	22	17	20	17
19	Syracuse	9 - 3	20	16	16	19
20	Fresno State	11 - 2	15	29	14	25
21	Southern California	6 - 5	26	25	37	12
22	Michigan	8 - 3	17	23	18	21
23	Ohio State	7 - 4	30	20	31	14
24	South Carolina	8 - 3	23	19	19	26
25	UCLA	7 - 4	13	27	21	28
26	Brigham Young	12 - 1	21	13	17	54
27	Oregon State	5 - 6	41	37	60	24
28	Washington	8 - 3	25	15	15	31
29	Alabama	6 - 5	32	38	39	22
30	North Carolina State	7 - 4	40	35	41	27
31	Boston College	7 - 4	38	31	38	32
32	Arkansas	7 - 4	34	22	26	29
33	Texas A&M	7 - 4	27	33	28	34
34	Hawaii	9 - 3	44	34	32	30
35	Georgia Tech	7 - 5	35	30	45	43
36	Iowa State	7 - 4	28	43	36	41
37	Michigan State	6 - 5	46	47	57	33
38	North Carolina	7 - 5	29	40	34	36
39	Indiana	5 - 6	49	41	61	35
40	Iowa	6 - 5	33	57	47	39

**Table 1 (continued)**  
**Combined Ranking**  
**Last Week of 2001 (before Bowl Games)**

Combined	win/loss	Sag.	Bil.	Col.	Dun.	BCS	
41	Louisville	10 - 2	31	26	22	63	27
42	Clemson	6 - 5	48	32	50	46	46
43	Notre Dame	5 - 6	42	50	53	40	43
44	Oklahoma State	4 - 7	56	39	74	45	59
45	Pittsburgh	6 - 5	55	48	55	38	57
46	Penn State	5 - 6	43	54	48	37	47
47	Boise State	8 - 4	45	59	43	48	49
48	Bowling Green State	8 - 3	47	46	35	53	50
49	Marshall	10 - 2	36	52	24	62	30
50	Central Florida	6 - 5	67	73	73	42	78
51	Utah	7 - 4	37	65	42	57	44
52	Minnesota	4 - 7	69	62	85	44	71
53	East Carolina	6 - 5	60	70	66	50	63
54	Virginia	5 - 7	66	51	71	47	62
55	New Mexico	6 - 5	65	68	69	51	69
56	Purdue	6 - 5	50	53	44	49	48
57	Auburn	7 - 4	39	28	23	61	24
58	Wake Forest	6 - 5	57	49	56	59	55
59	Wisconsin	5 - 7	52	66	65	55	56
60	Arizona	5 - 6	61	56	63	52	58
61	Colorado State	6 - 5	53	55	49	56	52
62	Southern Mississippi	6 - 5	62	69	68	60	70
63	Mississippi	7 - 4	51	42	40	66	38
64	Toledo	9 - 2	58	44	33	70	37
65	UNLV	4 - 7	73	72	89	64	79
66	South Florida	8 - 3	74	81	64	67	75
67	Arizona State	4 - 7	59	74	70	65	60
68	TCU	6 - 5	72	45	59	71	76
69	Louisiana Tech	7 - 4	54	58	46	80	54
70	Cincinnati	7 - 4	79	63	62	68	77
71	UAB	6 - 5	78	71	77	74	83
72	Middle Tenn State	8 - 3	71	64	51	77	67
73	Mississippi State	3 - 8	70	75	76	58	68
74	Northwestern	4 - 7	68	76	80	76	73
75	Missouri	4 - 7	64	80	75	78	64
76	Air Force	6 - 6	82	60	79	85	80
77	Troy State	7 - 4	76	61	58	84	65
78	Memphis	5 - 6	86	79	82	73	86
79	Miami (Ohio)	7 - 5	63	90	52	75	61
80	N Illinois	6 - 5	77	82	67	81	74

**Table 1 (continued)**  
**Combined Ranking**  
**Last Week of 2001 (before Bowl Games)**

Combined		win/loss	Sag.	Bil.	Col.	Dun.	BCS
81	Kent	6 - 5	81	88	72	79	81
82	Kentucky	2 - 9	80	85	90	69	82
83	West Virginia	3 - 8	84	84	88	72	84
84	Temple	4 - 7	91	67	84	83	88
85	San Diego State	3 - 8	90	87	99	82	91
86	North Texas	5 - 6	87	95	86	86	94
87	Rice	8 - 4	75	92	54	93	66
88	Utah State	4 - 7	94	78	94	96	95
89	Baylor	3 - 8	89	86	92	87	85
90	Southern Methodist	4 - 7	88	94	87	88	90
91	Western Michigan	5 - 6	85	97	81	92	87
92	Kansas	3 - 8	83	77	83	91	72
93	Akron	4 - 7	93	91	93	94	96
94	Ball State	5 - 6	92	93	78	90	92
95	San Jose State	3 - 9	95	101	97	95	97
96	New Mexico State	5 - 7	99	96	91	102	99
97	Vanderbilt	2 - 9	98	83	98	97	98
98	Tulane	3 - 9	101	98	100	98	100
99	California	1 - 10	97	89	96	89	89
100	Nevada	3 - 8	96	105	95	99	93
101	Wyoming	2 - 9	100	100	108	104	101
102	Buffalo	3 - 8	105	103	106	103	107
103	Central Michigan	3 - 8	102	112	103	100	102
104	Army	3 - 8	104	104	102	101	103
105	Louisiana–Lafayette	3 - 8	107	106	111	108	109
106	Ohio	1 - 10	103	114	109	105	105
107	Duke	0 - 11	106	99	112	106	106
108	Texas–El Paso	2 - 9	108	111	110	114	108
109	Tulsa	1 - 10	111	107	116	113	110
110	Eastern Michigan	2 - 9	116	116	115	111	117
111	Houston	0 - 11	109	108	114	107	113
112	Connecticut	2 - 9	112	109	107	116	112
113	Rutgers	2 - 9	113	102	101	112	104
114	Louisiana–Monroe	2 - 9	110	113	105	115	111
115	Idaho	1 - 10	114	115	113	110	114
116	Navy	0 - 10	115	110	117	109	115
117	Arkansas State	2 - 9	117	117	104	117	116