Kenneth D. West "Tests For Forecast Encompassing When Forecasts Depend on Estimated Regression Parameters" June 1999

Additional Appendix

This additional appendix presents not-for-publication tables of simulation results for alternative estimators of Ω, for nominal .10 tests, and for simulations with t(6) data. All simulations involved 10,000 repetitions.

All tables report results for four estimators. The lines labeled "10a" and "10b" are as defined in the text. The lines labeled "AA.1a" and "AA.1b" compute the t-statistic as in the first line of (10b) in the text, but use alternative, asymptotically equivalent estimators of Ω. AA.1a imposes homoskedasticity, while AA.1b imposes neither homoskedasticity nor $Ee_{1t}X_{2t}=0$.

Specifically:

(AA.1a) Compute $\frac{\sqrt{n}\bar{d}}{\sqrt{\hat{\Omega}}}$, compare to N(0,1) distribution,

$$\hat{\Omega} = \hat{S} + (\tfrac{n}{R})\hat{D}(1)^2\,\hat{V}_\beta(1,1),$$

$$\hat{V}_\beta(1,1) = [(R-1)^{-1}\Sigma_{t=1}^{R}\hat{e}_{1t}^2][R^{-1}\Sigma_{t=1}^{R}X_{1t}^2].$$

(AA.1b) Compute $\frac{\sqrt{n}\bar{d}}{\sqrt{\hat{\Omega}}}$, compare to N(0,1) distribution,

$$\hat{\Omega} = \hat{S} + (\tfrac{n}{R})\hat{D}\hat{V}_\beta\hat{D}',$$

$$\hat{D} = (n^{-1}\Sigma X_{1t}\hat{e}_{2t} \quad n^{-1}\Sigma X_{2t}\hat{e}_{1t})$$

$$\hat{V}_\beta(1,1) = [R^{-1}\Sigma_{t=1}^{R}X_{1t}^2\hat{e}_{1t}^2][R^{-1}\Sigma_{t=1}^{R}X_{1t}^2]^{-2},$$

$$\hat{V}_\beta(1,2) = [R^{-1}\Sigma_{t=1}^{R}X_{1t}X_{2t}\hat{e}_{1t}\hat{e}_{2t}][R^{-1}\Sigma_{t=1}^{R}X_{1t}^2]^{-1}[R^{-1}\Sigma_{t=1}^{R}X_{2t}^2]^{-1},$$

$$\hat{V}_\beta(2,2) = [R^{-1}\Sigma_{t=1}^{R}X_{2t}^2\hat{e}_{2t}^2][R^{-1}\Sigma_{t=1}^{R}X_{2t}^2]^{-2}.$$

Table A1

Empirical Sizes of Nominal 5%-Level Tests for Forecast Encompassing
Normally Distributed Data

n	Test Statistic	n/R = 2	1	.5	.25	.125	.0625
8	(10a)	8.30	5.94	4.97	4.32	3.70	3.58
	(10b)	9.83	6.39	5.36	5.29	6.28	7.66
	(AA.1a)	7.32	5.23	4.84	4.82	6.05	7.57
	(AA.1b)	7.96	4.84	4.22	4.44	5.50	7.16
16	(10a)	15.51	10.76	7.78	5.93	5.13	4.84
	(10b)	7.95	5.14	4.12	4.48	5.28	6.09
	(AA.1a)	6.25	4.51	3.83	4.21	5.30	6.11
	(AA.1b)	6.65	4.54	3.71	4.03	5.07	5.96
32	(10a)	20.77	14.18	9.55	6.47	5.51	5.08
	(10b)	6.52	4.98	4.23	4.32	5.03	5.52
	(AA.1a)	5.46	4.51	4.10	4.37	4.95	5.52
	(AA.1b)	6.02	4.74	4.05	4.19	4.89	5.47
64	(10a)	23.53	15.47	10.28	7.89	6.57	
	(10b)	5.52	4.68	4.78	5.20	5.35	
	(AA.1a)	5.03	4.40	4.62	5.11	5.33	
	(AA.1b)	5.37	4.42	4.65	5.12	5.30	
128	(10a)	24.71	15.67	10.61	8.10		
	(10b)	5.30	4.66	4.79	5.15		
	(AA.1a)	4.66	4.50	4.64	5.04		
	(AA.1b)	5.13	4.53	4.75	5.12		
256	(10a)	25.22	16.66	10.83			
	(10b)	4.97	4.74	4.84			
	(AA.1a)	4.72	4.60	4.88			
	(AA.1b)	4.92	4.67	4.84			

Notes:

1. Apart from the rounding in Table 1, the results reported in the lines labeled (10a) and (10b) are identical to those reported in lines (10a) and (10b) in Table 1. Lines (AA.1a) and (AA.1b) report statistics asymptotically equivalent to (10b).

2. See text for additional details.

Table A2

Empirical Sizes of Nominal 10%-Level Tests for Forecast Encompassing
Normally Distributed Data

n	Test Statistic	$\frac{n}{R}$ = 2	1	.5	.25	.125	.0625
8	(10a)	18.87	14.56	12.41	10.79	9.99	9.28
	(10b)	16.54	11.70	10.47	10.95	12.87	14.81
	(AA.1a)	12.28	9.56	9.22	10.34	12.61	14.78
	(AA.1b)	14.00	9.40	8.85	9.74	12.02	14.18
16	(10a)	25.89	20.11	15.43	12.54	11.07	10.44
	(10b)	12.91	9.80	9.13	9.85	11.06	12.09
	(AA.1a)	10.38	8.33	8.27	9.64	10.91	12.07
	(AA.1b)	11.52	8.73	8.35	9.38	10.69	11.88
32	(10a)	31.10	23.36	17.18	13.73	12.05	10.94
	(10b)	10.88	9.34	9.27	9.84	10.74	11.32
	(AA.1a)	8.99	8.42	8.79	9.75	10.74	11.26
	(AA.1b)	10.29	8.89	8.86	9.59	10.59	11.24
64	(10a)	33.25	23.90	17.37	14.06	12.53	
	(10b)	9.70	9.33	9.72	10.14	11.04	
	(AA.1a)	8.47	8.89	9.54	10.15	11.06	
	(AA.1b)	9.41	9.08	9.49	10.01	11.00	
128	(10a)	33.18	23.63	17.55	14.62		
	(10b)	9.97	9.65	9.68	10.62		
	(AA.1a)	9.05	9.38	9.57	10.60		
	(AA.1b)	9.76	9.52	9.69	10.58		
256	(10a)	34.00	24.27	18.11			
	(10b)	10.09	9.92	10.05			
	(AA.1a)	9.62	9.69	10.01			
	(AA.1b)	9.98	9.87	9.99			

See Notes to Table A1.

Table A3

Empirical Sizes of Nominal 5%-Level Tests for Forecast Encompassing
t(6) Data

n	Test Statistic	n/R = 2	1	.5	.25	.125	.0625
8	(10a)	6.85	5.11	4.03	3.25	3.01	2.81
	(10b)	8.90	6.02	4.99	4.94	5.41	6.46
	(AA.1a)	6.40	4.81	4.24	4.46	5.16	6.24
	(AA.1b)	6.96	4.37	3.77	4.01	4.76	5.89
16	(10a)	13.06	9.29	6.69	4.96	4.20	3.73
	(10b)	6.80	4.56	4.08	4.00	4.59	5.26
	(AA.1a)	5.35	3.93	3.63	3.76	4.55	5.16
	(AA.1b)	5.60	3.84	3.60	3.52	4.34	5.07
32	(10a)	19.24	13.02	8.90	6.39	5.36	4.94
	(10b)	5.99	4.20	3.79	4.27	4.63	5.16
	(AA.1a)	5.11	3.85	3.56	3.95	4.63	5.16
	(AA.1b)	5.46	3.86	3.56	4.11	4.54	5.13
64	(10a)	23.13	15.29	9.88	7.35	5.84	
	(10b)	5.27	4.16	4.06	4.62	4.75	
	(AA.1a)	4.66	3.91	3.99	4.60	4.78	
	(AA.1b)	4.93	4.03	3.99	4.52	4.72	
128	(10a)	24.55	16.00	10.50	7.77		
	(10b)	5.12	4.13	4.42	4.72		
	(AA.1a)	4.44	3.94	4.31	4.73		
	(AA.1b)	4.99	4.01	4.32	4.65		
256	(10a)	24.95	16.07	10.84			
	(10b)	4.67	4.71	4.80			
	(AA.1a)	4.44	4.62	4.81			
	(AA.1b)	4.57	4.62	4.71			

See Notes to Table A1.

Table A4

Empirical Sizes of Nominal 10%-Level Tests for Forecast Encompassing
t(6) Data

n	Test Statistic	n/R = 2	1	.5	.25	.125	.0625
8	(10a)	16.04	13.08	10.80	9.43	8.54	8.24
	(10b)	15.51	11.43	9.81	10.25	11.13	12.78
	(AA.1a)	11.66	9.31	8.53	9.37	10.67	12.64
	(AA.1b)	12.85	8.78	8.04	8.61	10.00	12.09
16	(10a)	24.39	18.69	14.26	11.76	10.44	9.73
	(10b)	12.07	9.00	8.70	8.94	9.82	11.14
	(AA.1a)	9.55	7.48	7.69	8.40	9.74	11.08
	(AA.1b)	10.28	7.99	7.76	8.28	9.45	10.84
32	(10a)	29.18	22.06	16.61	13.29	11.94	11.02
	(10b)	10.44	8.94	8.47	9.03	10.50	10.95
	(AA.1a)	8.41	7.49	7.88	8.83	10.33	11.01
	(AA.1b)	9.58	8.37	8.09	8.75	10.35	10.80
64	(10a)	32.12	23.82	17.38	14.09	11.99	
	(10b)	9.94	8.84	9.21	9.77	10.28	
	(AA.1a)	8.22	8.21	8.94	9.71	10.33	
	(AA.1b)	9.56	8.57	9.09	9.66	10.19	
128	(10a)	33.18	24.46	17.95	14.43		
	(10b)	9.82	8.93	9.63	10.28		
	(AA.1a)	8.71	8.45	9.37	10.19		
	(AA.1b)	9.65	8.86	9.57	10.18		
256	(10a)	34.17	24.44	18.16			
	(10b)	9.47	9.47	9.97			
	(AA.1a)	9.00	9.25	9.75			
	(AA.1b)	9.45	9.41	9.95			

See Notes to Table A1.