Results

Descriptive Statistics

Descriptive Statistics

		Valid	Missing	Mean	Std. Deviation	Shapiro-Wilk	P-value of Shapiro-Wilk	Minimum	Maximum
rank	abalone	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	adult	4650	0	2.742	1.416	0.878	< .001	1.000	5.000
rank	air_quality	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	bank	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	bike	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	car	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	diabetic	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	fish_toxicity	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	forest_fires	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	housing	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	iris	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	mushroom	4650	0	2.995	1.419	0.887	< .001	1.000	5.000
rank	parkinsons	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	student_performance	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
rank	wine_quality	4650	0	3.000	1.414	0.888	< .001	1.000	5.000
test_loss	abalone	4650	0	2.290	0.492	0.593	< .001	1.924	11.097
test_loss	adult	4650	0	360.582	2419.552	0.092	< .001	0.315	103454.890
test_loss	air_quality	4650	0	0.278	0.050	0.408	< .001	0.240	0.749
test_loss	bank	4650	0	0.268	0.330	0.102	< .001	0.207	14.320
test_loss	bike	4650	0	0.086	0.069	0.421	< .001	0.047	0.668
test_loss	car	4650	0	0.248	0.297	0.346	< .001	0.060	2.772
test_loss	diabetic	4650	0	1.238	1.321	0.224	< .001	0.883	40.770
test_loss	fish_toxicity	4650	0	0.112	0.043	0.353	< .001	0.084	0.540
test_loss	forest_fires	4650	0	0.083	0.103	0.577	< .001	0.012	0.895
test_loss	housing	4650	0	0.108	0.050	0.487	< .001	0.056	0.580
test_loss	iris	4650	0	0.273	0.501	0.376	< .001	2.769e−4	14.263
test_loss	mushroom	4650	0	1.335	49.223	0.009	< .001	0.000	3233.678
test_loss	parkinsons	4650	0	0.071	0.056	0.204	< .001	0.054	0.662
test_loss	student_performance	4650	0	0.227	0.086	0.687	< .001	0.148	0.611
test_loss	wine_quality	4650	0	1.142	0.248	0.313	< .001	1.011	3.010

ANOVA

ANOVA - rank

Cases	Sum of Squares	df	Mean Square	F	p
dataset	289.361	14	20.669	10.532	< .001
credit	172.812	4	43.203	22.015	< .001
dataset ✻ credit	2680.102	56	47.859	24.387	< .001
Residuals	136733.281	69675	1.962		

Note. Type III Sum of Squares

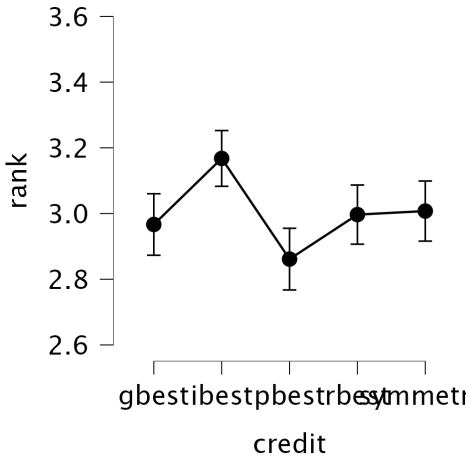
Descriptives

Descriptives - rank

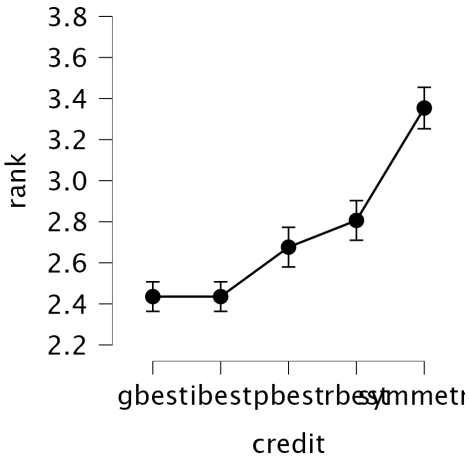
dataset	credit	Mean	SD	N
abalone	gbest	2.967	1.455	930
	ibest	3.168	1.319	930
	pbest	2.861	1.459	930
	rbest	2.997	1.399	930
	symmetric	3.008	1.421	930
adult	gbest	2.435	1.118	930
	ibest	2.435	1.118	930
	pbest	2.676	1.502	930
	rbest	2.806	1.500	930
	symmetric	3.354	1.568	930
air_quality	gbest	3.128	1.336	930
	ibest	3.131	1.347	930
	pbest	3.038	1.357	930
	rbest	2.591	1.465	930
	symmetric	3.112	1.487	930
bank	gbest	3.044	1.415	930
	ibest	2.859	1.344	930
	pbest	2.990	1.432	930
	rbest	2.888	1.410	930
	symmetric	3.218	1.442	930
bike	gbest	2.874	1.339	930
	ibest	3.053	1.340	930
	pbest	3.009	1.393	930
	rbest	3.067	1.483	930
	symmetric	2.998	1.503	930
car	gbest	2.689	1.354	930
	ibest	3.115	1.356	930
	pbest	3.031	1.483	930
	rbest	3.252	1.402	930
	symmetric	2.913	1.411	930
diabetic	gbest	2.892	1.362	930
	ibest	2.891	1.349	930
	pbest	2.627	1.417	930
	rbest	3.415	1.365	930
	symmetric	3.174	1.449	930
fish_toxicity	gbest	3.204	1.299	930
	ibest	3.152	1.436	930
	pbest	2.990	1.452	930
	rbest	2.758	1.475	930
	symmetric	2.896	1.358	930
forest_fires	gbest	3.122	1.502	930
	ibest	3.097	1.277	930
	pbest	3.181	1.304	930
	rbest	2.856	1.356	930
	symmetric	2.745	1.563	930
housing	gbest	3.311	1.324	930
	ibest	2.901	1.494	930
	pbest	2.853	1.317	930
	rbest	2.902	1.397	930
	symmetric	3.033	1.483	930
iris	gbest	2.824	1.409	930
	ibest	3.189	1.428	930
	pbest	3.084	1.441	930
	rbest	3.059	1.376	930
	symmetric	2.844	1.384	930
mushroom	gbest	3.084	1.418	930
	ibest	2.808	1.459	930
	pbest	3.018	1.411	930
	rbest	2.896	1.398	930
	symmetric	3.172	1.381	930
parkinsons	gbest	3.080	1.392	930
	ibest	2.565	1.484	930
	pbest	2.892	1.343	930
	rbest	3.506	1.219	930
	symmetric	2.957	1.455	930
student_performance	gbest	2.798	1.470	930
	ibest	2.662	1.312	930
	pbest	3.029	1.407	930
	rbest	3.189	1.382	930
	symmetric	3.322	1.394	930
wine_quality	gbest	2.942	1.411	930
	ibest	3.187	1.308	930
	pbest	2.637	1.471	930
	rbest	3.014	1.371	930
	symmetric	3.220	1.430	930

Descriptives plots

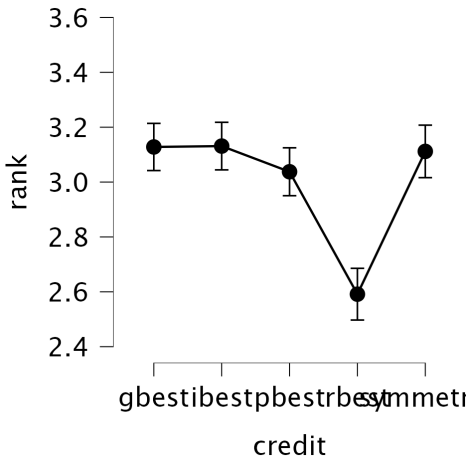
dataset: abalone



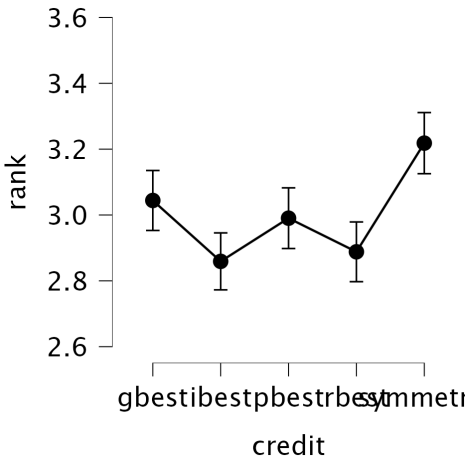
dataset: adult



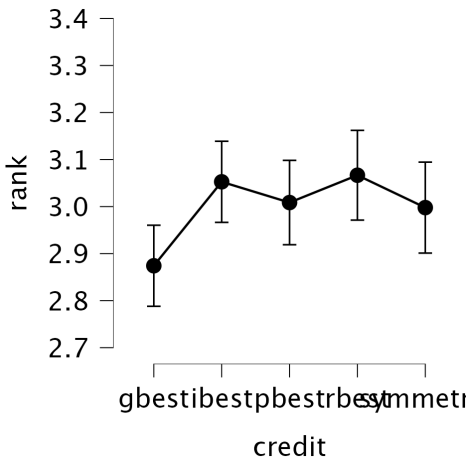
dataset: air_quality



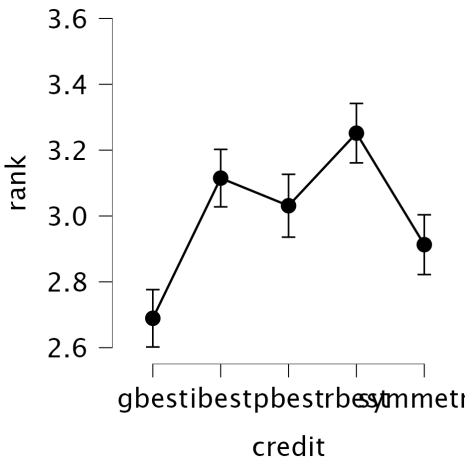
dataset: bank



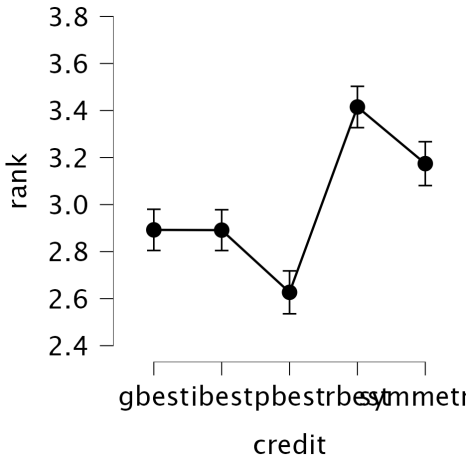
dataset: bike



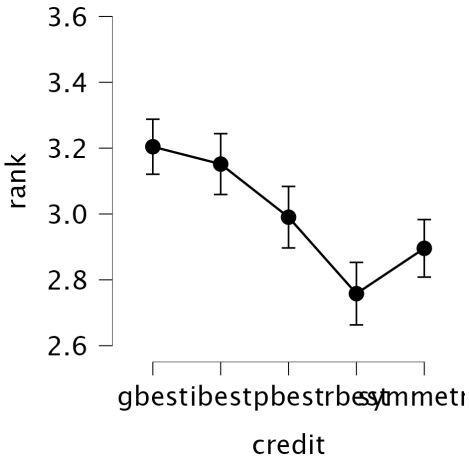
dataset: car



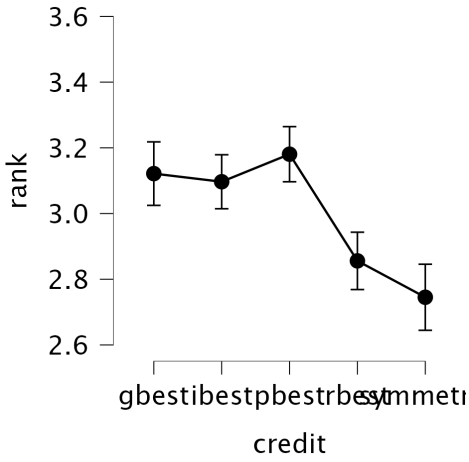
dataset: diabetic



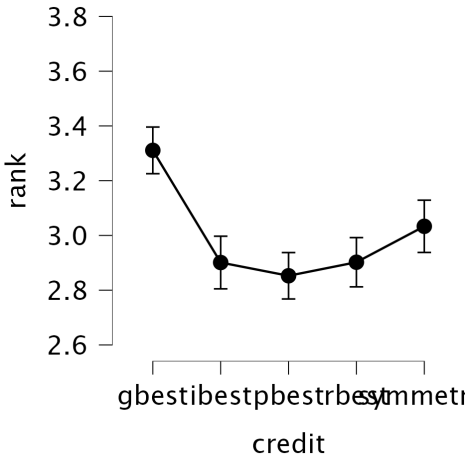
dataset: fish_toxicity



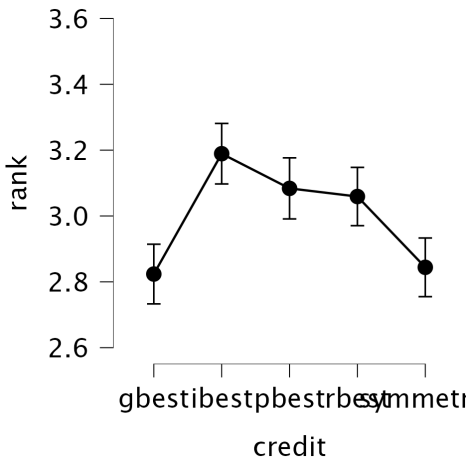
dataset: forest_fires



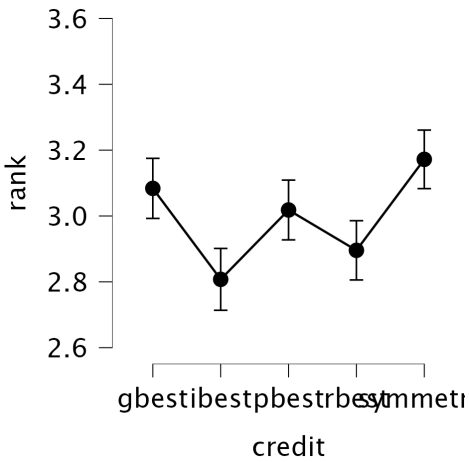
dataset: housing



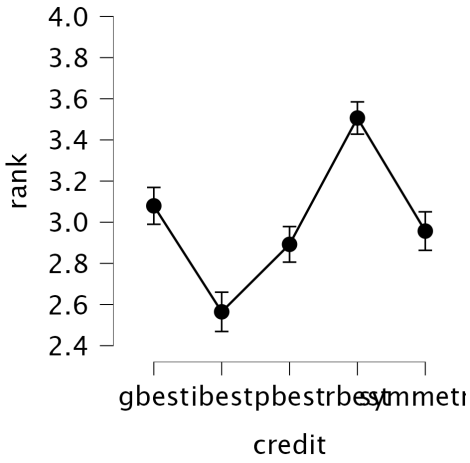
dataset: iris



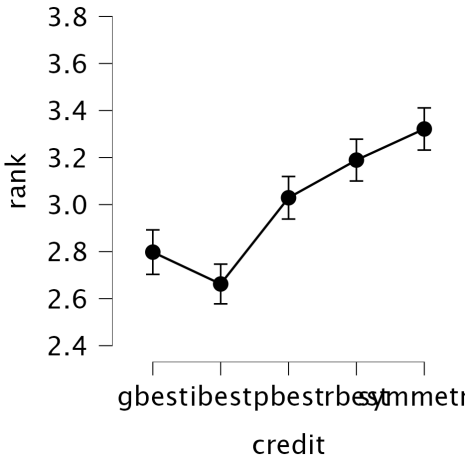
dataset: mushroom



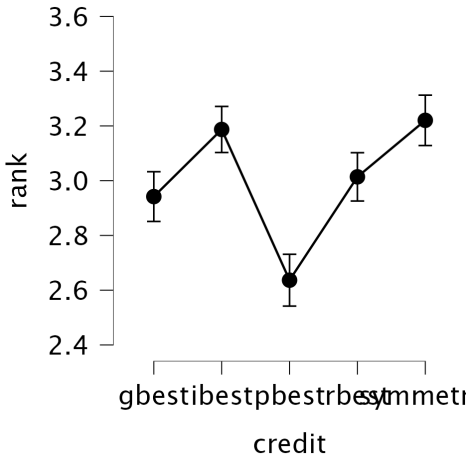
dataset: parkinsons



dataset: student_performance

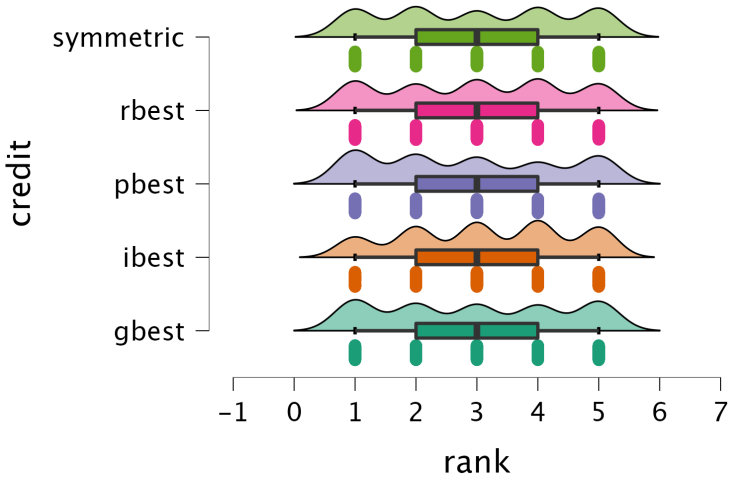


dataset: wine_quality

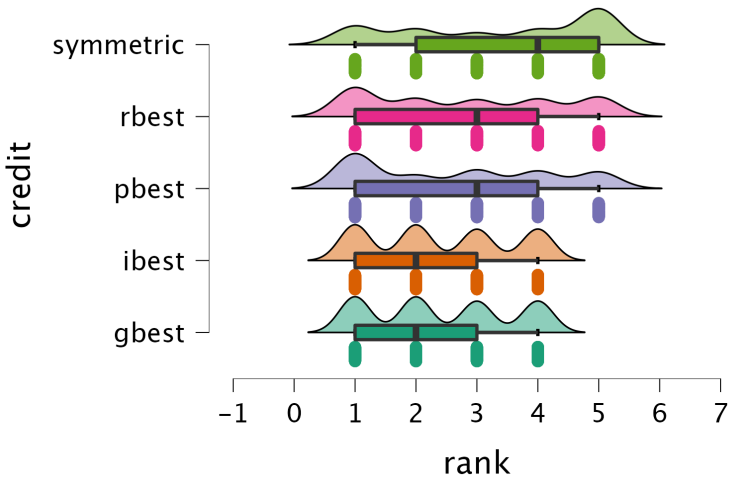


Raincloud plots

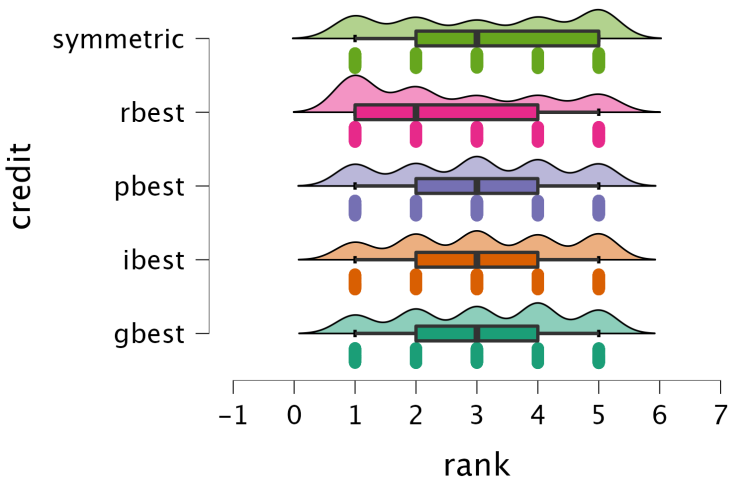
dataset: abalone



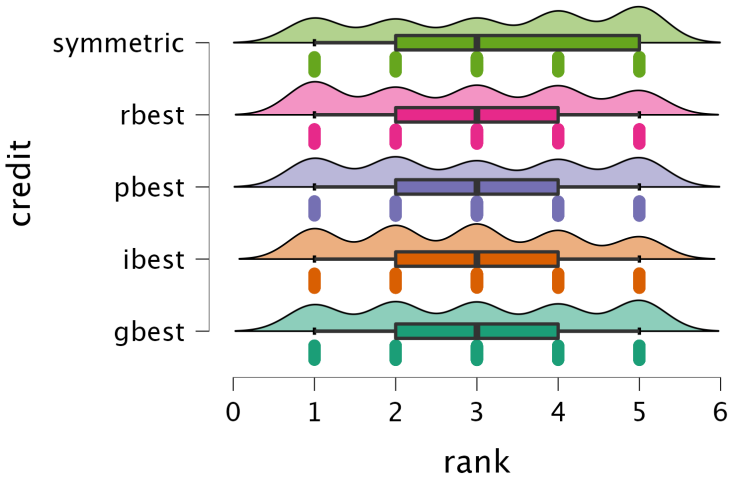
dataset: adult



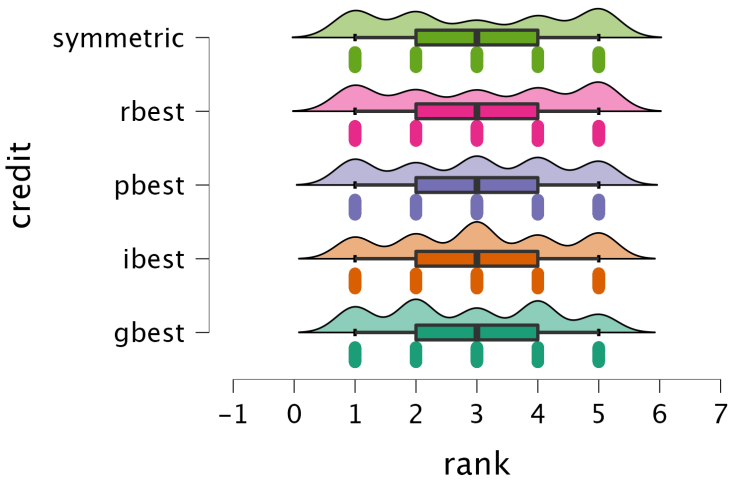
dataset: air_quality



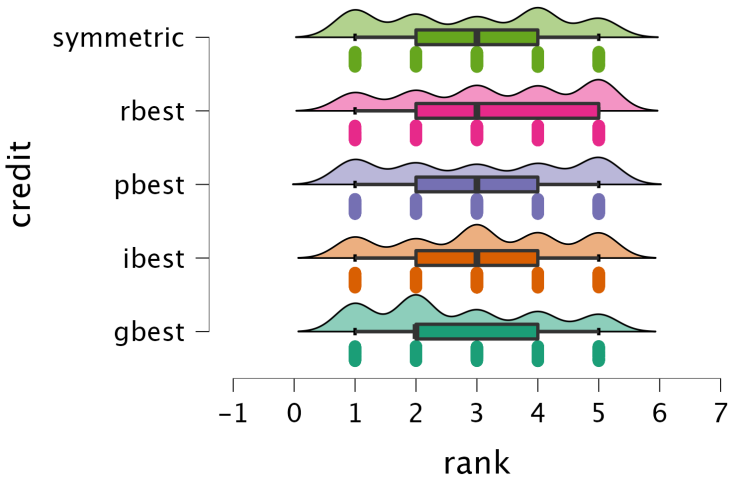
dataset: bank



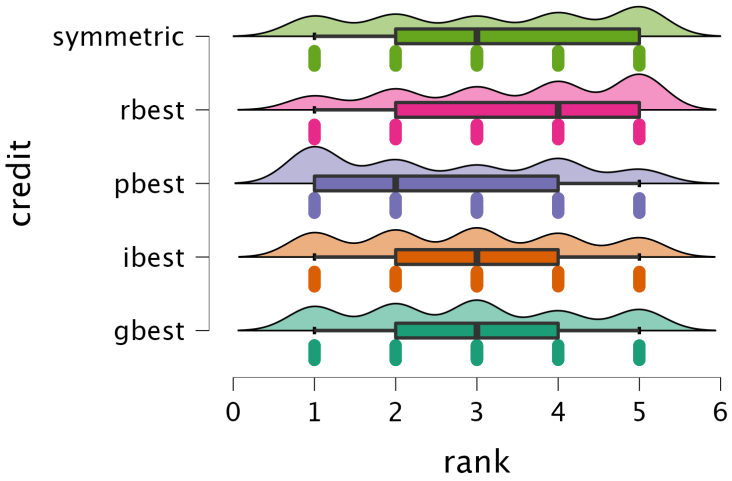
dataset: bike



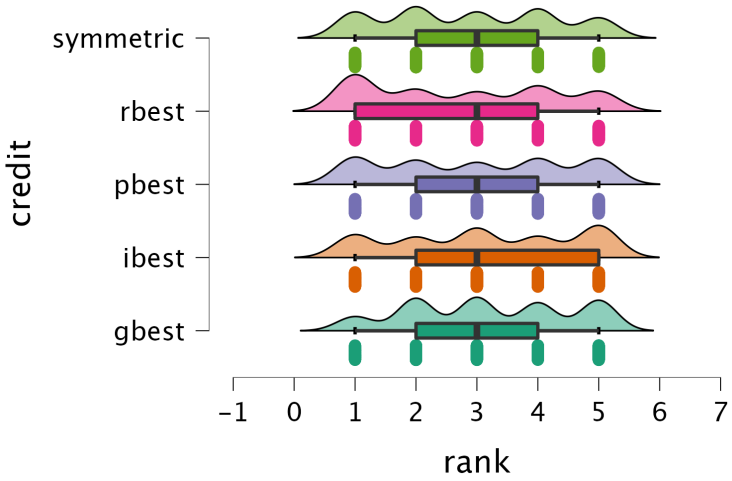
dataset: car



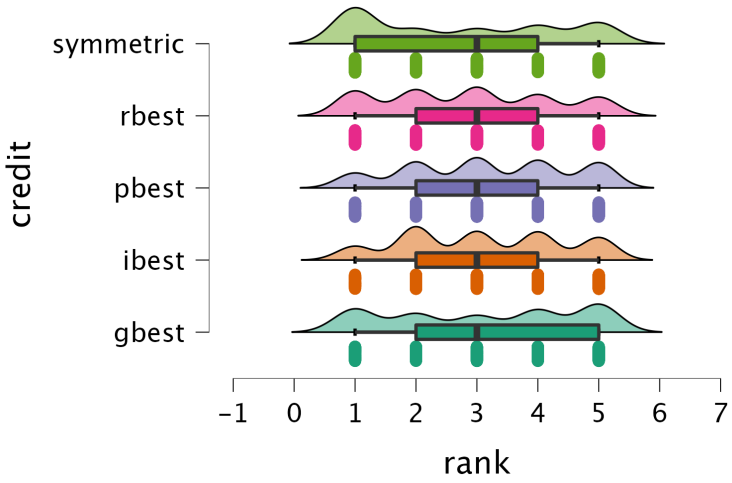
dataset: diabetic



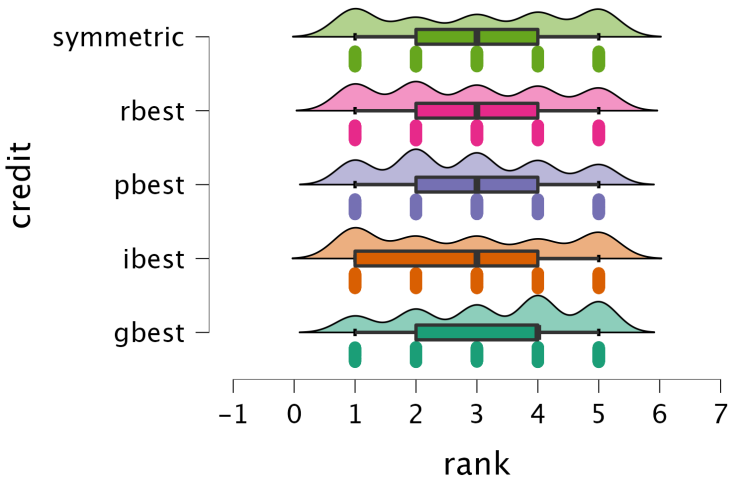
dataset: fish_toxicity



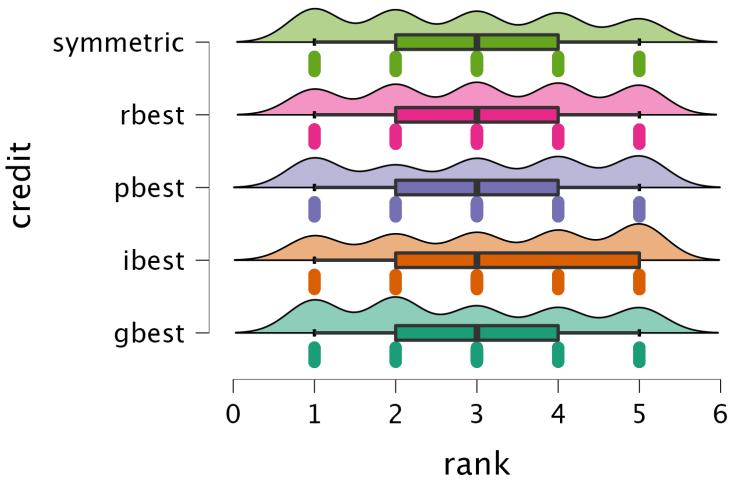
dataset: forest_fires



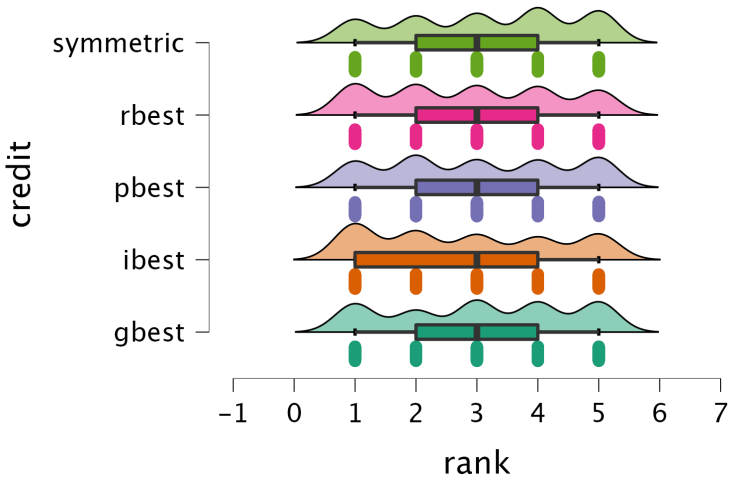
dataset: housing



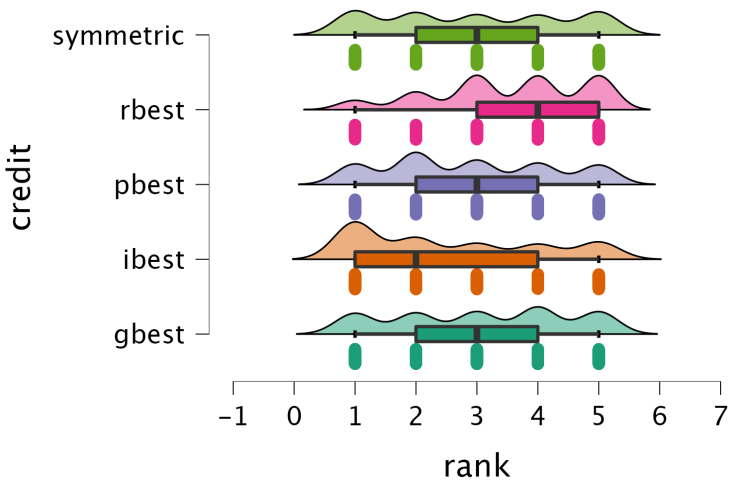
dataset: iris



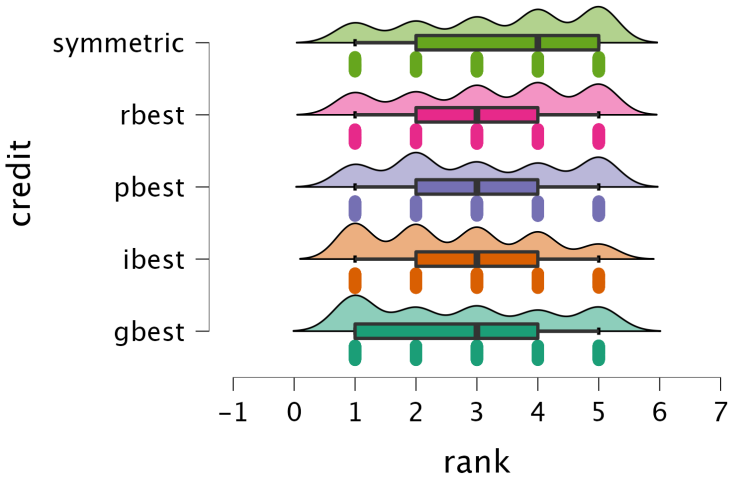
dataset: mushroom



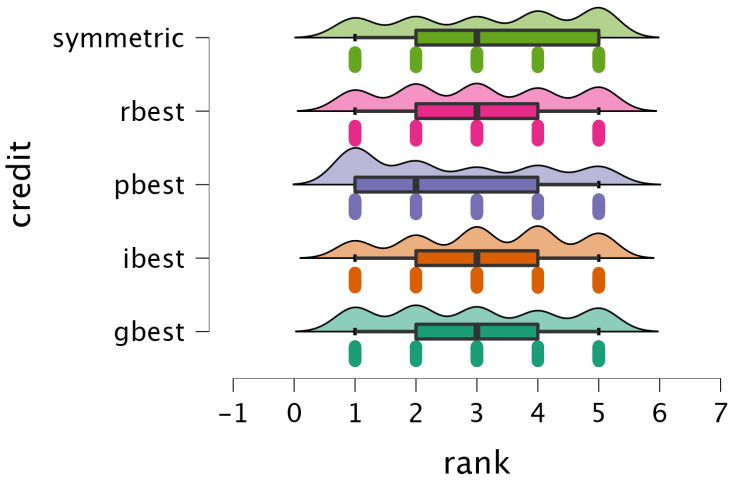
dataset: parkinsons



dataset: student_performance



dataset: wine_quality

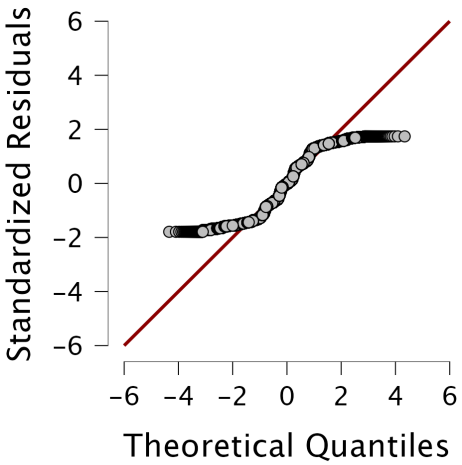


Assumption Checks

Test for Equality of Variances (Levene's)

F	df1	df2	p
13.639	74.000	69675.000	< .001

Q-Q Plot



Post Hoc Tests

Standard

Post Hoc Comparisons - credit

			95% CI for Mean Difference				
		Mean Difference	Lower	Upper	SE	t	p_{tukey}
gbest	ibest	0.012	−0.034	0.058	0.017	0.718	0.952
	pbest	0.032	−0.014	0.078	0.017	1.898	0.319
	rbest	−0.054	−0.099	−0.008	0.017	−3.192	0.012*
	symmetric	−0.105	−0.151	−0.059	0.017	−6.248	< .001***
ibest	pbest	0.020	−0.026	0.066	0.017	1.180	0.763
	rbest	−0.066	−0.111	−0.020	0.017	−3.910	< .001***
	symmetric	−0.117	−0.163	−0.071	0.017	−6.966	< .001***
pbest	rbest	−0.085	−0.131	−0.040	0.017	−5.090	< .001***
	symmetric	−0.137	−0.182	−0.091	0.017	−8.146	< .001***
rbest	symmetric	−0.051	−0.097	−0.005	0.017	−3.056	0.019*

Note. Results are averaged over the levels of: dataset
Note. P-value and confidence intervals adjusted for comparing a family of 5 estimates (confidence intervals corrected using the tukey method).
* p < .05, ** p < .01, *** p < .001

Kruskal-Wallis Test

Kruskal-Wallis Test

Factor	Statistic	df	p
credit	85.534	4	< .001