

APPENDIX

In the tables that follow we summarize the results of the extensive simulation study performed in order to compare the performance of several extreme-value estimators described in chapter 5. Each table corresponds to a different underlying distribution.

Table A.1 Simulation results of estimation of γ (Burr distribution, $\tau=0.25$ $\lambda=1$, $\gamma=0.25$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.133	1.133	1.141	-.097	.860	.865	-.207	.591	.626	-1.427	2.242	2.657	-.689	1.417	1.575	-.088	.982	.986
Hill	.017	.076	.078	.030	.059	.066	.070	.046	.084	-.031	.097	.102	-.014	.077	.078	.006	.064	.064
Adapted Hill	1.144	.207	1.162	1.180	.156	1.190	1.222	.109	1.226	1.091	.320	1.137	-1.118	.204	1.137	1.147	.170	1.160
Moment	-.204	.473	.515	-.066	.315	.321	.056	.219	.226	.002	.142	.142	.029	.115	.119	.053	.090	.104
Mom.-Ratio	.151	.118	.192	.212	.096	.232	.342	.078	.351	.125	.054	.136	.157	.042	.163	.197	.033	.200
QQ	.062	.114	.129	.056	.084	.101	.063	.057	.085	-.047	.108	.118	-.026	.092	.096	-.011	.077	.078
Peng's	-.291	.532	.607	-.172	.368	.406	-.119	.265	.291	-.045	.174	.179	-.031	.142	.146	-.026	.112	.115
W	1.828	.345	1.860	1.713	.226	1.728	1.626	.152	1.633	1.599	.128	1.604	1.570	.106	1.573	1.550	.088	1.553
<i>Mean Aver.</i>																		
Pickands	-.196	.323	.377	-.207	.221	.303	-.230	.127	.262	-.392	.398	.559	-.327	.283	.433	-.246	.227	.334
Hill	.013	.083	.084	.022	.064	.067	.050	.046	.068	-.022	.106	.109	-.008	.086	.087	.005	.068	.068
Adapted Hill	1.132	.215	1.153	1.162	.167	1.174	1.205	.117	1.211	.999	.349	1.058	1.044	.237	1.070	1.091	.170	1.104
Moment	-.346	.624	.714	-.136	.336	.363	.011	.219	.219	-.027	.166	.168	.011	.125	.126	.037	.100	.107
Mom.-Ratio	.126	.127	.179	.179	.106	.207	.280	.082	.292	.110	.060	.125	.138	.048	.146	.171	.038	.175
QQ	.068	.132	.149	.059	.099	.115	.058	.066	.088	-.062	.116	.131	-.037	.101	.107	-.021	.086	.089
Peng's	-.431	.671	.797	-.230	.383	.447	-.127	.257	.286	-.072	.197	.210	-.041	.151	.156	-.028	.122	.125
W	1.946	.474	2.003	1.771	.258	1.790	1.656	.171	1.665	1.626	.147	1.633	1.587	.118	1.591	1.563	.099	1.566
<i>Med. Aver.</i>																		
Pickands	-.088	.968	.972	-.059	.808	.810	-.155	.553	.575	-1.096	2.146	2.410	-.244	1.299	1.322	-.176	.922	.938
Hill	.012	.083	.084	.022	.064	.068	.051	.047	.069	-.024	.107	.110	-.009	.086	.087	.005	.068	.068
Adapted Hill	1.134	.217	1.155	1.163	.167	1.175	1.207	.117	1.213	1.002	.346	1.060	1.048	.235	1.074	1.093	.170	1.106
Moment	-.252	.471	.534	-.101	.312	.328	.029	.212	.214	-.021	.163	.164	.015	.124	.125	.040	.099	.107
Mom.-Ratio	.127	.128	.181	.180	.107	.209	.280	.084	.292	.111	.060	.126	.139	.048	.147	.172	.038	.176
QQ	.067	.131	.147	.058	.097	.113	.058	.066	.088	-.060	.116	.131	-.036	.101	.107	-.020	.086	.088
Peng's	-.335	.524	.621	-.195	.362	.411	-.108	.251	.274	-.066	.195	.206	-.037	.149	.154	-.025	.122	.124
W	1.893	.376	1.930	1.754	.241	1.771	1.650	.167	1.658	1.622	.145	1.628	1.584	.116	1.589	1.561	.098	1.564
<i>Excess Plots</i>																		
Median	.039	.113	.120	.053	.094	.108	.110	.075	.133	.050	.179	.186	.037	.121	.126	.045	.102	.112
Tr.Mean (1%)	.017	.076	.078	.030	.059	.066	.070	.046	.084	-.031	.097	.102	-.014	.077	.078	.003	.063	.063
Tr.Mean (5%)	.017	.076	.078	.030	.059	.066	.047	.044	.065	-.043	.092	.102	-.034	.071	.079	-.021	.058	.062
Tr.Mean (10%)	-.036	.064	.074	-.007	.053	.054	.015	.042	.045	-.064	.084	.106	-.062	.064	.089	-.048	.054	.072

Table A.2 Simulation results of estimation of γ (Burr distribution, $\tau=0.55$, $\lambda=1$, $\gamma=0.55$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.027	1.202	1.202	-.024	.879	.880	-.139	.632	.648	-1.378	2.129	2.536	-.609	1.418	1.543	-.011	1.112	1.112
Hill	.031	.174	.177	.062	.136	.149	.152	.103	.184	-.066	.211	.221	-.013	.173	.173	.015	.144	.144
Adapted Hill	1.723	1.294	2.155	1.449	.851	1.680	1.227	.475	1.316	1.598	2.201	2.720	1.490	1.587	2.176	1.364	1.114	1.761
Moment	-.240	.481	.538	-.094	.317	.330	.049	.223	.228	-.012	.146	.146	.016	.112	.113	.042	.096	.105
Mom.-Ratio	.033	.190	.193	.095	.154	.181	.218	.113	.245	.046	.094	.105	.071	.074	.103	.105	.059	.121
QQ	.128	.249	.280	.117	.188	.222	.134	.130	.187	-.091	.239	.256	-.045	.202	.207	-.013	.169	.170
Peng's	-.340	.566	.660	-.206	.394	.444	-.128	.283	.311	-.051	.201	.207	-.036	.152	.157	-.032	.129	.133
W	1.393	.303	1.425	1.276	.196	1.291	1.184	.130	1.191	1.136	.101	1.141	1.105	.081	1.108	1.084	.070	1.086
<i>Mean Aver.</i>																		
Pickands	-.360	.337	.493	-.387	.228	.449	-.439	.137	.460	-.592	.393	.711	-.530	.305	.612	-.460	.238	.518
Hill	.028	.188	.190	.045	.146	.153	.108	.106	.151	-.039	.239	.242	-.005	.192	.192	.020	.156	.157
Adapted Hill	1.877	1.584	2.456	1.590	1.076	1.920	1.304	.614	1.441	1.503	2.571	2.978	1.519	1.956	2.477	1.426	1.420	2.012
Moment	-.380	.593	.704	-.168	.360	.397	-.006	.239	.240	-.033	.167	.170	-.001	.129	.129	.025	.104	.107
Mom.-Ratio	.005	.207	.207	.062	.170	.181	.159	.127	.204	.035	.108	.113	.056	.085	.102	.083	.068	.108
QQ	.139	.286	.318	.122	.218	.250	.123	.151	.195	-.125	.256	.285	-.070	.222	.233	-.033	.189	.192
Peng's	-.483	.668	.824	-.272	.432	.511	-.147	.295	.329	-.068	.227	.236	-.045	.175	.180	-.035	.139	.143
W	1.498	.394	1.549	1.334	.235	1.354	1.217	.150	1.227	1.161	.116	1.166	1.123	.093	1.127	1.098	.077	1.100
<i>Med. Aver.</i>																		
Pickands	.020	1.010	1.011	.005	.846	.846	-.091	.594	.601	-1.102	2.062	2.338	-.237	1.353	1.373	-.143	.991	1.001
Hill	.027	.187	.189	.045	.148	.155	.108	.108	.153	-.044	.240	.244	-.008	.195	.195	.020	.157	.158
Adapted Hill	1.868	1.554	2.430	1.576	1.050	1.893	1.293	.596	1.424	1.535	2.555	2.980	1.529	1.931	2.463	1.424	1.389	1.989
Moment	-.298	.482	.567	-.140	.342	.370	.006	.234	.234	-.027	.164	.166	.003	.127	.127	.027	.103	.107
Mom.-Ratio	.007	.207	.208	.063	.171	.182	.159	.128	.204	.035	.107	.113	.057	.084	.102	.083	.068	.108
QQ	.138	.283	.315	.121	.216	.248	.123	.150	.193	-.120	.258	.284	-.067	.222	.232	-.031	.188	.191
Peng's	-.398	.560	.688	-.242	.416	.481	-.133	.289	.318	-.062	.223	.231	-.041	.173	.178	-.033	.137	.141
W	1.461	.335	1.498	1.321	.224	1.340	1.212	.147	1.221	1.157	.114	1.163	1.121	.092	1.125	1.096	.076	1.099
<i>Excess Plots</i>																		
Median	.081	.261	.273	.106	.206	.231	.240	.168	.293	.106	.383	.397	.099	.296	.312	.094	.234	.253
Tr.Mean (1%)	.031	.174	.177	.062	.136	.149	.152	.103	.184	-.066	.211	.221	-.013	.173	.173	.007	.142	.142
Tr.Mean (5%)	.031	.174	.177	.062	.136	.149	.102	.098	.142	-.094	.200	.221	-.059	.160	.170	-.047	.132	.141
Tr.Mean (10%)	-.082	.149	.170	-.019	.123	.124	.032	.092	.097	-.141	.184	.232	-.122	.147	.191	-.107	.123	.163

Table A.3 Simulation results of estimation of γ (Burr distribution, $\tau=0.5, \lambda=2, \gamma=1$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	.214	1.419	1.435	.290	1.063	1.102	.423	.741	.853	-1.316	2.292	2.643	-.387	1.515	1.563	.239	1.216	1.240
Hill	.309	.364	.477	.456	.302	.547	.834	.250	.870	.031	.441	.442	.174	.369	.408	.303	.325	.445
Adapted Hill	12.61 9	12.79 5	17.97 0	8.271	7.580	11.22 0	4.940	3.705	6.175	23.67 0	33.46 0	40.98 6	16.84 7	21.74 0	27.50 4	11.74 6	14.10 0	18.35 1
Moment	-.044	.573	.574	.164	.399	.431	.487	.300	.572	.088	.203	.221	.156	.161	.224	.238	.132	.272
Mom.-Ratio	.137	.382	.406	.247	.313	.398	.491	.227	.541	.115	.181	.215	.167	.145	.221	.238	.115	.265
QQ	.457	.480	.662	.488	.367	.611	.637	.262	.688	-.043	.480	.482	.072	.407	.413	.171	.348	.388
Peng's	-.223	.722	.756	-.040	.518	.519	.139	.378	.403	.001	.284	.284	.051	.225	.230	.087	.186	.205
W	.757	.204	.784	.658	.116	.668	.585	.064	.589	.579	.058	.582	.554	.040	.555	.537	.029	.538
Mean Aver.																		
Pickands	-.601	.436	.742	-.626	.281	.686	-.663	.166	.683	-.885	.438	.988	-.817	.342	.886	-.741	.278	.792
Hill	.267	.380	.464	.370	.301	.477	.645	.234	.686	.082	.496	.503	.174	.397	.433	.275	.337	.434
Adapted Hill	15.44 3	16.80 1	22.82 0	10.49 5	10.21 6	14.64 6	6.102	5.099	7.952	27.40 7	41.83 0	50.00 9	20.80 4	28.45 2	35.24 6	14.99 7	18.95 5	24.17 0
Moment	-.187	.664	.690	.058	.453	.457	.336	.326	.468	.049	.232	.237	.116	.183	.217	.184	.150	.237
Mom.-Ratio	.084	.417	.426	.187	.346	.393	.376	.256	.455	.088	.206	.224	.136	.165	.213	.192	.133	.233
QQ	.458	.548	.714	.468	.420	.629	.561	.299	.636	-.122	.508	.522	.008	.446	.446	.109	.382	.397
Peng's	-.380	.797	.883	-.130	.574	.588	.059	.417	.421	-.037	.320	.322	.023	.254	.255	.062	.207	.216
W	.839	.264	.879	.708	.154	.724	.613	.083	.618	.600	.072	.604	.568	.050	.570	.548	.036	.549
Med. Aver.																		
Pickands	.197	1.307	1.322	.265	1.034	1.068	.363	.706	.794	-1.105	2.238	2.496	-.013	1.571	1.572	.087	1.116	1.119
Hill	.265	.381	.464	.368	.306	.478	.648	.246	.693	.078	.496	.503	.166	.405	.438	.272	.341	.436
Adapted Hill	15.19 2	16.30 7	22.28 7	10.23 1	9.857	14.20 7	5.916	4.902	7.683	27.31 0	41.17 6	49.41 0	20.49 3	27.75 3	34.49 9	14.66 4	18.37 5	23.50 9
Moment	-.123	.591	.604	.081	.435	.442	.340	.327	.472	.054	.229	.235	.119	.182	.217	.185	.150	.238
Mom.-Ratio	.088	.419	.428	.190	.347	.395	.377	.258	.457	.090	.205	.224	.137	.164	.214	.192	.133	.233
QQ	.457	.543	.710	.467	.416	.625	.560	.298	.635	-.111	.511	.523	.014	.447	.447	.113	.382	.398
Peng's	-.307	.726	.788	-.098	.554	.563	.073	.414	.420	-.030	.316	.318	.028	.252	.253	.065	.205	.215
W	.820	.240	.854	.699	.146	.714	.609	.081	.615	.597	.070	.601	.566	.049	.569	.547	.035	.548
Excess Plots																		
Median	.484	.580	.755	.649	.475	.804	1.179	.444	1.260	.434	.831	.938	.435	.639	.773	.563	.543	.782
Tr.Mean (1%)	.309	.364	.477	.456	.302	.547	.834	.250	.870	.031	.441	.442	.174	.369	.408	.285	.322	.430
Tr.Mean (5%)	.309	.364	.477	.456	.302	.547	.723	.243	.763	-.028	.419	.420	.077	.347	.355	.170	.302	.347
Tr.Mean (10%)	.071	.324	.332	.284	.280	.399	.560	.232	.606	-.124	.385	.405	-.055	.324	.329	.042	.283	.286

Table A.4 Simulation results of estimation of γ (Burr distribution, $\tau=1, \lambda=0.5, \gamma=2$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.198	1.819	1.830	.050	1.381	1.382	.059	.960	.962	-1.367	2.547	2.891	-.629	1.894	1.996	.257	1.515	1.536
Hill	-.011	.605	.605	.029	.474	.475	.115	.322	.342	-.233	.768	.802	-.085	.621	.627	.018	.482	.482
Adapted Hill	6238. 969	6242. 054	8825. 416	3513. 064	3483. 745	4947. 534	1677. 017	1652. 665	2354. 504	6131. 423	25437 .009	26165 .546	3769. 132	15188 .002	15648 .698	2378. 167	9443. 000	9737. 860
Moment	-.153	.749	.764	.041	.559	.561	.352	.425	.552	.001	.299	.299	.050	.226	.231	.116	.179	.213
Mom.-Ratio	-.073	.725	.728	.041	.581	.582	.243	.423	.488	.004	.361	.361	.037	.277	.280	.078	.214	.228
QQ	.368	.877	.951	.287	.664	.723	.235	.460	.516	-.323	.900	.956	-.166	.746	.764	-.065	.616	.619
Peng's	-.363	.994	1.058	-.169	.761	.779	.017	.554	.554	-.053	.455	.458	-.018	.359	.360	.014	.279	.279
W	-.352	.129	.375	-.418	.068	.424	-.462	.030	.463	-.472	.023	.473	-.484	.013	.484	-.490	.008	.490
<i>Mean Aver.</i>																		
Pickands	-1.243	.567	1.366	-1.364	.368	1.413	-1.487	.211	1.502	-1.596	.567	1.694	-1.584	.450	1.646	-1.513	.344	1.552
Hill	-.007	.666	.666	.010	.513	.513	.073	.361	.369	-.138	.871	.882	-.033	.679	.680	.035	.547	.548
Adapted Hill	8654. 856	8711. 833	12280 .170	4876. 574	4861. 047	6885. 546	2327. 859	2299. 855	3272. 348	7980. 689	33149 .606	34096 .742	5107. 687	20967 .363	21580 .519	3259. 472	13081 .025	13481 .001
Moment	-.288	.889	.935	-.063	.637	.640	.202	.460	.503	-.024	.343	.344	.020	.264	.265	.072	.206	.218
Mom.-Ratio	-.133	.793	.804	-.020	.650	.650	.146	.483	.504	-.011	.419	.419	.018	.324	.325	.051	.253	.258
QQ	.423	1.009	1.094	.328	.769	.836	.251	.535	.591	-.443	.976	1.071	-.251	.830	.867	-.129	.695	.706
Peng's	-.530	1.131	1.249	-.269	.860	.901	-.053	.620	.622	-.085	.525	.531	-.038	.412	.414	-.006	.327	.327
W	-.287	.206	.353	-.385	.098	.397	-.446	.043	.448	-.462	.031	.463	-.477	.019	.478	-.486	.011	.486
<i>Med. Aver.</i>																		
Pickands	.272	1.700	1.721	.135	1.319	1.326	.054	.891	.893	-1.144	2.476	2.727	-.143	1.922	1.927	.010	1.425	1.425
Hill	-.012	.668	.668	.009	.515	.515	.073	.364	.371	-.152	.876	.889	-.041	.678	.679	.028	.545	.546
Adapted Hill	8264. 437	8314. 610	11723 .210	4664. 650	4643. 339	6581. 759	2231. 936	2203. 531	3136. 413	7830. 779	32912 .320	33831 .079	4939. 794	20184 .072	20779 .758	3142. 666	12575 .695	12962 .425
Moment	-.243	.822	.857	-.051	.629	.631	.205	.461	.504	-.022	.339	.340	.022	.262	.263	.074	.204	.217
Mom.-Ratio	-.127	.793	.803	-.015	.646	.646	.146	.484	.505	-.009	.416	.416	.018	.320	.321	.051	.250	.255
QQ	.420	1.000	1.085	.323	.761	.827	.247	.529	.584	-.425	.981	1.069	-.239	.828	.862	-.123	.692	.703
Peng's	-.463	1.063	1.160	-.243	.843	.878	-.041	.614	.615	-.077	.520	.526	-.035	.407	.408	-.004	.323	.323
W	-.302	.174	.349	-.390	.093	.401	-.449	.041	.451	-.463	.030	.464	-.478	.018	.478	-.486	.011	.487
<i>Excess Plots</i>																		
Median	.112	.922	.928	.129	.714	.726	.226	.477	.528	.357	1.340	1.387	.282	1.079	1.115	.287	.747	.800
Tr.Mean (1%)	-.011	.605	.605	.029	.474	.475	.115	.322	.342	-.233	.768	.802	-.085	.621	.627	-.014	.474	.474
Tr.Mean (5%)	-.011	.605	.605	.029	.474	.475	-.056	.300	.305	-.337	.724	.799	-.253	.571	.624	-.210	.434	.483
Tr.Mean (10%)	-.413	.512	.658	-.253	.426	.495	-.292	.273	.399	-.508	.663	.835	-.484	.520	.710	-.426	.400	.584

Table A.5 Simulation results of estimation of γ (Frechet distribution, $\gamma=0.25$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.009	1.166	1.166	-.061	.871	.873	-.117	.607	.619	-1.222	2.215	2.530	-.581	1.314	1.436	.038	.955	.955
Hill	.004	.078	.078	.013	.059	.061	.031	.042	.052	-.026	.102	.105	-.008	.079	.080	.002	.065	.065
Adapted Hill	1.173	.214	1.192	1.207	.156	1.217	1.272	.107	1.276	1.084	.314	1.128	1.107	.220	1.129	1.165	.172	1.178
Moment	-.286	.439	.524	-.170	.272	.321	-.117	.173	.209	-.047	.131	.139	-.036	.104	.110	-.029	.084	.089
Mom.-Ratio	-.021	.081	.084	-.009	.067	.067	.007	.050	.050	-.001	.043	.043	.002	.034	.034	.005	.027	.027
QQ	.050	.110	.121	.042	.083	.093	.040	.057	.070	-.038	.112	.119	-.018	.095	.097	-.006	.080	.081
Peng's	-.314	.476	.570	-.190	.309	.363	-.142	.202	.247	-.053	.158	.167	-.042	.126	.133	-.036	.102	.108
W	1.855	.368	1.891	1.739	.235	1.754	1.672	.158	1.680	1.600	.124	1.605	1.577	.105	1.581	1.562	.092	1.565
<i>Mean Aver.</i>																		
Pickands	-.172	.320	.363	-.183	.219	.285	-.219	.130	.255	-.365	.382	.528	-.299	.280	.409	-.226	.218	.314
Hill	.004	.084	.084	.008	.065	.065	.023	.045	.050	-.014	.112	.113	-.001	.089	.089	.006	.072	.072
Adapted Hill	1.151	.232	1.174	1.188	.172	1.201	1.244	.116	1.250	.979	.341	1.036	1.029	.238	1.056	1.096	.186	1.112
Moment	-.400	.519	.655	-.227	.310	.384	-.132	.196	.237	-.064	.149	.162	-.043	.115	.123	-.033	.094	.099
Mom.-Ratio	-.029	.088	.093	-.016	.074	.076	.000	.056	.056	-.003	.049	.050	.000	.039	.039	.003	.031	.031
QQ	.056	.127	.139	.046	.096	.106	.040	.067	.078	-.053	.119	.130	-.029	.105	.108	-.013	.089	.090
Peng's	-.432	.551	.700	-.250	.344	.425	-.154	.226	.274	-.071	.178	.191	-.049	.138	.146	-.040	.113	.119
W	1.960	.440	2.009	1.797	.272	1.817	1.694	.179	1.703	1.623	.140	1.629	1.591	.114	1.595	1.572	.099	1.575
<i>Med. Aver.</i>																		
Pickands	-.015	.961	.961	-.003	.822	.822	-.119	.571	.583	-.957	2.134	2.338	-.203	1.177	1.194	-.111	.908	.915
Hill	.003	.084	.084	.008	.065	.065	.023	.046	.051	-.015	.112	.113	-.001	.089	.089	.005	.072	.072
Adapted Hill	1.154	.232	1.177	1.190	.174	1.203	1.246	.116	1.252	.983	.337	1.039	1.031	.237	1.058	1.101	.185	1.116
Moment	-.333	.435	.547	-.202	.290	.354	-.122	.191	.227	-.059	.146	.157	-.040	.114	.121	-.032	.093	.098
Mom.-Ratio	-.028	.088	.093	-.015	.074	.075	.000	.056	.056	-.003	.049	.049	.000	.039	.039	.003	.031	.031
QQ	.056	.126	.137	.045	.095	.105	.040	.066	.077	-.051	.119	.130	-.027	.105	.108	-.013	.089	.090
Peng's	-.364	.469	.593	-.225	.326	.396	-.144	.222	.264	-.065	.175	.187	-.046	.137	.145	-.038	.112	.118
W	1.914	.382	1.951	1.779	.257	1.798	1.687	.174	1.696	1.618	.137	1.624	1.588	.113	1.592	1.570	.098	1.573
<i>Excess Plots</i>																		
Median	.021	.120	.122	.028	.089	.093	.052	.065	.083	.048	.177	.183	.038	.126	.131	.030	.100	.104
Tr.Mean (1%)	.004	.078	.078	.013	.059	.061	.031	.042	.052	-.026	.102	.105	-.008	.079	.080	-.002	.064	.064
Tr.Mean (5%)	.004	.078	.078	.013	.059	.061	.009	.039	.040	-.040	.096	.104	-.029	.073	.078	-.027	.058	.064
Tr.Mean (10%)	-.046	.067	.081	-.023	.053	.058	-.021	.036	.042	-.061	.088	.107	-.058	.065	.087	-.055	.053	.076

Table A.6 Simulation results of estimation of γ (Frechet distribution, $\gamma=0.55$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.027	1.221	1.221	-.039	.939	.940	-.087	.637	.643	-1.273	2.206	2.547	-.640	1.296	1.445	.010	1.043	1.043
Hill	.015	.176	.177	.028	.136	.139	.069	.095	.118	-.081	.200	.216	-.044	.167	.173	-.014	.128	.128
Adapted Hill	1.836	1.352	2.280	1.509	.889	1.752	1.240	.498	1.336	1.535	1.762	2.337	1.448	1.296	1.944	1.313	.940	1.615
Moment	-.272	.456	.531	-.148	.295	.330	-.071	.201	.213	-.052	.154	.163	-.034	.117	.122	-.021	.094	.096
Mom.-Ratio	-.037	.190	.194	-.011	.155	.155	.022	.113	.115	-.008	.099	.100	-.001	.078	.078	.006	.061	.061
QQ	.121	.246	.274	.098	.188	.212	.090	.133	.160	-.099	.239	.258	-.059	.199	.208	-.034	.167	.170
Peng's	-.328	.543	.635	-.193	.373	.420	-.122	.262	.289	-.065	.213	.223	-.048	.165	.172	-.038	.132	.137
W	1.393	.307	1.426	1.276	.198	1.291	1.191	.136	1.199	1.149	.111	1.154	1.116	.089	1.120	1.094	.075	1.096
<i>Mean Aver.</i>																		
Pickands	-.345	.359	.498	-.388	.237	.455	-.432	.143	.455	-.575	.401	.701	-.533	.301	.612	-.460	.224	.511
Hill	.014	.187	.188	.019	.147	.148	.049	.104	.115	-.054	.224	.231	-.026	.183	.185	-.010	.147	.147
Adapted Hill	2.036	1.659	2.627	1.678	1.125	2.020	1.336	.642	1.482	1.438	2.031	2.489	1.462	1.579	2.152	1.377	1.172	1.809
Moment	-.399	.553	.682	-.209	.347	.405	-.097	.225	.245	-.071	.177	.191	-.044	.135	.142	-.029	.107	.111
Mom.-Ratio	-.054	.208	.215	-.025	.173	.174	.008	.129	.129	-.013	.115	.116	-.006	.090	.090	.001	.071	.071
QQ	.138	.283	.314	.110	.216	.243	.091	.153	.178	-.128	.260	.290	-.080	.220	.235	-.050	.187	.193
Peng's	-.467	.633	.787	-.259	.423	.496	-.143	.287	.321	-.086	.241	.256	-.057	.186	.195	-.044	.149	.156
W	1.497	.387	1.546	1.334	.240	1.356	1.222	.155	1.232	1.175	.125	1.182	1.135	.100	1.140	1.108	.084	1.111
<i>Med. Aver.</i>																		
Pickands	.065	1.076	1.078	-.003	.892	.892	-.074	.615	.619	-.972	2.135	2.346	-.239	1.379	1.399	-.143	.914	.925
Hill	.012	.187	.188	.018	.147	.148	.049	.105	.116	-.057	.223	.230	-.028	.185	.187	-.012	.148	.148
Adapted Hill	2.020	1.627	2.594	1.661	1.098	1.991	1.323	.623	1.463	1.469	2.026	2.502	1.470	1.558	2.142	1.375	1.150	1.793
Moment	-.336	.482	.588	-.184	.329	.377	-.088	.218	.235	-.066	.174	.186	-.041	.132	.139	-.028	.106	.110
Mom.-Ratio	-.052	.208	.214	-.024	.173	.174	.009	.129	.129	-.012	.114	.114	-.005	.089	.089	.002	.070	.070
QQ	.137	.279	.311	.108	.214	.240	.090	.152	.177	-.124	.260	.288	-.077	.219	.233	-.049	.186	.193
Peng's	-.403	.565	.694	-.233	.406	.468	-.133	.282	.311	-.080	.239	.252	-.054	.184	.192	-.043	.149	.155
W	1.464	.344	1.504	1.322	.230	1.341	1.217	.152	1.227	1.172	.123	1.178	1.133	.099	1.137	1.107	.083	1.110
<i>Excess Plots</i>																		
Median	.050	.261	.266	.057	.193	.201	.115	.144	.184	.062	.334	.340	.055	.277	.282	.048	.199	.205
Tr.Mean (1%)	.015	.176	.177	.028	.136	.139	.069	.095	.118	-.081	.200	.216	-.044	.167	.173	-.023	.125	.127
Tr.Mean (5%)	.015	.176	.177	.028	.136	.139	.020	.088	.091	-.109	.188	.217	-.089	.154	.177	-.076	.114	.137
Tr.Mean (10%)	-.099	.151	.181	-.052	.121	.132	-.047	.081	.093	-.155	.170	.230	-.151	.140	.206	-.133	.104	.169

Table A.7 Simulation results of estimation of γ (Frechet distribution, $\gamma=1$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.038	1.348	1.348	-.033	.984	.985	.007	.725	.725	-1.348	2.316	2.680	-.674	1.537	1.678	.061	1.218	1.220
Hill	.011	.292	.292	.043	.239	.243	.126	.175	.215	-.135	.420	.441	-.046	.340	.343	-.002	.254	.254
Adapted Hill	19.56 5	16.18 9	25.39 4	13.00 8	9.878	16.33 4	7.339	5.003	8.882	34.91 2	98.49 6	104.5 00	25.05 0	59.88 3	64.91 1	17.78 7	37.73 9	41.72 0
Moment	-.244	.524	.578	-.109	.354	.371	-.008	.245	.245	-.045	.180	.186	-.021	.140	.142	-.003	.113	.113
Mom.-Ratio	-.054	.363	.367	-.011	.292	.293	.045	.211	.216	-.015	.170	.171	-.003	.134	.134	.009	.107	.108
QQ	.174	.430	.464	.149	.322	.355	.150	.228	.273	-.190	.474	.511	-.103	.406	.419	-.047	.338	.341
Peng's	-.339	.678	.758	-.182	.489	.522	-.095	.352	.365	-.073	.269	.278	-.042	.211	.215	-.030	.170	.173
W	.793	.233	.827	.689	.142	.703	.613	.085	.619	.586	.064	.589	.560	.045	.562	.544	.034	.545
<i>Mean Aver.</i>																		
Pickands	-.653	.412	.772	-.699	.252	.743	-.751	.156	.767	-.921	.463	1.031	-.856	.337	.920	-.801	.279	.848
Hill	-.004	.315	.315	.023	.248	.249	.086	.187	.206	-.087	.481	.489	-.028	.383	.384	.011	.294	.295
Adapted Hill	23.91 8	20.83 0	31.71 7	16.37 6	13.07 7	20.95 7	9.450	6.776	11.62 8	40.95 6	132.0 39	138.2 45	30.73 7	81.70 9	87.29 9	22.40 8	51.77 0	56.41 2
Moment	-.367	.652	.748	-.176	.420	.455	-.047	.277	.281	-.065	.210	.220	-.035	.162	.166	-.015	.130	.131
Mom.-Ratio	-.084	.397	.406	-.033	.328	.330	.020	.243	.244	-.025	.193	.195	-.010	.154	.154	.001	.124	.124
QQ	.194	.501	.537	.161	.375	.408	.146	.263	.300	-.252	.502	.561	-.151	.444	.469	-.082	.380	.389
Peng's	-.488	.786	.925	-.260	.556	.614	-.123	.389	.408	-.099	.303	.318	-.060	.240	.248	-.039	.193	.197
W	.884	.317	.939	.741	.182	.763	.640	.103	.649	.607	.078	.612	.575	.056	.577	.554	.041	.556
<i>Med. Aver.</i>																		
Pickands	.042	1.237	1.238	.031	.902	.902	-.002	.666	.666	-1.096	2.251	2.503	-.133	1.569	1.574	-.134	1.166	1.173
Hill	-.007	.315	.315	.020	.249	.250	.086	.189	.207	-.100	.482	.492	-.029	.382	.383	-.008	.293	.293
Adapted Hill	23.46 6	20.28 7	31.01 9	15.99 1	12.66 0	20.39 6	9.189	6.539	11.27 8	40.64 7	128.0 56	134.3 52	30.23 9	78.85 5	84.45 4	21.94 0	49.88 3	54.49 4
Moment	-.305	.571	.647	-.154	.400	.429	-.041	.272	.275	-.061	.206	.215	-.033	.160	.164	-.014	.129	.129
Mom.-Ratio	-.081	.398	.406	-.031	.327	.328	.021	.243	.244	-.024	.192	.193	-.009	.153	.153	.001	.123	.123
QQ	.193	.495	.532	.159	.370	.403	.145	.260	.298	-.243	.506	.561	-.145	.444	.467	-.078	.378	.386
Peng's	-.419	.710	.824	-.234	.536	.585	-.113	.384	.400	-.093	.299	.313	-.057	.237	.244	-.037	.191	.195
W	.859	.273	.901	.732	.172	.751	.637	.100	.644	.604	.076	.609	.573	.054	.576	.553	.040	.554
<i>Excess Plots</i>																		
Median	.090	.438	.447	.121	.360	.380	.216	.278	.352	.184	.762	.784	.165	.522	.547	.123	.393	.412
Tr.Mean (1%)	.011	.292	.292	.043	.239	.243	.126	.175	.215	-.135	.420	.441	-.046	.340	.343	-.017	.250	.251
Tr.Mean (5%)	.011	.292	.292	.043	.239	.243	.040	.165	.170	-.185	.397	.437	-.127	.312	.337	-.112	.226	.252
Tr.Mean (10%)	-.186	.249	.311	-.096	.216	.237	-.080	.152	.172	-.266	.362	.450	-.239	.282	.369	-.218	.205	.299

Table A.8 Simulation results of estimation of γ (Frechet distribution, $\gamma=2$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	.204	1.777	1.789	.197	1.306	1.321	.153	.973	.985	-1.548	2.754	3.159	-.633	1.927	2.028	.279	1.534	1.559
Hill	.048	.613	.615	.108	.484	.496	.253	.351	.432	-.220	.770	.801	-.093	.621	.628	-.028	.484	.484
Adapted Hill	30105 .499	29400 .927	42080 .347	16768 .355	16340 .139	23413 .199	7953. 861	7741. 155	11099 .071	98919 .597	20368 96.67	20392 97.22	58695 .502	12055 20.06	12069 48.13	36451 .360	74773 0.383	74861 8.345
Moment	-.229	.750	.784	-.062	.538	.541	.118	.374	.392	-.017	.287	.288	.015	.224	.224	.053	.177	.185
Mom.-Ratio	-.140	.696	.710	-.042	.563	.564	.079	.407	.414	-.003	.363	.363	.017	.281	.282	.039	.218	.222
QQ	.374	.875	.952	.328	.660	.737	.320	.463	.563	-.302	.898	.947	-.156	.747	.763	-.073	.622	.627
Peng's	-.431	.974	1.065	-.229	.742	.776	-.064	.534	.538	-.055	.460	.463	-.022	.360	.360	-.001	.281	.281
W	-.346	.139	.373	-.415	.072	.421	-.460	.033	.461	-.473	.022	.473	-.484	.013	.484	-.490	.008	.490
Mean Aver.																		
Pickands	-1.243	.560	1.363	-1.344	.354	1.390	-1.458	.216	1.474	-1.612	.573	1.710	-1.600	.452	1.663	-1.511	.350	1.551
Hill	.028	.661	.661	.077	.513	.519	.183	.374	.416	-.127	.880	.889	-.033	.686	.687	.009	.555	.555
Adapted Hill	42298 .436	41410 .153	59194 .244	23424 .728	22855 .628	32727 .628	11068 .389	10777 .564	15448 .791	13703 5.255	28317 15.93	28350 29.76	81369 .722	16739 99.90	16759 76.34	50539 .011	10376 49.26	10388 79.29
Moment	-.359	.891	.960	-.150	.629	.646	.039	.426	.428	-.035	.334	.336	-.002	.257	.257	.029	.203	.205
Mom.-Ratio	-.199	.758	.784	-.093	.629	.636	.027	.467	.468	-.018	.418	.418	.005	.327	.327	.025	.257	.258
QQ	.407	1.008	1.087	.351	.766	.843	.316	.534	.621	-.417	.966	1.052	-.235	.830	.863	-.125	.699	.710
Peng's	-.592	1.102	1.251	-.332	.845	.908	-.124	.607	.620	-.087	.522	.529	-.042	.412	.414	-.015	.329	.329
W	-.283	.207	.351	-.381	.105	.395	-.444	.046	.447	-.462	.030	.463	-.478	.018	.478	-.486	.011	.486
Med. Aver.																		
Pickands	.272	1.680	1.702	.200	1.301	1.316	.183	.917	.935	-1.330	2.717	3.025	-.167	2.036	2.043	.022	1.441	1.441
Hill	.020	.656	.656	.074	.514	.519	.184	.379	.421	-.143	.888	.899	-.038	.689	.690	.002	.554	.554
Adapted Hill	40232 .855	39360 .071	56284 .081	22365 .148	21813 .581	31241 .514	10604 .555	10324 .410	14800 .339	13157 6.002	27161 97.81	27193 82.80	78169 .768	16074 28.49	16093 28.08	48570 .705	99698 9.902	99817 2.319
Moment	-.312	.830	.887	-.135	.617	.632	.044	.423	.426	-.033	.332	.333	.001	.257	.257	.030	.201	.203
Mom.-Ratio	-.192	.761	.785	-.087	.628	.634	.030	.465	.466	-.017	.415	.415	.005	.324	.324	.025	.254	.255
QQ	.404	.999	1.078	.349	.758	.834	.314	.528	.615	-.400	.971	1.050	-.224	.830	.860	-.119	.695	.705
Peng's	-.524	1.038	1.163	-.304	.829	.883	-.111	.601	.611	-.083	.517	.523	-.038	.406	.408	-.013	.325	.326
W	-.298	.179	.347	-.387	.099	.399	-.447	.044	.449	-.464	.029	.465	-.479	.017	.479	-.487	.011	.487
Excess Plots																		
Median	.219	.908	.934	.238	.745	.782	.415	.522	.667	.377	1.362	1.414	.268	1.061	1.095	.185	.758	.780
Tr.Mean (1%)	.048	.613	.615	.108	.484	.496	.253	.351	.432	-.220	.770	.801	-.093	.621	.628	-.059	.476	.479
Tr.Mean (5%)	.048	.613	.615	.108	.484	.496	.080	.329	.339	-.327	.726	.796	-.264	.573	.630	-.258	.434	.505
Tr.Mean (10%)	-.344	.526	.629	-.171	.439	.471	-.164	.304	.346	-.502	.663	.831	-.498	.525	.724	-.473	.397	.617

Table A.9 Simulation results of estimation of γ (Log-gamma distribution, $\alpha=1, \lambda=4, \gamma=0.25$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	.054	1.133	1.134	.005	.859	.859	-.017	.610	.610	-1.111	2.032	2.315	-.627	1.368	1.505	.046	.980	.981
Hill	-.001	.073	.073	-.001	.058	.058	.000	.041	.041	-.038	.099	.106	-.022	.080	.083	-.014	.064	.066
Adapted Hill	1.172	.203	1.189	1.229	.162	1.239	1.321	.114	1.326	1.111	.335	1.161	1.137	.237	1.161	1.187	.187	1.202
Moment	-.267	.401	.481	-.155	.265	.307	-.075	.173	.189	-.048	.128	.136	-.028	.099	.103	-.018	.079	.081
Mom.-Ratio	-.022	.095	.098	-.014	.076	.078	-.007	.055	.055	-.005	.043	.043	-.003	.034	.034	-.002	.028	.028
QQ	.045	.106	.115	.033	.081	.088	.023	.056	.061	-.051	.109	.120	-.032	.094	.099	-.021	.080	.082
Peng's	-.287	.445	.530	-.168	.308	.350	-.081	.207	.223	-.053	.153	.162	-.031	.120	.124	-.019	.097	.098
W	1.839	.340	1.870	1.724	.232	1.740	1.635	.157	1.642	1.600	.120	1.605	1.572	.099	1.575	1.553	.084	1.556
Mean Aver.																		
Pickands	-.162	.330	.367	-.169	.220	.277	-.194	.126	.231									
Hill	-.001	.080	.080	-.001	.063	.063	.000	.044	.044	-.028	.109	.113	-.015	.088	.089	-.010	.071	.072
Adapted Hill	1.151	.225	1.172	1.200	.171	1.212	1.280	.123	1.286	1.016	.357	1.077	1.057	.257	1.088	1.123	.199	1.140
Moment	-.383	.490	.622	-.211	.313	.378	-.101	.190	.216	-.065	.140	.154	-.040	.111	.118	-.024	.088	.091
Mom.-Ratio	-.028	.103	.107	-.018	.086	.088	-.009	.063	.064	-.007	.048	.048	-.004	.039	.039	-.002	.032	.032
QQ	.051	.122	.132	.039	.093	.101	.027	.066	.071	-.066	.115	.133	-.042	.102	.110	-.028	.088	.092
Peng's	-.409	.529	.668	-.227	.354	.421	-.110	.226	.251	-.072	.165	.181	-.044	.132	.140	-.026	.106	.109
W	1.948	.421	1.993	1.783	.275	1.804	1.666	.174	1.675	1.623	.131	1.628	1.588	.109	1.592	1.565	.091	1.567
Med. Aver.																		
Pickands	.015	.989	.989	.050	.794	.796	-.011	.551	.552	-.819	1.987	2.149	-.199	1.125	1.143	-.109	.946	.952
Hill	-.002	.080	.080	-.002	.063	.063	.000	.044	.044	-.028	.110	.114	-.015	.087	.089	-.010	.072	.072
Adapted Hill	1.153	.225	1.175	1.204	.172	1.216	1.283	.124	1.289	1.018	.360	1.079	1.061	.253	1.090	1.127	.201	1.145
Moment	-.323	.417	.527	-.188	.293	.348	-.092	.184	.206	-.060	.138	.150	-.037	.110	.116	-.022	.087	.089
Mom.-Ratio	-.028	.103	.106	-.017	.086	.088	-.009	.063	.064	-.006	.048	.048	-.004	.039	.039	-.002	.032	.032
QQ	.050	.120	.131	.039	.092	.100	.027	.065	.070	-.064	.116	.132	-.041	.102	.110	-.027	.088	.092
Peng's	-.348	.458	.575	-.203	.335	.392	-.100	.220	.242	-.067	.163	.176	-.042	.132	.138	-.024	.105	.107
W	1.904	.364	1.939	1.766	.259	1.785	1.660	.169	1.668	1.619	.129	1.624	1.587	.108	1.590	1.563	.090	1.566
Excess Plots																		
Median	.011	.101	.102	.009	.085	.085	.006	.059	.059	.033	.169	.172	.021	.125	.126	.012	.099	.100
Tr.Mean (1%)	-.001	.073	.073	-.001	.058	.058	.000	.041	.041	-.038	.099	.106	-.022	.080	.083	-.017	.063	.065
Tr.Mean (5%)	-.001	.073	.073	-.001	.058	.058	-.021	.038	.043	-.050	.094	.106	-.042	.073	.084	-.041	.057	.070
Tr.Mean (10%)	-.051	.062	.080	-.035	.052	.063	-.050	.035	.061	-.071	.085	.111	-.069	.066	.096	-.066	.052	.084

Table A.10 Simulation results of estimation of γ (Log-Gamma distribution, $\alpha=1, \lambda=1/0.55, \gamma=0.55$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.021	1.156	1.156	.007	.919	.919	-.003	.636	.636	-1.321	2.164	2.535	-.581	1.343	1.463	-.009	1.039	1.039
Hill	-.004	.163	.163	-.002	.121	.121	.001	.090	.090	-.090	.208	.227	-.053	.170	.178	-.033	.136	.140
Adapted Hill	1.873	1.395	2.336	1.528	.906	1.776	1.247	.497	1.343	1.586	2.473	2.937	1.478	1.731	2.276	1.340	1.211	1.806
Moment	-.262	.471	.539	-.138	.297	.327	-.068	.184	.196	-.045	.150	.156	-.025	.112	.114	-.016	.089	.090
Mom.-Ratio	-.041	.195	.199	-.024	.160	.161	-.011	.119	.119	-.006	.101	.101	-.003	.079	.079	-.002	.062	.062
QQ	.101	.239	.259	.074	.179	.193	.049	.123	.133	-.112	.246	.271	-.072	.207	.219	-.048	.172	.179
Peng's	-.309	.553	.634	-.163	.377	.411	-.080	.254	.266	-.053	.212	.218	-.028	.160	.163	-.019	.129	.131
W	1.381	.303	1.414	1.263	.203	1.280	1.175	.130	1.182	1.145	.104	1.150	1.110	.083	1.113	1.087	.070	1.090
Mean Aver.																		
Pickands	-.366	.344	.502	-.386	.226	.447	-.414	.136	.436	-.600	.389	.715	-.515	.307	.600	-.458	.221	.508
Hill	-.003	.178	.178	-.004	.134	.134	-.002	.096	.096	-.060	.244	.251	-.038	.188	.192	-.026	.152	.154
Adapted Hill	2.094	1.732	2.717	1.706	1.154	2.059	1.350	.646	1.497	1.491	2.991	3.342	1.503	2.168	2.638	1.408	1.546	2.091
Moment	-.361	.559	.666	-.196	.339	.391	-.093	.214	.233	-.062	.175	.186	-.035	.130	.135	-.022	.102	.104
Mom.-Ratio	-.055	.213	.220	-.033	.177	.180	-.016	.134	.135	-.009	.116	.116	-.005	.091	.091	-.003	.072	.072
QQ	.118	.276	.300	.088	.209	.226	.059	.144	.155	-.143	.262	.299	-.093	.229	.247	-.063	.193	.203
Peng's	-.419	.634	.760	-.232	.418	.478	-.110	.285	.305	-.073	.239	.250	-.041	.184	.188	-.025	.146	.148
W	1.474	.388	1.524	1.321	.233	1.341	1.208	.151	1.217	1.170	.119	1.176	1.130	.094	1.134	1.102	.078	1.105
Med. Aver.																		
Pickands	.001	1.031	1.031	.036	.840	.841	-.005	.590	.590	-1.057	2.080	2.333	-.153	1.294	1.303	-.123	.911	.919
Hill	-.005	.178	.178	-.006	.133	.134	-.002	.096	.096	-.064	.241	.249	-.039	.187	.191	-.027	.152	.154
Adapted Hill	2.073	1.693	2.677	1.687	1.125	2.027	1.336	.628	1.476	1.524	2.955	3.325	1.509	2.127	2.608	1.406	1.512	2.064
Moment	-.303	.453	.545	-.174	.320	.364	-.085	.208	.225	-.058	.173	.183	-.033	.128	.132	-.020	.101	.103
Mom.-Ratio	-.053	.213	.219	-.031	.177	.180	-.015	.133	.134	-.008	.115	.115	-.004	.090	.090	-.002	.071	.071
QQ	.116	.273	.296	.087	.206	.224	.057	.142	.153	-.138	.264	.298	-.090	.228	.245	-.061	.193	.202
Peng's	-.357	.536	.644	-.207	.401	.452	-.102	.279	.297	-.068	.238	.247	-.038	.181	.185	-.023	.145	.147
W	1.441	.324	1.477	1.309	.223	1.328	1.203	.147	1.212	1.167	.119	1.173	1.127	.093	1.131	1.101	.077	1.103
Excess Plots																		
Median	.030	.234	.236	.018	.177	.178	.012	.135	.135	.070	.344	.351	.041	.269	.272	.022	.212	.214
Tr.Mean (1%)	-.004	.163	.163	-.002	.121	.121	.001	.090	.090	-.090	.208	.227	-.053	.170	.178	-.041	.134	.140
Tr.Mean (5%)	-.004	.163	.163	-.002	.121	.121	-.046	.083	.095	-.117	.195	.228	-.097	.155	.183	-.092	.123	.153
Tr.Mean (10%)	-.116	.138	.180	-.080	.107	.134	-.109	.076	.133	-.162	.176	.239	-.157	.140	.210	-.148	.112	.186

Table A.11 Simulation results of estimation of γ (Log-Gamma distribution, $\alpha=1, \lambda=1, \gamma=1$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.038	1.376	1.377	.062	1.011	1.013	.011	.702	.702	-1.363	2.366	2.731	-.608	1.472	1.593	-.029	1.170	1.171
Hill	-.004	.297	.297	.001	.230	.230	.002	.157	.157	-.170	.369	.406	-.105	.299	.317	-.066	.252	.260
Adapted Hill	23.27 5	19.60 6	30.43 2	15.20 5	11.71 8	19.19 7	8.452	5.861	10.28 5	27.75 0	42.08 9	50.41 3	20.62 1	27.31 4	34.22 4	14.98 4	17.88 3	23.33 1
Moment	-.252	.498	.558	-.145	.348	.377	-.071	.227	.237	-.069	.182	.195	-.043	.133	.140	-.028	.104	.108
Mom.-Ratio	-.080	.354	.363	-.047	.287	.291	-.024	.213	.214	-.034	.167	.171	-.024	.127	.130	-.017	.102	.103
QQ	.169	.452	.483	.132	.338	.363	.092	.230	.248	-.200	.440	.483	-.134	.370	.393	-.092	.312	.325
Peng's	-.333	.644	.725	-.197	.484	.523	-.093	.341	.353	-.095	.281	.296	-.060	.209	.218	-.040	.162	.167
W	.789	.232	.823	.690	.146	.705	.613	.085	.619	.590	.073	.594	.563	.051	.565	.545	.038	.547
<i>Mean Aver.</i>																		
Pickands	-.651	.415	.772	-.689	.270	.740	-.740	.155	.756	-.926	.456	1.032	-.846	.341	.912	-.804	.262	.846
Hill	-.008	.334	.334	-.001	.254	.254	.003	.176	.176	-.111	.433	.447	-.080	.332	.342	-.053	.273	.278
Adapted Hill	28.93 7	25.71 6	38.71 3	19.33 5	15.70 4	24.90 9	10.95 7	7.975	13.55 2	31.58 9	53.22 7	61.89 5	24.75 9	35.74 4	43.48 1	18.57 4	23.86 9	30.24 4
Moment	-.382	.674	.775	-.201	.411	.457	-.095	.264	.281	-.091	.216	.235	-.058	.160	.170	-.038	.122	.128
Mom.-Ratio	-.103	.384	.398	-.064	.320	.327	-.032	.241	.243	-.043	.196	.201	-.030	.150	.153	-.022	.117	.119
QQ	.191	.525	.558	.152	.394	.422	.108	.269	.290	-.254	.469	.533	-.170	.409	.442	-.118	.347	.366
Peng's	-.484	.806	.940	-.265	.546	.607	-.127	.381	.402	-.122	.321	.343	-.079	.246	.258	-.054	.188	.196
W	.883	.332	.943	.740	.184	.763	.641	.106	.650	.611	.090	.618	.578	.064	.582	.556	.046	.558
<i>Med. Aver.</i>																		
Pickands	.047	1.245	1.246	.068	.978	.980	.050	.666	.668	-1.132	2.297	2.561	-.124	1.501	1.507	-.151	1.077	1.087
Hill	-.011	.333	.333	-.003	.254	.254	.001	.174	.174	-.118	.429	.445	-.085	.332	.343	-.053	.273	.278
Adapted Hill	28.27 7	24.93 9	37.70 3	18.83 8	15.16 2	24.18 2	10.64 5	7.684	13.12 8	31.49 8	52.21 3	60.97 8	24.45 8	34.81 6	42.54 9	18.24 1	23.14 9	29.47 2
Moment	-.317	.569	.652	-.181	.390	.430	-.089	.259	.274	-.087	.212	.230	-.056	.157	.166	-.036	.121	.126
Mom.-Ratio	-.100	.383	.396	-.062	.319	.325	-.031	.240	.242	-.042	.194	.199	-.029	.148	.151	-.021	.116	.118
QQ	.189	.519	.552	.150	.390	.417	.106	.266	.286	-.245	.472	.532	-.165	.408	.440	-.115	.345	.363
Peng's	-.412	.705	.817	-.239	.526	.578	-.117	.375	.393	-.115	.317	.337	-.074	.243	.254	-.052	.186	.193
W	.857	.286	.903	.731	.173	.751	.637	.104	.645	.608	.088	.615	.576	.063	.580	.555	.045	.557
<i>Excess Plots</i>																		
Median	.068	.424	.430	.038	.334	.336	.023	.221	.223	.109	.626	.635	.051	.469	.472	.041	.385	.387
Tr.Mean (1%)	-.004	.297	.297	.001	.230	.230	.002	.157	.157	-.170	.369	.406	-.105	.299	.317	-.081	.247	.260
Tr.Mean (5%)	-.004	.297	.297	.001	.230	.230	-.082	.145	.167	-.219	.346	.409	-.185	.272	.329	-.174	.223	.283
Tr.Mean (10%)	-.200	.249	.319	-.137	.204	.246	-.198	.131	.238	-.301	.311	.433	-.295	.242	.382	-.275	.202	.342

Table A.12 Simulation results of estimation of γ (Log-Gamma distribution, $\alpha=1, \lambda=0.5, \gamma=2$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.169	1.798	1.806	.082	1.302	1.304	.097	.916	.921	-1.515	2.507	2.929	-.672	1.831	1.951	.197	1.513	1.526
Hill	.007	.613	.613	.016	.480	.480	.001	.328	.328	-.302	.716	.777	-.204	.584	.619	-.144	.478	.499
Adapted Hill	2058. 077	7629. 323	7902. 041	1190. 964	4251. 080	4414. 757	577.7 15	2015. 505	2096. 668	6171. 243	22572 .631	23401 .024	3812. 083	13436 .700	13966 .992	2414. 832	8346. 481	8688. 795
Moment	-.255	.766	.807	-.132	.519	.535	-.065	.361	.367	-.025	.297	.298	-.012	.225	.225	-.004	.176	.176
Mom.-Ratio	-.141	.732	.745	-.076	.588	.593	-.036	.425	.426	.005	.400	.400	.008	.301	.301	.009	.234	.234
QQ	.392	.886	.969	.300	.674	.738	.197	.474	.513	-.380	.857	.938	-.242	.714	.754	-.171	.600	.624
Peng's	-.415	1.032	1.113	-.218	.766	.796	-.099	.545	.554	-.037	.501	.502	-.016	.382	.382	-.006	.298	.298
W	-.341	.138	.368	-.411	.074	.418	-.458	.036	.459	-.473	.022	.474	-.484	.013	.484	-.490	.008	.490
<i>Mean Aver.</i>																		
Pickands	-1.257	.548	1.371	-1.363	.373	1.413	-1.476	.210	1.491	-1.622	.549	1.713	-1.604	.403	1.654	-1.530	.338	1.566
Hill	.003	.665	.665	.014	.521	.521	.003	.368	.368	-.207	.823	.848	-.125	.650	.661	-.104	.526	.536
Adapted Hill	2760. 283	10679 .334	11030 .292	1627. 309	5937. 624	6156. 583	796.8 22	2805. 320	2916. 290	8102. 149	30999 .290	32040 .611	5149. 709	18590 .121	19290 .208	3300. 172	11569 .886	12031 .351
Moment	-.359	.883	.954	-.193	.619	.649	-.087	.418	.427	-.038	.348	.350	-.019	.263	.264	-.010	.204	.204
Mom.-Ratio	-.190	.801	.823	-.107	.662	.670	-.049	.485	.488	-.003	.468	.468	.006	.358	.358	.008	.276	.276
QQ	.453	1.022	1.118	.347	.778	.852	.238	.549	.598	-.491	.932	1.053	-.315	.792	.852	-.214	.669	.703
Peng's	-.565	1.126	1.260	-.315	.883	.937	-.142	.624	.640	-.066	.581	.585	-.027	.447	.448	-.011	.349	.349
W	-.276	.195	.338	-.376	.105	.391	-.441	.050	.444	-.463	.031	.464	-.478	.018	.478	-.486	.011	.486
<i>Med. Aver.</i>																		
Pickands	.230	1.643	1.659	.152	1.330	1.338	.117	.888	.896	-1.317	2.461	2.792	-.175	1.827	1.835	-.043	1.372	1.373
Hill	.001	.667	.667	.011	.519	.519	-.001	.369	.369	-.222	.821	.850	-.128	.651	.663	-.109	.525	.536
Adapted Hill	2663. 819	10177 .816	10520 .640	1563. 890	5670. 353	5882. 062	765.3 63	2687. 629	2794. 482	7903. 209	29884 .206	30911 .592	4982. 273	17875 .483	18556 .830	3183. 798	11121 .183	11567 .942
Moment	-.318	.836	.894	-.181	.608	.634	-.083	.416	.424	-.035	.344	.346	-.019	.260	.261	-.010	.202	.202
Mom.-Ratio	-.183	.802	.822	-.101	.660	.667	-.047	.481	.484	-.001	.464	.464	.007	.355	.355	.008	.273	.273
QQ	.448	1.011	1.106	.342	.770	.842	.234	.543	.592	-.474	.936	1.050	-.303	.789	.845	-.209	.665	.697
Peng's	-.501	1.081	1.192	-.290	.866	.914	-.132	.614	.628	-.061	.575	.579	-.023	.443	.444	-.009	.345	.345
W	-.290	.177	.340	-.382	.099	.395	-.444	.048	.446	-.464	.030	.465	-.479	.018	.479	-.487	.011	.487
<i>Excess Plots</i>																		
Median	.108	.865	.872	.103	.680	.688	.020	.463	.463	.281	1.313	1.342	.126	.940	.948	.015	.702	.702
Tr.Mean (1%)	.007	.613	.613	.016	.480	.480	.001	.328	.328	-.302	.716	.777	-.204	.584	.619	-.174	.470	.501
Tr.Mean (5%)	.007	.613	.613	.016	.480	.480	-.172	.304	.349	-.403	.673	.784	-.367	.534	.648	-.363	.425	.559
Tr.Mean (10%)	-.403	.520	.658	-.271	.426	.505	-.404	.274	.488	-.569	.611	.835	-.590	.482	.762	-.567	.386	.687

Table A.13 Simulation results of estimation of γ (Log-logistic distribution, $\gamma=0.25$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.084	1.189	1.192	-.118	.861	.869	-.189	.573	.603	-1.192	2.126	2.438	-.632	1.296	1.441	-.149	.966	.978
Hill	.020	.080	.083	.029	.060	.067	.068	.047	.083	-.039	.093	.101	-.016	.075	.077	.006	.064	.065
Adapted Hill	1.152	.216	1.172	1.191	.157	1.202	1.229	.105	1.234	1.118	.321	1.164	1.120	.218	1.141	1.144	.170	1.157
Moment	-.302	.454	.545	-.185	.286	.340	-.150	.206	.254	-.061	.133	.146	-.043	.104	.112	-.042	.087	.096
Mom.-Ratio	-.012	.094	.095	.003	.076	.076	.028	.053	.060	-.001	.042	.042	.004	.033	.034	.010	.027	.028
QQ	.062	.116	.132	.056	.086	.103	.062	.060	.086	-.048	.106	.117	-.028	.090	.094	-.012	.075	.076
Peng's	-.330	.496	.596	-.210	.326	.388	-.189	.237	.303	-.071	.160	.175	-.052	.125	.135	-.055	.104	.118
W	1.872	.377	1.909	1.755	.244	1.772	1.704	.184	1.714	1.614	.128	1.619	1.587	.105	1.590	1.576	.092	1.578
<i>Mean Aver.</i>																		
Pickands	-.184	.340	.387	-.206	.218	.300	-.219	.121	.250	-.371	.392	.540	-.293	.286	.409	-.261	.209	.335
Hill	.015	.087	.089	.024	.065	.069	.048	.048	.068	-.025	.107	.110	-.012	.084	.085	.003	.068	.068
Adapted Hill	1.147	.238	1.172	1.169	.170	1.182	1.217	.114	1.222	1.011	.339	1.066	1.051	.241	1.079	1.091	.179	1.106
Moment	-.415	.532	.675	-.242	.327	.407	-.157	.216	.267	-.078	.150	.169	-.053	.115	.127	-.041	.091	.100
Mom.-Ratio	-.020	.103	.105	-.005	.085	.085	.016	.062	.064	-.004	.048	.048	.001	.038	.038	.006	.031	.031
QQ	.066	.135	.150	.059	.101	.117	.058	.069	.090	-.062	.113	.129	-.039	.099	.106	-.022	.084	.087
Peng's	-.448	.568	.723	-.268	.365	.453	-.189	.248	.312	-.089	.178	.199	-.062	.138	.151	-.052	.110	.121
W	1.978	.452	2.029	1.813	.283	1.835	1.719	.195	1.730	1.636	.142	1.642	1.602	.116	1.606	1.582	.097	1.585
<i>Med. Aver.</i>																		
Pickands	-.051	1.021	1.022	-.088	.803	.808	-.115	.527	.539	-.920	2.039	2.237	-.162	1.224	1.234	-.259	.874	.912
Hill	.014	.087	.088	.023	.065	.069	.048	.049	.069	-.027	.107	.110	-.012	.084	.085	.004	.068	.068
Adapted Hill	1.148	.237	1.173	1.172	.169	1.184	1.219	.114	1.224	1.017	.335	1.071	1.054	.241	1.081	1.093	.178	1.107
Moment	-.350	.459	.577	-.216	.308	.377	-.146	.210	.256	-.073	.147	.164	-.050	.114	.125	-.039	.090	.098
Mom.-Ratio	-.019	.103	.105	-.004	.085	.085	.017	.061	.063	-.004	.048	.048	.002	.038	.038	.006	.031	.031
QQ	.066	.133	.149	.058	.100	.115	.057	.068	.089	-.059	.114	.128	-.037	.099	.106	-.021	.084	.086
Peng's	-.381	.497	.626	-.242	.347	.424	-.178	.242	.301	-.083	.176	.194	-.059	.137	.149	-.049	.108	.119
W	1.931	.397	1.972	1.796	.269	1.816	1.712	.191	1.723	1.632	.140	1.638	1.599	.114	1.604	1.580	.096	1.583
<i>Excess Plots</i>																		
Median	.043	.119	.126	.052	.090	.104	.106	.074	.129	.029	.165	.167	.031	.129	.132	.045	.101	.111
Tr.Mean (1%)	.020	.080	.083	.029	.060	.067	.068	.047	.083	-.039	.093	.101	-.016	.075	.077	.002	.064	.064
Tr.Mean (5%)	.020	.080	.083	.029	.060	.067	.045	.044	.064	-.052	.088	.102	-.036	.069	.078	-.022	.059	.063
Tr.Mean (10%)	-.032	.068	.075	-.008	.054	.054	.013	.041	.043	-.072	.080	.108	-.064	.063	.090	-.048	.055	.073

Table A.14 Simulation results of estimation of γ (Log-logistic distribution, $\gamma=0.55$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.021	1.212	1.212	-.034	.880	.881	-.095	.661	.668	-1.391	2.014	2.448	-.709	1.407	1.576	-.062	.992	.994
Hill	.044	.174	.180	.069	.139	.155	.154	.101	.184	-.086	.200	.217	-.030	.170	.173	.010	.140	.140
Adapted Hill	1.964	1.403	2.414	1.593	.907	1.834	1.297	.499	1.389	1.442	1.740	2.259	1.371	1.291	1.883	1.270	.933	1.576
Moment	-.265	.481	.549	-.138	.315	.344	-.063	.208	.217	-.042	.151	.157	-.024	.119	.121	-.014	.094	.095
Mom.-Ratio	-.019	.201	.201	.011	.163	.163	.063	.115	.131	.002	.097	.097	.010	.076	.076	.021	.060	.064
QQ	.138	.248	.284	.127	.188	.227	.140	.129	.190	-.112	.225	.251	-.065	.190	.201	-.030	.161	.164
Peng's	-.327	.567	.654	-.189	.400	.443	-.149	.270	.308	-.057	.207	.214	-.042	.164	.169	-.043	.129	.136
W	1.394	.319	1.430	1.277	.206	1.293	1.197	.140	1.205	1.143	.106	1.148	1.112	.088	1.115	1.091	.076	1.093
Mean Aver.																		
Pickands	-.363	.348	.503	-.395	.232	.458	-.426	.139	.448	-.587	.374	.696	-.555	.296	.629	-.475	.233	.529
Hill	.034	.188	.191	.055	.147	.157	.109	.104	.151	-.063	.223	.232	-.025	.182	.184	.006	.152	.152
Adapted Hill	2.218	1.748	2.824	1.783	1.159	2.127	1.402	.649	1.545	1.331	1.996	2.399	1.374	1.566	2.083	1.315	1.165	1.756
Moment	-.386	.560	.680	-.199	.363	.414	-.091	.236	.253	-.058	.171	.181	-.034	.135	.139	-.020	.108	.109
Mom.-Ratio	-.038	.217	.220	-.005	.182	.182	.038	.132	.137	-.003	.112	.112	.005	.088	.088	.014	.070	.071
QQ	.149	.286	.323	.132	.218	.255	.130	.151	.200	-.143	.240	.280	-.091	.209	.228	-.052	.178	.186
Peng's	-.461	.636	.785	-.255	.442	.510	-.157	.302	.340	-.074	.231	.243	-.050	.184	.191	-.041	.147	.153
W	1.494	.384	1.542	1.335	.246	1.357	1.226	.161	1.236	1.167	.120	1.173	1.129	.098	1.134	1.104	.083	1.107
Med. Aver.																		
Pickands	.010	1.043	1.043	-.022	.836	.836	-.037	.599	.600	-1.087	1.949	2.231	-.326	1.359	1.397	-.195	.943	.963
Hill	.032	.188	.191	.055	.148	.158	.109	.106	.152	-.067	.224	.234	-.027	.183	.185	.005	.153	.153
Adapted Hill	2.192	1.709	2.780	1.761	1.129	2.092	1.388	.630	1.524	1.361	1.996	2.416	1.384	1.546	2.075	1.315	1.142	1.742
Moment	-.321	.490	.586	-.173	.341	.382	-.080	.230	.244	-.052	.167	.175	-.031	.133	.136	-.019	.106	.108
Mom.-Ratio	-.036	.218	.221	-.003	.182	.182	.039	.131	.137	-.002	.111	.111	.005	.087	.087	.014	.069	.070
QQ	.148	.284	.320	.131	.215	.252	.130	.150	.198	-.139	.241	.278	-.089	.209	.227	-.051	.178	.185
Peng's	-.392	.569	.691	-.227	.421	.478	-.147	.296	.330	-.067	.228	.238	-.046	.182	.188	-.039	.146	.151
W	1.461	.342	1.500	1.321	.232	1.341	1.221	.158	1.231	1.163	.117	1.169	1.127	.097	1.131	1.102	.083	1.105
Excess Plots																		
Median	.096	.267	.284	.120	.215	.246	.234	.167	.287	.080	.356	.365	.089	.291	.304	.101	.217	.239
Tr.Mean (1%)	.044	.174	.180	.069	.139	.155	.154	.101	.184	-.086	.200	.217	-.030	.170	.173	.002	.138	.138
Tr.Mean (5%)	.044	.174	.180	.069	.139	.155	.103	.096	.141	-.113	.188	.220	-.074	.160	.176	-.050	.128	.138
Tr.Mean (10%)	-.072	.149	.165	-.013	.126	.126	.032	.090	.095	-.158	.172	.234	-.135	.150	.202	-.107	.118	.160

Table A.15 Simulation results of estimation of γ (Log-logistic distribution, $\gamma=1$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.131	1.374	1.381	.070	.990	.993	-.013	.675	.676	-1.084	2.301	2.544	-.691	1.687	1.823	.094	1.171	1.174
Hill	.070	.312	.320	.112	.236	.262	.281	.190	.339	-.097	.390	.402	-.034	.304	.305	.020	.245	.246
Adapted Hill	40.54 0	33.23 8	52.42 4	24.63 9	18.99 5	31.11 1	12.84 0	9.179	15.78 3	28.07 5	37.99 9	47.24 5	20.70 1	24.55 9	32.12 0	14.90 4	16.02 3	21.88 3
Moment	-.280	.532	.601	-.121	.359	.379	.036	.257	.260	-.045	.190	.195	-.013	.146	.147	.018	.114	.116
Mom.-Ratio	-.074	.339	.347	-.011	.274	.275	.096	.201	.223	-.013	.174	.175	.008	.134	.134	.031	.106	.111
QQ	.247	.446	.510	.221	.334	.400	.250	.233	.342	-.134	.449	.469	-.061	.373	.378	-.016	.310	.311
Peng's	-.397	.675	.784	-.237	.482	.537	-.129	.343	.367	-.080	.277	.289	-.053	.220	.226	-.036	.173	.176
W	.809	.242	.844	.700	.148	.716	.619	.085	.625	.591	.067	.595	.564	.049	.567	.547	.037	.548
<i>Mean Aver.</i>																		
Pickands	-.628	.415	.752	-.672	.267	.723	-.750	.155	.766	-.854	.443	.962	-.837	.340	.904	-.788	.283	.837
Hill	.062	.337	.343	.087	.257	.271	.199	.192	.277	-.043	.444	.446	.000	.344	.344	.026	.275	.277
Adapted Hill	53.40 3	45.61 3	70.23 1	32.66 9	26.13 1	41.83 4	17.10 8	12.67 6	21.29 3	31.97 1	47.95 9	57.63 8	24.98 6	32.22 8	40.77 9	18.59 7	21.43 9	28.38 1
Moment	-.417	.637	.761	-.200	.419	.465	-.029	.286	.288	-.066	.214	.224	-.032	.171	.174	-.002	.134	.134
Mom.-Ratio	-.111	.367	.383	-.045	.305	.308	.046	.227	.232	-.024	.200	.202	-.004	.156	.157	.016	.124	.125
QQ	.267	.517	.581	.233	.389	.454	.230	.269	.354	-.193	.479	.517	-.100	.414	.426	-.045	.349	.352
Peng's	-.559	.762	.944	-.315	.543	.628	-.165	.377	.411	-.104	.310	.327	-.070	.251	.260	-.047	.199	.205
W	.901	.310	.953	.754	.188	.777	.649	.106	.658	.613	.080	.618	.580	.059	.583	.558	.045	.560
<i>Med. Aver.</i>																		
Pickands	.117	1.245	1.250	.108	.961	.967	.018	.663	.663	-.812	2.257	2.398	-.088	1.546	1.548	-.080	1.122	1.124
Hill	.059	.335	.341	.086	.257	.271	.201	.197	.281	-.046	.454	.456	-.004	.341	.341	.022	.278	.279
Adapted Hill	51.51 3	43.66 6	67.53 0	31.54 2	25.05 1	40.27 9	16.52 2	12.17 1	20.52 1	31.95 0	47.27 9	57.06 2	24.67 1	31.38 1	39.91 8	18.24 9	20.78 4	27.65 9
Moment	-.347	.557	.656	-.178	.404	.441	-.021	.281	.282	-.062	.211	.220	-.031	.170	.172	-.001	.133	.133
Mom.-Ratio	-.106	.367	.382	-.043	.303	.306	.048	.227	.232	-.022	.198	.200	-.003	.155	.155	.016	.122	.123
QQ	.265	.511	.576	.231	.385	.449	.229	.267	.352	-.184	.482	.516	-.094	.413	.424	-.042	.348	.351
Peng's	-.479	.682	.834	-.288	.526	.600	-.153	.371	.401	-.099	.306	.322	-.066	.249	.258	-.045	.198	.203
W	.876	.274	.918	.745	.180	.766	.645	.103	.653	.610	.078	.615	.578	.058	.581	.557	.044	.558
<i>Excess Plots</i>																		
Median	.156	.458	.484	.191	.360	.407	.446	.309	.542	.178	.701	.723	.135	.472	.491	.141	.382	.408
Tr.Mean (1%)	.070	.312	.320	.112	.236	.262	.281	.190	.339	-.097	.390	.402	-.034	.304	.305	.004	.242	.242
Tr.Mean (5%)	.070	.312	.320	.112	.236	.262	.189	.181	.262	-.151	.368	.398	-.121	.279	.304	-.097	.224	.244
Tr.Mean (10%)	-.139	.269	.303	-.035	.213	.215	.060	.170	.180	-.240	.335	.412	-.239	.255	.350	-.208	.207	.293

Table A.16 Simulation results of estimation of γ (Log-logistic distribution, $\gamma=2$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.150	1.813	1.819	.152	1.372	1.380	.333	.909	.967	-1.320	2.813	3.108	-.608	1.896	1.991	.281	1.494	1.520
Hill	.104	.641	.649	.225	.482	.532	.531	.375	.651	-.223	.781	.812	-.064	.616	.619	.072	.515	.520
Adapted Hill	1853. 020	9080. 504	9267. 644	1065. 283	5053. 115	5164. 184	512.9 20	2394. 784	2449. 098	17962 .334	16881 0.383	16976 3.337	10794 .465	99930 .440	10051 1.757	6740. 631	61987 .265	62352 .684
Moment	-.182	.736	.758	-.001	.554	.554	.317	.411	.519	.015	.304	.305	.062	.232	.240	.126	.189	.227
Mom.-Ratio	-.114	.708	.717	.004	.572	.572	.213	.407	.460	.025	.368	.369	.052	.285	.290	.090	.223	.241
QQ	.436	.891	.992	.410	.670	.785	.473	.467	.664	-.314	.878	.932	-.152	.740	.755	-.040	.620	.621
Peng's	-.407	.959	1.042	-.209	.756	.784	-.011	.544	.544	-.028	.465	.465	.002	.365	.365	.030	.286	.287
W	-.346	.128	.369	-.415	.068	.420	-.460	.032	.461	-.473	.025	.474	-.484	.014	.485	-.490	.009	.490
<i>Mean Aver.</i>																		
Pickands	-1.270	.553	1.385	-1.351	.377	1.403	-1.435	.213	1.451	-1.601	.563	1.697	-1.568	.466	1.636	-1.511	.343	1.550
Hill	.073	.694	.698	.161	.524	.549	.375	.376	.532	-.118	.889	.897	-.014	.694	.694	.071	.556	.560
Adapted Hill	2498. 077	12750 .379	12992 .789	1461. 325	7062. 814	7212. 407	709.8 56	3333. 749	3408. 486	24373 .639	23394 4.651	23521 0.914	14842 .034	13874 4.170	13953 5.769	9308. 326	86016 .802	86518 .987
Moment	-.324	.890	.948	-.098	.631	.638	.170	.455	.486	-.007	.349	.349	.034	.269	.271	.083	.212	.228
Mom.-Ratio	-.179	.766	.787	-.060	.639	.642	.116	.469	.483	.011	.424	.424	.036	.332	.334	.065	.262	.270
QQ	.474	1.019	1.124	.421	.778	.885	.433	.539	.692	-.438	.928	1.026	-.240	.815	.850	-.110	.692	.701
Peng's	-.592	1.097	1.247	-.311	.842	.898	-.093	.616	.623	-.058	.531	.535	-.016	.419	.420	.012	.333	.334
W	-.280	.189	.338	-.381	.096	.392	-.444	.044	.446	-.463	.034	.464	-.478	.020	.479	-.486	.013	.487
<i>Med. Aver.</i>																		
Pickands	.191	1.659	1.670	.204	1.379	1.394	.272	.910	.949	-1.122	2.738	2.959	-.035	2.067	2.067	.030	1.384	1.384
Hill	.068	.698	.701	.164	.528	.553	.378	.388	.542	-.123	.897	.906	-.018	.699	.699	.069	.559	.564
Adapted Hill	2407. 836	12138 .157	12374 .673	1403. 192	6742. 652	6887. 112	681.3 48	3193. 741	3265. 611	23573 .016	22499 1.535	22622 3.071	14293 .137	13323 3.563	13399 8.045	8956. 408	82648 .064	83131 .942
Moment	-.275	.825	.870	-.085	.622	.628	.175	.456	.489	-.005	.346	.346	.035	.266	.268	.085	.211	.228
Mom.-Ratio	-.172	.765	.784	-.055	.638	.640	.118	.468	.483	.012	.421	.421	.036	.328	.330	.066	.259	.267
QQ	.470	1.011	1.115	.417	.770	.876	.431	.534	.686	-.418	.934	1.023	-.228	.816	.847	-.103	.690	.698
Peng's	-.523	1.029	1.154	-.284	.826	.874	-.081	.611	.617	-.051	.525	.527	-.014	.414	.415	.014	.330	.330
W	-.294	.168	.339	-.386	.091	.397	-.446	.042	.448	-.465	.033	.466	-.479	.019	.479	-.487	.012	.487
<i>Excess Plots</i>																		
Median	.309	.968	1.016	.433	.710	.832	.827	.620	1.033	.358	1.340	1.387	.295	1.019	1.061	.363	.815	.893
Tr.Mean (1%)	.104	.641	.649	.225	.482	.532	.531	.375	.651	-.223	.781	.812	-.064	.616	.619	.041	.507	.509
Tr.Mean (5%)	.104	.641	.649	.225	.482	.532	.350	.359	.501	-.327	.737	.807	-.232	.568	.613	-.157	.466	.492
Tr.Mean (10%)	-.306	.560	.638	-.066	.439	.444	.097	.330	.344	-.498	.673	.838	-.463	.519	.695	-.376	.429	.571

Table A.17 Simulation results of estimation of γ (Pareto distribution, $\gamma=0.25$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.094	1.171	1.175	-.035	.860	.861	.000	.612	.612	-1.281	2.012	2.385	-.574	1.373	1.488	.032	.976	.977
Hill	-.003	.075	.075	-.001	.057	.057	.000	.041	.041	-.036	.092	.099	-.023	.073	.077	-.016	.060	.062
Adapted Hill	1.176	.217	1.196	1.226	.166	1.237	1.321	.114	1.326	1.085	.307	1.127	1.128	.214	1.148	1.188	.170	1.200
Moment	-.236	.384	.451	-.138	.248	.284	-.070	.170	.184	-.042	.123	.130	-.027	.099	.102	-.017	.079	.081
Mom.-Ratio	-.020	.088	.090	-.013	.072	.073	-.007	.054	.054	-.004	.042	.042	-.002	.033	.033	-.001	.027	.027
QQ	.042	.108	.116	.032	.081	.087	.022	.056	.060	-.051	.104	.116	-.032	.088	.094	-.022	.074	.077
Peng's	-.253	.426	.496	-.150	.286	.323	-.076	.202	.216	-.046	.150	.157	-.030	.120	.124	-.018	.097	.099
W	1.814	.328	1.843	1.708	.214	1.722	1.628	.155	1.636	1.594	.119	1.599	1.569	.100	1.572	1.551	.085	1.554
<i>Mean Aver.</i>																		
Pickands	-.199	.333	.388	-.192	.217	.289	-.191	.130	.231	-.382	.362	.526	-.296	.280	.408	-.214	.212	.301
Hill	-.004	.081	.081	-.002	.062	.062	.000	.044	.044	-.025	.106	.109	-.015	.083	.084	-.012	.066	.067
Adapted Hill	1.163	.236	1.186	1.199	.178	1.212	1.278	.125	1.284	.991	.340	1.048	1.046	.238	1.073	1.120	.183	1.135
Moment	-.376	.552	.668	-.188	.286	.342	-.095	.191	.213	-.058	.144	.156	-.035	.108	.113	-.024	.088	.091
Mom.-Ratio	-.026	.095	.098	-.016	.080	.082	-.009	.061	.062	-.005	.047	.047	-.003	.038	.038	-.002	.031	.031
QQ	.048	.126	.135	.037	.094	.101	.026	.065	.070	-.067	.110	.129	-.042	.097	.106	-.028	.083	.087
Peng's	-.402	.585	.710	-.203	.324	.382	-.103	.222	.245	-.064	.172	.184	-.039	.130	.136	-.026	.106	.109
W	1.942	.471	1.998	1.762	.252	1.780	1.659	.173	1.668	1.617	.137	1.623	1.583	.108	1.587	1.563	.093	1.565
<i>Med. Aver.</i>																		
Pickands	-.096	.999	1.004	-.014	.812	.812	-.006	.568	.568	-.956	1.932	2.155	-.149	1.238	1.247	-.046	.860	.861
Hill	-.005	.081	.081	-.002	.062	.062	.000	.044	.044	-.027	.106	.110	-.016	.083	.084	-.012	.066	.067
Adapted Hill	1.163	.235	1.186	1.201	.178	1.214	1.281	.125	1.287	.997	.338	1.053	1.053	.242	1.080	1.125	.180	1.139
Moment	-.311	.453	.549	-.166	.267	.314	-.086	.184	.203	-.053	.142	.151	-.032	.106	.111	-.022	.087	.089
Mom.-Ratio	-.025	.095	.098	-.016	.080	.082	-.009	.061	.061	-.005	.047	.047	-.003	.037	.038	-.002	.031	.031
QQ	.048	.124	.133	.036	.093	.100	.026	.064	.069	-.065	.111	.129	-.041	.097	.105	-.027	.082	.087
Peng's	-.336	.489	.593	-.180	.307	.356	-.094	.216	.235	-.057	.170	.179	-.036	.128	.133	-.024	.105	.108
W	1.895	.398	1.937	1.746	.236	1.762	1.652	.168	1.661	1.612	.135	1.618	1.581	.107	1.584	1.561	.092	1.564
<i>Excess Plots</i>																		
Median	.018	.115	.116	.011	.086	.087	.005	.060	.060	.044	.166	.172	.021	.120	.122	.007	.092	.092
Tr.Mean (1%)	-.003	.075	.075	-.001	.057	.057	.000	.041	.041	-.036	.092	.099	-.023	.073	.077	-.020	.059	.062
Tr.Mean (5%)	-.003	.075	.075	-.001	.057	.057	-.022	.038	.044	-.048	.087	.099	-.043	.067	.079	-.043	.054	.069
Tr.Mean (10%)	-.053	.063	.083	-.036	.052	.063	-.050	.035	.061	-.068	.079	.104	-.070	.061	.093	-.069	.049	.085

Table A.18 Simulation results of estimation of γ (Pareto distribution, $\gamma=0.55$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.006	1.248	1.248	.006	.938	.938	.008	.624	.624	-1.285	2.164	2.517	-.622	1.434	1.563	.068	1.008	1.010
Hill	-.003	.173	.173	-.001	.126	.126	-.002	.091	.091	-.085	.211	.227	-.051	.171	.179	-.039	.131	.136
Adapted Hill	1.802	1.429	2.300	1.486	.929	1.753	1.230	.508	1.331	1.517	1.955	2.474	1.435	1.429	2.025	1.311	1.021	1.662
Moment	-.281	.471	.548	-.154	.292	.330	-.073	.191	.204	-.044	.146	.152	-.030	.119	.122	-.022	.093	.096
Mom.-Ratio	-.047	.206	.211	-.027	.168	.170	-.012	.121	.122	-.009	.101	.101	-.006	.078	.078	-.004	.060	.060
QQ	.101	.251	.271	.075	.188	.202	.049	.130	.139	-.110	.237	.261	-.069	.204	.215	-.048	.170	.177
Peng's	-.328	.564	.652	-.185	.379	.422	-.088	.261	.275	-.050	.204	.210	-.034	.168	.172	-.027	.134	.137
W	1.390	.306	1.424	1.274	.197	1.289	1.182	.133	1.189	1.142	.105	1.147	1.111	.088	1.114	1.088	.075	1.091
<i>Mean Aver.</i>																		
Pickands	-.368	.354	.511	-.382	.240	.451	-.415	.138	.437	-.588	.395	.709	-.526	.294	.602	-.450	.233	.506
Hill	-.002	.189	.189	-.003	.142	.142	-.002	.099	.099	-.060	.231	.239	-.033	.189	.192	-.027	.149	.151
Adapted Hill	1.994	1.774	2.669	1.650	1.183	2.030	1.323	.662	1.480	1.408	2.268	2.670	1.445	1.746	2.266	1.369	1.287	1.878
Moment	-.390	.554	.678	-.215	.346	.408	-.101	.221	.243	-.063	.170	.181	-.039	.133	.139	-.027	.108	.111
Mom.-Ratio	-.062	.225	.233	-.037	.187	.191	-.017	.139	.140	-.011	.116	.117	-.008	.091	.091	-.006	.071	.071
QQ	.116	.289	.311	.088	.220	.237	.059	.151	.163	-.141	.255	.291	-.091	.222	.240	-.061	.191	.201
Peng's	-.450	.634	.777	-.255	.430	.500	-.121	.295	.319	-.072	.236	.247	-.044	.186	.191	-.031	.153	.156
W	1.490	.392	1.541	1.332	.240	1.354	1.216	.154	1.226	1.168	.120	1.174	1.129	.098	1.133	1.103	.083	1.106
<i>Med. Aver.</i>																		
Pickands	-.004	1.063	1.063	.041	.864	.865	.006	.593	.593	-1.003	2.092	2.320	-.201	1.279	1.295	-.094	.965	.970
Hill	-.004	.187	.187	-.005	.141	.141	-.003	.099	.099	-.065	.230	.239	-.036	.190	.194	-.028	.148	.151
Adapted Hill	1.979	1.737	2.633	1.634	1.153	2.000	1.311	.641	1.459	1.442	2.261	2.682	1.455	1.721	2.254	1.367	1.262	1.861
Moment	-.326	.472	.574	-.191	.327	.379	-.092	.215	.234	-.058	.166	.176	-.037	.132	.137	-.026	.106	.110
Mom.-Ratio	-.060	.225	.233	-.036	.186	.190	-.016	.137	.138	-.011	.115	.116	-.007	.091	.091	-.005	.070	.071
QQ	.115	.286	.308	.087	.217	.234	.058	.150	.160	-.137	.255	.290	-.087	.222	.239	-.059	.191	.200
Peng's	-.383	.555	.674	-.230	.411	.471	-.111	.288	.308	-.067	.233	.242	-.042	.186	.190	-.029	.151	.154
W	1.455	.339	1.494	1.320	.229	1.339	1.211	.151	1.220	1.165	.118	1.171	1.127	.097	1.131	1.101	.083	1.104
<i>Excess Plots</i>																		
Median	.032	.250	.252	.017	.180	.181	.006	.131	.131	.075	.366	.374	.049	.277	.282	.008	.193	.194
Tr.Mean (1%)	-.003	.173	.173	-.001	.126	.126	-.002	.091	.091	-.085	.211	.227	-.051	.171	.179	-.048	.128	.137
Tr.Mean (5%)	-.003	.173	.173	-.001	.126	.126	-.049	.083	.097	-.112	.199	.228	-.095	.156	.183	-.099	.116	.152
Tr.Mean (10%)	-.114	.144	.184	-.079	.110	.135	-.113	.076	.136	-.157	.181	.240	-.156	.139	.208	-.155	.105	.188

Table A.19 Simulation results of estimation of γ (Pareto distribution, $\gamma=1$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.040	1.367	1.368	.037	1.045	1.045	.028	.712	.713	-1.169	2.177	2.471	-.720	1.507	1.671	-.101	1.105	1.109
Hill	-.012	.293	.294	-.003	.221	.221	-.007	.157	.157	-.197	.354	.405	-.122	.289	.314	-.066	.242	.251
Adapted Hill	19.53 1	16.05 5	25.28 3	13.07 7	9.776	16.32 7	7.428	4.962	8.933	23.70 8	29.02 7	37.47 8	18.09 0	19.41 6	26.53 7	13.37 7	12.95 8	18.62 3
Moment	-.254	.490	.552	-.140	.324	.354	-.066	.221	.230	-.046	.191	.196	-.028	.145	.147	-.019	.112	.113
Mom.-Ratio	-.083	.341	.351	-.051	.279	.284	-.023	.208	.209	-.013	.184	.184	-.008	.143	.144	-.005	.113	.113
QQ	.166	.423	.455	.126	.318	.342	.085	.219	.235	-.221	.424	.478	-.155	.352	.385	-.108	.292	.311
Peng's	-.335	.636	.718	-.187	.460	.497	-.096	.326	.340	-.062	.290	.296	-.035	.225	.227	-.023	.180	.182
W	.781	.209	.808	.683	.131	.696	.610	.081	.616	.585	.070	.589	.559	.050	.561	.543	.037	.544
<i>Mean Aver.</i>																		
Pickands	-.666	.404	.779	-.697	.262	.745	-.745	.158	.762	-.891	.423	.987	-.849	.321	.908	-.825	.252	.862
Hill	-.014	.316	.316	-.009	.243	.244	-.005	.172	.172	-.139	.410	.433	-.102	.320	.336	-.062	.265	.272
Adapted Hill	23.74 8	20.67 5	31.48 7	16.39 5	12.95 7	20.89 8	9.541	6.712	11.66 6	26.35 6	35.72 3	44.39 4	21.36 4	24.92 3	32.82 6	16.38 0	17.06 1	23.65 2
Moment	-.357	.572	.675	-.197	.391	.438	-.094	.257	.273	-.063	.222	.230	-.038	.170	.174	-.024	.132	.134
Mom.-Ratio	-.108	.371	.386	-.067	.310	.317	-.033	.235	.237	-.019	.211	.212	-.011	.166	.166	-.007	.132	.132
QQ	.190	.490	.525	.147	.370	.398	.101	.255	.275	-.271	.457	.532	-.191	.392	.436	-.137	.328	.355
Peng's	-.466	.701	.842	-.262	.524	.585	-.134	.369	.392	-.083	.326	.336	-.049	.257	.261	-.029	.206	.208
W	.861	.264	.901	.733	.168	.752	.638	.100	.645	.605	.085	.611	.574	.062	.577	.553	.045	.555
<i>Med. Aver.</i>																		
Pickands	.001	1.211	1.211	.050	.958	.960	.030	.675	.676	-.938	2.128	2.326	-.143	1.381	1.388	-.244	1.027	1.056
Hill	-.016	.316	.317	-.012	.243	.243	-.006	.172	.172	-.149	.408	.434	-.108	.322	.340	-.063	.267	.275
Adapted Hill	23.32 6	20.14 0	30.81 8	16.02 0	12.54 1	20.34 5	9.287	6.478	11.32 3	26.38 8	35.29 7	44.07 0	21.15 4	24.38 0	32.27 8	16.12 5	16.60 2	23.14 4
Moment	-.308	.523	.607	-.179	.375	.416	-.088	.251	.266	-.059	.218	.226	-.036	.168	.172	-.023	.129	.131
Mom.-Ratio	-.104	.370	.385	-.064	.308	.315	-.031	.233	.235	-.018	.210	.210	-.010	.164	.164	-.007	.131	.131
QQ	.188	.484	.520	.145	.366	.394	.100	.253	.272	-.262	.460	.529	-.186	.392	.434	-.135	.326	.353
Peng's	-.408	.654	.770	-.238	.509	.562	-.124	.363	.383	-.078	.323	.332	-.047	.254	.258	-.027	.204	.205
W	.843	.244	.878	.725	.162	.743	.634	.097	.642	.603	.083	.609	.572	.060	.575	.552	.044	.554
<i>Excess Plots</i>																		
Median	.069	.447	.452	.036	.336	.338	.007	.239	.239	.050	.608	.610	.039	.483	.485	.067	.390	.396
Tr.Mean (1%)	-.012	.293	.294	-.003	.221	.221	-.007	.157	.157	-.197	.354	.405	-.122	.289	.314	-.081	.238	.252
Tr.Mean (5%)	-.012	.293	.294	-.003	.221	.221	-.092	.147	.173	-.245	.332	.413	-.200	.266	.333	-.172	.220	.280
Tr.Mean (10%)	-.210	.249	.325	-.142	.196	.242	-.206	.135	.246	-.325	.301	.443	-.307	.244	.392	-.272	.204	.340

Table A.20 Simulation results of estimation of γ (Pareto distribution, $\gamma=2$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	.176	1.813	1.822	.155	1.328	1.337	.085	.903	.907	-1.689	2.529	3.042	-.651	1.923	2.031	.082	1.520	1.522
Hill	.035	.598	.599	.031	.451	.452	.014	.319	.319	-.339	.736	.810	-.236	.582	.629	-.156	.473	.498
Adapted Hill	1895. 541	4187. 084	4596. 167	1101. 154	2339. 147	2585. 372	535.3 91	1110. 229	1232. 579	7845. 539	43406 .587	44109 .911	4809. 085	25782 .494	26227 .167	3035. 036	16007 .980	16293 .154
Moment	-.257	.758	.800	-.147	.543	.562	-.070	.363	.370	-.055	.298	.303	-.030	.230	.232	-.020	.180	.181
Mom.-Ratio	-.155	.720	.737	-.091	.590	.597	-.044	.436	.438	-.049	.348	.351	-.028	.275	.277	-.017	.224	.225
QQ	.418	.877	.971	.322	.650	.725	.218	.441	.492	-.421	.868	.965	-.288	.725	.780	-.206	.602	.636
Peng's	-.414	.996	1.079	-.238	.775	.811	-.113	.555	.566	-.099	.433	.444	-.063	.348	.353	-.037	.282	.284
W	-.344	.142	.372	-.412	.080	.420	-.458	.037	.460	-.471	.024	.472	-.483	.014	.483	-.489	.009	.490
Mean Aver.																		
Pickands	-1.246	.558	1.365	-1.350	.360	1.397	-1.470	.207	1.484	-1.658	.546	1.746	-1.618	.420	1.671	-1.543	.352	1.582
Hill	.035	.650	.651	.034	.493	.495	.022	.343	.344	-.243	.844	.878	-.175	.651	.674	-.128	.527	.542
Adapted Hill	2531. 551	5833. 668	6359. 279	1501. 202	3262. 337	3591. 163	737.7 81	1544. 686	1711. 834	10426 .483	60019 .937	60918 .834	6528. 789	35720 .426	36312 .173	4159. 005	22197 .771	22584 .029
Moment	-.380	.919	.995	-.202	.628	.660	-.096	.424	.435	-.076	.335	.344	-.044	.264	.268	-.026	.209	.211
Mom.-Ratio	-.201	.783	.808	-.122	.658	.669	-.060	.496	.500	-.065	.394	.399	-.040	.316	.318	-.024	.256	.257
QQ	.474	1.020	1.125	.372	.762	.848	.260	.517	.578	-.534	.937	1.079	-.360	.805	.882	-.257	.677	.724
Peng's	-.587	1.138	1.280	-.322	.867	.925	-.158	.632	.651	-.137	.498	.516	-.086	.396	.405	-.053	.321	.325
W	-.278	.216	.351	-.378	.108	.394	-.442	.052	.445	-.460	.033	.461	-.476	.020	.477	-.485	.012	.485
Med. Aver.																		
Pickands	.262	1.675	1.695	.183	1.283	1.296	.142	.886	.897	-1.473	2.489	2.892	-.241	1.846	1.862	-.112	1.431	1.435
Hill	.030	.649	.650	.031	.491	.492	.020	.343	.344	-.250	.849	.885	-.187	.649	.675	-.127	.526	.542
Adapted Hill	2446. 445	5573. 192	6086. 507	1443. 543	3117. 065	3435. 100	708.8 37	1480. 079	1641. 061	10128 .936	57663 .157	58546 .008	6307. 174	34326 .217	34900 .854	4009. 391	21333 .440	21706 .932
Moment	-.328	.857	.918	-.188	.612	.640	-.091	.418	.428	-.073	.332	.340	-.042	.262	.265	-.025	.208	.210
Mom.-Ratio	-.194	.783	.807	-.114	.658	.667	-.058	.493	.496	-.062	.390	.395	-.039	.313	.316	-.023	.254	.255
QQ	.469	1.008	1.112	.368	.752	.837	.256	.510	.570	-.518	.940	1.073	-.349	.803	.876	-.251	.673	.719
Peng's	-.516	1.069	1.187	-.296	.852	.902	-.147	.624	.641	-.131	.492	.509	-.082	.391	.400	-.050	.317	.321
W	-.292	.193	.350	-.384	.102	.398	-.445	.049	.447	-.462	.032	.463	-.477	.019	.478	-.486	.012	.486
Excess Plots																		
Median	.177	.887	.904	.097	.670	.677	.037	.473	.475	.275	1.366	1.393	.064	.910	.913	.058	.770	.773
Tr.Mean (1%)	.035	.598	.599	.031	.451	.452	.014	.319	.319	-.339	.736	.810	-.236	.582	.629	-.185	.465	.501
Tr.Mean (5%)	.035	.598	.599	.031	.451	.452	-.161	.300	.340	-.437	.691	.818	-.394	.531	.661	-.370	.423	.562
Tr.Mean (10%)	-.377	.510	.635	-.258	.405	.480	-.396	.276	.483	-.599	.626	.866	-.612	.478	.776	-.569	.388	.689

Table A.21 Simulation results of estimation of γ (Weibull distribution, $\lambda=1$, $\tau=0.5$, $\gamma=0$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.396	1.171	1.236	.420	.891	.985	.608	.623	.870	-.977	2.188	2.396	-.315	1.404	1.439	.328	1.014	1.066
Hill	.678	.181	.702	.841	.160	.856	1.264	.181	1.277	.456	.182	.491	.584	.161	.606	.737	.166	.756
Adapted Hill	3.359	1.576	3.711	2.915	1.075	3.107	2.547	.604	2.618	2.705	1.869	3.288	2.729	1.493	3.111	2.616	1.126	2.848
Moment	.129	.512	.528	.328	.335	.469	.640	.237	.682	1.480	.178	1.490	1.593	.160	1.601	1.742	.166	1.749
Mom.-Ratio	.528	.135	.545	.648	.120	.659	.922	.110	.928	.009	.007	.011	.005	.004	.006	.003	.002	.003
QQ	.679	.188	.704	.764	.155	.779	.973	.126	.981	.387	.165	.421	.476	.149	.498	.572	.133	.587
Peng's	-.020	.580	.580	.133	.398	.420	.302	.293	.421	1.032	.029	1.033	1.015	.011	1.015	1.007	.005	1.007
W	2.050	.331	2.077	1.919	.201	1.929	1.789	.118	1.793	.957	.050	.958	.969	.044	.970	.974	.041	.975
<i>Mean Aver.</i>																		
Pickands	.100	.331	.346	.122	.225	.256	.132	.135	.189	-.123	.376	.396	-.041	.305	.307	.033	.233	.235
Hill	.625	.169	.648	.753	.149	.768	1.060	.142	1.070	.458	.190	.496	.557	.166	.581	.676	.150	.692
Adapted Hill	3.581	1.890	4.049	3.147	1.331	3.417	2.664	.780	2.776	2.457	2.020	3.181	2.680	1.725	3.187	2.671	1.361	2.998
Moment	-.046	.597	.599	.222	.364	.426	.500	.236	.553	1.487	.188	1.499	1.571	.164	1.579	1.682	.149	1.689
Mom.-Ratio	.483	.139	.503	.582	.124	.595	.790	.105	.797	.011	.008	.014	.007	.005	.008	.004	.003	.005
QQ	.651	.204	.682	.716	.170	.736	.872	.132	.882	.342	.166	.380	.425	.157	.453	.510	.141	.529
Peng's	-.187	.649	.676	.054	.411	.414	.237	.275	.363	1.040	.031	1.040	1.021	.016	1.021	1.011	.008	1.011
W	2.172	.416	2.212	1.987	.251	2.002	1.840	.144	1.846	.955	.041	.956	.966	.040	.967	.972	.041	.973
<i>Med. Aver.</i>																		
Pickands	.299	.994	1.038	.433	.828	.934	.549	.580	.799	-.697	2.057	2.172	.082	1.285	1.287	.190	.961	.979
Hill	.624	.175	.648	.754	.157	.771	1.059	.160	1.071	.454	.197	.494	.554	.175	.581	.677	.156	.695
Adapted Hill	3.572	1.861	4.027	3.128	1.306	3.390	2.640	.759	2.747	2.514	2.021	3.226	2.707	1.716	3.206	2.679	1.343	2.997
Moment	.057	.494	.497	.266	.337	.429	.519	.233	.569	1.481	.194	1.494	1.567	.173	1.577	1.683	.155	1.690
Mom.-Ratio	.485	.142	.505	.583	.128	.597	.789	.108	.796	.011	.008	.014	.007	.005	.008	.004	.003	.005
QQ	.653	.204	.684	.718	.171	.738	.872	.133	.882	.347	.169	.386	.429	.159	.457	.512	.142	.531
Peng's	-.079	.544	.550	.099	.386	.398	.259	.272	.375	1.038	.031	1.038	1.019	.015	1.020	1.010	.008	1.010
W	2.128	.367	2.159	1.970	.237	1.984	1.833	.140	1.838	.957	.042	.958	.967	.040	.968	.973	.042	.974
<i>Excess Plots</i>																		
Median	.823	.314	.881	1.040	.291	1.079	1.644	.337	1.678	.671	.356	.759	.792	.324	.856	.973	.311	1.021
Tr.Mean (1%)	.678	.181	.702	.841	.160	.856	1.264	.181	1.277	.456	.182	.491	.584	.161	.606	.729	.165	.748
Tr.Mean (5%)	.678	.181	.702	.841	.160	.856	1.209	.179	1.222	.434	.176	.468	.544	.154	.566	.679	.160	.698
Tr.Mean (10%)	.580	.168	.603	.764	.155	.780	1.117	.175	1.131	.396	.166	.430	.490	.147	.512	.619	.155	.638

Table A.22 Simulation results of estimation of γ (Weibull distribution, $\lambda=1$, $\tau=1.5$, $\gamma=0$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.135	1.131	1.139	-.205	.847	.872	-.241	.573	.622	-1.339	2.093	2.485	-.696	1.361	1.528	-.211	.984	1.007
Hill	.226	.058	.234	.282	.056	.287	.421	.059	.425	.153	.061	.165	.195	.056	.203	.242	.053	.248
Adapted Hill	1.370	.203	1.385	1.331	.146	1.339	1.311	.091	1.314	1.509	.317	1.541	1.408	.225	1.426	1.354	.171	1.365
Moment	-.353	.539	.644	-.223	.325	.394	-.174	.237	.295	1.178	.061	1.180	1.205	.054	1.206	1.247	.051	1.248
Mom.-Ratio	.178	.044	.183	.219	.040	.222	.308	.038	.311	.003	.003	.004	.002	.001	.002	.001	.001	.001
QQ	.228	.062	.236	.255	.051	.260	.325	.043	.327	.131	.054	.142	.159	.048	.167	.190	.042	.194
Peng's	-.406	.565	.696	-.289	.350	.454	-.284	.263	.387	1.028	.029	1.028	1.012	.011	1.012	1.006	.005	1.006
W	2.367	.454	2.410	2.252	.269	2.268	2.212	.181	2.220	.970	.035	.970	.985	.016	.985	.992	.009	.992
<i>Mean Aver.</i>																		
Pickands	-.038	.312	.314	-.055	.214	.221	-.057	.121	.134	-.216	.376	.434	-.136	.292	.322	-.083	.216	.232
Hill	.208	.055	.215	.251	.050	.256	.354	.047	.357	.155	.062	.167	.186	.054	.193	.223	.047	.227
Adapted Hill	1.395	.208	1.410	1.351	.151	1.359	1.314	.092	1.318	1.455	.338	1.494	1.386	.228	1.405	1.344	.171	1.355
Moment	-.457	.583	.741	-.287	.341	.445	-.187	.206	.278	1.185	.065	1.187	1.201	.053	1.202	1.230	.046	1.231
Mom.-Ratio	.161	.046	.168	.196	.041	.200	.266	.037	.269	.004	.003	.005	.002	.002	.003	.001	.001	.002
QQ	.220	.069	.230	.240	.056	.246	.291	.045	.295	.116	.055	.128	.143	.051	.152	.170	.045	.176
Peng's	-.505	.601	.785	-.345	.360	.499	-.275	.222	.353	1.034	.031	1.035	1.018	.017	1.018	1.009	.007	1.009
W	2.461	.509	2.513	2.309	.307	2.329	2.222	.180	2.229	.965	.033	.966	.980	.022	.980	.989	.012	.989
<i>Med. Aver.</i>																		
Pickands	-.114	.935	.942	-.185	.797	.818	-.216	.517	.560	-1.011	1.994	2.235	-.267	1.252	1.280	-.277	.900	.941
Hill	.208	.057	.215	.252	.052	.257	.353	.052	.357	.153	.064	.166	.185	.056	.194	.222	.049	.227
Adapted Hill	1.393	.212	1.409	1.348	.153	1.356	1.313	.094	1.317	1.456	.345	1.496	1.382	.235	1.401	1.344	.173	1.355
Moment	-.362	.465	.589	-.239	.309	.391	-.167	.202	.262	1.183	.066	1.184	1.200	.055	1.201	1.229	.048	1.230
Mom.-Ratio	.162	.047	.169	.197	.042	.201	.266	.039	.269	.004	.003	.005	.002	.002	.003	.001	.001	.002
QQ	.220	.069	.231	.240	.056	.247	.291	.045	.295	.118	.056	.130	.144	.051	.153	.171	.046	.177
Peng's	-.409	.485	.635	-.297	.330	.444	-.255	.221	.337	1.032	.032	1.033	1.017	.017	1.017	1.008	.007	1.008
W	2.393	.424	2.430	2.277	.282	2.295	2.212	.176	2.219	.967	.034	.968	.981	.022	.981	.989	.011	.989
<i>Excess Plots</i>																		
Median	.272	.102	.291	.348	.102	.363	.545	.106	.556	.226	.123	.258	.262	.108	.284	.315	.104	.332
Tr.Mean (1%)	.226	.058	.234	.282	.056	.287	.421	.059	.425	.153	.061	.165	.195	.056	.203	.240	.052	.245
Tr.Mean (5%)	.226	.058	.234	.282	.056	.287	.402	.058	.406	.146	.059	.157	.182	.054	.189	.223	.051	.229
Tr.Mean (10%)	.192	.055	.200	.256	.054	.261	.371	.056	.376	.133	.056	.144	.163	.052	.171	.203	.050	.209

Table A.23 Simulation results of estimation of γ (Exponential distribution, $\gamma=0$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.033	1.094	1.094	-.040	.821	.822	.020	.613	.613	-1.252	2.120	2.462	-.462	1.265	1.346	-.021	.908	.909
Hill	.344	.092	.356	.428	.089	.437	.629	.091	.636	.234	.087	.250	.293	.082	.305	.362	.082	.371
Adapted Hill	1.099	.218	1.120	1.129	.156	1.140	1.235	.107	1.240	1.057	.250	1.086	1.060	.208	1.081	1.088	.158	1.100
Moment	-.223	.529	.574	-.083	.340	.350	.017	.238	.239	-.009	.148	.148	.018	.110	.111	.032	.096	.101
Mom.-Ratio	.267	.067	.275	.326	.061	.332	.463	.056	.467	.228	.026	.229	.263	.022	.264	.307	.019	.308
QQ	.343	.093	.355	.387	.079	.395	.488	.068	.493	.202	.086	.219	.243	.075	.254	.287	.067	.295
Peng's	-.299	.566	.640	-.180	.379	.419	-.151	.277	.316	-.056	.167	.176	-.041	.125	.132	-.046	.111	.121
W	2.269	.411	2.306	2.148	.262	2.164	2.075	.165	2.082	2.051	.132	2.056	2.030	.100	2.032	2.022	.083	2.024
<i>Mean Aver.</i>																		
Pickands	-.018	.313	.313	-.013	.207	.207	.001	.130	.130	-.207	.389	.440	-.094	.267	.283	-.034	.198	.201
Hill	.314	.084	.326	.382	.080	.390	.530	.075	.535	.238	.093	.256	.281	.080	.293	.335	.075	.343
Adapted Hill	1.095	.215	1.116	1.111	.167	1.123	1.183	.112	1.189	.953	.269	.990	.989	.205	1.010	1.031	.167	1.044
Moment	-.349	.542	.645	-.147	.348	.378	-.021	.221	.222	-.031	.154	.157	.002	.114	.114	.024	.091	.094
Mom.-Ratio	.243	.069	.253	.293	.061	.300	.397	.054	.401	.212	.028	.214	.242	.024	.243	.278	.020	.279
QQ	.329	.102	.345	.362	.084	.372	.440	.070	.445	.179	.090	.200	.219	.080	.234	.259	.071	.269
Peng's	-.421	.570	.709	-.231	.377	.443	-.154	.245	.289	-.073	.169	.184	-.050	.128	.138	-.041	.103	.111
W	2.378	.453	2.421	2.204	.293	2.224	2.101	.182	2.109	2.071	.145	2.076	2.043	.109	2.045	2.027	.088	2.028
<i>Med. Aver.</i>																		
Pickands	-.054	.939	.940	-.034	.757	.758	.016	.570	.570	-.977	2.024	2.248	-.123	1.177	1.184	-.102	.805	.811
Hill	.314	.086	.326	.383	.084	.392	.529	.084	.535	.237	.094	.255	.281	.082	.292	.336	.078	.345
Adapted Hill	1.096	.218	1.118	1.112	.169	1.125	1.187	.113	1.192	.957	.272	.995	.995	.208	1.016	1.033	.167	1.046
Moment	-.255	.451	.518	-.104	.324	.340	.002	.217	.217	-.021	.151	.152	.009	.113	.113	.028	.092	.096
Mom.-Ratio	.245	.071	.255	.294	.063	.300	.397	.056	.401	.212	.028	.214	.243	.024	.244	.279	.021	.279
QQ	.330	.102	.345	.363	.085	.373	.439	.072	.445	.181	.091	.203	.221	.081	.235	.260	.072	.270
Peng's	-.326	.482	.582	-.188	.354	.401	-.131	.242	.276	-.064	.166	.178	-.043	.127	.134	-.038	.103	.110
W	2.319	.389	2.351	2.181	.277	2.199	2.091	.178	2.099	2.065	.143	2.070	2.038	.108	2.041	2.024	.088	2.026
<i>Excess Plots</i>																		
Median	.422	.163	.452	.533	.164	.557	.808	.163	.824	.345	.177	.387	.387	.158	.418	.468	.157	.493
Tr.Mean (1%)	.344	.092	.356	.428	.089	.437	.629	.091	.636	.234	.087	.250	.293	.082	.305	.358	.082	.367
Tr.Mean (5%)	.344	.092	.356	.428	.089	.437	.601	.090	.608	.222	.083	.237	.273	.079	.284	.332	.079	.341
Tr.Mean (10%)	.293	.087	.306	.388	.086	.398	.555	.087	.562	.203	.078	.217	.245	.076	.256	.301	.076	.311

Table A.24 Simulation results of estimation of γ (Log-normal distribution, $\mu=100$, $\sigma=1$, $\gamma=0$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.305	1.156	1.196	.305	.897	.947	.325	.609	.690	-1.119	1.972	2.267	-.226	1.408	1.426	.333	.983	1.038
Hill	.495	.130	.512	.559	.113	.570	.704	.098	.711	.371	.159	.404	.431	.131	.451	.497	.108	.509
Adapted Hill	6.18 E+43	2.53 E+43	6.68 E+43	5.21 E+43	1.70 E+43	5.48 E+43	4.03 E+43	9.87 E+42	4.15 E+43	4.864 67041 E+43	2.945 42955 E+43	5.686 87730 E+43	4.812 40894 E+43	2.324 03920 E+43	5.344 19666 E+43	4.514 98922 E+43	1.759 18457 E+43	4.845 60193 E+43
Moment	.048	.497	.499	.200	.317	.374	.330	.202	.387	.250	.132	.283	.292	.105	.311	.321	.087	.333
Mom.-Ratio	.403	.117	.420	.460	.097	.470	.567	.077	.572	.382	.050	.386	.416	.042	.418	.454	.035	.456
QQ	.529	.158	.552	.556	.124	.570	.623	.095	.630	.324	.151	.358	.378	.136	.402	.426	.116	.441
Peng's	-.041	.552	.554	.102	.371	.385	.186	.245	.308	.196	.162	.254	.232	.129	.265	.246	.106	.268
W	2.075	.351	2.104	1.952	.226	1.965	1.857	.144	1.863	1.853	.117	1.857	1.817	.095	1.819	1.793	.079	1.795
<i>Mean Aver.</i>																		
Pickands	.093	.322	.335	.091	.224	.242	.084	.126	.152	-1.131	.364	.386	-.054	.273	.278	.048	.224	.229
Hill	.471	.134	.490	.525	.109	.536	.634	.091	.640	.377	.167	.412	.428	.140	.451	.477	.112	.491
Adapted Hill	6.73 E+43	3.10 E+43	7.41 E+43	5.72 E+43	2.12 E+43	6.10 E+43	4.51 E+43	1.25 E+43	4.68 E+43	4.658 E+43	3.202 E+43	5.652 E+43	4.862 E+43	2.684 E+43	5.554 E+43	4.711 E+43	2.113 E+43	5.163 E+43
Moment	-.111	.751	.759	.127	.339	.362	.281	.214	.353	.219	.149	.264	.269	.111	.291	.303	.092	.317
Mom.-Ratio	.377	.123	.397	.429	.106	.441	.517	.083	.524	.365	.054	.369	.396	.046	.399	.429	.039	.431
QQ	.521	.176	.550	.541	.140	.559	.591	.104	.600	.290	.154	.328	.348	.144	.376	.395	.127	.415
Peng's	-.200	.791	.816	.035	.384	.386	.161	.251	.299	.167	.180	.245	.213	.134	.252	.237	.110	.262
W	2.199	.540	2.264	2.012	.257	2.028	1.891	.165	1.899	1.881	.135	1.886	1.837	.104	1.840	1.808	.087	1.810
<i>Med. Aver.</i>																		
Pickands	.279	.967	1.006	.326	.833	.895	.350	.550	.652	-.823	1.899	2.069	.023	1.238	1.238	.236	.929	.958
Hill	.471	.137	.490	.525	.111	.537	.634	.096	.642	.375	.170	.412	.427	.143	.450	.478	.113	.491
Adapted Hill	6.68 E+43	3.04 E+43	7.34 E+43	5.68 E+43	2.07 E+43	6.05 E+43	4.48 E+43	1.22 E+43	4.64 E+43	4.716 E+43	3.213 E+43	5.706 E+43	4.889 E+43	2.673 E+43	5.572 E+43	4.713 E+43	2.089 E+43	5.155 E+43
Moment	.000	.464	.464	.162	.315	.354	.296	.208	.362	.226	.147	.269	.274	.111	.296	.307	.092	.320
Mom.-Ratio	.379	.125	.399	.430	.107	.443	.518	.084	.525	.366	.054	.370	.397	.046	.400	.430	.039	.432
QQ	.521	.176	.550	.542	.139	.559	.591	.105	.601	.294	.155	.332	.351	.145	.380	.397	.128	.417
Peng's	-.087	.513	.520	.072	.360	.367	.176	.246	.303	.175	.177	.249	.219	.134	.256	.241	.110	.265
W	2.137	.373	2.170	1.994	.242	2.009	1.885	.161	1.892	1.877	.133	1.882	1.834	.104	1.837	1.806	.086	1.808
<i>Excess Plots</i>																		
Median	.575	.220	.616	.648	.194	.676	.839	.167	.855	.542	.307	.623	.550	.232	.597	.609	.188	.638
Tr.Mean (1%)	.495	.130	.512	.559	.113	.570	.704	.098	.711	.371	.159	.404	.431	.131	.451	.491	.107	.502
Tr.Mean (5%)	.495	.130	.512	.559	.113	.570	.664	.095	.670	.351	.153	.383	.399	.123	.417	.451	.101	.462
Tr.Mean (10%)	.413	.119	.430	.498	.107	.509	.601	.091	.608	.320	.142	.350	.354	.114	.372	.405	.094	.416

Table A.25 Simulation results of estimation of γ (Normal distribution, $\mu=100$, $\sigma=1$, $\gamma=0$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.254	1.086	1.115	-.337	.797	.865	-.435	.56	.709	-.168	.469	.498	-.204	.378	.429	-.265	.29	.393
Hill	.042	.011	.043	.049	.01	.05	.066	.009	.066	.036	.004	.036	.041	.004	.041	.046	.003	.046
Adapted Hill	1.207	.205	1.224	1.1	.159	1.112	.931	.107	.937	1.251	.087	1.254	1.182	.072	1.184	1.113	.054	1.115
Moment	-.423	.474	.635	-.35	.322	.475	-.387	.239	.454	-.171	.135	.218	-.185	.108	.214	-.206	.09	.225
Mom.-Ratio	.034	.01	.035	.039	.008	.04	.051	.007	.051	.031	.004	.031	.035	.003	.035	.039	.003	.039
QQ	.044	.013	.045	.047	.01	.048	.055	.008	.056	.034	.004	.034	.037	.004	.037	.04	.003	.04
Peng's	-.431	.48	.645	-.359	.326	.486	-.401	.244	.47	-.176	.138	.224	-.191	.111	.221	-.214	.092	.233
W	2.425	.46	2.468	2.352	.311	2.373	2.387	.23	2.398	2.174	.133	2.178	2.187	.107	2.19	2.208	.089	2.21
<i>Mean Aver.</i>																		
Pickands	-.077	.299	.309	-.09	.204	.223	-.1	.118	.155	-.045	.102	.111	-.047	.078	.091	-.056	.06	.082
Hill	.039	.011	.041	.045	.009	.046	.058	.008	.058	.034	.004	.035	.038	.004	.038	.043	.003	.043
Adapted Hill	1.26	.205	1.277	1.159	.149	1.168	1.002	.101	1.007	1.282	.09	1.285	1.223	.07	1.225	1.159	.056	1.16
Moment	-.527	.528	.746	-.381	.319	.496	-.357	.211	.414	-.179	.144	.23	-.177	.11	.208	-.192	.089	.212
Mom.-Ratio	.032	.01	.033	.036	.009	.037	.045	.007	.046	.03	.004	.03	.033	.004	.033	.036	.003	.036
QQ	.043	.014	.045	.045	.011	.047	.051	.009	.052	.033	.005	.033	.035	.004	.035	.038	.003	.038
Peng's	-.535	.532	.755	-.389	.323	.506	-.369	.214	.426	-.183	.147	.235	-.182	.112	.214	-.199	.091	.218
W	2.527	.516	2.579	2.383	.313	2.404	2.358	.207	2.367	2.182	.144	2.187	2.179	.109	2.182	2.195	.089	2.196
<i>Med. Aver.</i>																		
Pickands	-.232	.896	.926	-.284	.746	.799	-.405	.519	.658	-.158	.421	.449	-.179	.335	.38	-.224	.253	.338
Hill	.039	.011	.04	.045	.01	.046	.058	.008	.059	.034	.004	.035	.038	.004	.038	.043	.003	.043
Adapted Hill	1.259	.21	1.277	1.155	.156	1.165	.996	.108	1.002	1.279	.093	1.282	1.221	.074	1.223	1.155	.059	1.157
Moment	-.441	.444	.625	-.344	.299	.456	-.342	.209	.401	-.172	.141	.223	-.173	.11	.205	-.191	.09	.211
Mom.-Ratio	.032	.01	.033	.037	.009	.038	.045	.007	.046	.03	.004	.03	.033	.004	.033	.036	.003	.036
QQ	.043	.014	.045	.045	.011	.047	.051	.009	.052	.033	.005	.033	.035	.004	.035	.038	.003	.038
Peng's	-.448	.449	.634	-.353	.304	.466	-.354	.213	.414	-.177	.144	.228	-.179	.112	.211	-.197	.092	.218
W	2.446	.436	2.485	2.35	.294	2.368	2.346	.206	2.355	2.176	.141	2.18	2.176	.11	2.179	2.194	.09	2.195
<i>Excess Plots</i>																		
Median	.049	.018	.052	.059	.017	.061	.081	.016	.083	.04	.007	.041	.046	.007	.046	.053	.006	.054
Tr.Mean (1%)	.042	.011	.043	.049	.01	.05	.066	.009	.066	.036	.004	.036	.041	.004	.041	.045	.003	.045
Tr.Mean (5%)	.042	.011	.043	.049	.01	.05	.062	.009	.063	.033	.004	.033	.037	.003	.037	.041	.003	.041
Tr.Mean (10%)	.035	.01	.036	.044	.009	.045	.057	.008	.058	.03	.004	.03	.033	.003	.033	.037	.003	.038

Table A.26 Simulation results of estimation of γ (Gamma distribution, $\alpha=0.5$, $\beta=1$, $\gamma=0$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	.039	1.098	1.099	.059	.860	.862	.197	.591	.623	-1.17	1.99	2.31	-.54	1.31	1.41	.03	.96	.96
Hill	.457	.118	.472	.584	.115	.595	.922	.140	.932	.29	.11	.31	.38	.11	.39	.48	.11	.50
Adapted Hill	1.265	.206	1.281	1.340	.153	1.349	1.618	.122	1.622	1.16	.26	1.19	1.19	.18	1.20	1.25	.16	1.26
Moment	-.163	.556	.580	.005	.352	.352	.206	.255	.328	.04	.15	.15	.09	.11	.14	.12	.09	.15
Mom.-Ratio	.345	.084	.355	.437	.079	.444	.655	.080	.660	.29	.03	.29	.34	.03	.34	.40	.03	.41
QQ	.446	.118	.461	.512	.098	.521	.679	.088	.684	.24	.10	.26	.30	.09	.32	.37	.08	.38
Peng's	-.271	.604	.661	-.139	.401	.425	-.055	.304	.309	-.03	.17	.17	.00	.13	.13	.01	.11	.11
W	2.231	.391	2.265	2.101	.246	2.115	1.985	.146	1.990	2.02	.12	2.03	1.99	.09	1.99	1.97	.07	1.97
<i>Mean Aver.</i>																		
Pickands	-.002	.308	.308	.014	.219	.219	.037	.123	.128	-.19	.36	.40	-.10	.26	.27	-.03	.22	.22
Hill	.413	.110	.427	.511	.097	.520	.754	.105	.761	.29	.11	.31	.36	.10	.37	.44	.10	.45
Adapted Hill	1.261	.228	1.281	1.298	.164	1.308	1.477	.122	1.482	1.07	.27	1.10	1.11	.19	1.12	1.17	.15	1.18
Moment	-.324	.625	.704	-.082	.348	.357	.123	.225	.257	.01	.14	.14	.06	.12	.13	.10	.09	.13
Mom.-Ratio	.311	.085	.323	.386	.078	.394	.549	.074	.554	.27	.03	.27	.31	.03	.31	.36	.03	.36
QQ	.424	.128	.443	.475	.106	.486	.598	.087	.604	.21	.10	.24	.27	.09	.28	.33	.09	.34
Peng's	-.423	.659	.783	-.205	.383	.435	-.077	.252	.263	-.05	.16	.17	-.01	.13	.13	.00	.10	.10
W	2.360	.496	2.412	2.166	.277	2.184	2.029	.167	2.036	2.05	.13	2.05	2.01	.10	2.01	1.98	.08	1.98
<i>Med. Aver.</i>																		
Pickands	-.005	.925	.925	.067	.807	.810	.156	.532	.554	-.89	1.87	2.07	-.15	1.13	1.14	-.07	.90	.90
Hill	.413	.114	.428	.510	.104	.521	.752	.119	.762	.29	.11	.31	.36	.11	.37	.44	.10	.45
Adapted Hill	1.261	.228	1.281	1.301	.164	1.312	1.476	.123	1.481	1.08	.27	1.11	1.11	.19	1.13	1.17	.16	1.18
Moment	-.217	.495	.541	-.035	.324	.325	.150	.222	.268	.02	.14	.14	.06	.12	.13	.10	.09	.14
Mom.-Ratio	.313	.088	.325	.387	.080	.395	.548	.078	.554	.27	.03	.27	.31	.03	.31	.36	.03	.36
QQ	.425	.128	.444	.475	.107	.487	.597	.088	.604	.22	.10	.24	.27	.09	.29	.33	.09	.34
Peng's	-.315	.532	.618	-.158	.359	.393	-.048	.251	.255	-.04	.16	.16	-.01	.13	.13	.01	.10	.10
W	2.301	.412	2.338	2.145	.260	2.160	2.020	.162	2.026	2.04	.13	2.05	2.01	.10	2.01	1.98	.08	1.98
<i>Excess Plots</i>																		
Median	.565	.204	.600	.737	.210	.766	1.218	.251	1.244	.44	.22	.49	.52	.21	.56	.64	.20	.67
Tr.Mean (1%)	.457	.118	.472	.584	.115	.595	.922	.140	.932	.29	.11	.31	.38	.11	.39	.48	.11	.49
Tr.Mean (5%)	.457	.118	.472	.584	.115	.595	.884	.139	.895	.28	.10	.30	.35	.11	.37	.45	.10	.46
Tr.Mean (10%)	.393	.112	.409	.533	.113	.545	.822	.136	.833	.25	.10	.27	.32	.10	.34	.41	.10	.42

Table A.27 Simulation results of estimation of γ (Gamma distribution, $\alpha=1.5$, $\beta=1$, $\gamma=0$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.101	1.064	1.069	-.060	.812	.815	-.085	.543	.550	-.05	.46	.46	-.04	.37	.37	-.06	.28	.28
Hill	.293	.073	.302	.358	.068	.365	.518	.073	.524	.24	.03	.24	.28	.02	.28	.33	.02	.33
Adapted Hill	1.064	.226	1.088	1.067	.166	1.080	1.113	.112	1.118	1.03	.10	1.04	1.04	.08	1.04	1.05	.06	1.05
Moment	-.245	.512	.568	-.110	.320	.338	-.040	.227	.230	-.02	.15	.15	-.01	.12	.12	.00	.09	.09
Mom.-Ratio	.232	.060	.240	.281	.052	.285	.385	.048	.388	.20	.02	.20	.23	.02	.23	.26	.02	.26
QQ	.298	.079	.308	.329	.064	.336	.411	.054	.414	.22	.03	.22	.24	.02	.24	.27	.02	.27
Peng's	-.309	.545	.626	-.189	.354	.401	-.172	.259	.311	-.06	.16	.17	-.06	.13	.15	-.06	.10	.12
W	2.283	.401	2.318	2.166	.256	2.182	2.107	.171	2.114	2.06	.13	2.06	2.05	.11	2.05	2.04	.08	2.04
Mean Aver.																		
Pickands	-.042	.315	.318	-.024	.196	.198	-.021	.116	.118	.00	.10	.10	-.01	.08	.08	-.01	.06	.06
Hill	.271	.070	.280	.322	.061	.327	.442	.060	.447	.22	.03	.22	.25	.02	.25	.29	.02	.29
Adapted Hill	1.072	.246	1.100	1.065	.177	1.080	1.086	.122	1.093	1.03	.11	1.04	1.04	.09	1.04	1.04	.07	1.04
Moment	-.388	.592	.708	-.180	.332	.377	-.062	.208	.217	-.04	.15	.15	-.02	.12	.12	.00	.09	.09
Mom.-Ratio	.213	.064	.222	.254	.054	.260	.335	.047	.339	.19	.03	.19	.21	.02	.21	.24	.02	.24
QQ	.288	.087	.300	.312	.071	.319	.372	.056	.376	.21	.03	.21	.22	.02	.23	.25	.02	.25
Peng's	-.449	.616	.763	-.251	.358	.437	-.166	.230	.284	-.07	.16	.18	-.06	.13	.14	-.06	.10	.12
W	2.409	.509	2.462	2.226	.285	2.244	2.125	.181	2.133	2.07	.14	2.08	2.05	.11	2.05	2.04	.09	2.04
Med. Aver.																		
Pickands	-.127	.944	.953	-.059	.737	.740	-.064	.505	.509	-.01	.41	.41	-.03	.34	.34	-.03	.26	.26
Hill	.271	.072	.281	.322	.065	.329	.443	.066	.448	.22	.03	.22	.25	.02	.25	.29	.02	.30
Adapted Hill	1.074	.248	1.102	1.066	.178	1.081	1.089	.123	1.096	1.03	.11	1.04	1.04	.09	1.04	1.04	.07	1.04
Moment	-.291	.476	.558	-.140	.310	.340	-.041	.201	.205	-.03	.15	.15	-.01	.12	.12	.00	.09	.09
Mom.-Ratio	.214	.064	.223	.255	.055	.261	.335	.048	.339	.19	.03	.19	.21	.02	.21	.24	.02	.24
QQ	.288	.087	.301	.312	.071	.320	.372	.057	.377	.21	.03	.21	.22	.02	.23	.25	.02	.25
Peng's	-.351	.503	.613	-.210	.337	.397	-.145	.225	.268	-.07	.16	.17	-.05	.13	.14	-.06	.11	.12
W	2.344	.420	2.381	2.203	.269	2.219	2.115	.175	2.123	2.07	.14	2.07	2.05	.11	2.05	2.04	.09	2.04
Excess Plots																		
Median	.356	.129	.379	.438	.122	.454	.664	.131	.677	.28	.05	.28	.32	.04	.32	.39	.04	.39
Tr.Mean (1%)	.293	.073	.302	.358	.068	.365	.518	.073	.524	.24	.03	.24	.28	.02	.28	.32	.02	.32
Tr.Mean (5%)	.293	.073	.302	.358	.068	.365	.494	.072	.500	.22	.03	.22	.25	.02	.25	.30	.02	.30
Tr.Mean (10%)	.248	.069	.258	.324	.066	.330	.455	.070	.461	.20	.03	.20	.23	.02	.23	.27	.02	.27

Table A.28 Simulation results of estimation of γ (Beta distribution, $\alpha=0.5$, $\beta=3$, $\gamma=-1/3$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.018	1.070	1.070	.069	.832	.835	.270	.576	.637	-1.14	1.94	2.25	-.45	1.25	1.33	.10	.95	.95
Hill	.652	.084	.658	.783	.093	.789	1.124	.129	1.131	.52	.07	.52	.60	.08	.60	.70	.09	.70
Adapted Hill	2.633	.212	2.642	2.609	.146	2.613	2.791	.116	2.794	2.90	.34	2.92	2.73	.22	2.73	2.66	.18	2.67
Moment	-.166	.684	.704	.026	.431	.432	.233	.284	.368	.05	.17	.17	.07	.13	.15	.12	.11	.16
Mom.-Ratio	.564	.053	.566	.651	.055	.653	.876	.072	.879	.50	.02	.50	.55	.02	.55	.62	.02	.62
QQ	.618	.070	.622	.691	.066	.694	.866	.070	.868	.48	.05	.48	.53	.05	.53	.59	.05	.59
Peng's	-.255	.716	.760	-.100	.469	.480	-.016	.325	.325	-.01	.18	.18	.00	.15	.15	.02	.12	.12
W	2.830	.519	2.877	2.678	.303	2.695	2.545	.160	2.550	2.64	.14	2.65	2.63	.11	2.63	2.60	.08	2.60
Mean Aver.																		
Pickands	.219	.296	.368	.238	.204	.314	.301	.121	.325	.07	.36	.37	.15	.25	.29	.23	.20	.31
Hill	.609	.072	.613	.710	.074	.714	.954	.090	.959	.51	.07	.52	.57	.07	.58	.65	.07	.66
Adapted Hill	2.680	.218	2.688	2.617	.152	2.621	2.688	.109	2.690	2.91	.35	2.93	2.74	.24	2.75	2.66	.17	2.66
Moment	-.325	.657	.733	-.071	.381	.387	.135	.227	.264	.03	.15	.15	.06	.12	.13	.09	.09	.13
Mom.-Ratio	.533	.050	.536	.603	.050	.605	.767	.059	.769	.48	.02	.48	.52	.01	.52	.57	.01	.57
QQ	.593	.073	.598	.650	.066	.653	.782	.064	.785	.45	.05	.46	.50	.05	.50	.55	.05	.55
Peng's	-.403	.680	.790	-.177	.404	.441	-.054	.250	.255	-.02	.16	.16	-.01	.13	.13	.00	.10	.10
W	2.962	.544	3.012	2.754	.315	2.772	2.604	.174	2.609	2.66	.14	2.66	2.64	.11	2.64	2.62	.08	2.62
Med. Aver.																		
Pickands	-.010	.888	.888	.038	.772	.772	.223	.529	.574	-.86	1.87	2.06	-.18	1.16	1.18	-.03	.85	.85
Hill	.608	.077	.613	.710	.081	.715	.951	.103	.956	.51	.07	.52	.57	.07	.58	.65	.07	.66
Adapted Hill	2.675	.223	2.684	2.614	.154	2.618	2.688	.112	2.690	2.88	.35	2.90	2.73	.25	2.74	2.65	.18	2.66
Moment	-.173	.500	.529	-.007	.348	.348	.168	.224	.280	.04	.15	.16	.06	.12	.14	.10	.10	.14
Mom.-Ratio	.534	.053	.537	.604	.053	.606	.766	.063	.769	.48	.02	.48	.52	.02	.52	.57	.02	.57
QQ	.594	.074	.598	.651	.068	.654	.781	.066	.784	.46	.06	.46	.50	.05	.50	.55	.05	.55
Peng's	-.251	.525	.582	-.114	.374	.391	-.021	.248	.249	.00	.16	.16	.00	.13	.13	.01	.10	.10
W	2.865	.436	2.898	2.719	.294	2.735	2.590	.170	2.595	2.65	.14	2.65	2.63	.11	2.64	2.61	.08	2.61
Excess Plots																		
Median	.754	.151	.769	.933	.172	.949	1.420	.234	1.439	.62	.15	.64	.72	.15	.73	.84	.16	.85
Tr.Mean (1%)	.652	.084	.658	.783	.093	.789	1.124	.129	1.131	.52	.07	.52	.60	.08	.60	.69	.09	.70
Tr.Mean (5%)	.652	.084	.658	.783	.093	.789	1.098	.127	1.105	.51	.07	.51	.58	.07	.59	.67	.08	.68
Tr.Mean (10%)	.614	.081	.620	.751	.092	.757	1.051	.125	1.058	.50	.07	.50	.56	.07	.57	.65	.08	.65

Table A.29 Simulation results of estimation of γ (Beta distribution, $\alpha=2$, $\beta=3$, $\gamma=-1/3$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.200	1.086	1.104	-.171	.815	.833	-.195	.551	.584	-1.13	2.07	2.36	-.64	1.27	1.42	-.11	.93	.93
Hill	.458	.033	.459	.503	.035	.504	.618	.044	.620	.41	.03	.41	.44	.03	.44	.47	.03	.48
Adapted Hill	2.931	.232	2.941	2.742	.174	2.747	2.499	.109	2.501	3.35	.36	3.37	3.07	.27	3.08	2.86	.19	2.87
Moment	-.325	.650	.727	-.216	.411	.464	-.202	.298	.360	-.07	.18	.19	-.08	.14	.16	-.07	.11	.13
Mom.-Ratio	.424	.021	.425	.456	.022	.457	.534	.025	.535	.40	.01	.40	.42	.01	.42	.44	.01	.44
QQ	.447	.028	.448	.473	.025	.473	.532	.025	.533	.39	.02	.39	.41	.02	.41	.43	.02	.43
Peng's	-.359	.664	.755	-.264	.426	.501	-.290	.316	.429	-.09	.19	.21	-.11	.15	.18	-.11	.11	.16
W	2.981	.581	3.037	2.881	.357	2.903	2.870	.238	2.880	2.74	.17	2.75	2.76	.13	2.76	2.75	.10	2.75
Mean Aver.																		
Pickands	.171	.313	.357	.177	.205	.271	.209	.119	.241	.06	.34	.35	.12	.27	.30	.19	.20	.27
Hill	.442	.028	.443	.478	.029	.478	.561	.032	.562	.40	.03	.41	.43	.03	.43	.46	.03	.46
Adapted Hill	3.034	.234	3.043	2.842	.172	2.847	2.600	.108	2.603	3.39	.37	3.41	3.13	.26	3.14	2.94	.19	2.94
Moment	-.464	.667	.813	-.261	.369	.452	-.200	.232	.306	-.07	.16	.17	-.07	.12	.14	-.07	.10	.12
Mom.-Ratio	.412	.020	.413	.438	.020	.439	.497	.022	.497	.39	.01	.39	.41	.01	.41	.43	.01	.43
QQ	.439	.029	.440	.458	.026	.459	.504	.024	.504	.38	.02	.38	.40	.02	.40	.42	.02	.42
Peng's	-.494	.676	.837	-.301	.380	.485	-.268	.242	.361	-.09	.16	.19	-.10	.12	.16	-.10	.10	.15
W	3.113	.620	3.174	2.924	.345	2.944	2.868	.209	2.875	2.75	.15	2.75	2.75	.11	2.75	2.75	.09	2.75
Med. Aver.																		
Pickands	-.153	.939	.951	-.160	.768	.784	-.169	.520	.547	-.81	1.90	2.07	-.28	1.20	1.23	-.21	.80	.83
Hill	.443	.030	.444	.478	.031	.479	.561	.036	.562	.40	.03	.41	.43	.03	.43	.46	.03	.46
Adapted Hill	3.022	.244	3.032	2.834	.181	2.840	2.591	.116	2.593	3.37	.40	3.39	3.12	.27	3.13	2.92	.20	2.93
Moment	-.324	.527	.619	-.195	.336	.389	-.171	.230	.287	-.06	.16	.17	-.07	.12	.14	-.07	.10	.12
Mom.-Ratio	.413	.021	.413	.438	.022	.439	.497	.024	.497	.39	.01	.39	.41	.01	.41	.43	.01	.43
QQ	.439	.029	.440	.459	.026	.460	.503	.025	.504	.38	.02	.38	.40	.02	.40	.42	.02	.42
Peng's	-.354	.537	.643	-.235	.348	.420	-.240	.242	.340	-.08	.16	.18	-.09	.12	.15	-.10	.10	.14
W	2.995	.499	3.037	2.872	.317	2.890	2.850	.208	2.857	2.73	.15	2.74	2.74	.12	2.74	2.74	.09	2.75
Excess Plots																		
Median	.496	.061	.499	.556	.064	.559	.720	.078	.724	.45	.06	.45	.48	.06	.49	.53	.06	.53
Tr.Mean (1%)	.458	.033	.459	.503	.035	.504	.618	.044	.620	.41	.03	.41	.44	.03	.44	.47	.03	.47
Tr.Mean (5%)	.458	.033	.459	.503	.035	.504	.608	.043	.610	.40	.03	.40	.43	.03	.43	.46	.03	.47
Tr.Mean (10%)	.442	.032	.443	.490	.035	.491	.590	.042	.592	.40	.03	.40	.42	.03	.42	.45	.03	.46

Table A.30 Simulation results of estimation of γ (Beta distribution, $\alpha=0.5$, $\beta=0.5$, $\gamma=-2$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.173	1.273	1.285	-.052	.957	.959	.136	.675	.688	-1.24	2.19	2.52	-.54	1.41	1.51	-.09	1.11	1.12
Hill	2.026	.015	2.026	2.069	.030	2.070	2.287	.079	2.288	2.01	.00	2.01	2.02	.01	2.02	2.04	.02	2.04
Adapted Hill	5.873	.558	5.900	4.887	.392	4.903	3.784	.165	3.787	7.55	.87	7.60	6.36	.63	6.40	5.40	.47	5.42
Moment	-1.061	3.854	3.997	-.475	1.677	1.743	-.107	.939	.946	-.11	.66	.67	-.03	.46	.46	-.04	.37	.37
Mom.-Ratio	2.015	.008	2.015	2.041	.017	2.041	2.168	.044	2.169	2.00	.00	2.00	2.01	.00	2.01	2.03	.00	2.03
QQ	2.015	.008	2.015	2.034	.015	2.034	2.118	.033	2.119	2.00	.00	2.00	2.01	.00	2.01	2.02	.01	2.02
Peng's	-1.071	3.855	4.001	-.503	1.681	1.754	-.223	.952	.978	-.11	.66	.67	-.03	.46	.46	-.06	.37	.38
W	7.024	3.747	7.961	6.423	1.584	6.615	5.978	.776	6.028	6.11	.66	6.14	6.02	.45	6.04	6.03	.36	6.04
<i>Mean Aver.</i>																		
Pickands	1.255	.363	1.306	1.366	.253	1.389	1.517	.143	1.524	1.25	.43	1.32	1.37	.31	1.40	1.46	.23	1.48
Hill	2.017	.010	2.017	2.043	.019	2.043	2.169	.047	2.169	2.00	.00	2.00	2.01	.01	2.01	2.03	.01	2.03
Adapted Hill	6.388	.603	6.417	5.408	.414	5.423	4.212	.215	4.217	7.91	.88	7.96	6.85	.69	6.88	5.91	.50	5.93
Moment	-2.728	6.763	7.293	-.780	1.257	1.480	-.213	.597	.634	-.19	.46	.49	-.08	.34	.35	-.07	.24	.25
Mom.-Ratio	2.010	.006	2.010	2.026	.011	2.026	2.099	.027	2.099	2.00	.00	2.00	2.01	.00	2.01	2.02	.00	2.02
QQ	2.010	.006	2.010	2.022	.011	2.023	2.073	.023	2.074	2.00	.00	2.00	2.00	.00	2.00	2.01	.01	2.01
Peng's	-2.735	6.764	7.296	-.797	1.258	1.489	-.280	.598	.661	-.19	.46	.50	-.09	.34	.35	-.08	.24	.25
W	8.679	6.617	10.914	6.737	1.230	6.849	6.128	.565	6.154	6.19	.46	6.21	6.08	.34	6.09	6.06	.24	6.06
<i>Med. Aver.</i>																		
Pickands	-.235	1.090	1.116	-.090	.904	.909	.076	.617	.622	-.81	2.04	2.20	-.23	1.30	1.32	-.12	.97	.98
Hill	2.016	.010	2.016	2.042	.020	2.042	2.162	.053	2.163	2.00	.00	2.00	2.01	.01	2.01	2.03	.01	2.03
Adapted Hill	6.348	.639	6.380	5.364	.441	5.382	4.164	.245	4.171	7.88	.92	7.94	6.80	.74	6.84	5.88	.53	5.91
Moment	-.764	1.594	1.767	-.255	.864	.901	-.027	.557	.558	-.08	.44	.44	-.02	.34	.34	-.03	.25	.25
Mom.-Ratio	2.010	.006	2.010	2.025	.011	2.025	2.095	.029	2.095	2.00	.00	2.00	2.01	.00	2.01	2.01	.00	2.01
QQ	2.010	.007	2.010	2.022	.011	2.022	2.071	.024	2.071	2.00	.00	2.00	2.00	.00	2.00	2.01	.01	2.01
Peng's	-.771	1.594	1.771	-.273	.864	.907	-.097	.560	.569	-.08	.44	.45	-.03	.34	.34	-.04	.25	.26
W	6.750	1.581	6.933	6.236	.850	6.293	5.969	.525	5.992	6.08	.44	6.09	6.02	.34	6.03	6.02	.25	6.02
<i>Excess Plots</i>																		
Median	2.040	.024	2.040	2.111	.049	2.111	2.462	.133	2.466	2.01	.01	2.01	2.03	.02	2.03	2.07	.03	2.07
Tr.Mean (1%)	2.026	.015	2.026	2.069	.030	2.070	2.287	.079	2.288	2.01	.00	2.01	2.02	.01	2.02	2.04	.02	2.04
Tr.Mean (5%)	2.026	.015	2.026	2.069	.030	2.070	2.283	.078	2.285	2.01	.00	2.01	2.02	.01	2.02	2.04	.02	2.04
Tr.Mean (10%)	2.024	.014	2.024	2.067	.029	2.068	2.276	.077	2.277	2.01	.00	2.01	2.01	.01	2.02	2.04	.02	2.04

Table A.31 Simulation results of estimation of γ (Beta distribution, $\alpha=2$, $\beta=0.5$, $\gamma=-2$)

Estimators	k=12			n=100 k=20			k=40			k=60			n=1000 k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
<i>Standard</i>																		
Pickands	-.240	1.289	1.312	-.158	.996	1.009	-.142	.659	.674	-1.26	2.42	2.73	-.52	1.44	1.53	-.26	1.09	1.12
Hill	2.005	.003	2.005	2.012	.005	2.012	2.053	.015	2.053	2.00	.00	2.00	2.00	.00	2.00	2.01	.00	2.01
Adapted Hill	7.557	.570	7.579	6.505	.419	6.518	5.067	.270	5.074	9.28	.87	9.32	8.07	.68	8.10	7.02	.51	7.04
Moment	-1.161	3.409	3.601	-.538	1.600	1.688	-.334	.918	.977	-.11	.65	.66	-.09	.48	.48	-.06	.39	.39
Mom.-Ratio	2.003	.001	2.003	2.007	.003	2.007	2.031	.008	2.031	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
QQ	2.003	.001	2.003	2.006	.003	2.006	2.021	.006	2.021	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
Peng's	-1.163	3.410	3.602	-.543	1.600	1.690	-.356	.921	.987	-.11	.65	.66	-.09	.48	.49	-.06	.39	.39
W	7.154	3.394	7.918	6.528	1.584	6.718	6.305	.884	6.367	6.11	.65	6.15	6.09	.48	6.11	6.05	.39	6.07
<i>Mean Aver.</i>																		
Pickands	1.248	.380	1.305	1.344	.257	1.368	1.470	.145	1.477	1.24	.48	1.33	1.36	.31	1.40	1.44	.24	1.46
Hill	2.003	.002	2.003	2.008	.003	2.008	2.031	.009	2.031	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
Adapted Hill	8.104	.609	8.127	7.073	.446	7.087	5.678	.288	5.685	9.65	.89	9.69	8.57	.68	8.60	7.57	.53	7.59
Moment	-2.584	6.078	6.604	-.865	1.388	1.635	-.376	.611	.718	-.16	.48	.51	-.09	.32	.33	-.05	.25	.25
Mom.-Ratio	2.002	.001	2.002	2.005	.002	2.005	2.018	.005	2.018	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
QQ	2.002	.001	2.002	2.004	.002	2.004	2.013	.004	2.013	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
Peng's	-2.585	6.078	6.605	-.868	1.388	1.637	-.388	.612	.725	-.16	.48	.51	-.09	.32	.33	-.06	.25	.25
W	8.575	6.066	10.50	6.857	1.382	6.995	6.358	.604	6.386	6.16	.48	6.18	6.09	.32	6.10	6.05	.25	6.06
<i>Med. Aver.</i>																		
Pickands	-.255	1.140	1.168	-.168	.921	.936	-.125	.617	.629	-.84	2.28	2.43	-.28	1.43	1.46	-.23	1.01	1.03
Hill	2.003	.002	2.003	2.007	.004	2.007	2.029	.010	2.029	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
Adapted Hill	8.077	.653	8.103	7.042	.484	7.059	5.639	.318	5.648	9.58	.92	9.62	8.54	.74	8.57	7.52	.57	7.54
Moment	-.686	1.516	1.664	-.309	.875	.928	-.181	.549	.578	-.05	.46	.46	-.03	.32	.32	-.02	.25	.25
Mom.-Ratio	2.002	.001	2.002	2.004	.002	2.004	2.018	.005	2.018	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
QQ	2.002	.001	2.002	2.004	.002	2.004	2.013	.004	2.013	2.00	.00	2.00	2.00	.00	2.00	2.00	.00	2.00
Peng's	-.688	1.516	1.665	-.313	.875	.929	-.193	.550	.583	-.05	.46	.46	-.03	.32	.32	-.02	.25	.25
W	6.684	1.514	6.853	6.305	.872	6.366	6.169	.543	6.192	6.05	.46	6.06	6.03	.32	6.04	6.02	.25	6.02
<i>Excess Plots</i>																		
Median	2.007	.004	2.007	2.020	.009	2.020	2.086	.026	2.086	2.00	.00	2.00	2.00	.00	2.00	2.01	.01	2.01
Tr.Mean (1%)	2.005	.003	2.005	2.012	.005	2.012	2.053	.015	2.053	2.00	.00	2.00	2.00	.00	2.00	2.01	.00	2.01
Tr.Mean (5%)	2.005	.003	2.005	2.012	.005	2.012	2.053	.015	2.053	2.00	.00	2.00	2.00	.00	2.00	2.01	.00	2.01
Tr.Mean (10%)	2.004	.003	2.004	2.012	.005	2.012	2.051	.015	2.051	2.00	.00	2.00	2.00	.00	2.00	2.01	.00	2.01

Table A.32 Simulation results of estimation of γ (Uniform distribution (0,1), $\gamma=-1$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.142	1.120	1.129	-.096	.804	.810	-.034	.576	.577	-1.141	2.173	2.455	-.548	1.346	1.453	-.083	.896	.900
Hill	1.065	.022	1.065	1.114	.030	1.115	1.273	.051	1.274	1.027	.012	1.027	1.049	.018	1.050	1.085	.026	1.086
Adapted Hill	3.953	.318	3.966	3.475	.223	3.482	2.909	.120	2.912	4.813	.470	4.836	4.204	.331	4.217	3.721	.264	3.731
Moment	-.510	1.769	1.841	-.197	.717	.744	-.118	.501	.515	-.075	.311	.320	-.036	.252	.255	-.011	.193	.193
Mom.-Ratio	1.043	.014	1.043	1.074	.018	1.074	1.173	.030	1.174	1.021	.003	1.021	1.036	.004	1.036	1.059	.005	1.059
QQ	1.048	.015	1.048	1.075	.018	1.075	1.150	.025	1.150	1.018	.008	1.018	1.029	.010	1.030	1.047	.013	1.047
Peng's	-.534	1.774	1.852	-.237	.727	.765	-.216	.518	.561	-.085	.312	.324	-.054	.254	.260	-.041	.195	.200
W	4.478	1.655	4.774	4.173	.652	4.224	4.079	.406	4.100	4.072	.304	4.084	4.033	.243	4.041	4.008	.182	4.012
Mean Aver.																		
Pickands	.616	.312	.691	.664	.200	.694	.740	.123	.750	.548	.373	.663	.632	.278	.691	.710	.203	.738
Hill	1.050	.016	1.050	1.086	.022	1.087	1.193	.034	1.194	1.024	.011	1.024	1.040	.014	1.040	1.066	.019	1.066
Adapted Hill	4.211	.312	4.223	3.725	.226	3.732	3.132	.125	3.134	4.973	.484	4.996	4.423	.336	4.435	3.959	.254	3.967
Moment	-.773	1.278	1.493	-.328	.617	.699	-.145	.337	.367	-.086	.241	.256	-.046	.189	.195	-.020	.154	.155
Mom.-Ratio	1.033	.011	1.033	1.056	.014	1.056	1.124	.022	1.124	1.016	.002	1.016	1.027	.003	1.027	1.043	.004	1.043
QQ	1.039	.014	1.039	1.059	.016	1.059	1.113	.021	1.113	1.014	.007	1.014	1.023	.008	1.023	1.036	.010	1.036
Peng's	-.791	1.281	1.505	-.358	.622	.717	-.214	.344	.405	-.094	.242	.259	-.059	.190	.199	-.042	.155	.161
W	4.733	1.225	4.889	4.301	.589	4.341	4.115	.311	4.127	4.084	.239	4.091	4.044	.186	4.048	4.018	.150	4.020
Med. Aver.																		
Pickands	-.152	.936	.948	-.094	.726	.732	-.026	.536	.537	-.761	2.016	2.155	-.182	1.219	1.232	-.135	.835	.846
Hill	1.050	.018	1.050	1.086	.024	1.087	1.191	.039	1.192	1.023	.012	1.024	1.040	.016	1.040	1.066	.021	1.066
Adapted Hill	4.191	.340	4.204	3.700	.248	3.708	3.110	.148	3.114	4.948	.518	4.975	4.401	.371	4.416	3.939	.277	3.948
Moment	-.376	.788	.873	-.152	.502	.524	-.075	.332	.341	-.050	.242	.247	-.023	.192	.193	-.007	.157	.157
Mom.-Ratio	1.033	.012	1.033	1.056	.015	1.056	1.123	.024	1.123	1.016	.003	1.016	1.026	.003	1.026	1.043	.004	1.043
QQ	1.039	.014	1.039	1.059	.016	1.059	1.112	.022	1.113	1.014	.008	1.014	1.023	.009	1.023	1.035	.011	1.035
Peng's	-.395	.791	.884	-.183	.507	.539	-.145	.341	.371	-.058	.243	.249	-.037	.193	.196	-.030	.159	.162
W	4.363	.766	4.430	4.145	.484	4.173	4.062	.306	4.074	4.049	.239	4.056	4.022	.189	4.027	4.006	.153	4.009
Excess Plots																		
Median	1.094	.037	1.095	1.168	.052	1.169	1.409	.089	1.411	1.045	.024	1.045	1.078	.035	1.079	1.132	.047	1.133
Tr.Mean (1%)	1.065	.022	1.065	1.114	.030	1.115	1.273	.051	1.274	1.027	.012	1.027	1.049	.018	1.050	1.085	.026	1.085
Tr.Mean (5%)	1.065	.022	1.065	1.114	.030	1.115	1.267	.051	1.268	1.026	.012	1.026	1.047	.018	1.047	1.082	.025	1.082
Tr.Mean (10%)	1.060	.021	1.060	1.109	.030	1.109	1.256	.050	1.257	1.024	.011	1.024	1.045	.017	1.045	1.077	.025	1.078

Table A.33 Simulation results of estimation of γ (Uniform distribution(5,10), $\gamma=-1$)

Estimators	n=100									n=1000								
	k=12			k=20			k=40			k=60			k=100			k=160		
	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse	Bias	Std	Rmse
Standard																		
Pickands	-.137	1.119	1.127	-.046	.829	.830	-.016	.548	.548	-1.369	2.138	2.539	-.570	1.407	1.518	-.107	.966	.972
Hill	1.031	.010	1.032	1.053	.013	1.053	1.114	.019	1.114	1.013	.007	1.013	1.024	.009	1.024	1.041	.012	1.041
Adapted Hill	2.433	.292	2.451	2.018	.198	2.028	1.589	.122	1.593	3.244	.474	3.279	2.682	.347	2.704	2.224	.248	2.238
Moment	-.453	1.284	1.362	-.217	.742	.773	-.098	.416	.427	-.082	.315	.325	-.035	.239	.242	-.010	.173	.173
Mom.-Ratio	1.020	.006	1.020	1.035	.008	1.035	1.075	.011	1.075	1.010	.001	1.010	1.017	.002	1.017	1.028	.002	1.028
QQ	1.023	.007	1.023	1.036	.008	1.036	1.067	.010	1.067	1.009	.004	1.009	1.014	.005	1.014	1.023	.006	1.023
Peng's	-.464	1.287	1.368	-.235	.746	.782	-.138	.423	.445	-.087	.315	.327	-.044	.240	.244	-.024	.174	.175
W	4.438	1.238	4.607	4.206	.707	4.265	4.086	.385	4.104	4.081	.311	4.092	4.034	.235	4.041	4.009	.168	4.013
Mean Aver.																		
Pickands	.605	.302	.676	.673	.212	.705	.745	.119	.754	.537	.391	.665	.605	.291	.672	.707	.211	.737
Hill	1.025	.008	1.025	1.041	.010	1.041	1.084	.014	1.084	1.012	.006	1.012	1.020	.007	1.020	1.032	.009	1.032
Adapted Hill	2.669	.299	2.686	2.234	.195	2.243	1.754	.111	1.757	3.421	.472	3.453	2.880	.343	2.900	2.437	.240	2.449
Moment	-.719	1.271	1.460	-.323	.579	.663	-.134	.339	.365	-.088	.231	.248	-.052	.179	.186	-.028	.140	.143
Mom.-Ratio	1.016	.005	1.016	1.027	.007	1.027	1.055	.009	1.055	1.008	.001	1.008	1.013	.001	1.013	1.021	.002	1.021
QQ	1.019	.007	1.019	1.029	.007	1.029	1.052	.009	1.052	1.007	.003	1.007	1.011	.004	1.011	1.017	.005	1.017
Peng's	-.727	1.273	1.466	-.337	.581	.672	-.163	.343	.379	-.092	.232	.249	-.059	.179	.189	-.038	.141	.146
W	4.700	1.241	4.861	4.311	.566	4.348	4.122	.327	4.135	4.088	.230	4.094	4.051	.178	4.055	4.027	.138	4.029
Med. Aver.																		
Pickands	-.184	.905	.923	-.065	.777	.780	-.011	.514	.514	-.925	2.042	2.242	-.329	1.318	1.358	-.129	.875	.885
Hill	1.025	.009	1.025	1.041	.011	1.041	1.084	.016	1.084	1.011	.006	1.011	1.019	.008	1.019	1.032	.010	1.032
Adapted Hill	2.649	.326	2.669	2.213	.216	2.223	1.738	.130	1.743	3.400	.517	3.439	2.860	.366	2.884	2.419	.267	2.433
Moment	-.336	.717	.792	-.161	.498	.523	-.077	.331	.340	-.053	.231	.237	-.029	.180	.183	-.014	.143	.144
Mom.-Ratio	1.016	.005	1.016	1.027	.007	1.027	1.055	.010	1.055	1.008	.001	1.008	1.013	.001	1.013	1.021	.002	1.021
QQ	1.019	.007	1.019	1.029	.008	1.029	1.052	.009	1.052	1.007	.003	1.007	1.011	.004	1.011	1.017	.005	1.017
Peng's	-.345	.719	.797	-.175	.500	.530	-.107	.335	.351	-.057	.231	.238	-.036	.181	.184	-.025	.144	.146
W	4.331	.708	4.388	4.158	.490	4.186	4.072	.319	4.085	4.053	.230	4.059	4.029	.179	4.033	4.014	.141	4.017
Excess Plots																		
Median	1.046	.018	1.046	1.077	.022	1.077	1.166	.034	1.167	1.023	.013	1.023	1.038	.016	1.038	1.063	.022	1.063
Tr.Mean (1%)	1.031	.010	1.032	1.053	.013	1.053	1.114	.019	1.114	1.013	.007	1.013	1.024	.009	1.024	1.040	.012	1.040
Tr.Mean (5%)	1.031	.010	1.032	1.053	.013	1.053	1.111	.019	1.111	1.013	.007	1.013	1.023	.009	1.023	1.039	.011	1.039
Tr.Mean (10%)	1.029	.010	1.029	1.051	.013	1.051	1.106	.018	1.106	1.012	.006	1.012	1.021	.008	1.022	1.037	.011	1.037