

Results of the Simulation Study of Continuous Data

with fixed $y_1 = 0$ Table 1: The results summarized from 1000 replications of the data of $N = 10$ individuals with each having $T = 5$ observations and a fixed $y_1 = 0$

		True ^a	Est. ^b	Bias.abs ^c	Bias.rel ^d	SE.emp ^e	SE.avg ^f	MSE ^g	Cover ^h	Code ⁱ	
P.L. ^j	Exact ^k	μ	0	-0.0027	0.0027	0.0027	0.0640	0.0574	0.0041	0.9440	
		α	0.5	0.3567	0.1433	0.2867	0.1399	0.1318	0.0401	0.8250	3
		ψ	0.25	0.1942	0.0558	0.2234	0.0466	0.0392	0.0053	0.5990	
	Cond. ^l	μ	0	-0.0039	0.0039	0.0039	0.0884	0.0782	0.0078	0.9200	
		α	0.5	0.4534	0.0466	0.0932	0.1794	0.1693	0.0344	0.9330	3
		ψ	0.25	0.2372	0.0128	0.0510	0.0572	0.0531	0.0034	0.8750	
P.D. ^m	Exact	μ	0	-0.0032	0.0032	0.0032	0.0708	0.0641	0.0050	0.9370	
		α	0.5	0.3245	0.1755	0.3509	0.1325	0.1325	0.0484	0.7630	2
		ψ	0.25	0.2039	0.0461	0.1845	0.0501	0.0408	0.0046	0.6480	
	Cond.	μ	0	-0.0033	0.0033	0.0033	0.0729	0.0660	0.0053	0.9350	
		α	0.5	0.3310	0.1690	0.3381	0.1353	0.1355	0.0469	0.7790	2
		ψ	0.25	0.2078	0.0422	0.1686	0.0511	0.0420	0.0044	0.6830	

^a The true value of the corresponding parameter.^b The average of the estimate of the corresponding parameter across 1000 replications.^c The absolute bias of the estimate.^d The relative bias of the estimate.^e The empirical s.e. across 1000 replications.^f The average of the s.e. obtained from the model.^g The mean square error of the estimate, $MSE = Bias.abs^2 + SE.emp^2$.^h The coverage probability of the estimate.ⁱ The maximum of the convergence code across 1000 replications.^j The method of pooling likelihood functions.^k Parameters are estimated by maximizing the exact likelihood function of the original data.^l Parameters are estimated by maximizing the conditional likelihood function of the original data.^m The method of pooling data (connecting data directly).Table 2: The results summarized from 1000 replications of the data of $N = 50$ individuals with each having $T = 5$ observations and a fixed $y_1 = 0$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	-0.0008	0.0008	0.0008	0.0258	0.0254	0.0007	0.9570	
		α	0.5	0.3862	0.1138	0.2275	0.0599	0.0583	0.0165	0.5230	2
		ψ	0.25	0.2006	0.0494	0.1975	0.0199	0.0181	0.0028	0.2600	
	Cond.	μ	0	-0.0011	0.0011	0.0011	0.0364	0.0353	0.0013	0.9460	
		α	0.5	0.4903	0.0097	0.0195	0.0766	0.0752	0.0060	0.9450	2
		ψ	0.25	0.2477	0.0023	0.0091	0.0247	0.0248	0.0006	0.9430	
P.D.	Exact	μ	0	-0.0011	0.0011	0.0011	0.0286	0.0290	0.0008	0.9550	
		α	0.5	0.3553	0.1447	0.2893	0.0552	0.0590	0.0240	0.2980	2
		ψ	0.25	0.2107	0.0393	0.1574	0.0213	0.0189	0.0020	0.4410	
	Cond.	μ	0	-0.0011	0.0011	0.0011	0.0288	0.0292	0.0008	0.9550	
		α	0.5	0.3568	0.1432	0.2865	0.0554	0.0593	0.0236	0.3120	2
		ψ	0.25	0.2115	0.0385	0.1540	0.0214	0.0190	0.0019	0.4600	

Note: With the same notations as in Table 1.

Table 3: The results summarized from 1000 replications of the data of $N = 10$ individuals with each having $T = 30$ observations and a fixed $y_1 = 0$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	0.0009	0.0009	0.0009	0.0279	0.0275	0.0008	0.9530	2
		α	0.5	0.4737	0.0263	0.0526	0.0506	0.0501	0.0033	0.9250	
		ψ	0.25	0.2393	0.0107	0.0429	0.0199	0.0196	0.0005	0.8870	
	Cond.	μ	0	0.0010	0.0010	0.0010	0.0297	0.0293	0.0009	0.9530	2
		α	0.5	0.4897	0.0103	0.0205	0.0523	0.0523	0.0028	0.9520	
		ψ	0.25	0.2474	0.0026	0.0105	0.0206	0.0206	0.0004	0.9340	
P.D.	Exact	μ	0	0.0010	0.0010	0.0010	0.0289	0.0284	0.0008	0.9480	2
		α	0.5	0.4727	0.0273	0.0546	0.0512	0.0507	0.0034	0.9280	
		ψ	0.25	0.2415	0.0085	0.0339	0.0202	0.0197	0.0005	0.8970	
	Cond.	μ	0	0.0010	0.0010	0.0010	0.0290	0.0286	0.0008	0.9480	2
		α	0.5	0.4743	0.0257	0.0515	0.0513	0.0509	0.0033	0.9320	
		ψ	0.25	0.2423	0.0077	0.0307	0.0202	0.0198	0.0005	0.9050	

Note: With the same notations as in Table 1.

Table 4: The results summarized from 1000 replications of the data of $N = 50$ individuals with each having $T = 30$ observations and a fixed $y_1 = 0$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	0.0002	0.0002	0.0002	0.0126	0.0123	0.0002	0.9450	2
		α	0.5	0.4810	0.0190	0.0380	0.0225	0.0223	0.0009	0.8680	
		ψ	0.25	0.2413	0.0087	0.0348	0.0087	0.0088	0.0002	0.8280	
	Cond.	μ	0	0.0002	0.0002	0.0002	0.0134	0.0131	0.0002	0.9450	2
		α	0.5	0.4974	0.0026	0.0052	0.0233	0.0233	0.0005	0.9590	
		ψ	0.25	0.2495	0.0005	0.0019	0.0090	0.0093	0.0001	0.9560	
P.D.	Exact	μ	0	0.0002	0.0002	0.0002	0.0131	0.0128	0.0002	0.9410	2
		α	0.5	0.4802	0.0198	0.0397	0.0227	0.0226	0.0009	0.8580	
		ψ	0.25	0.2438	0.0062	0.0248	0.0088	0.0089	0.0001	0.8720	
	Cond.	μ	0	0.0002	0.0002	0.0002	0.0131	0.0128	0.0002	0.9410	2
		α	0.5	0.4805	0.0195	0.0391	0.0227	0.0227	0.0009	0.8600	
		ψ	0.25	0.2440	0.0060	0.0241	0.0088	0.0089	0.0001	0.8780	

Note: With the same notations as in Table 1.

Results with $y_1 \sim N(0, \psi)$ Table 5: The results summarized from 1000 replications of the data of $N = 10$ individuals with each having $T = 5$ observations and a random $y_1 \sim N(0, \psi)$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	-0.0007	0.0007	0.0007	0.0657	0.0604	0.0043	0.9470	2
		α	0.5	0.4387	0.0613	0.1225	0.1345	0.1318	0.0218	0.9370	
		ψ	0.25	0.2301	0.0199	0.0795	0.0481	0.0466	0.0027	0.8550	
	Cond.	μ	0	-0.0008	0.0008	0.0008	0.0874	0.0786	0.0076	0.9230	3
		α	0.5	0.4638	0.0362	0.0724	0.1491	0.1443	0.0235	0.9310	
		ψ	0.25	0.2382	0.0118	0.0473	0.0550	0.0533	0.0032	0.8890	
P.D.	Exact	μ	0	-0.0009	0.0009	0.0009	0.0753	0.0713	0.0057	0.9450	2
		α	0.5	0.3613	0.1387	0.2775	0.1322	0.1312	0.0367	0.8450	
		ψ	0.25	0.2512	0.0012	0.0048	0.0535	0.0503	0.0029	0.9140	
	Cond.	μ	0	-0.0004	0.0004	0.0004	0.0772	0.0729	0.0060	0.9370	2
		α	0.5	0.3621	0.1379	0.2757	0.1331	0.1319	0.0367	0.8470	
		ψ	0.25	0.2517	0.0017	0.0069	0.0537	0.0509	0.0029	0.9170	

Note: With the same notations as in Table 1.

Table 6: The results summarized from 1000 replications of the data of 50 individuals with each having 30 observations and a random $y_1 \sim N(0, \psi)$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	0.0007	0.0007	0.0007	0.0125	0.0125	0.0002	0.9490	2
		α	0.5	0.4949	0.0051	0.0103	0.0236	0.0225	0.0006	0.9320	
		ψ	0.25	0.2474	0.0026	0.0103	0.0092	0.0090	0.0001	0.9280	
	Cond.	μ	0	0.0009	0.0009	0.0009	0.0132	0.0131	0.0002	0.9480	2
		α	0.5	0.4989	0.0011	0.0022	0.0241	0.0229	0.0006	0.9340	
		ψ	0.25	0.2494	0.0006	0.0022	0.0094	0.0093	0.0001	0.9390	
P.D.	Exact	μ	0	0.0007	0.0007	0.0007	0.0130	0.0130	0.0002	0.9490	2
		α	0.5	0.4822	0.0178	0.0356	0.0238	0.0226	0.0009	0.8650	
		ψ	0.25	0.2521	0.0021	0.0084	0.0094	0.0092	0.0001	0.9300	
	Cond.	μ	0	0.0007	0.0007	0.0007	0.0131	0.0130	0.0002	0.9480	2
		α	0.5	0.4823	0.0177	0.0355	0.0238	0.0226	0.0009	0.8680	
		ψ	0.25	0.2521	0.0021	0.0086	0.0094	0.0092	0.0001	0.9280	

Note: With the same notations as in Table 1.

Results with $y_1 \sim N(\frac{\mu}{1-\alpha}, \frac{\psi}{1-\alpha^2})$

Table 5: The results summarized from 1000 replications of the data of 10 individuals with each having 5 observations and a random $y_1 \sim N(\frac{\mu}{1-\alpha}, \frac{\psi}{1-\alpha^2})$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	-0.0006	0.0006	0.0006	0.0692	0.0616	0.0048	0.9400	
		α	0.5	0.4561	0.0439	0.0879	0.1384	0.1325	0.0211	0.9380	3
		ψ	0.25	0.2417	0.0083	0.0333	0.0501	0.0490	0.0026	0.9010	
	Cond.	μ	0	-0.0011	0.0011	0.0011	0.0896	0.0789	0.0080	0.9120	
		α	0.5	0.4603	0.0397	0.0794	0.1505	0.1392	0.0242	0.9250	3
		ψ	0.25	0.2382	0.0118	0.0470	0.0551	0.0533	0.0032	0.8920	
P.D.	Exact	μ	0	-0.0004	0.0004	0.0004	0.0800	0.0736	0.0064	0.9310	
		α	0.5	0.3666	0.1334	0.2669	0.1324	0.1311	0.0353	0.8500	2
		ψ	0.25	0.2670	0.0170	0.0680	0.0586	0.0534	0.0037	0.9230	
	Cond.	μ	0	-0.0011	0.0011	0.0011	0.0820	0.0752	0.0067	0.9290	
		α	0.5	0.3662	0.1338	0.2675	0.1327	0.1315	0.0355	0.8490	2
		ψ	0.25	0.2668	0.0168	0.0672	0.0593	0.0539	0.0038	0.9190	

Note: With the same notations as in Table 1.

Table 6: The results summarized from 1000 replications of the data of 50 individuals with each having 30 observations and a random $y_1 \sim N(\frac{\mu}{1-\alpha}, \frac{\psi}{1-\alpha^2})$

		True	Est.	Bias.abs	Bias.rel	SE.emp	SE.avg	MSE	Cover	Code	
P.L.	Exact	μ	0	-0.0002	0.0002	0.0002	0.0127	0.0125	0.0002	0.9540	
		α	0.5	0.4998	0.0002	0.0003	0.0220	0.0225	0.0005	0.9470	2
		ψ	0.25	0.2495	0.0005	0.0021	0.0091	0.0091	0.0001	0.9570	
	Cond.	μ	0	-0.0001	0.0001	0.0001	0.0134	0.0131	0.0002	0.9540	
		α	0.5	0.4997	0.0003	0.0007	0.0222	0.0227	0.0005	0.9440	2
		ψ	0.25	0.2494	0.0006	0.0024	0.0093	0.0093	0.0001	0.9530	
P.D.	Exact	μ	0	-0.0002	0.0002	0.0002	0.0132	0.0130	0.0002	0.9560	
		α	0.5	0.4833	0.0167	0.0334	0.0222	0.0226	0.0008	0.8900	2
		ψ	0.25	0.2549	0.0049	0.0195	0.0095	0.0093	0.0001	0.9260	
	Cond.	μ	0	-0.0002	0.0002	0.0002	0.0133	0.0131	0.0002	0.9560	
		α	0.5	0.4833	0.0167	0.0334	0.0221	0.0226	0.0008	0.8900	2
		ψ	0.25	0.2549	0.0049	0.0195	0.0095	0.0093	0.0001	0.9260	

Note: With the same notations as in Table 1.