

Supplementary data

Table 1: Simulation I results

Bias of the beta estimates, standard error and confidence intervals of different imputation results compared to the original full dataset

Type	Missingness (percent)	Missingness mechanism	Estimate	Std. error	2.50%	97.50%
Complete case	10	MAR	0.0008	1.0577	0.0004	0.0011
Multiple imputation	10	MAR	-0.0033	1.6242	-0.0074	0.0007
Single imputation	10	MAR	0.0014	0.9929	0.0014	0.0013
Complete case	25	MAR	-0.0014	1.2031	-0.0027	-0.0001
Multiple imputation	25	MAR	-0.0020	2.2217	-0.0096	0.0056
Single imputation	25	MAR	0.0001	1.0654	-0.0003	0.0005
Complete case	40	MAR	-0.0021	1.3082	-0.0041	-0.0002
Multiple imputation	40	MAR	-0.0076	2.1663	-0.0149	-0.0003
Single imputation	40	MAR	-0.0070	1.2819	-0.0088	-0.0053
Complete case	55	MAR	0.0044	1.6530	0.0003	0.0085
Multiple imputation	55	MAR	-0.0051	3.5173	-0.0207	0.0105
Single imputation	55	MAR	-0.0025	1.8942	-0.0082	0.0031
Complete case	10	MCAR	0.0009	1.0263	0.0007	0.0011
Multiple imputation	10	MCAR	0.0012	1.0714	0.0007	0.0016

Single imputation	10	MCAR	0.0015	0.9815	0.0016	0.0014
Complete case	25	MCAR	-0.0006	1.1458	-0.0015	0.0003
Multiple imputation	25	MCAR	-0.0049	1.6375	-0.0089	-0.0008
Single imputation	25	MCAR	-0.0036	1.1866	-0.0048	-0.0025
Complete case	40	MCAR	-0.0021	1.3011	-0.0040	-0.0002
Multiple imputation	40	MCAR	0.0005	1.8279	-0.0048	0.0057
Single imputation	40	MCAR	0.0032	1.5406	-0.0002	0.0066
Complete case	55	MCAR	-0.0002	1.4918	-0.0033	0.0030
Multiple imputation	55	MCAR	0.0033	2.5927	-0.0067	0.0132
Single imputation	55	MCAR	0.0012	1.5033	-0.0020	0.0044

Table 2: Simulation II results

Bias of the beta estimates, standard error and confidence intervals of different imputation results compared to the original full dataset

Type	Missingness (percent)	Missingness mechanism	Estimate	Std. error	2.5%	97.5%
Complete case	10	MAR	-0.0013	1.0657	-0.0017	-0.0009
Multiple imputation	10	MAR	-0.0022	1.1361	-0.0031	-0.0013
Single imputation	10	MAR	-0.0036	1.0490	-0.0039	-0.0033
Complete case	25	MAR	0.0000	1.2098	-0.0014	0.0013

Multiple imputation	25	MAR	-0.0001	2.6300	-0.0103	0.0102
Single imputation	25	MAR	0.0105	2.6791	-0.0001	0.0211
Complete case	40	MAR	-0.0018	1.3983	-0.0044	0.0007
Multiple imputation	40	MAR	0.0017	3.1344	-0.0116	0.0150
Single imputation	40	MAR	0.0016	1.7751	-0.0033	0.0065
Complete case	55	MAR	0.0000	1.6034	-0.0038	0.0038
Multiple imputation	55	MAR	0.0106	3.6135	-0.0059	0.0270
Single imputation	55	MAR	0.0133	1.5911	0.0096	0.0170
Complete case	10	MCAR	-0.0002	1.0449	-0.0004	0.0001
Multiple imputation	10	MCAR	-0.0001	1.0547	-0.0004	0.0003
Single imputation	10	MCAR	0.0003	0.9964	0.0003	0.0003
Complete case	25	MCAR	-0.0010	1.1678	-0.0021	0.0000
Multiple imputation	25	MCAR	-0.0019	1.7480	-0.0065	0.0026
Single imputation	25	MCAR	-0.0013	1.1867	-0.0024	-0.0001
Complete case	40	MCAR	0.0002	1.4170	-0.0025	0.0028
Multiple imputation	40	MCAR	0.0001	2.2443	-0.0077	0.0078
Single imputation	40	MCAR	-0.0082	1.5263	-0.0115	-0.0048
Complete case	55	MCAR	-0.0002	1.5045	-0.0034	0.0030

Multiple imputation	55	MCAR	-0.0202	3.9316	-0.0382	-0.0021
Single imputation	55	MCAR	-0.0224	1.7155	-0.0269	-0.0179

Table 3: Simulation III results

Bias of the beta estimates, standard error and confidence intervals of different imputation results compared to the original full dataset

Type	Missingness (percent)	Missingness mechanism	Estimate	Std. error	2.5%	97.5%
Complete case	10	MAR	0.0008	1.0650	0.0004	0.0012
Multiple imputation	10	MAR	-0.0008	1.3106	-0.0028	0.0012
Single imputation	10	MAR	0.0019	1.0106	0.0018	0.0019
Complete case	25	MAR	0.0013	1.1996	0.0001	0.0026
Multiple imputation	25	MAR	-0.0026	1.6381	-0.0066	0.0015
Single imputation	25	MAR	0.0012	1.0470	0.0009	0.0015
Complete case	40	MAR	-0.0014	1.3102	-0.0034	0.0005
Multiple imputation	40	MAR	-0.0040	2.2080	-0.0112	0.0033
Single imputation	40	MAR	-0.0025	1.1865	-0.0037	-0.0014
Complete case	55	MAR	-0.0008	1.6253	-0.0048	0.0031
Multiple imputation	55	MAR	0.0049	3.5128	-0.0106	0.0203
Single imputation	55	MAR	0.0012	1.4126	-0.0014	0.0038

Complete case	10	MCAR	0.0004	1.0605	0.0000	0.0007
Multiple imputation	10	MCAR	0.0001	1.1683	-0.0010	0.0012
Single imputation	10	MCAR	0.0002	1.0303	0.0000	0.0004
Complete case	25	MCAR	0.0000	1.1418	-0.0008	0.0009
Multiple imputation	25	MCAR	-0.0004	1.4312	-0.0031	0.0024
Single imputation	25	MCAR	0.0013	1.1591	0.0003	0.0023
Complete case	40	MCAR	-0.0025	1.2640	-0.0042	-0.0009
Multiple imputation	40	MCAR	-0.0097	2.0798	-0.0165	-0.0029
Single imputation	40	MCAR	-0.0003	1.3641	-0.0026	0.0020
Complete case	55	MCAR	-0.0003	1.4933	-0.0034	0.0029
Multiple imputation	55	MCAR	0.0040	2.2389	-0.0039	0.0120
Single imputation	55	MCAR	0.0057	1.2765	0.0040	0.0074