Linear Model Simulations

Kellie Ottoboni
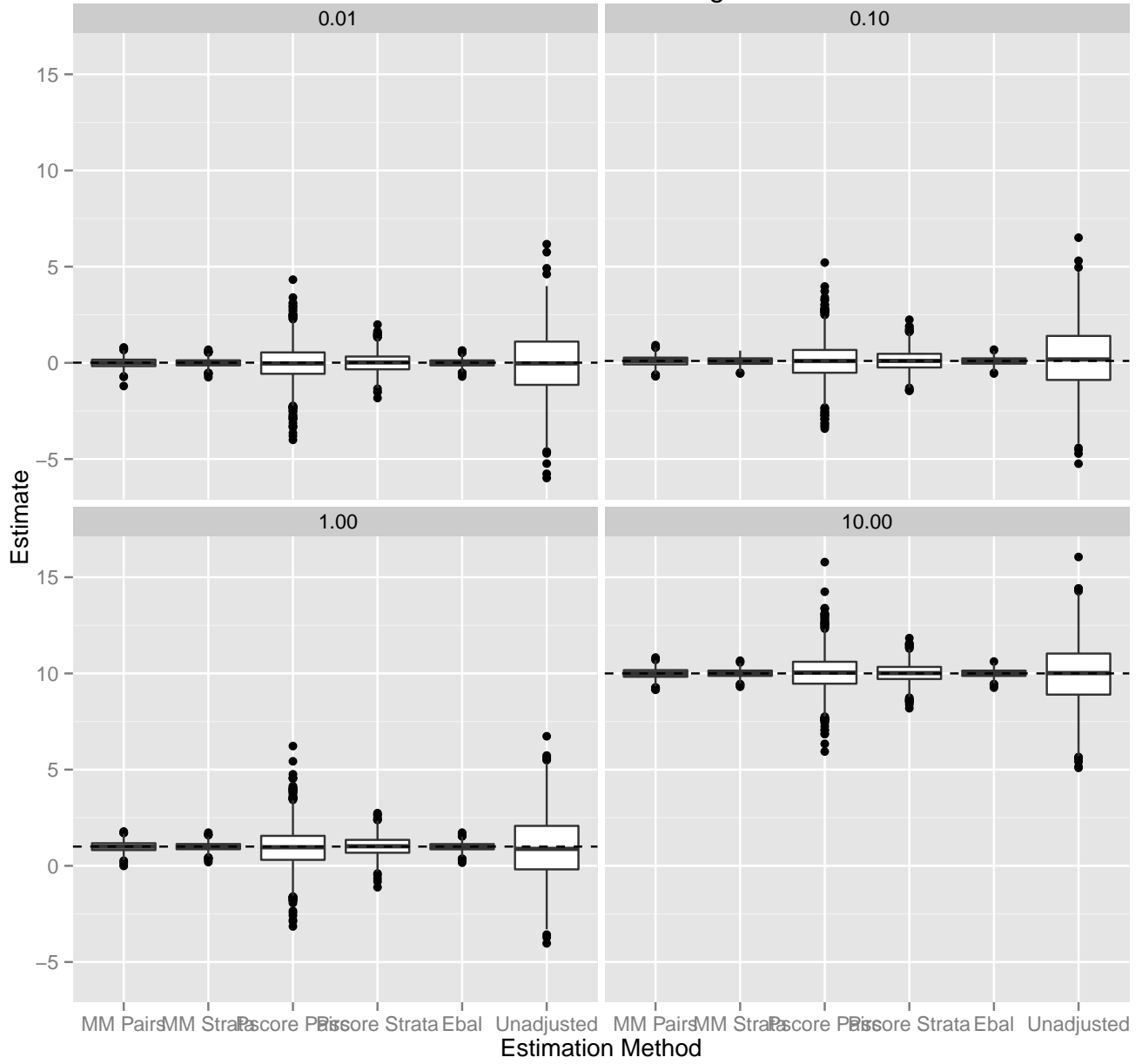
February 6, 2016

Set simulation parameters

```
set.seed(321)
gamma <- c(0.01, 0.1, 1, 10)
B <- 1000
N <- 100
```
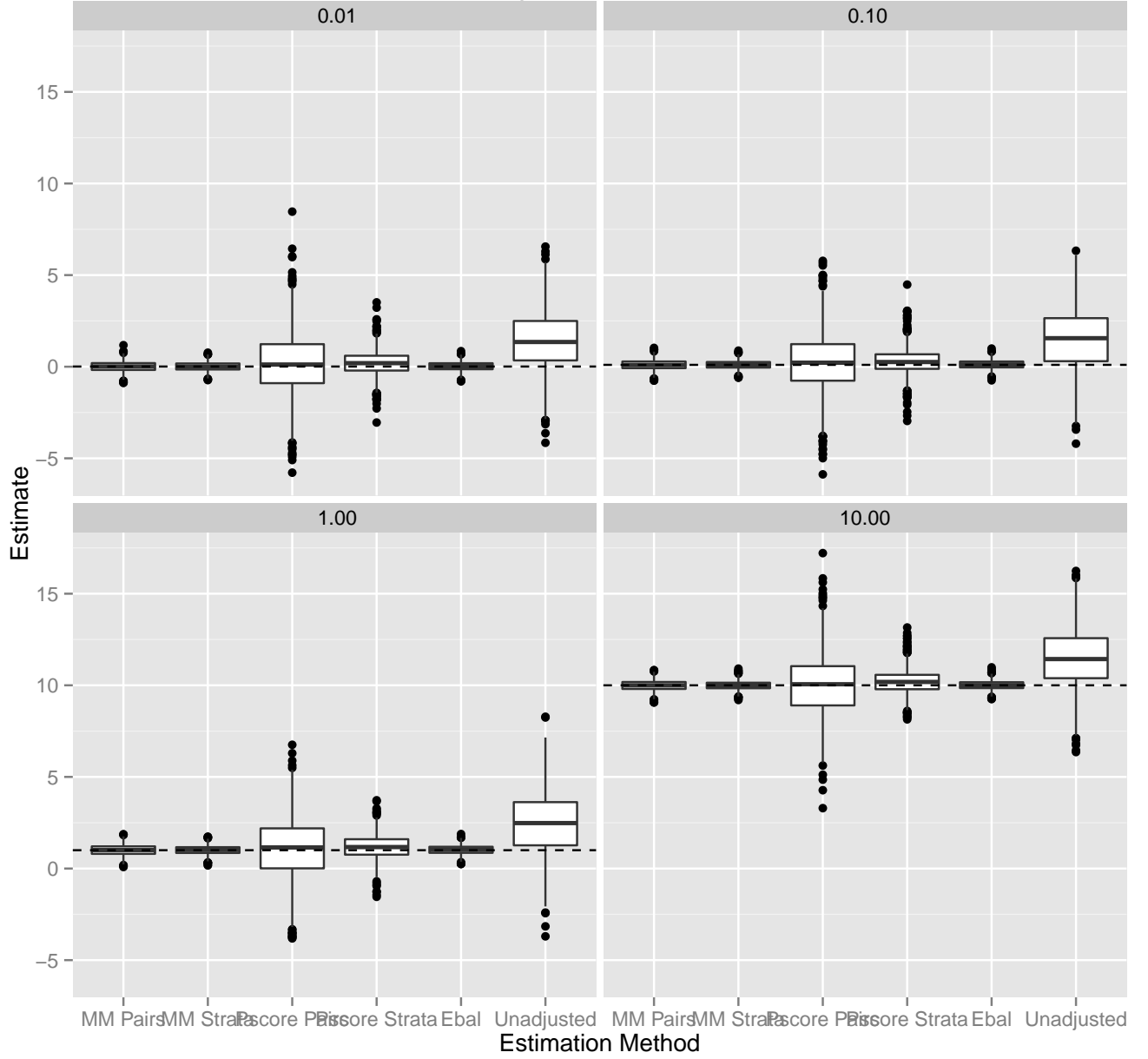
1 Gaussian Errors in the Linear Model

Estimates of Varying Levels of Constant Additive Treatment Effects
Random Treatment Assignment

	0.01	0.1	1	10
MM Pairs	0.257	0.263	0.264	0.260
MM Strata	0.203	0.200	0.210	0.204
Pscore Pairs	1.030	1.033	1.139	1.043
Pscore Strata	0.520	0.548	0.519	0.512
Ebal	0.206	0.201	0.212	0.205
Unadjusted	1.683	1.705	1.646	1.579

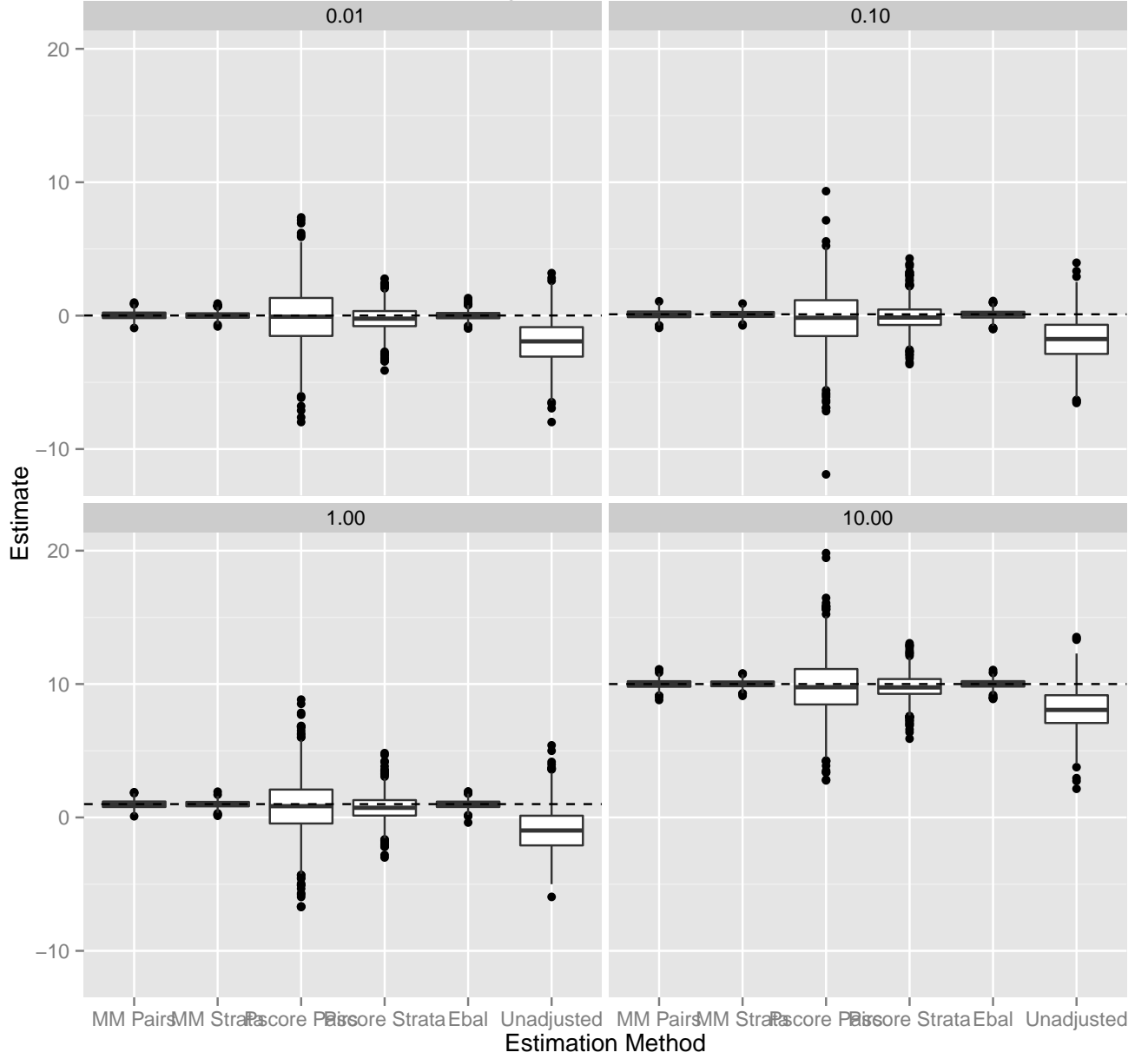Table 1: RMSE for various treatment effects; Random Treatment Assignment

Estimates of Varying Levels of Constant Additive Treatment Effects
Treatment Assignment with Cov(T, X1) = 0.5

	0.01	0.1	1	10
MM Pairs	0.287	0.291	0.296	0.296
MM Strata	0.239	0.234	0.234	0.237
Pscore Pairs	1.736	1.661	1.686	1.701
Pscore Strata	0.705	0.735	0.683	0.689
Ebal	0.250	0.243	0.251	0.248
Unadjusted	2.132	2.220	2.238	2.229

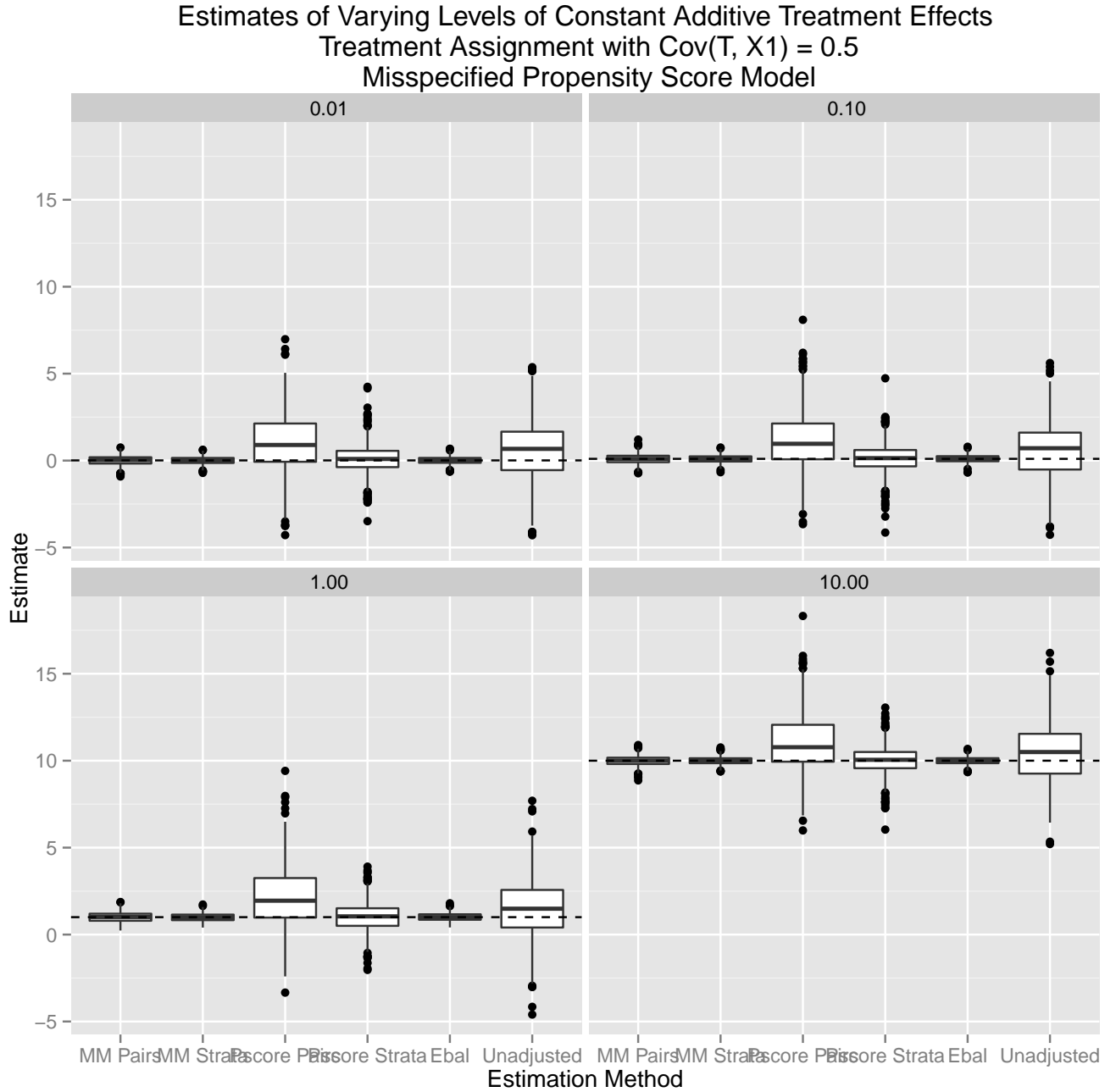Table 2: RMSE for various treatment effects; Treatment Assignment with $cov(T, X_1) = 0.5$

Estimates of Varying Levels of Constant Additive Treatment Effects
Treatment Assignment with Cov(T, X1) = −0.75

	0.01	0.1	1	10
MM Pairs	0.302	0.313	0.292	0.304
MM Strata	0.256	0.266	0.245	0.262
Pscore Pairs	2.143	2.160	2.134	2.164
Pscore Strata	0.945	1.057	0.991	0.967
Ebal	0.310	0.319	0.300	0.308
Unadjusted	2.555	2.476	2.564	2.489

Table 3: RMSE for various treatment effects; Treatment Assignment with $cov(T, X_1) = -0.75$
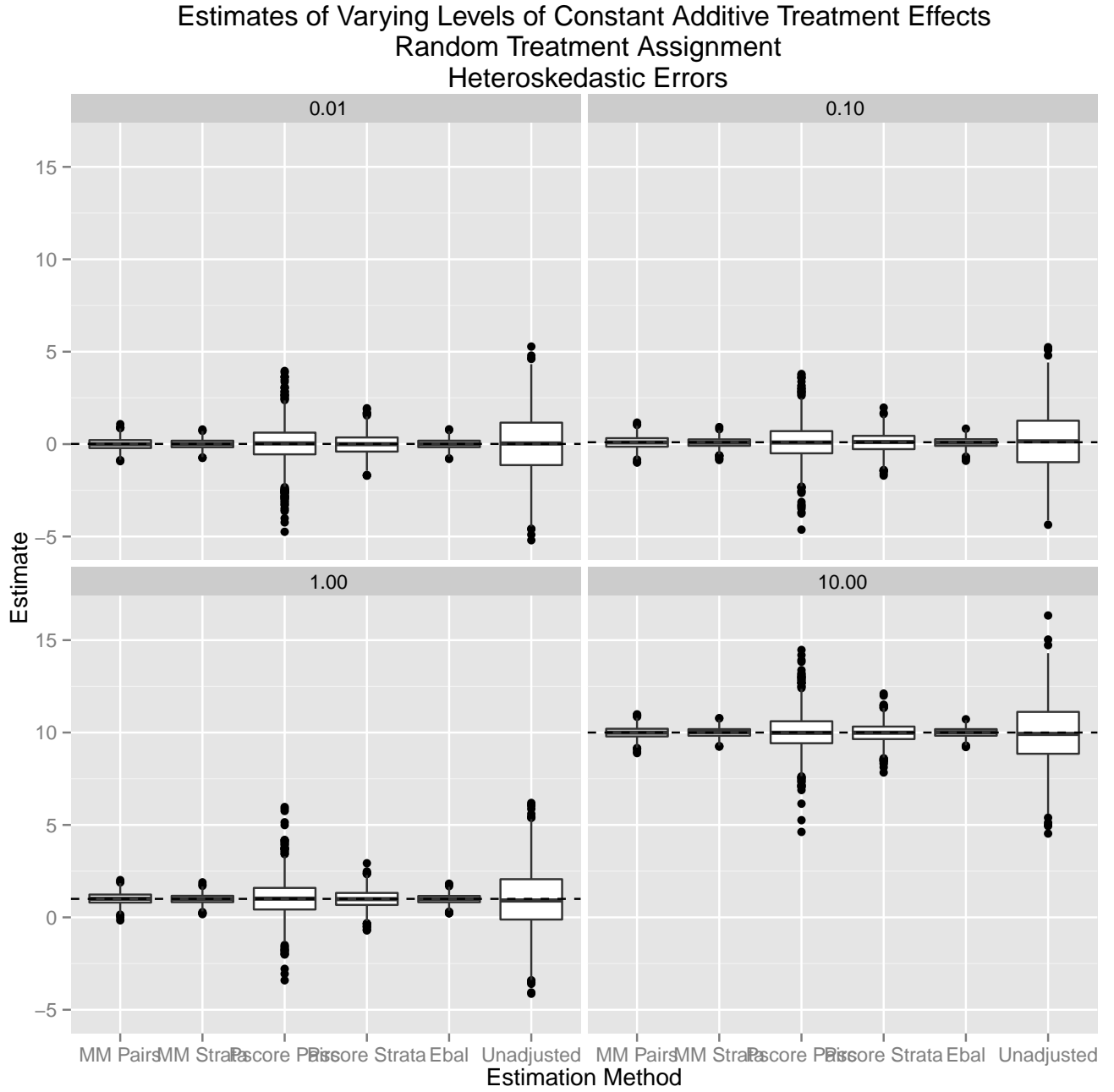
4

2 Misspecified Propensity Score Estimates

Estimates of Varying Levels of Constant Additive Treatment Effects
Treatment Assignment with Cov(T, X1) = 0.5
Misspecified Propensity Score Model

	0.01	0.1	1	10
MM Pairs	0.277	0.273	0.288	0.279
MM Strata	0.215	0.214	0.221	0.214
Pscore Pairs	1.912	1.893	2.035	1.909
Pscore Strata	0.825	0.804	0.810	0.788
Ebal	0.213	0.214	0.223	0.213
Unadjusted	1.748	1.704	1.740	1.751

Table 4: RMSE for various treatment effects; Treatment Assignment with $cov(T, X_1) = 0.5$; Misspecified Propensity Score Model
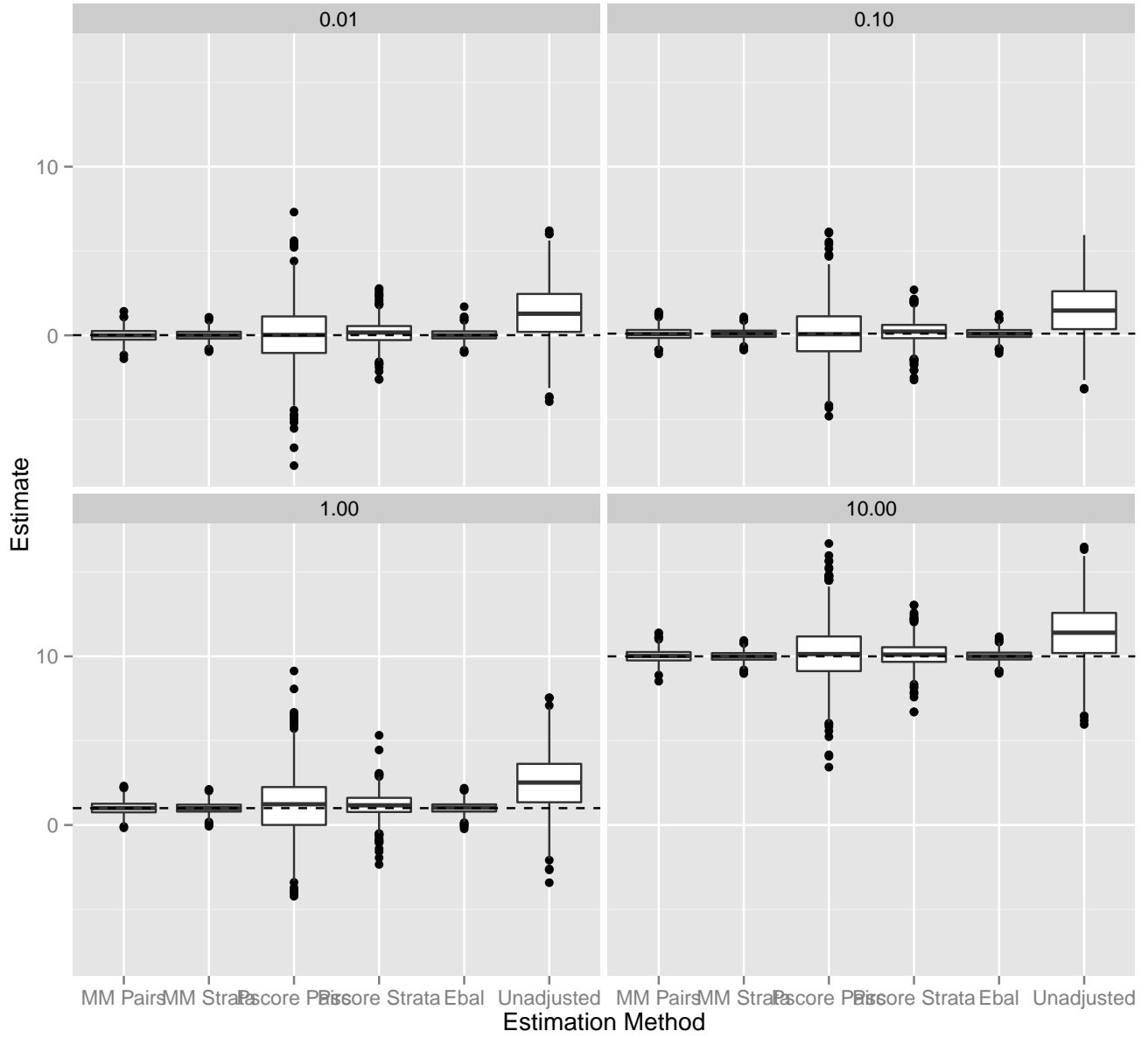
3 Heteroskedastic Linear Model Errors

Estimates of Varying Levels of Constant Additive Treatment Effects
Random Treatment Assignment
Heteroskedastic Errors

	0.01	0.1	1	10
MM Pairs	0.330	0.343	0.325	0.330
MM Strata	0.261	0.261	0.252	0.263
Pscore Pairs	1.115	1.049	1.068	1.084
Pscore Strata	0.554	0.545	0.510	0.542
Ebal	0.262	0.262	0.251	0.265
Unadjusted	1.678	1.630	1.708	1.635

Table 5: RMSE for various treatment effects; Random Treatment Assignment; Heteroskedastic Errors
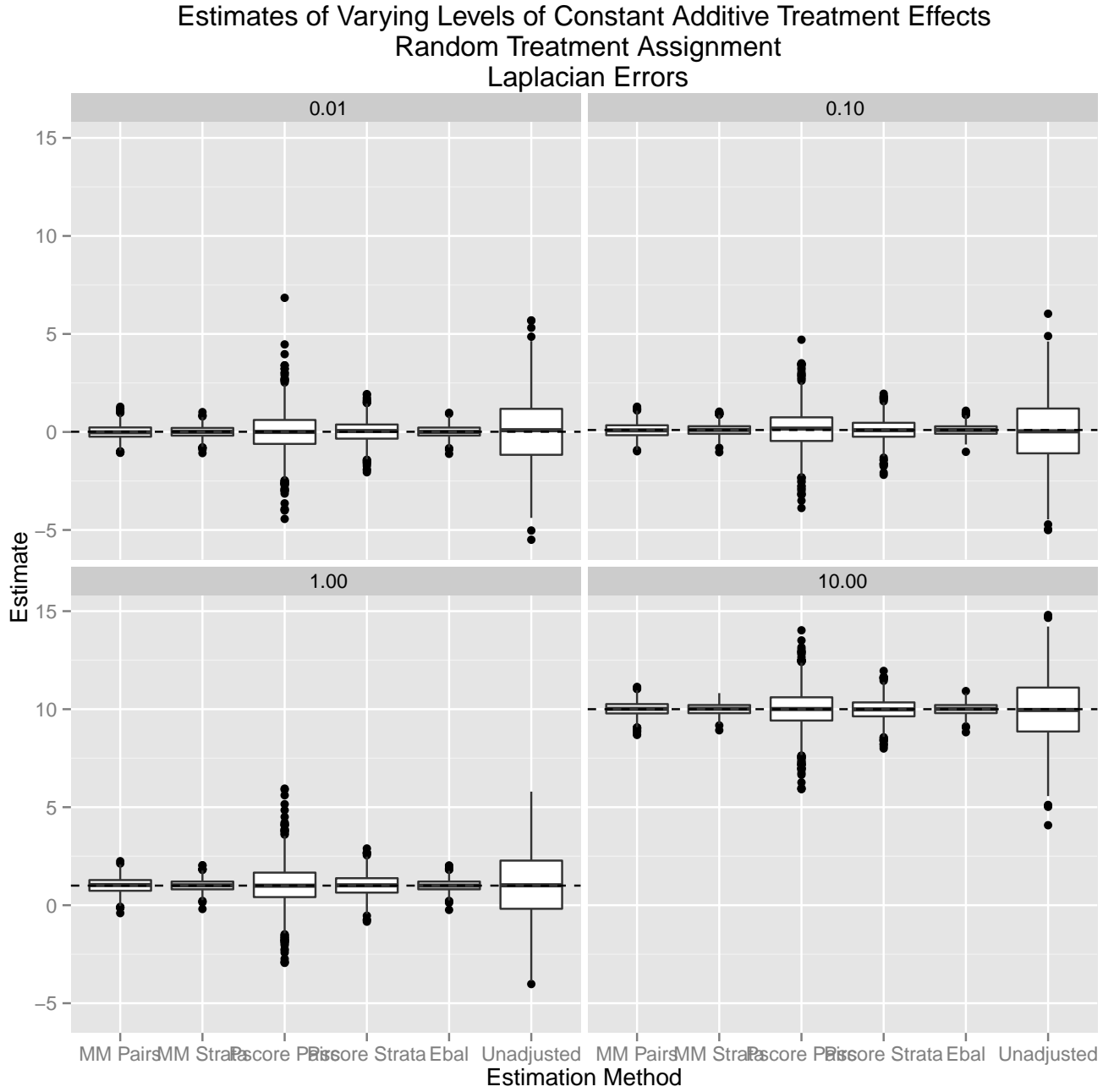
Estimates of Varying Levels of Constant Additive Treatment Effects
Treatment Assignment with Cov(T, X1) = 0.5
Heteroskedastic Errors

	0.01	0.1	1	10
MM Pairs	0.366	0.364	0.364	0.373
MM Strata	0.304	0.294	0.301	0.297
Pscore Pairs	1.732	1.610	1.741	1.742
Pscore Strata	0.689	0.680	0.733	0.715
Ebal	0.318	0.313	0.319	0.310
Unadjusted	2.167	2.140	2.229	2.207

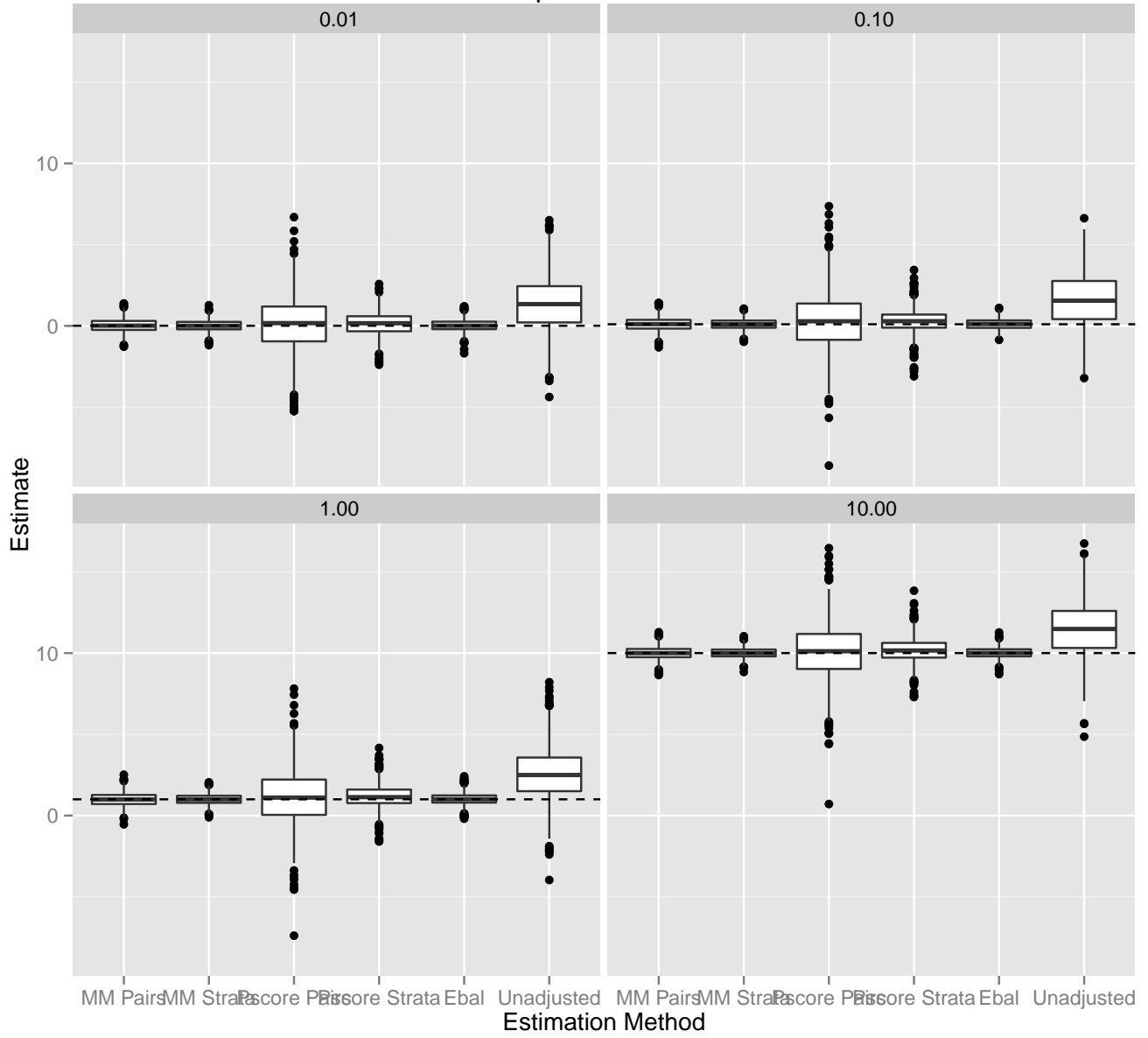Table 6: RMSE for various treatment effects; Treatment Assignment with $cov(T, X_1) = 0.5$; Heteroskedastic Errors

4 Heavy-tailed Linear Model Errors

Estimates of Varying Levels of Constant Additive Treatment Effects
Random Treatment Assignment
Laplacian Errors

	0.01	0.1	1	10
MM Pairs	0.363	0.376	0.388	0.382
MM Strata	0.285	0.293	0.304	0.301
Pscore Pairs	1.109	1.076	1.126	1.073
Pscore Strata	0.586	0.569	0.567	0.581
Ebal	0.286	0.292	0.304	0.297
Unadjusted	1.737	1.665	1.673	1.685

Table 7: RMSE for various treatment effects; Random Treatment Assignment; Laplacian Errors

Estimates of Varying Levels of Constant Additive Treatment Effects
Treatment Assignment with Cov(T, X1) = 0.5
Laplacian Errors

	0.01	0.1	1	10
MM Pairs	0.409	0.402	0.412	0.401
MM Strata	0.343	0.329	0.337	0.328
Pscore Pairs	1.677	1.736	1.723	1.718
Pscore Strata	0.706	0.756	0.728	0.771
Ebal	0.357	0.336	0.356	0.344
Unadjusted	2.164	2.192	2.266	2.225

Table 8: RMSE for various treatment effects; Treatment Assignment with $cov(T, X_1) = 0.5$; Laplacian Errors