

Statin Simulation Report

Haodong Li

2022-10-03

Simulation

DGD:

$$\begin{aligned}W_1 &\sim Unif(-1, 1) \\W_2 &\sim Unif(-1, 1) \\A &\sim Bernoulli(p) \text{ where } p = \text{expit}(0.1 * W_1 * W_2 - 0.4 * W_1) \\ \tau &= W_1^2 * (W_1 + 7/5) + (5 * W_2/3)^2 \\ \mu_Y &= A * \tau + W_1 * W_2 + 2 * W_2^2 - W_1 \\ Y &\sim N(\mu_Y, 1)\end{aligned}$$

Models:

- 1) GAM: General Additive Models (Correctly specified based on true DGD of Q and g)
- 2) Earth: Multivariate Adaptive Regression Splines
- 3) HAL: Highly Adaptive Lasso

CATE estimation

- 1) DR-learner: regress pseudo outcome estimates φ_n^0 on W .
- 2) T-learner: just use $\bar{Q}_n^0(1, W) - \bar{Q}_n^0(0, W)$

Truncation:

$g_n \in [0.025, 0.975]$.

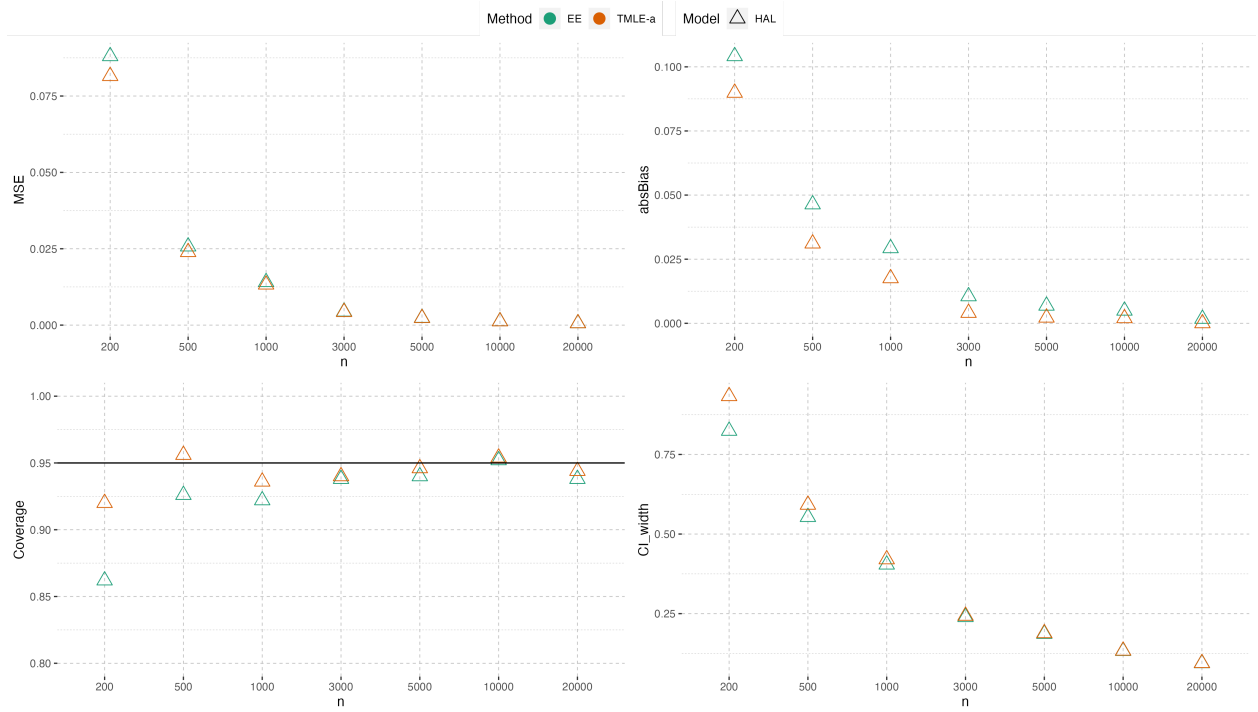


Figure 1: Main performance metrics (T-learner, no CV)

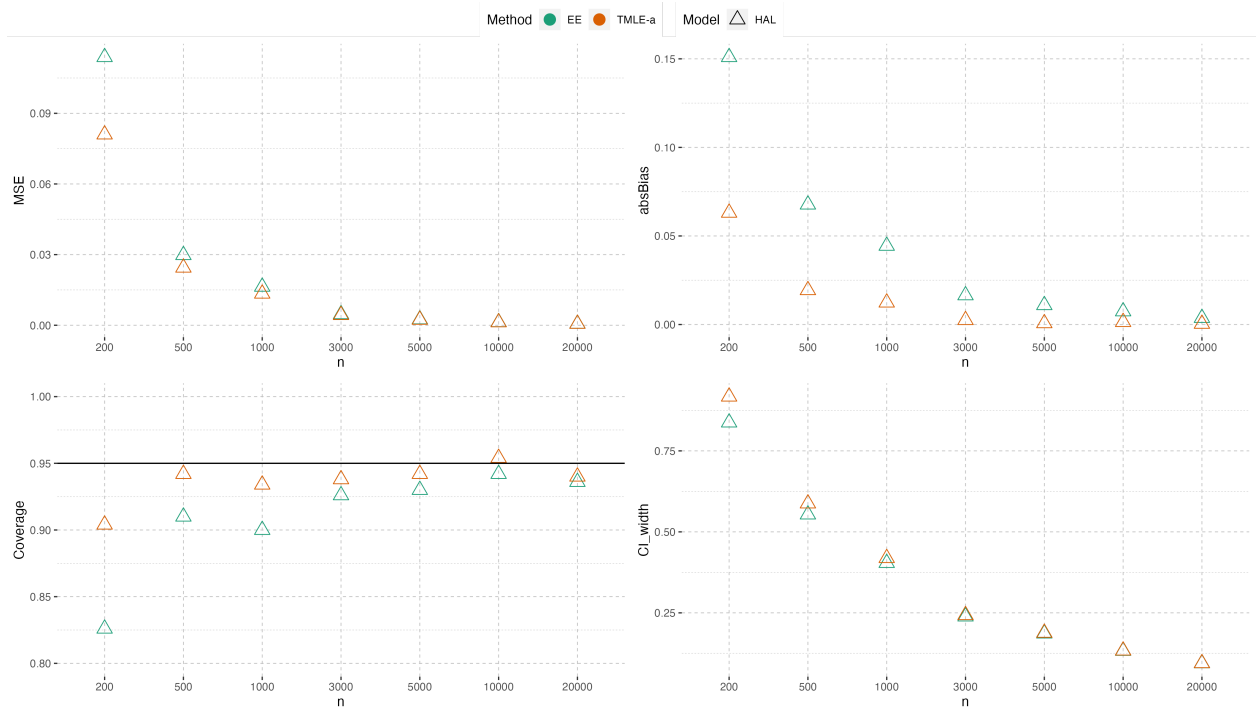


Figure 2: Main performance metrics (DR-learner, no CV)



Figure 3: Main performance metrics (Plug-in HAL, no CV)