

1 Description of DGP

$$W_1 \sim Normal(\mu = 0, \sigma^2 = 1)$$

$$W_2, W_3, W_4 \sim \mathcal{N}(\boldsymbol{\mu} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \boldsymbol{\Sigma} = \begin{bmatrix} 1.0 & 0.3 & 0.7 \\ 0.3 & 1.0 & 0.8 \\ 0.7 & 0.8 & 1.0 \end{bmatrix})$$

$$A \sim Bernoulli(p = 0.5)$$

$$Y \sim Bernoulli(p)$$

$$p = \text{logit}^{-1}(0.5 * \text{plogis}(1 - W_1^2 + 3 * W_2 + 5 * W_3^2 * A - 4.45 * A) + 0.5 * \text{plogis}(-0.5 - W_3 + 2 * W_1 * W_2 + 3 * W_4))$$

True blip function is:

$$B_0(W) = 0.5[\text{logit}^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 - 4.45) + \text{logit}^{-1}(-0.5 - W_3 + 2W_1W_2 + 3|W_2| - 1.5) - \text{logit}^{-1}(1 - W_1^2 + 3W_2) + \text{logit}^{-1}(-0.5 - W_3 + 2W_1W_2)]$$

2 Library legend

- Simple - GLMs
 - QAW.SL.library = linear model with W_j and A as main terms and $W_j * A$ interaction for each j
 - blip.SL.library = linear model with main terms W_j for each j
- Medium - ML + GLMs not aggressive
 - QAW.SL.library = GLMs library AND SL.glm, SL.mean, SL.glm.interaction, SL.earth, SL.nnet, SL.svm, SL.rpart
 - blip.SL.library = GLMs library AND SL.glm, SL.mean, SL.glm.interaction, SL.earth, SL.nnet, SL.svm, SL.rpart
- Aggressive - ML + GLMs not aggressive
 - QAW.SL.library = ML + GLMs aggressive library AND SL.randomForest
 - blip.SL.library = ML + GLMs aggressive library AND SL.randomForest

2.1 Table EnYd0 for E0Yd0

		Library	Estimator	Bias	Variance	MSE
Psi_gcomp		GLMs	G-comp.	-0.0917	0.0002	0.0086
Psi_IPTW		GLMs	IPTW	0.0032	0.0007	0.0007
Psi_IPTW_DR		GLMs	IPTW-DR	0.0029	0.0004	0.0004
Psi_TMLe		GLMs	TMLe	0.0030	0.0004	0.0004
Psi_CV.TMLe		GLMs	CV-TMLe	0.0031	0.0004	0.0004
Psi_gcomp1	ML + GLMs not aggressive		G-comp.	-0.0954	0.0012	0.0103
Psi_IPTW1	ML + GLMs not aggressive		IPTW	0.0037	0.0008	0.0008
Psi_IPTW_DR1	ML + GLMs not aggressive		IPTW-DR	0.0035	0.0005	0.0005
Psi_TMLe1	ML + GLMs not aggressive		TMLe	0.0034	0.0005	0.0005
Psi_CV.TMLe1	ML + GLMs not aggressive		CV-TMLe	0.0037	0.0005	0.0005
Psi_gcomp2	ML + GLMs aggressive		G-comp.	-0.0875	0.0008	0.0085

Psi_IPTW2	ML + GLMs aggressive	IPTW	0.0031	0.0008	0.0008
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	-0.0041	0.0005	0.0005
Psi_TMLE2	ML + GLMs aggressive	TMLE	-0.0033	0.0005	0.0005
Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	0.0034	0.0005	0.0005

Coverage

Psi_gcomp	-
Psi_IPTW	95.4%
Psi_IPTW_DR	97.1%
Psi_TMLE	96.8%
Psi_CV.TMLE	96.2%
Psi_gcomp1	-
Psi_IPTW1	94.8%
Psi_IPTW_DR1	95.2%
Psi_TMLE1	95.9%
Psi_CV.TMLE1	95.2%
Psi_gcomp2	-
Psi_IPTW2	94.3%
Psi_IPTW_DR2	92.7%
Psi_TMLE2	92.9%
Psi_CV.TMLE2	94.2%

2.2 Table EnYdn for E0Yd0

	Library	Estimator	Bias	Variance	MSE
Psi_gcomp	GLMs	G-comp.	-0.0720	0.0004	0.0055
Psi_IPTW	GLMs	IPTW	-0.0527	0.0009	0.0036
Psi_IPTW_DR	GLMs	IPTW-DR	-0.0531	0.0007	0.0035
Psi_TMLE	GLMs	TMLE	-0.0531	0.0007	0.0035
Psi_CV.TMLE	GLMs	CV-TMLE	-0.0705	0.0010	0.0059
Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.0953	0.0013	0.0104
Psi_IPTW1	ML + GLMs not aggressive	IPTW	0.0227	0.0009	0.0014
Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	0.0263	0.0007	0.0013
Psi_TMLE1	ML + GLMs not aggressive	TMLE	0.0259	0.0006	0.0013
Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0233	0.0007	0.0012
Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.0848	0.0010	0.0082
Psi_IPTW2	ML + GLMs aggressive	IPTW	0.1000	0.0095	0.0195
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	0.0860	0.0080	0.0154
Psi_TMLE2	ML + GLMs aggressive	TMLE	0.0938	0.0106	0.0194
Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	-0.0221	0.0006	0.0011

Coverage

Psi_gcomp	-
Psi_IPTW	49.1%
Psi_IPTW_DR	35.2%
Psi_TMLE	35.2%
Psi_CV.TMLE	19.3%
Psi_gcomp1	-
Psi_IPTW1	86.7%
Psi_IPTW_DR1	74.3%
Psi_TMLE1	74.3%
Psi_CV.TMLE1	77.2%
Psi_gcomp2	-

Psi_IPTW2	43%
Psi_IPTW_DR2	38.9%
Psi_TMLE2	37.8%
Psi_CV.TMLE2	78.7%

2.3 Table EnYdn for E0Ydn

	Library	Estimator	Bias	Variance	MSE
Psi_gcomp	GLMs	G-comp.	-0.0029	0.0004	0.0004
Psi_IPTW	GLMs	IPTW	0.0164	0.0009	0.0011
Psi_IPTW_DR	GLMs	IPTW-DR	0.0160	0.0007	0.0010
Psi_TMLE	GLMs	TMLE	0.0160	0.0007	0.0010
Psi_CV.TMLE	GLMs	CV-TMLE	0.0009	0.0010	0.0010
Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.0745	0.0013	0.0069
Psi_IPTW1	ML + GLMs not aggressive	IPTW	0.0435	0.0009	0.0028
Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	0.0472	0.0007	0.0029
Psi_TMLE1	ML + GLMs not aggressive	TMLE	0.0467	0.0006	0.0028
Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0002	0.0007	0.0007
Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.0602	0.0010	0.0046
Psi_IPTW2	ML + GLMs aggressive	IPTW	0.1246	0.0095	0.0251
Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	0.1106	0.0080	0.0202
Psi_TMLE2	ML + GLMs aggressive	TMLE	0.1184	0.0106	0.0246
Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	0.0008	0.0006	0.0006
Coverage					
Psi_gcomp	-				
Psi_IPTW	96.1%				
Psi_IPTW_DR	91.2%				
Psi_TMLE	91%				
Psi_CV.TMLE	92.7%				
Psi_gcomp1	-				
Psi_IPTW1	69.3%				
Psi_IPTW_DR1	45.3%				
Psi_TMLE1	43.8%				
Psi_CV.TMLE1	94.5%				
Psi_gcomp2	-				
Psi_IPTW2	29.6%				
Psi_IPTW_DR2	25.6%				
Psi_TMLE2	24.7%				
Psi_CV.TMLE2	94.1%				

3 Results

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1