

1 Description of DGP

$$\begin{aligned} W_1, W_2, W_3, W_4 &\sim \text{Normal}(\mu = 0, \sigma^2 = 1) \\ A &\sim \text{Bernoulli}(p = 0.5) \\ Y &\sim \text{Bernoulli}(p) . \end{aligned}$$

$$p = 0.5 * \text{logit}^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 A - 4.45A) + 0.5 \text{logit}^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W_2|A - 1.5A) ,$$

True blip function is:

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

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.	-0.0935	2e-04	0.0090
##	Psi_IPTW	GLMs	IPTW	-0.0004	8e-04	0.0008
##	Psi_IPTW_DR	GLMs	IPTW-DR	0.0002	4e-04	0.0004
##	Psi_TMLE	GLMs	TMLE	0.0004	4e-04	0.0004
##	Psi_CV.TMLE	GLMs	CV-TMLE	0.0007	5e-04	0.0005
##	Psi_gcomp1	ML + GLMs not aggressive	G-comp.	-0.1313	6e-04	0.0179
##	Psi_IPTW1	ML + GLMs not aggressive	IPTW	-0.0009	7e-04	0.0007
##	Psi_IPTW_DR1	ML + GLMs not aggressive	IPTW-DR	-0.0009	5e-04	0.0005
##	Psi_TMLE1	ML + GLMs not aggressive	TMLE	-0.0008	5e-04	0.0005
##	Psi_CV.TMLE1	ML + GLMs not aggressive	CV-TMLE	-0.0004	5e-04	0.0005
##	Psi_gcomp2	ML + GLMs aggressive	G-comp.	-0.1165	6e-04	0.0142
##	Psi_IPTW2	ML + GLMs aggressive	IPTW	0.0007	8e-04	0.0008
##	Psi_IPTW_DR2	ML + GLMs aggressive	IPTW-DR	-0.0074	5e-04	0.0006

## Psi_TMLE2	ML + GLMs aggressive	TMLE	-0.0067	5e-04	0.0006
## Psi_CV.TMLE2	ML + GLMs aggressive	CV-TMLE	0.0007	5e-04	0.0005
##	Coverage				
## Psi_gcomp	-				
## Psi_IPTW	95.8%				
## Psi_IPTW_DR	95.8%				
## Psi_TMLE	95.8%				
## Psi_CV.TMLE	95.3%				
## Psi_gcomp1	-				
## Psi_IPTW1	96.3%				
## Psi_IPTW_DR1	95%				
## Psi_TMLE1	94.8%				
## Psi_CV.TMLE1	94.9%				
## Psi_gcomp2	-				
## Psi_IPTW2	95.2%				
## Psi_IPTW_DR2	90.5%				
## Psi_TMLE2	91%				
## Psi_CV.TMLE2	94.7%				

2.2 Table EnYdn for E0Yd0

##		Library	Estimator	Bias	Variance	MSE
## Psi_gcomp		GLMs	G-comp.	-0.0765	0.0003	0.0062
## Psi_IPTW		GLMs	IPTW	-0.0569	0.0008	0.0041
## Psi_IPTW_DR		GLMs	IPTW-DR	-0.0565	0.0007	0.0038
## Psi_TMLE		GLMs	TMLE	-0.0563	0.0007	0.0038
## Psi_CV.TMLE		GLMs	CV-TMLE	-0.0752	0.0009	0.0066
## Psi_gcomp1	ML + GLMs not aggressive		G-comp.	-0.1325	0.0007	0.0182
## Psi_IPTW1	ML + GLMs not aggressive		IPTW	0.0300	0.0010	0.0019
## Psi_IPTW_DR1	ML + GLMs not aggressive		IPTW-DR	0.0295	0.0008	0.0016
## Psi_TMLE1	ML + GLMs not aggressive		TMLE	0.0268	0.0007	0.0014
## Psi_CV.TMLE1	ML + GLMs not aggressive		CV-TMLE	-0.0310	0.0007	0.0017
## Psi_gcomp2	ML + GLMs aggressive		G-comp.	-0.1152	0.0007	0.0140
## Psi_IPTW2	ML + GLMs aggressive		IPTW	0.1131	0.0114	0.0242
## Psi_IPTW_DR2	ML + GLMs aggressive		IPTW-DR	0.0925	0.0096	0.0181
## Psi_TMLE2	ML + GLMs aggressive		TMLE	0.0963	0.0118	0.0211
## Psi_CV.TMLE2	ML + GLMs aggressive		CV-TMLE	-0.0281	0.0007	0.0015
##	Coverage					
## Psi_gcomp	-					
## Psi_IPTW	45.7%					
## Psi_IPTW_DR	29.8%					
## Psi_TMLE	29.4%					
## Psi_CV.TMLE	14%					
## Psi_gcomp1	-					
## Psi_IPTW1	79.5%					
## Psi_IPTW_DR1	69.9%					
## Psi_TMLE1	72.2%					
## Psi_CV.TMLE1	70.3%					
## Psi_gcomp2	-					

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## Psi_IPTW2      38.3%
## Psi_IPTW_DR2   38.9%
## Psi_TMLE2      38.5%
## Psi_CV.TMLE2   71.9%
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2.3 Table EnYdn for E0Ydn

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##                               Library Estimator   Bias Variance   MSE
## Psi_gcomp                    GLMs    G-comp. -0.0035   0.0003 0.0004
## Psi_IPTW                     GLMs      IPTW  0.0162   0.0008 0.0011
## Psi_IPTW_DR                  GLMs  IPTW-DR  0.0166   0.0007 0.0009
## Psi_TMLE                     GLMs      TMLE  0.0167   0.0007 0.0009
## Psi_CV.TMLE                  GLMs  CV-TMLE  0.0002   0.0009 0.0009
## Psi_gcomp1  ML + GLMs not aggressive G-comp. -0.1048   0.0007 0.0117
## Psi_IPTW1    ML + GLMs not aggressive IPTW  0.0577   0.0010 0.0043
## Psi_IPTW_DR1 ML + GLMs not aggressive IPTW-DR 0.0572   0.0008 0.0041
## Psi_TMLE1    ML + GLMs not aggressive TMLE  0.0545   0.0007 0.0037
## Psi_CV.TMLE1 ML + GLMs not aggressive CV-TMLE -0.0008   0.0007 0.0007
## Psi_gcomp2      ML + GLMs aggressive G-comp. -0.0842   0.0007 0.0078
## Psi_IPTW2       ML + GLMs aggressive IPTW  0.1442   0.0114 0.0322
## Psi_IPTW_DR2    ML + GLMs aggressive IPTW-DR 0.1236   0.0096 0.0248
## Psi_TMLE2       ML + GLMs aggressive TMLE  0.1274   0.0118 0.0280
## Psi_CV.TMLE2    ML + GLMs aggressive CV-TMLE 0.0013   0.0007 0.0007
##                               Coverage
## Psi_gcomp                    -
## Psi_IPTW                     94.9%
## Psi_IPTW_DR                  90.6%
## Psi_TMLE                     90.5%
## Psi_CV.TMLE                  93.9%
## Psi_gcomp1                    -
## Psi_IPTW1                     48%
## Psi_IPTW_DR1                  33%
## Psi_TMLE1                     33.9%
## Psi_CV.TMLE1                  93.9%
## Psi_gcomp2                    -
## Psi_IPTW2                     25%
## Psi_IPTW_DR2                  22.6%
## Psi_TMLE2                     22.5%
## Psi_CV.TMLE2                  93.9%
```

3 Results

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## pdf
## 2
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