

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




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

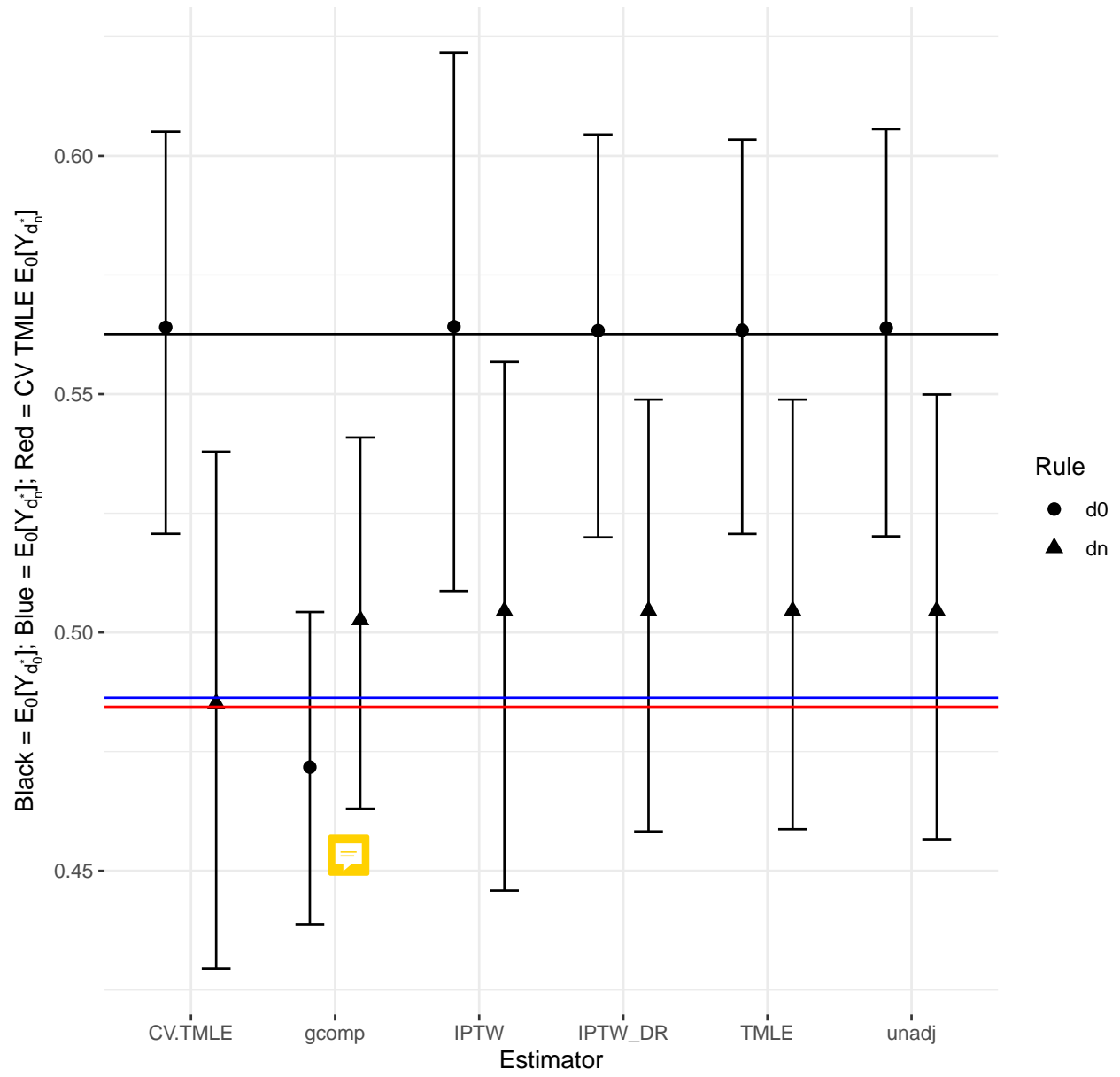
True blip function is:

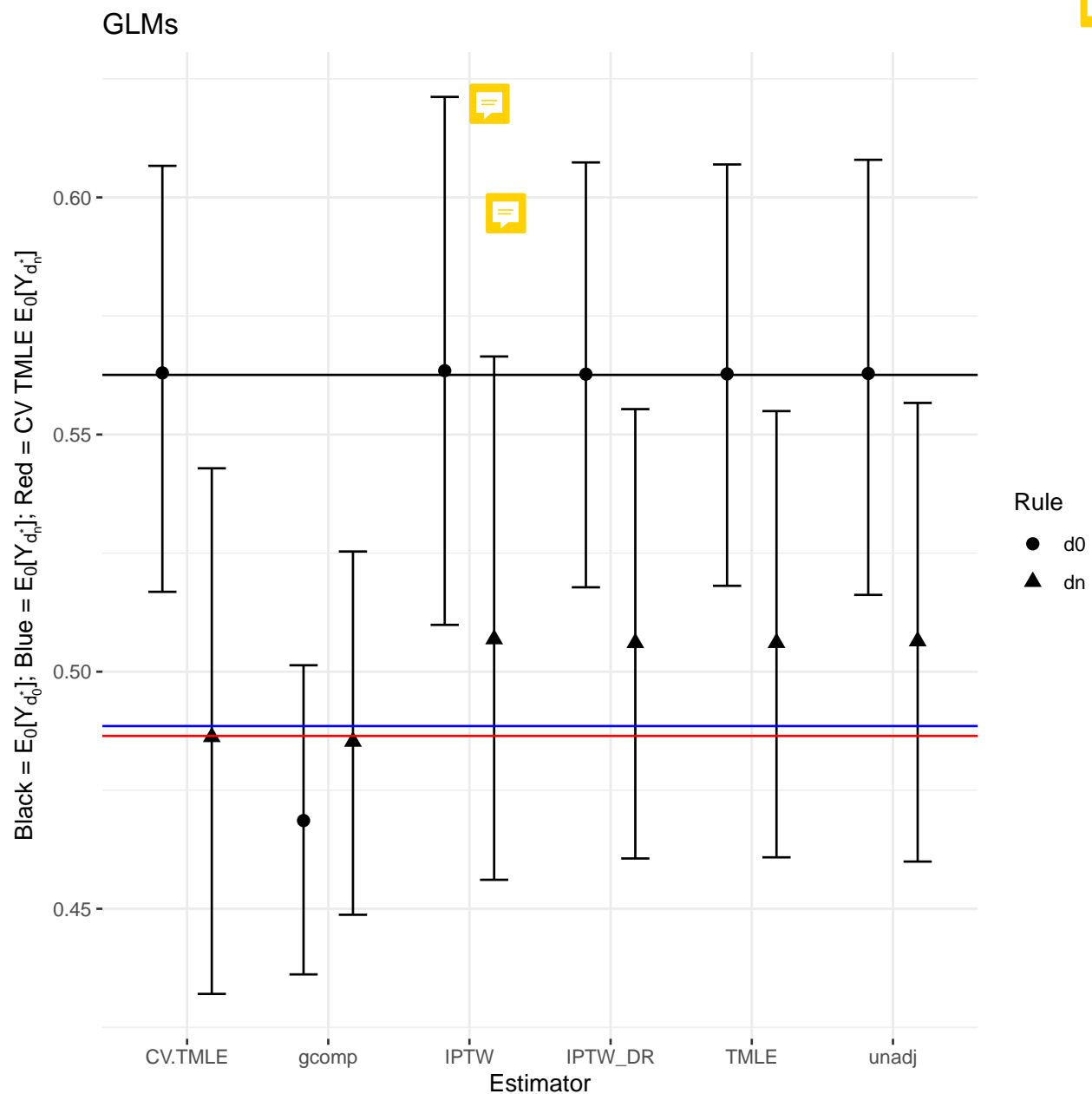
$$\begin{aligned} B_0(W) = &0.5[\text{logit}^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 - 4.45) + \text{logit}^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W_2| - 1.5) \\ &- \text{logit}^{-1}(1 - W_1^2 + 3W_2) + \text{logit}^{-1}(-0.5 - W_3 + 2W_1 W_2)] . \end{aligned}$$

1 Library legend

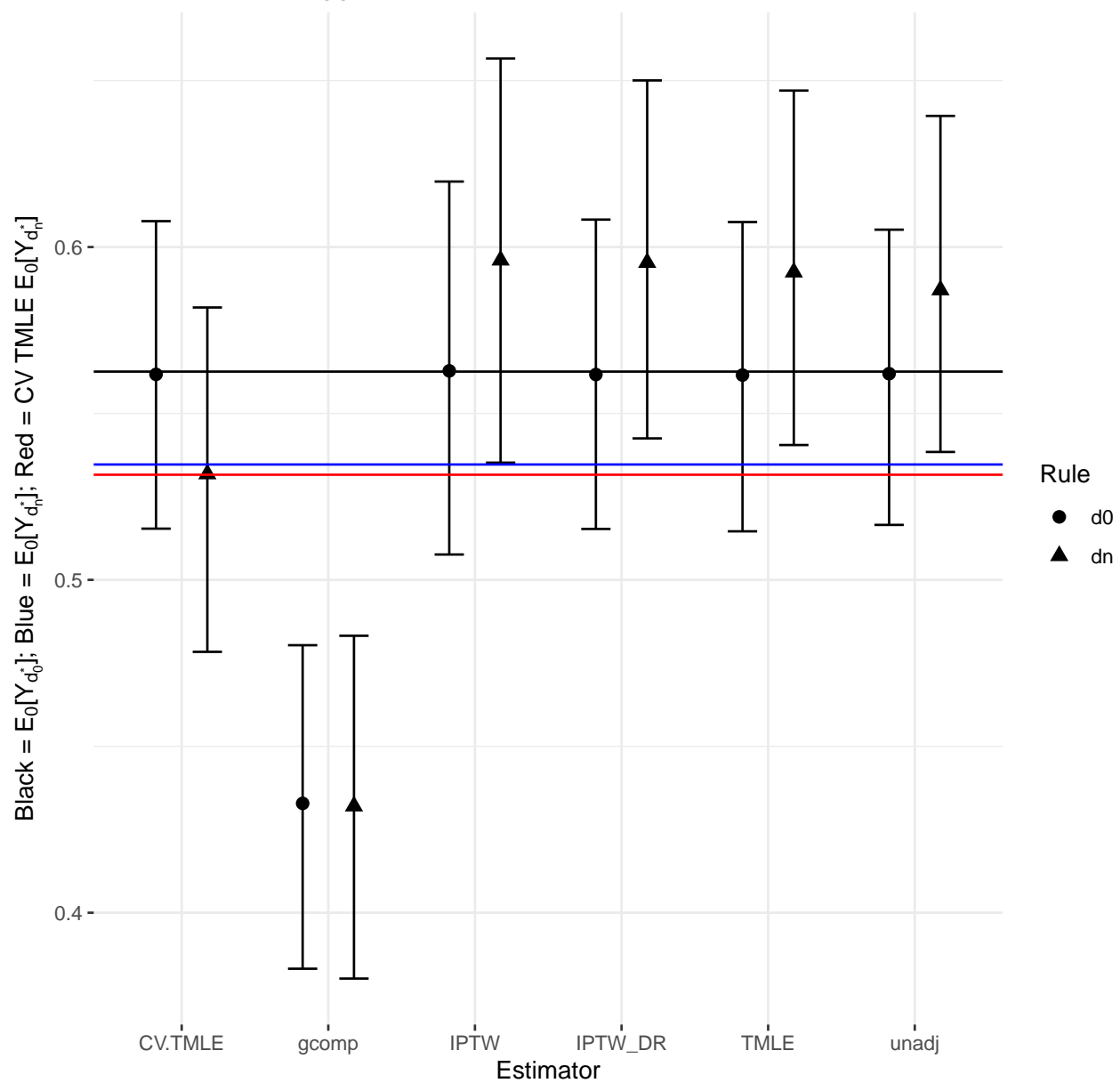
- Incorrect GLM
 - QAW.SL.library = linear model main terms W and A and interaction with W and A
 - blip.SL.library = linear model with main terms W
- GLMs
 - QAW.SL.library = linear model with W_j and A as main terms and $W_j * A$ interaction for each j
 - blip.SL.library = linear model with main terms W_j for each j
- 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
- ML + GLMs  aggressive
 - QAW.SL.library = ML + GLMs aggressive library AND SL.randomForest
 - blip.SL.library = ML + GLMs aggressive library AND SL.randomForest

Incorrect GLM

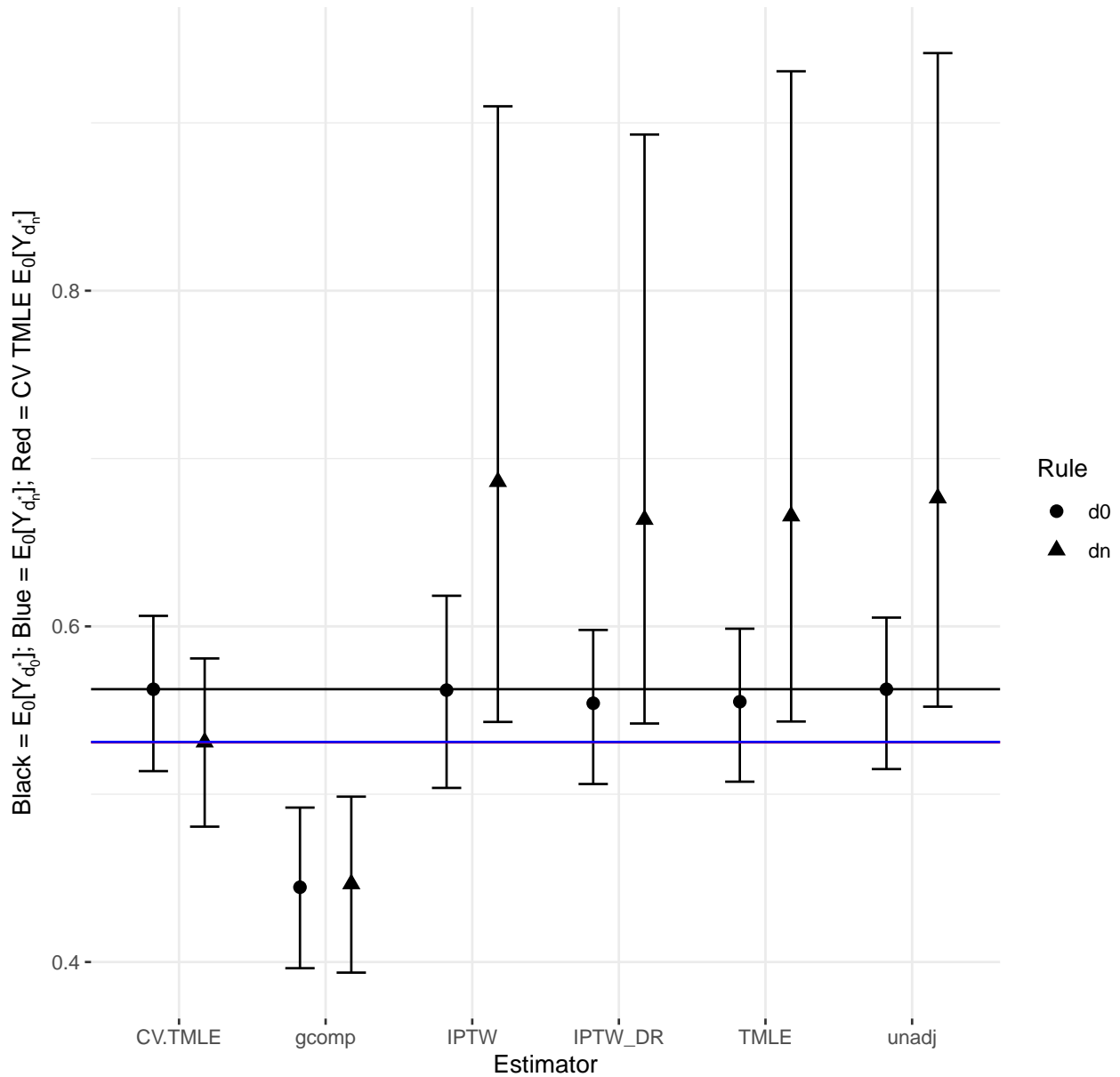




ML + GLMs not aggressive



ML + GLMs aggressive



```
# Incorrect GLM
make_table_EYdopt(EYdopt = EYdoptbin_glm, truevalues = DGP_bin_complex_true_values)
```

##	Bias	Variance	MSE	Coverage
## unadj	-0.058	6e-04	0.004	0.295
## gcomp	-0.06	4e-04	0.004	-
## IPTW	-0.0581	8e-04	0.0042	0.455
## IPTW_DR	-0.0581	6e-04	0.0039	0.28
## TMLE	-0.0581	6e-04	0.0039	0.277
## LTMLE	-	-	-	-
## CV.TMLE	-0.0775	7e-04	0.0067	0.091
## unadj_dopt0	0.0013	5e-04	5e-04	0.951
## gcomp_dopt0	-0.0908	3e-04	0.0085	-
## IPTW_dopt0	0.0016	8e-04	8e-04	0.947
## IPTW_DR_dopt0	8e-04	5e-04	5e-04	0.95

```
## TMLE_dopt0      8e-04    5e-04    5e-04    0.952
## LTMLE_dopt0      -        -        -        -
## CV.TMLE_dopt0    0.0015    5e-04    5e-04    0.953
## unadj_sampspec    0.0182    6e-04    7e-04    0.917
## gcomp_sampspec    0.0163    4e-04    7e-04    -
## IPTW_sampspec     0.0182    8e-04    9e-04    0.942
## IPTW_DR_sampspec  0.0182    6e-04    7e-04    0.901
## LTMLE_sampspec     -        -        -        -
## TMLE_sampspec     0.0182    6e-04    7e-04    0.903
## CV.TMLE_sampspec  7e-04    7e-04    5e-04    0.95
```

GLMs

```
make_table_EYdopt(EYdopt = EYdoptbin_glms, truevalues = DGP_bin_complex_true_values)
```

```
##              Bias Variance      MSE Coverage
## unadj        -0.0561    7e-04  0.0038    0.318
## gcomp        -0.0773    4e-04  0.0064    -
## IPTW         -0.0557    8e-04  0.0039    0.452
## IPTW_DR      -0.0565    6e-04  0.0038    0.302
## TMLE         -0.0565    6e-04  0.0038    0.298
## LTMLE         -        -        -        -
## CV.TMLE      -0.0763    9e-04  0.0067    0.147
## unadj_dopt0    3e-04    5e-04    5e-04    0.933
## gcomp_dopt0   -0.094    3e-04  0.0091    -
## IPTW_dopt0     9e-04    8e-04    8e-04    0.953
## IPTW_DR_dopt0  2e-04    5e-04    5e-04    0.937
## TMLE_dopt0     2e-04    5e-04    5e-04    0.937
## LTMLE_dopt0     -        -        -        -
## CV.TMLE_dopt0  4e-04    5e-04    5e-04    0.937
## unadj_sampspec 0.0179    7e-04    7e-04    0.907
## gcomp_sampspec -0.0033    4e-04    6e-04    -
## IPTW_sampspec  0.0183    8e-04    9e-04    0.943
## IPTW_DR_sampspec 0.0175    6e-04    7e-04    0.906
## LTMLE_sampspec -        -        -        -
## TMLE_sampspec  0.0175    6e-04    7e-04    0.907
## CV.TMLE_sampspec -2e-04    9e-04    5e-04    0.943
```

ML + GLMs not aggressive

```
make_table_EYdopt(EYdopt = EYdoptbin_MLnotaggglms, truevalues = DGP_bin_complex_true_values)
```

```
##              Bias Variance      MSE Coverage
## unadj         0.0245    7e-04  0.0013    0.75
## gcomp        -0.1306    7e-04  0.0177    -
## IPTW          0.0335    0.001  0.0021    0.757
## IPTW_DR       0.0328    8e-04  0.0019    0.665
## TMLE          0.0299    8e-04  0.0016    0.713
## LTMLE         -        -        -        -
## CV.TMLE      -0.0308    7e-04  0.0017    0.69
## unadj_dopt0   -6e-04    5e-04    5e-04    0.947
## gcomp_dopt0   -0.1297    6e-04  0.0175    -
## IPTW_dopt0     2e-04    8e-04    8e-04    0.947
```

```

## IPTW_DR_dopt0      -9e-04      6e-04      6e-04      0.94
## TMLE_dopt0         -0.001      5e-04      5e-04      0.936
## LTMLE_dopt0         -          -          -          -
## CV.TMLE_dopt0      -8e-04      5e-04      5e-04      0.932
## unadj_sampspec     0.0524      7e-04      0.0033      0.362
## gcomp_sampspec     -0.1027      7e-04      0.0114      -
## IPTW_sampspec       0.0614      0.001      0.0046      0.438
## IPTW_DR_sampspec    0.0607      8e-04      0.0044      0.289
## LTMLE_sampspec      -          -          -          -
## TMLE_sampspec       0.0578      8e-04      0.004      0.304
## CV.TMLE_sampspec    2e-04      7e-04      5e-04      0.94

# ML + GLMs aggressive
make_table_EYdopt(EYdoptbin_MLaggglm, truevalues = DGP_bin_complex_true_values)

##              Bias Variance      MSE Coverage
## unadj          0.1138    0.0113 0.0243    0.299
## gcomp         -0.116     7e-04 0.0142      -
## IPTW          0.1236    0.0109 0.0262    0.31
## IPTW_DR       0.1011    0.0092 0.0194    0.33
## TMLE          0.1031    0.0108 0.0214    0.336
## LTMLE          -          -          -          -
## CV.TMLE       -0.0316    7e-04 0.0017    0.686
## unadj_dopt0   -1e-04     5e-04 5e-04    0.937
## gcomp_dopt0   -0.118     6e-04 0.0146      -
## IPTW_dopt0    -6e-04     9e-04 9e-04    0.94
## IPTW_DR_dopt0 -0.0084     5e-04 6e-04    0.901
## TMLE_dopt0    -0.0075     5e-04 6e-04    0.907
## LTMLE_dopt0    -          -          -          -
## CV.TMLE_dopt0 -1e-04     5e-04 5e-04    0.936
## unadj_sampspec 0.1453    0.0113 0.0342    0.123
## gcomp_sampspec -0.0846     7e-04 0.0081      -
## IPTW_sampspec  0.1551    0.0109 0.0366    0.163
## IPTW_DR_sampspec 0.1325    0.0092 0.0283    0.158
## LTMLE_sampspec -          -          -          -
## TMLE_sampspec  0.1346    0.0108 0.0307    0.157
## CV.TMLE_sampspec 1e-04     7e-04 5e-04    0.948

```