1 Description of DGP

$$W_1, W_2, W_3, W_4 \sim Normal(\mu = 0, \sigma^2 = 1)$$
$$A \sim Bernoulli(p = 0.5)$$
$$Y \sim Bernoulli(p) \ .$$

$p = 0.5 * logit^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 A - 4.45A) + 0.5 logit^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W2|A - 1.5A)$,

True blip function is:

$$B_0(W) = 0.5[logit^{-1}(1 - W_1^2 + 3W_2 + 5W_3^2 - 4.45) + logit^{-1}(-0.5 - W_3 + 2W_1 W_2 + 3|W2| - 1.5) - logit^{-1}(1 - W_1^2 + 3W_2) + logit^{-1}(-0.5 - W_3 + 2W_1 W_2)] \ .$$

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 Simple Library

```
## $table_EnYdn_for_E0Yd0
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.0765    3e-04 0.0062        -
## Psi_IPTW    -0.0569    8e-04 0.0041    45.7%
## Psi_IPTW_DR -0.0565    7e-04 0.0038    29.8%
## Psi_TMLE    -0.0563    7e-04 0.0038    29.4%
## Psi_CV.TMLE -0.0752    9e-04 0.0066      14%
##
## $table_EnYd0_for_E0Yd0
##                Bias Variance   MSE Coverage
## Psi_gcomp   -0.0935    2e-04 9e-03        -
## Psi_IPTW    -0.0004    8e-04 8e-04    95.8%
## Psi_IPTW_DR  0.0002    4e-04 4e-04    95.8%
## Psi_TMLE     0.0004    4e-04 4e-04    95.8%
```

```
## Psi_CV.TMLE  0.0007    5e-04 5e-04    95.3%
##
## $table_EnYdn_for_E0Ydn
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.0035    3e-04 0.0004        -
## Psi_IPTW     0.0162    8e-04 0.0011    94.9%
## Psi_IPTW_DR  0.0166    7e-04 0.0009    90.6%
## Psi_TMLE     0.0167    7e-04 0.0009    90.5%
## Psi_CV.TMLE  0.0002    9e-04 0.0009    93.9%
```

2.2 Table Medium Library

```
## $table_EnYdn_for_E0Yd0
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.1248   0.0005 0.0161        -
## Psi_IPTW     0.0341   0.0011 0.0022    75.7%
## Psi_IPTW_DR  0.0352   0.0009 0.0021    64.2%
## Psi_TMLE     0.0331   0.0008 0.0019    64.5%
## Psi_CV.TMLE -0.0297   0.0008 0.0016    71.4%
##
## $table_EnYd0_for_E0Yd0
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.1235    5e-04 0.0157        -
## Psi_IPTW    -0.0011    8e-04 0.0008    95.2%
## Psi_IPTW_DR -0.0011    5e-04 0.0005    94.8%
## Psi_TMLE    -0.0009    5e-04 0.0005    94.9%
## Psi_CV.TMLE -0.0008    5e-04 0.0005    95.4%
##
## $table_EnYdn_for_E0Ydn
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.0977   0.0005 0.0101        -
## Psi_IPTW     0.0612   0.0011 0.0048    45.3%
## Psi_IPTW_DR  0.0623   0.0009 0.0048    29.1%
## Psi_TMLE     0.0602   0.0008 0.0044      30%
## Psi_CV.TMLE  0.0002   0.0008 0.0008    94.3%
```

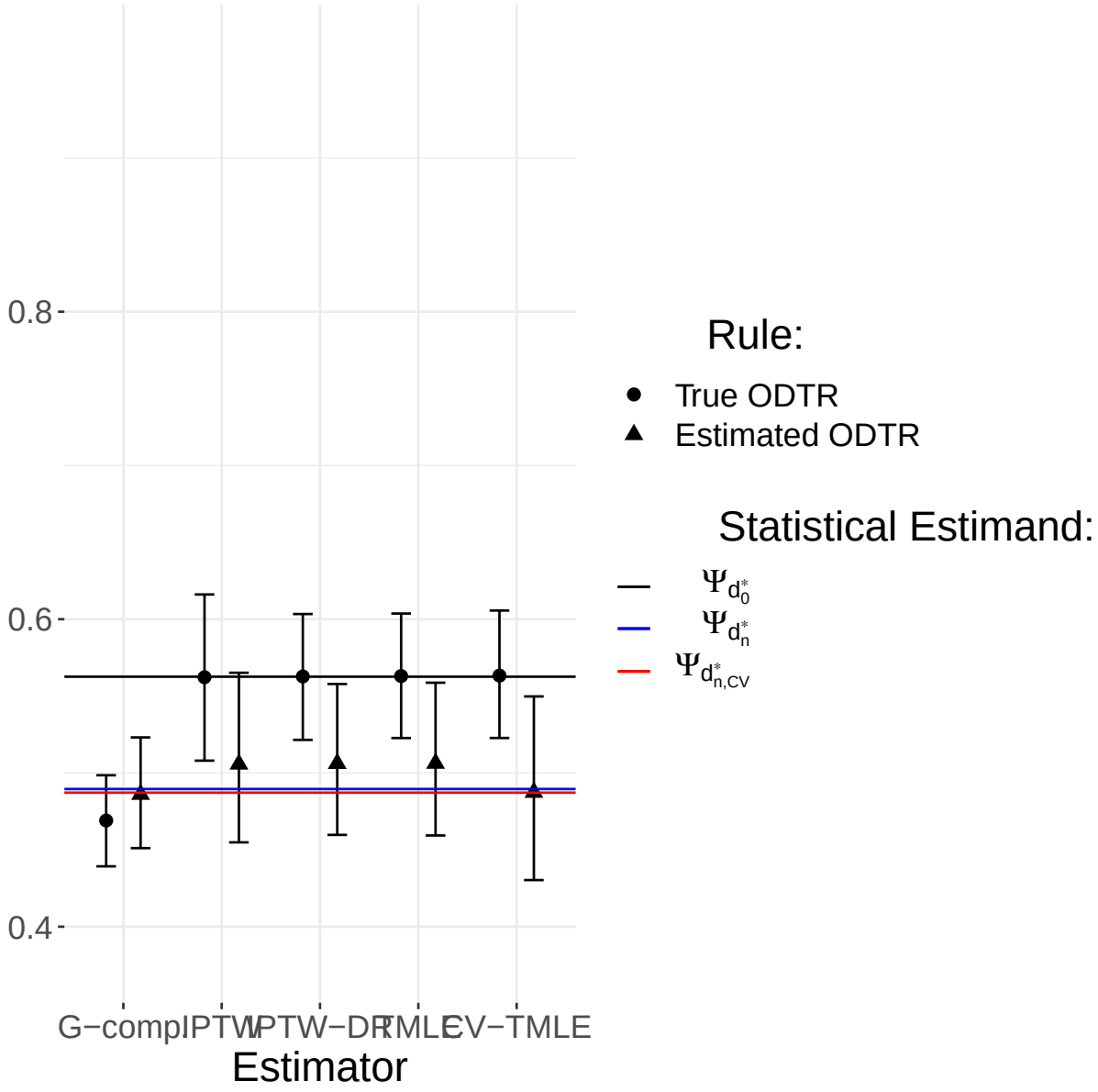
2.3 Table Aggressive Library

```
## $table_EnYdn_for_E0Yd0
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.1165   0.0006 0.0142        -
## Psi_IPTW     0.1076   0.0104 0.0220    40.5%
## Psi_IPTW_DR  0.0995   0.0102 0.0201    36.6%
## Psi_TMLE     0.1004   0.0115 0.0216    36.9%
## Psi_CV.TMLE -0.0278   0.0007 0.0014    74.8%
##
## $table_EnYd0_for_E0Yd0
```

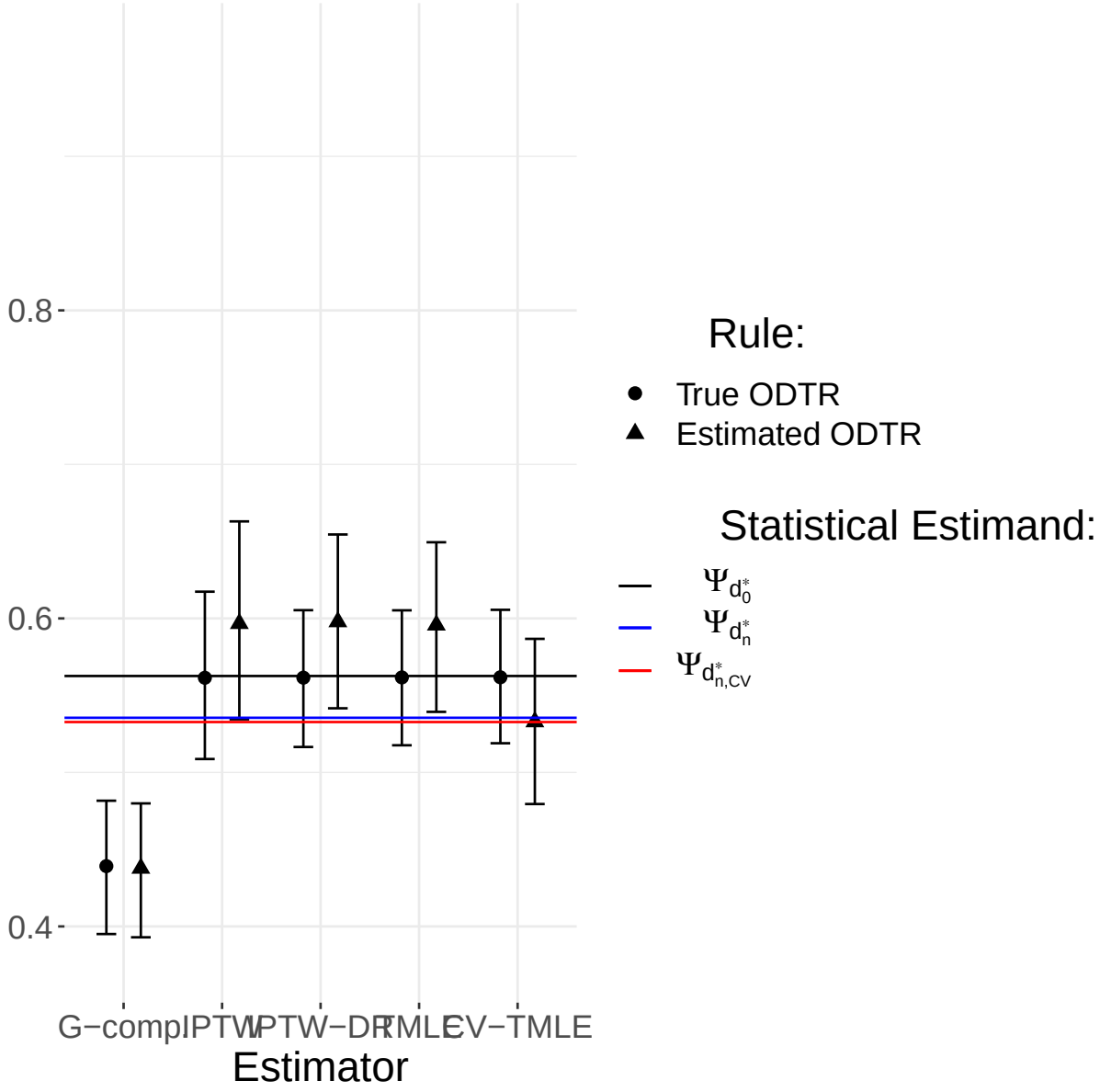
```
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.1170    6e-04 0.0142        -
## Psi_IPTW     0.0020    8e-04 0.0008    95.8%
## Psi_IPTW_DR -0.0036    5e-04 0.0005    93.9%
## Psi_TMLE    -0.0034    5e-04 0.0005    94.4%
## Psi_CV.TMLE  0.0011    5e-04 0.0005    95.7%
##
## $table_EnYdn_for_E0Ydn
##                Bias Variance    MSE Coverage
## Psi_gcomp   -0.0868   0.0006 0.0081        -
## Psi_IPTW     0.1373   0.0104 0.0292    25.4%
## Psi_IPTW_DR  0.1292   0.0102 0.0269    20.5%
## Psi_TMLE     0.1301   0.0115 0.0285      20%
## Psi_CV.TMLE  0.0003   0.0007 0.0007      95%
```

3 Results

GLMs − least data adaptive



ML + HAL + GLMs − medium data adaptive



ML + HAL + GLMs − most data adaptive