

Reproducibility Guidelines: Step 4

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Load the R Packages

- Please double check whether **Steps 1 - 3** have been executed and **NO output has been deleted**.

```
packages=c("Rcpp", "RcppArmadillo", "RcppGSL", "RcppDist", "plyr", "reshape2", "ggplot2",  
           "caret", "parallel", "psrwe", "mvtnorm", "foreach", "doParallel", "MASS",  
           "inline", "devtools", "writexl", "ggpubr", "coda", "ggmcmc", "latex2exp",  
           "ape", "survival", "survminer", "data.table", "dplyr", "optmatch", "MCMCpack",  
           "ROCR", "dbarts", "randomForest", "mltools", "gtools", "ape", "OpenMPController", "CAPPMx")  
lapply(packages, require, character.only = TRUE)
```

Figures in Supplementary Materials

Figure S.2

```
source("supplementary_figures/test_of_fit.R")  
ggsave(qplot_aug, file="supplementary_figures/qplot_testoffit.pdf",  
        width=9.5, height = 6, units = "in")  
qplot_aug
```

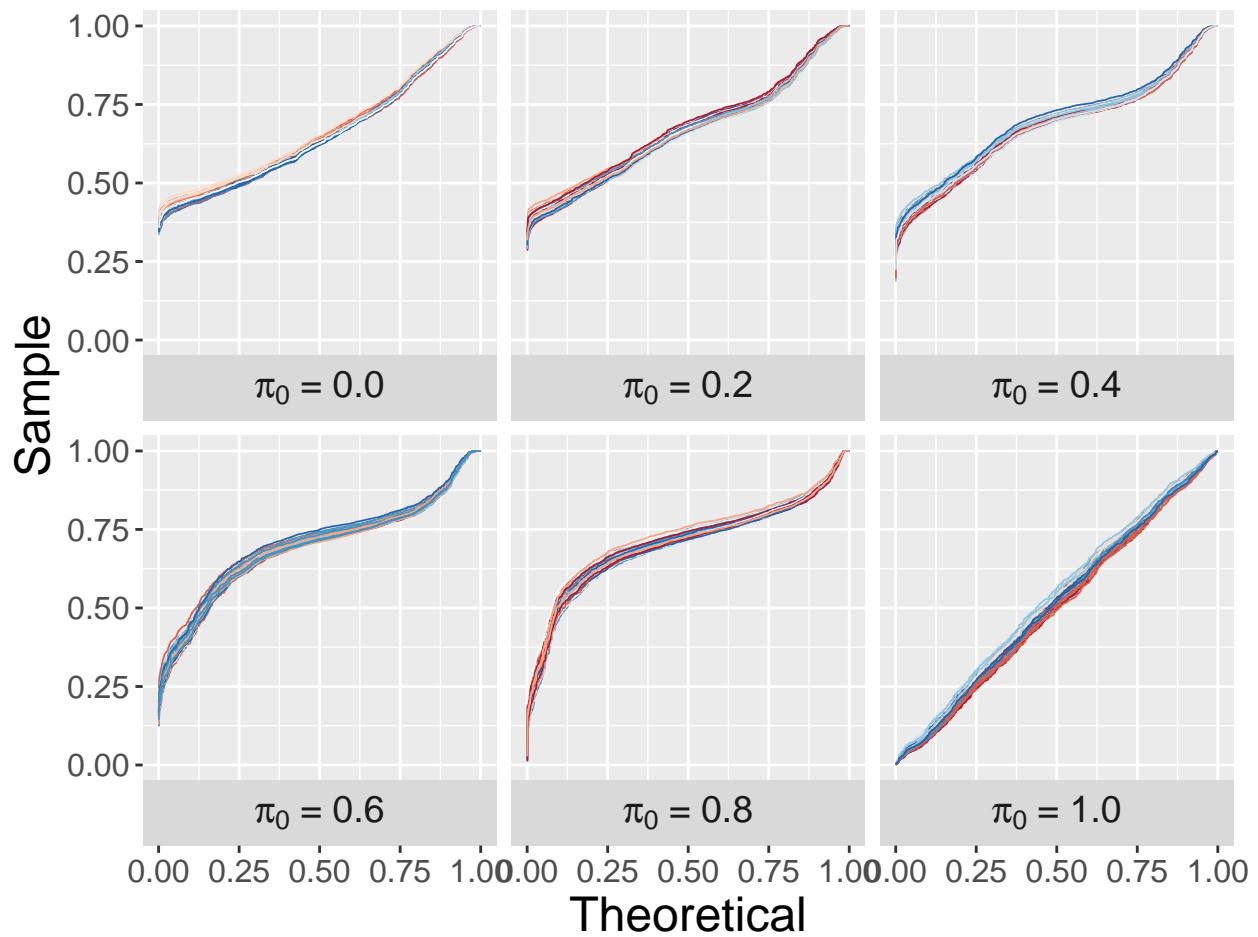


Figure 1: Figure S.2 of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures` with the name `qqplot_testoffit.pdf`.

Figure S.3

```
input_dir=paste0(getwd(),"/propensity_score_sims/")
output_dir=paste0(getwd(),"/supplementary_figures/biasplots/")
source("supplementary_figures/biasplots/make_graphs.R")
ggsave(plot=p_fig,filename=paste0(output_dir,"Comb_biasplots.pdf"),width=10,height=7.5,units="in")
p_fig
```

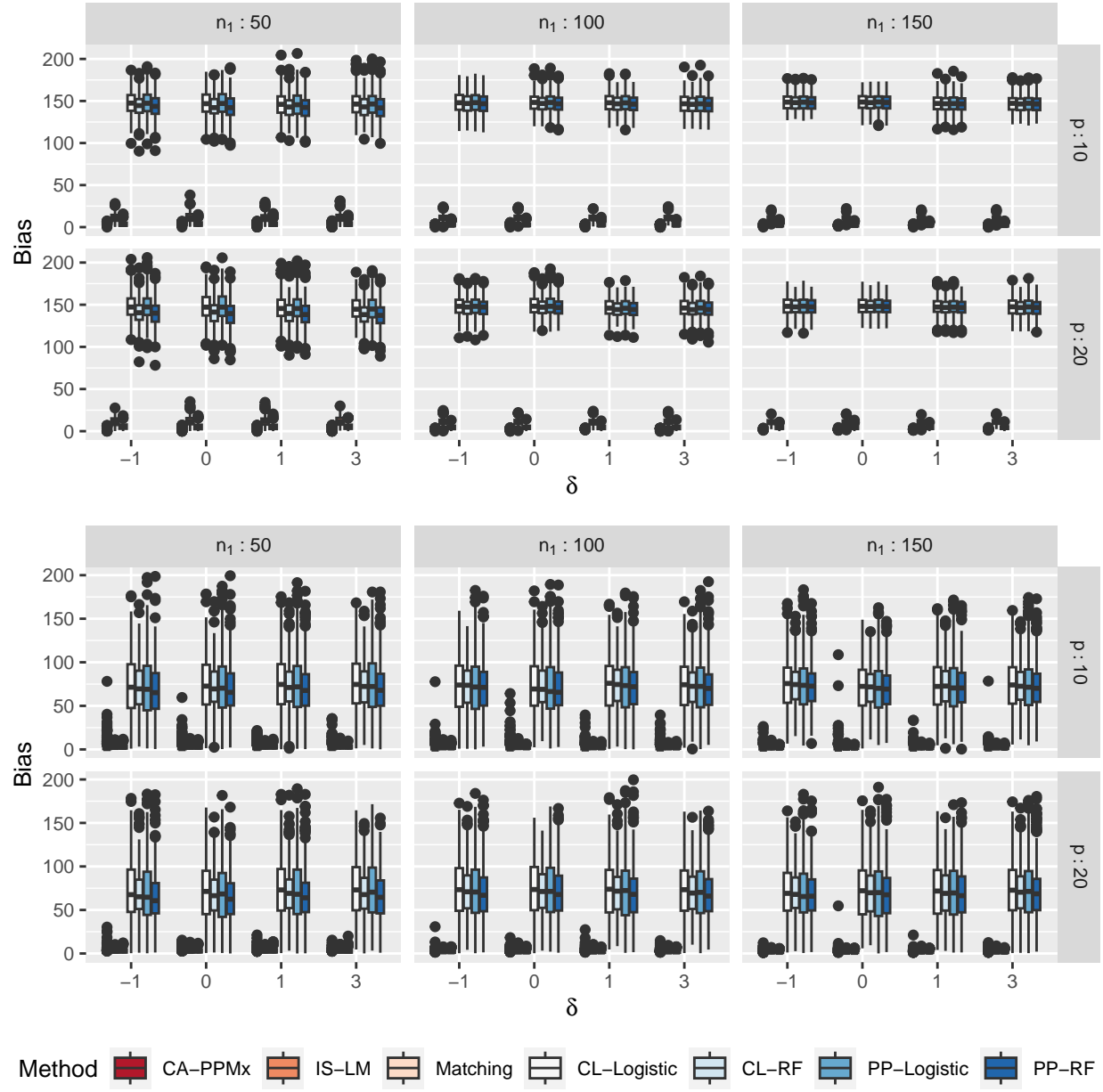


Figure 2: Figure S.3(a) of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures/biasplots` with the name `Comb_biasplots.pdf`.

```
input_dir=paste0(getwd(), "/GBM_sims/")
output_dir=paste0(getwd(), "/supplementary_figures/biasplots/")
source("supplementary_figures/biasplots/GBM_bias_graphs.R")
ggsave(plot=p.gbm_sims, filename=paste0(output_dir, "gbm_sim_bias.png"), width=15.5, height=3.5, units="in")
p.gbm_sims
```

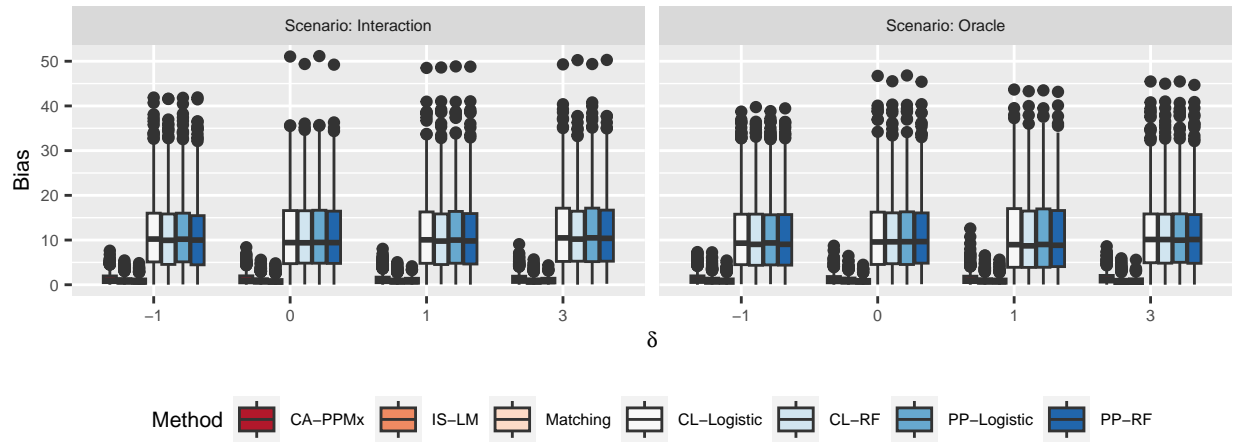


Figure 3: Figure S.3(b) of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures/biasplots` with the name `gbm_sim_bias.png`.

Figure S.4

Set the directories and simulate data

```
dir=paste0(getwd(), "/simData/mult_RWD/")
output_dir=paste0(getwd(), "/propensity_score_sims/Outputs/mult_RWD/")
source("supplementary_figures/multiple_RWD/gen_data_Mixture.R")
```

Fit CA-PPMx on the simulated data

```
source("supplementary_figures/multiple_RWD/analysis_CA-PPMx.R")
```

Generate the figure:

```
input_dir=paste0(getwd(), "/propensity_score_sims/Outputs/mult_RWD/")
output_dir="supplementary_figures/multiple_RWD/"
source("supplementary_figures/multiple_RWD/gen_biases_CA-PPMx.R")
input_dir=output_dir
source("supplementary_figures/multiple_RWD/gen_type_I_n_II_errors.R")
ggsave(plot=pplot1, filename=paste0(output_dir, "mult_RWD.pdf"), width=8, height=4.45, units="in")
pplot1
```

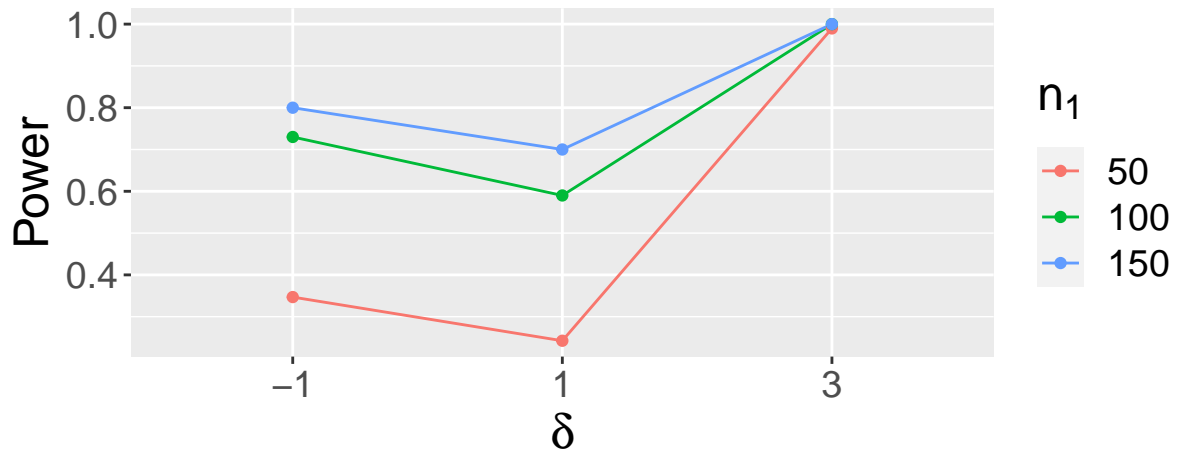


Figure 4: Figure S.4 of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures/multiple_RWD` with the name `mult_RWD.pdf`.

Figure S.5

Set the directories and simulate data

```
dir=paste0(getwd(),"/simData/missing_confounder/")
output_dir=paste0(getwd(),"/propensity_score_sims/Outputs/missing_confounder/")
source("supplementary_figures/missing_confounder/gen_data.R")
```

Fit CA-PPMx on the simulated data

```
input_dir=dir
source("supplementary_figures/missing_confounder/analysis_full.R")
source("supplementary_figures/missing_confounder/analysis_missing_confounder.R")
```

Generate the figure

```
input_dir=paste0(getwd(),"/propensity_score_sims/Outputs/missing_confounder/")
output_dir="supplementary_figures/missing_confounder/"
source("supplementary_figures/missing_confounder/gen_biases_CA-PPMx.R")
input_dir=output_dir
source("supplementary_figures/missing_confounder/make_graphs.R")
ggsave(plot=p1,filename=paste0(output_dir,"missing_compare.pdf"),width=9,height=5,units="in")
p1
```

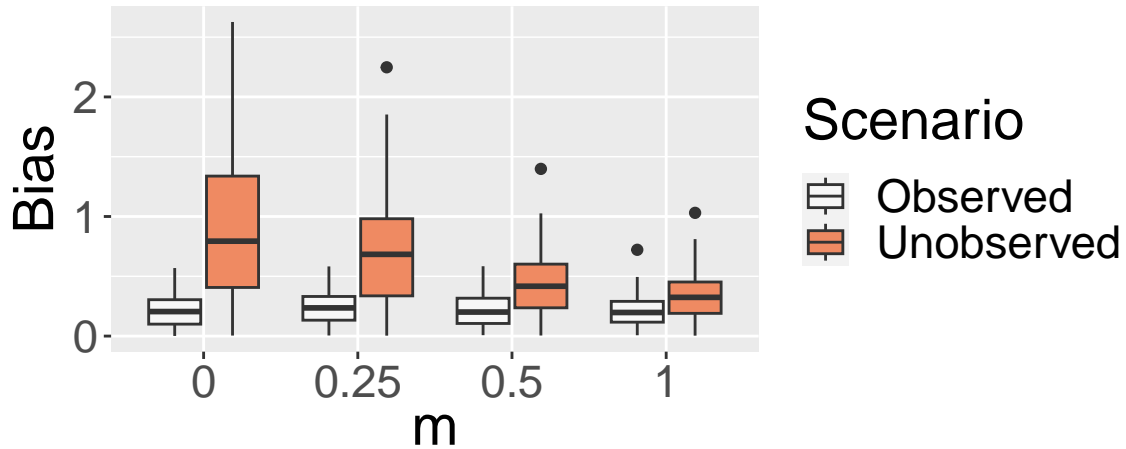


Figure 5: Figure S.5 of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures/missing_confounder` with the name `missing_compare.pdf`.

Figure S.6

Fit CA-PPMx and save the execution times:

```
input_dir=paste0(getwd(), "/simData/")
output_dir=paste0(getwd(), "/supplementary_figures/MCMC_runtime/")
source("supplementary_figures/MCMC_runtime/analysis_CA-PPMx.R")
gc()
```

Make the graph

```
input_dir=output_dir=paste0(getwd(), "/supplementary_figures/MCMC_runtime/")
source("supplementary_figures/MCMC_runtime/gen_graph.R")
ggsave(plot=pplot1, filename=paste0(output_dir, "MCMC_time.pdf"), width=8.5, height=4, units="in")
pplot1
```

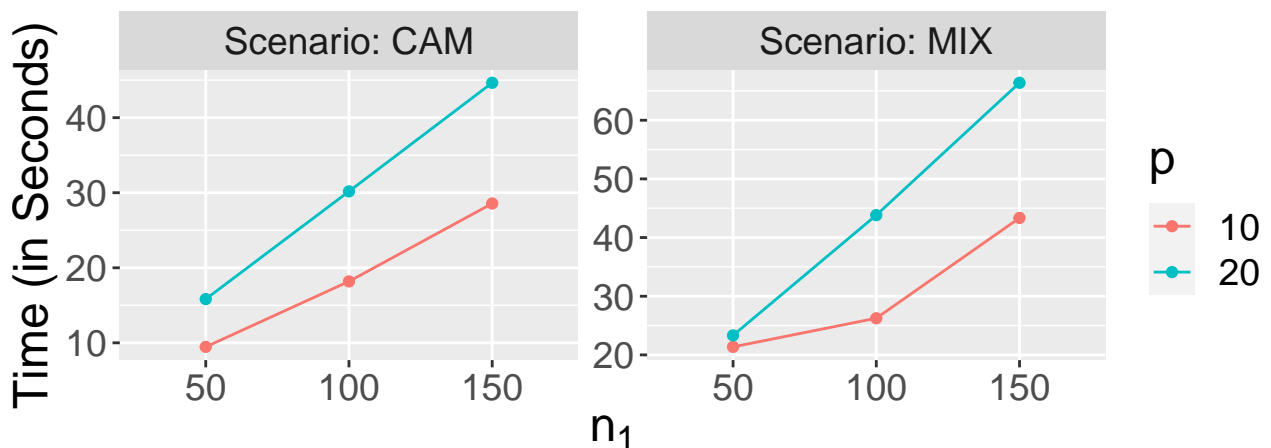


Figure 6: Figure S.6 of the supplementary materials

A pdf copy of this figure is saved in the folder `supplementary_figures/MCMC_runtime` with the name `MCMC_time.pdf`.

- This figure can be quite different from the one reported in the paper depending on the configuration of the system.

Figure S.7

```
output_dir=paste0(getwd(), "/supplementary_figures/MCMC_diagnostics/")
input_dir=paste0(getwd(), "/GBM_real_data/")
source(paste0(output_dir, "MCMC_diagnostics.R"))
```

- `importance_weights.png` inside the folder `supplementary_figures/MCMC_diagnostics/` is Figure S.7(a) of the supplementary materials.
- `dir_params.png` inside the folder `supplementary_figures/MCMC_diagnostics/` is Figure S.7(b) of the supplementary materials.
- `lognorm_hyperparams.png` inside the folder `supplementary_figures/MCMC_diagnostics/` is Figure S.7(c) of the supplementary materials.