Supplementary Material

February 18, 2021

1 Software and other computational details

The code to run the simulation was written in the R statistical programming language (version 4.0.3). All experiments were run using a 2.6 GHz Intel Xeon(R) Gold 6126 processor, 523.78 GB of Memory. The operating system was Windows Server 2012 R2. Computations were run in parallel across 30 cores. Parallel computing was implemented using the R package *parallel* and to ensure replicability of the findings seeds were set using the method by **?** implemented in the R package *rlecuyer*. Code to run the studies can be found at `https://github.com/EdoardoCostantini/imputeHD-comp`. In the following, each step of the simulation procedure is described in details for both experiments.

2 Additional Figures

2.0.1 Experiment 1

Supplements to experiment 1.

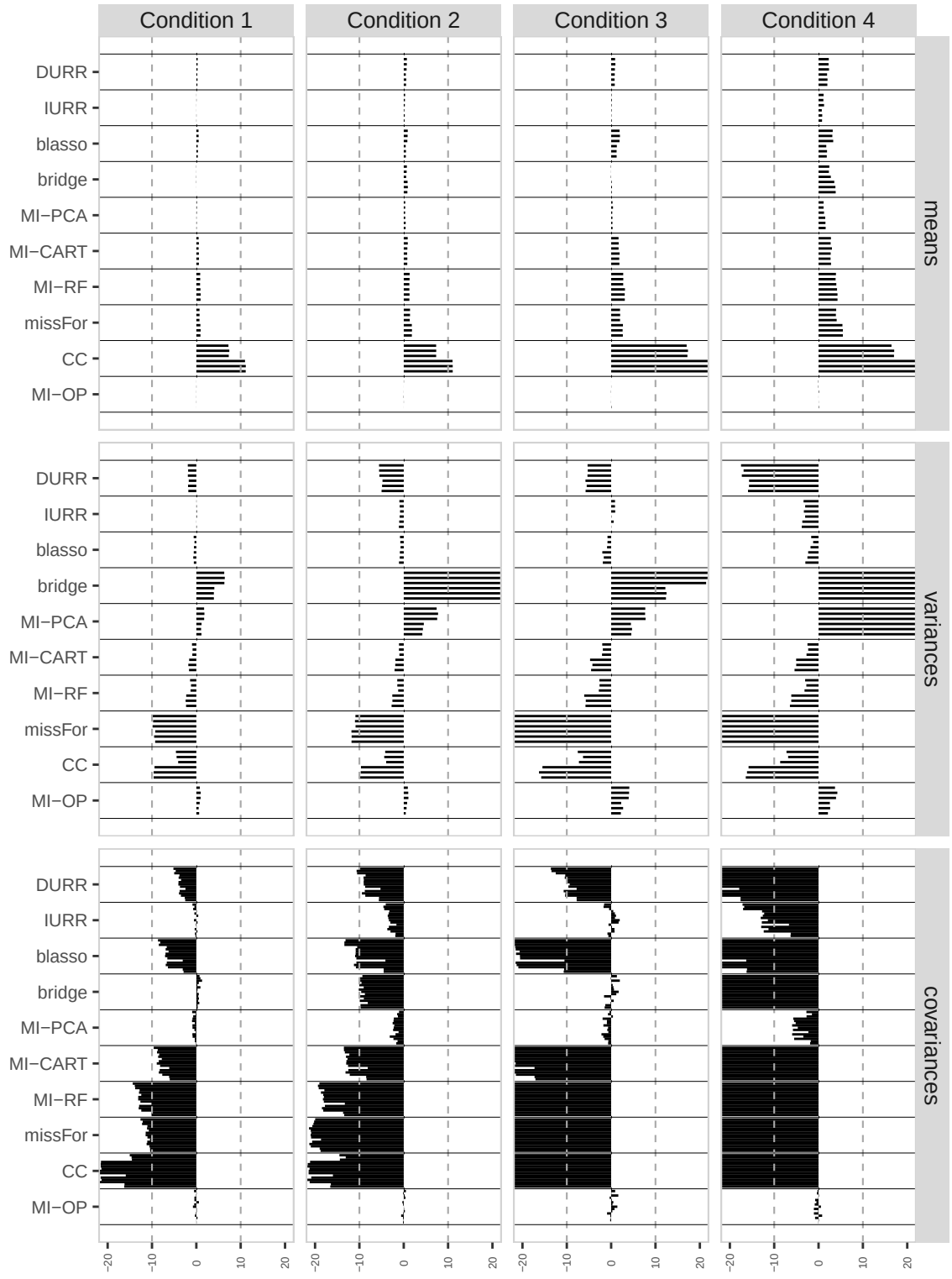

Figure 1: Percent Relative Bias (PRB) for item means, variances, and covariances. For every method, single horizontal lines, representing the PRB of a parameter estimate on a single variable (or pair of variables), combine to form larger horizontal bars giving an aggregate account of how each method performed across multiple variables with missing values.

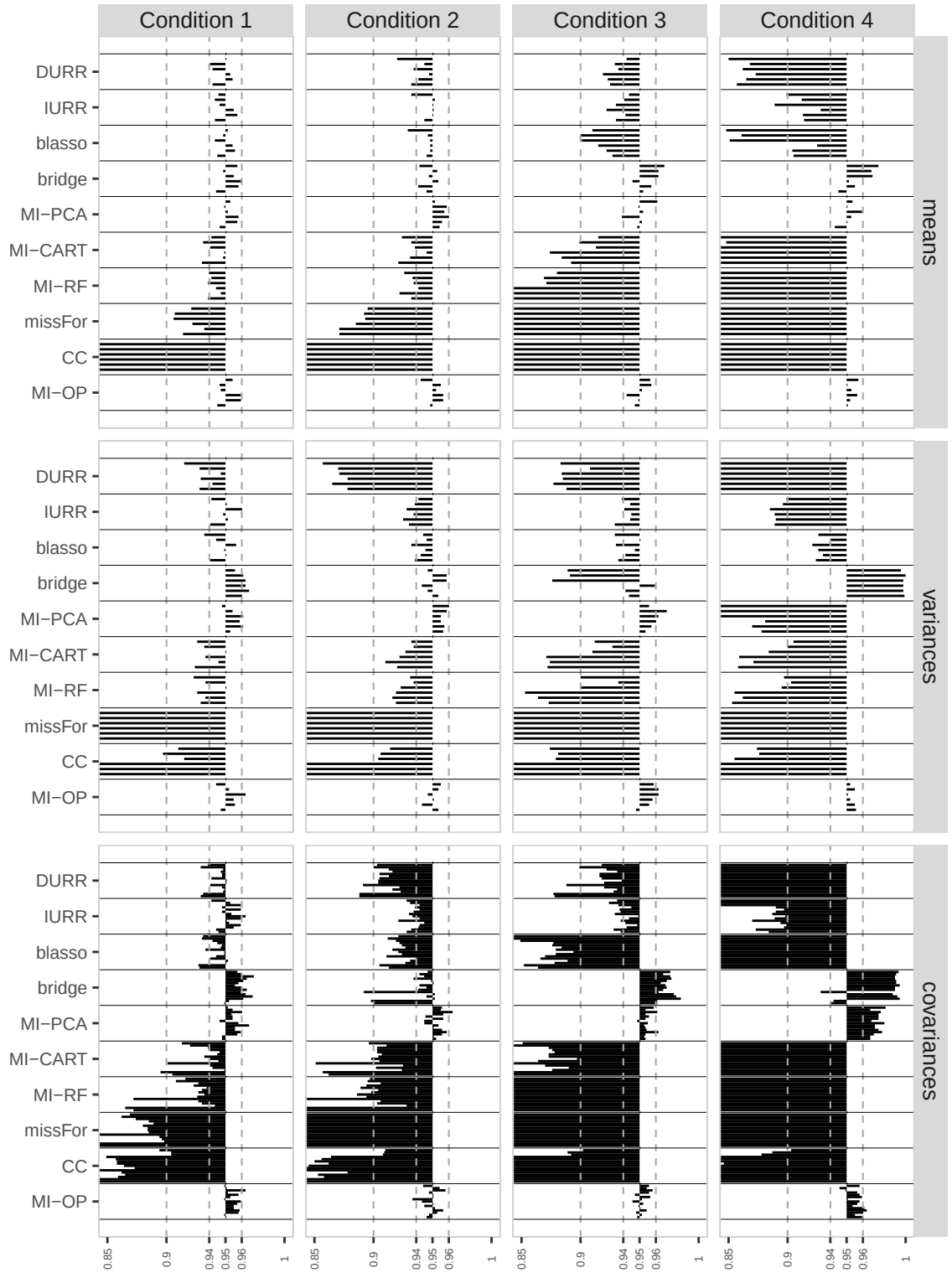

Figure 2: Confidence Interval Coverage (CIC) for item means, variances, and covariances. For every method, single horizontal lines, representing the CIC of a parameter estimate on a single variable (or pair of variables), combine to form larger horizontal bars giving an aggregate account of how each method performed across multiple variables with missing values.

2.0.2 Experiment 2

Supplements to simulation study (experiment 2)

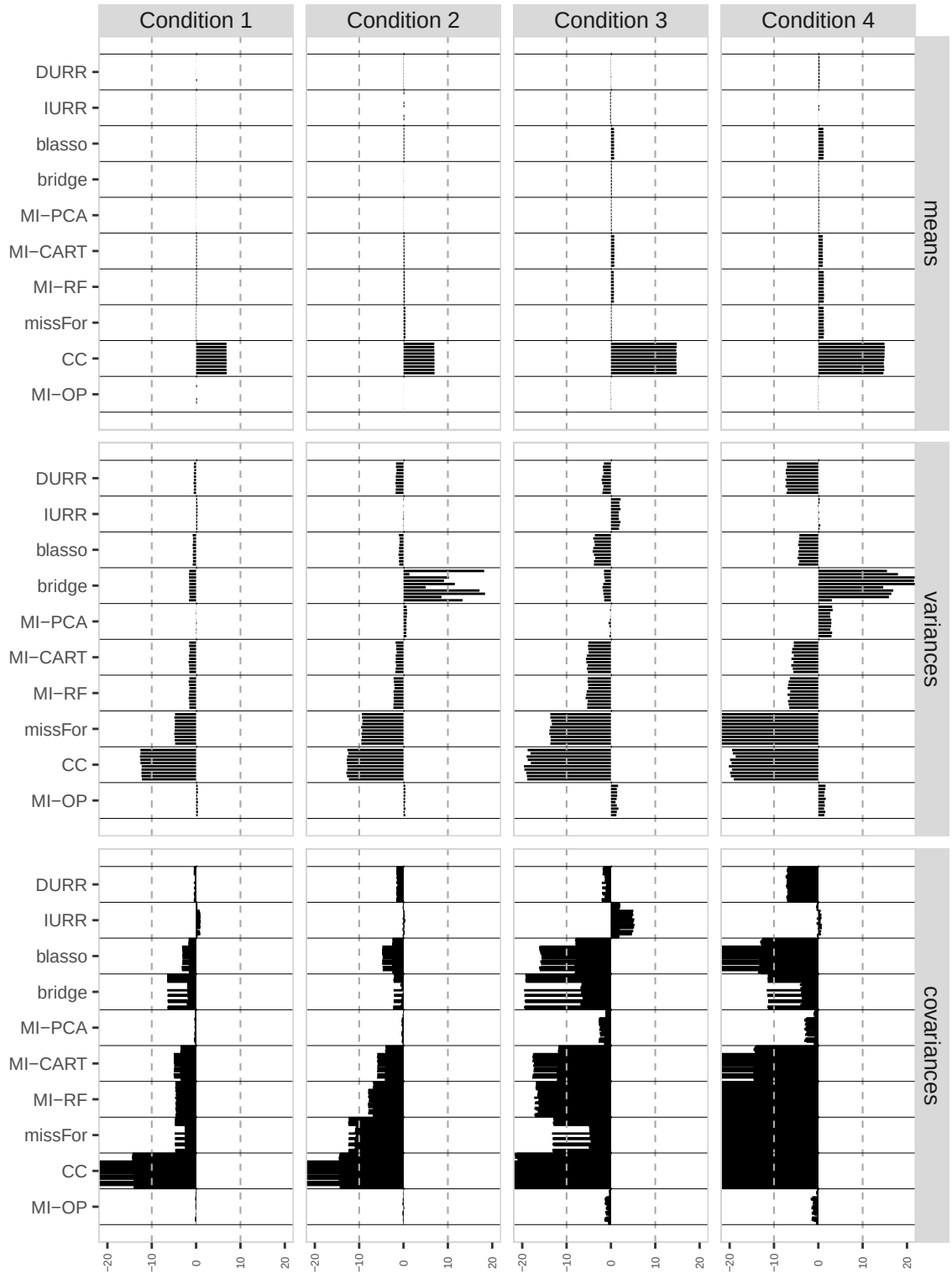

Figure 3: PRBs for the means, variances and covariances (PRB) for condition 1 to 4. For every method, single horizontal lines, representing the PRB of a parameter estimate on a single variable (or pair of variables), combine to form larger horizontal bars giving an aggregate account of how each method performed across multiple variables with missing values.

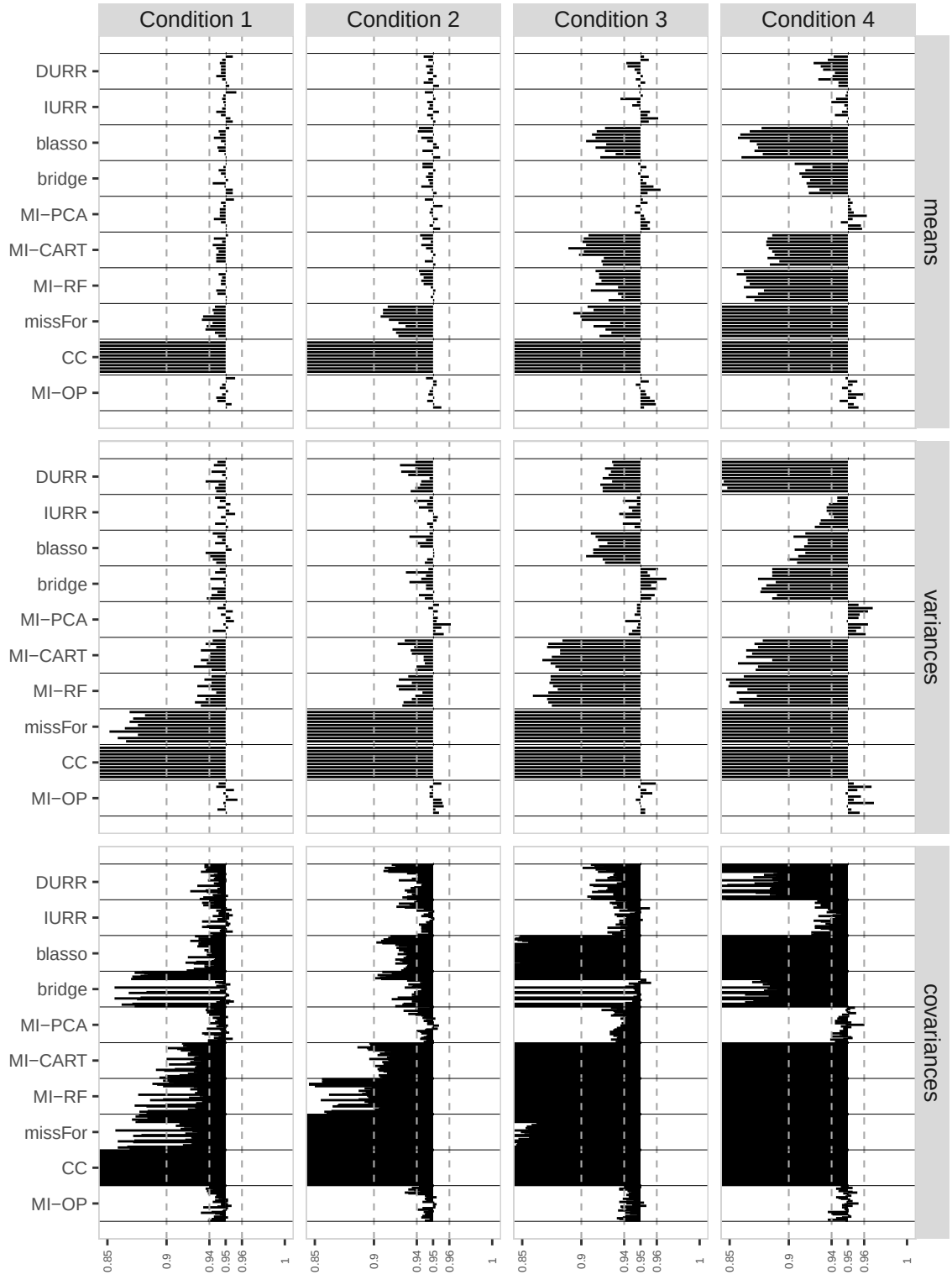

Figure 4: CIC for the means, variances, and covariances for condition 1 to 4. For every method, single horizontal lines, representing the CIC of a parameter estimate on a single variable (or pair of variables), combine to form larger horizontal bars giving an aggregate account of how each method performed across multiple variables with missing values.

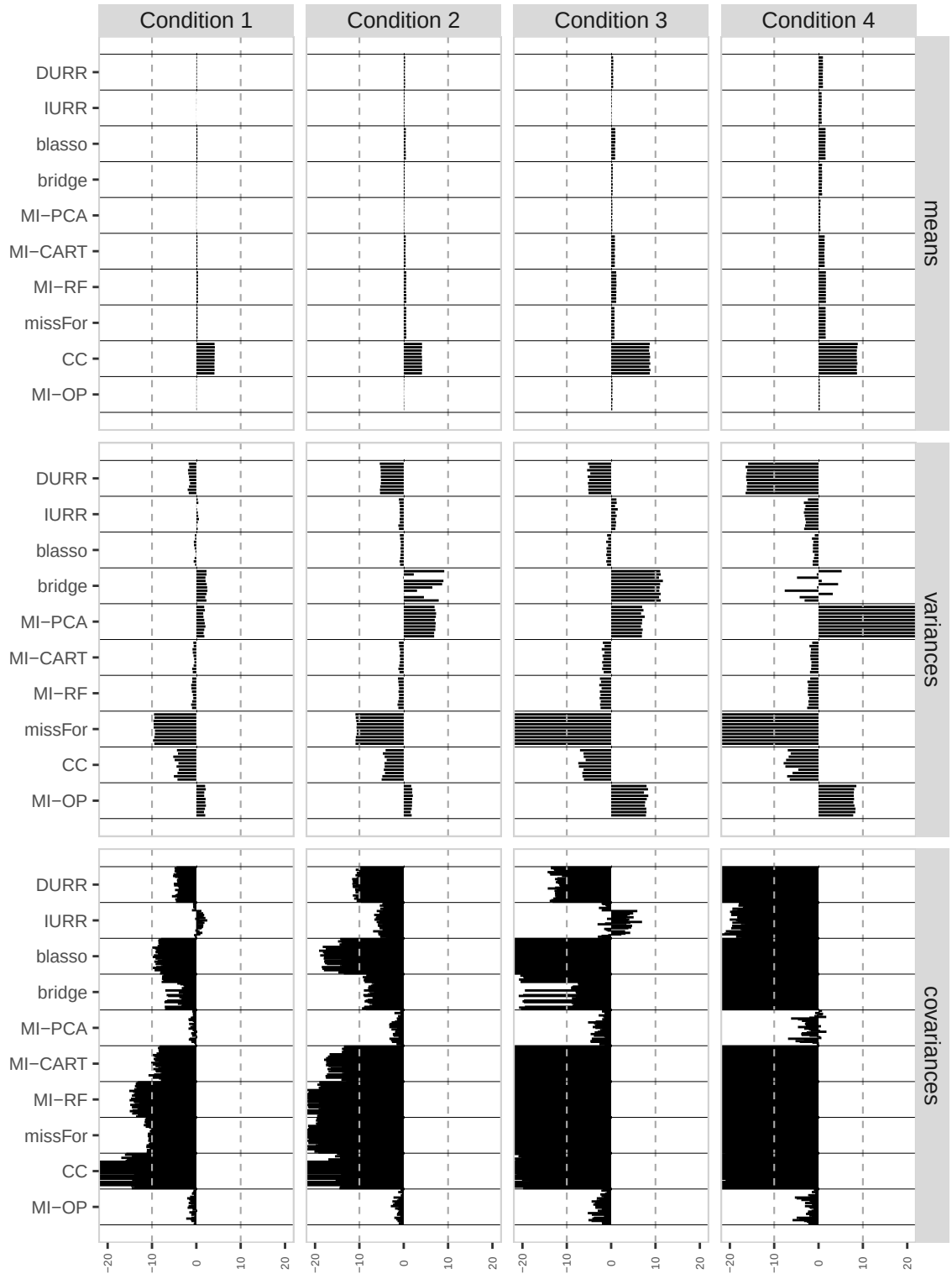

Figure 5: Bias estimation for the means (SB), variances and covariances (PRB) for condition 5 to 8.

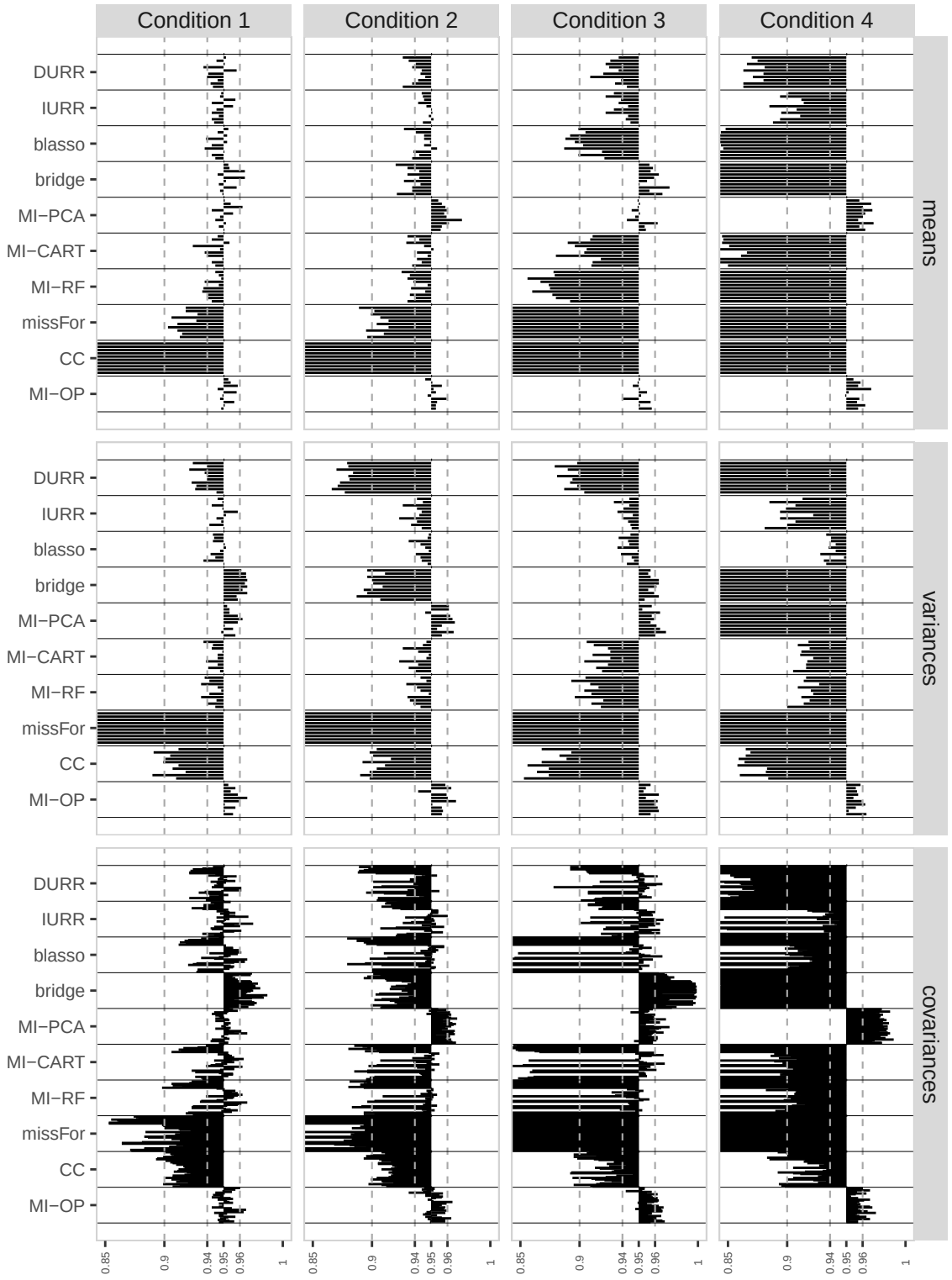

Figure 6: Confidence Interval Coverage (CIC) for the means, variances, and covariances for condition 5 to 8.

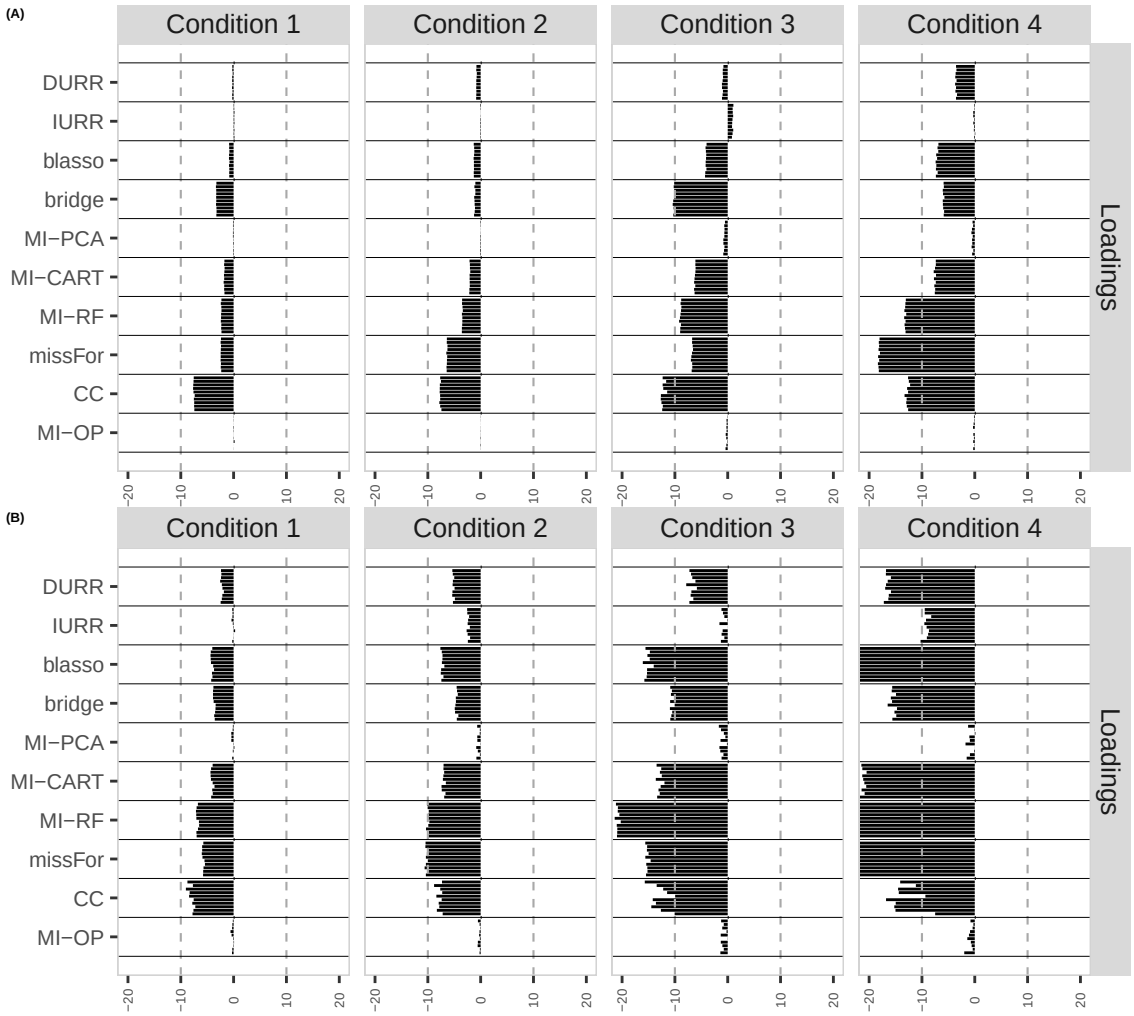

Figure 7: Percent Relative Bias (PRB) for the factor loadings in conditions 1 to 4 (panel A) and conditions 5 to 8 (panel B). Within each panel, for every method, single horizontal lines report the PRB of the factor loading estimation for each item with missing values.

2.0.3 Resampling Study

Supplements to resampling study

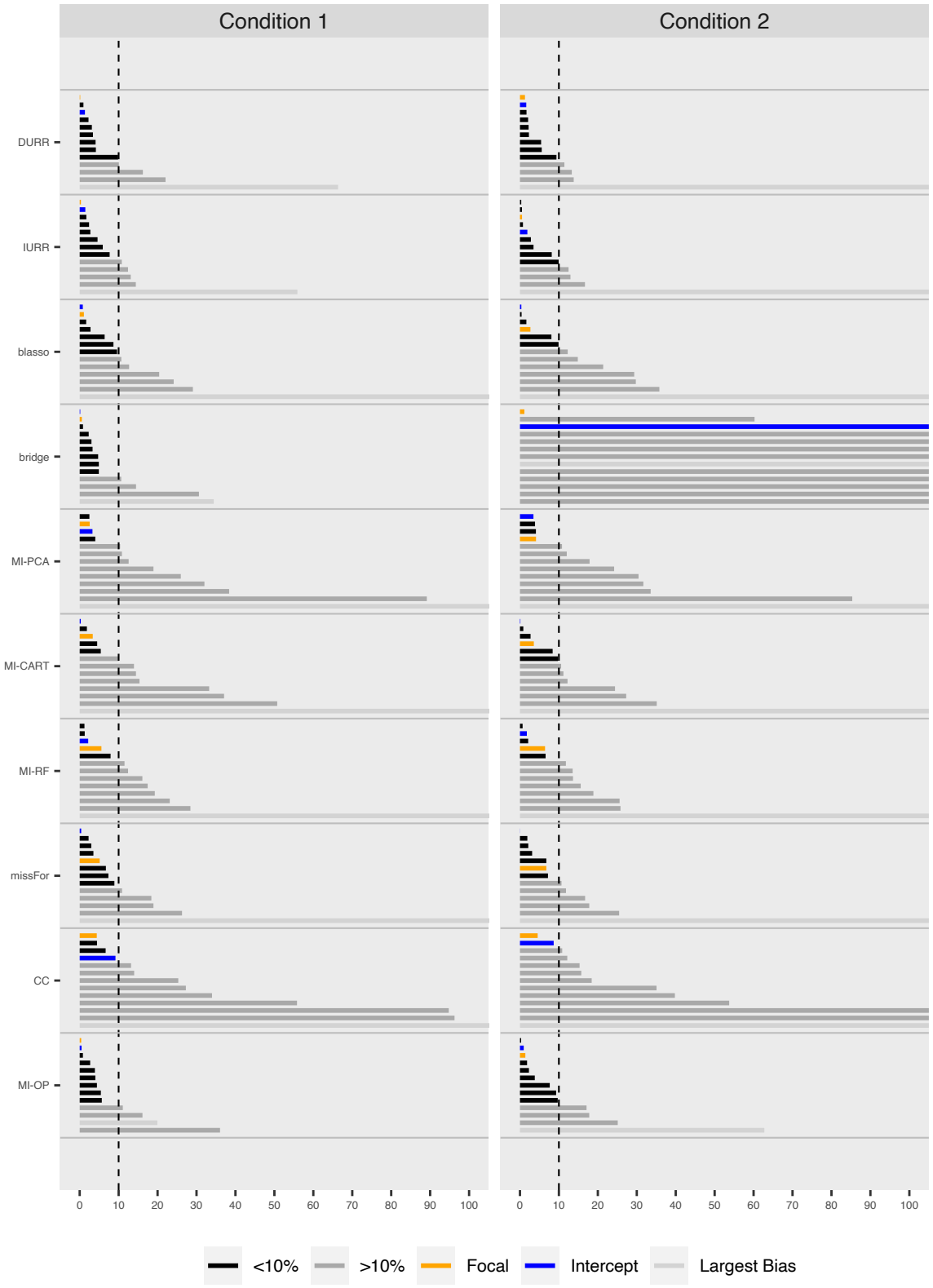

Figure 8: PRBs for all the model parameters in model 1. The order of the bars is based on the absolute value of the PRBs. The values for the intercept, the focal regression coefficient, and the regression coefficient with which most methods struggle (Largest Bias) are highlighted

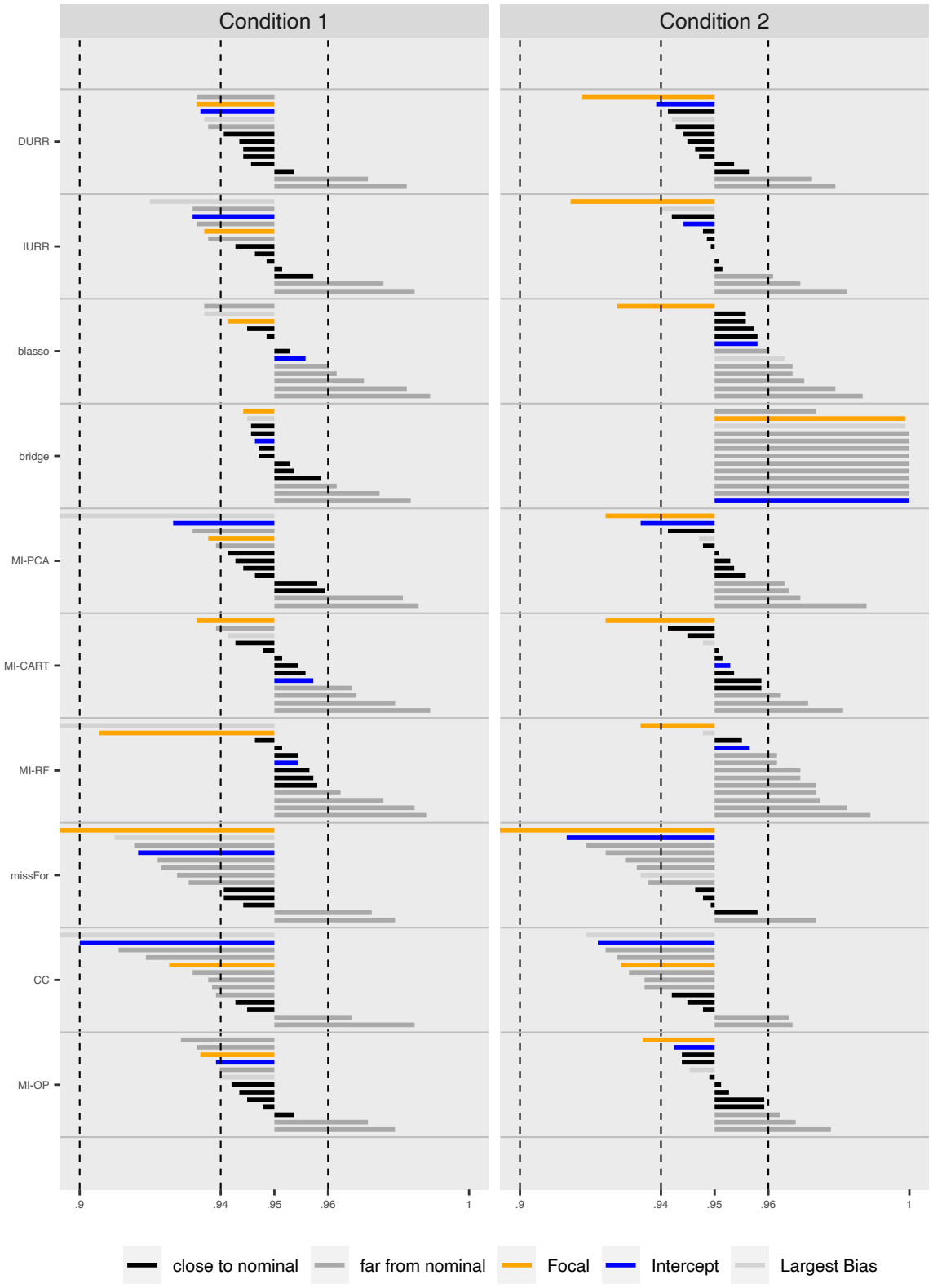

Figure 9: CIC for all model parameter in model 1. Bars are sorted in by ascending value. The values for the intercept, the focal regression coefficient, and the regression coefficient with which most methods struggle (Largest Bias) are highlighted