Simulation of PCB with resampling

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Contents

1 Decorrelation using Graphical Lasso (glasso) and motivation

Based on the previous simulation results, we found that the variance estimator of proposed method is not very stable, means variance of the estimator is large when the sample proportion is small. Thus, One possible reason for that is the decorrelation procedure of the proposed method is not that accurate. It uses the SVD method to find the inverse covariance matrix, which could be too closed to the sample date to capture the true structure of the covariance matrix. Therefore, we want to try the glasso method which add penalty to the estimated inverse covariance matrix if it's in favor of the sample data.

1.1 Main Idea of glasso

For the N multivariate normal observations of dimension p, with mean μ and covaraince Σ.

To estimate the precision matrix, we could maximize the penalized log-likelihood,

$$\log|\Theta| - tr(S\Theta) - \rho||\Theta||_1,$$

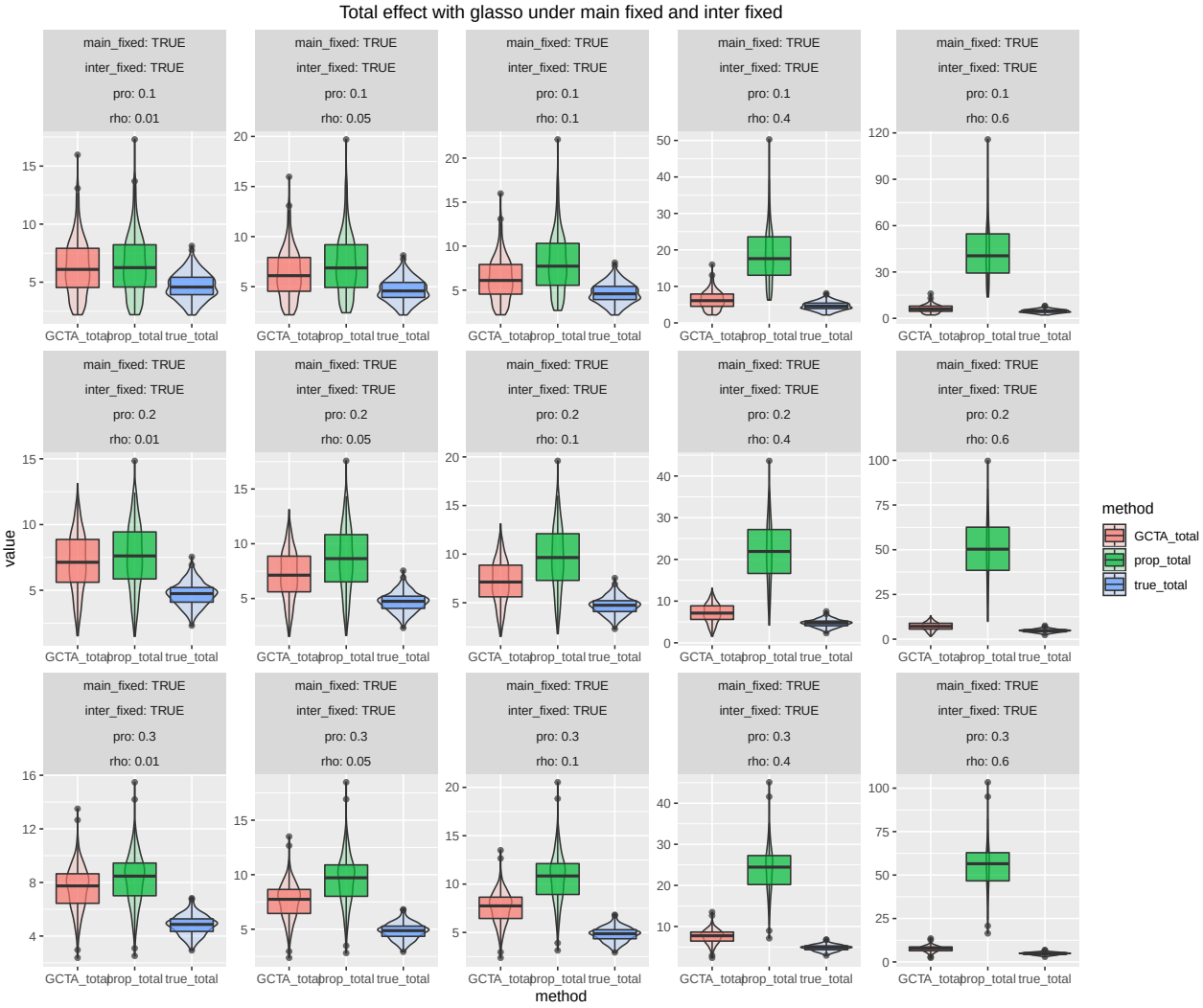
where

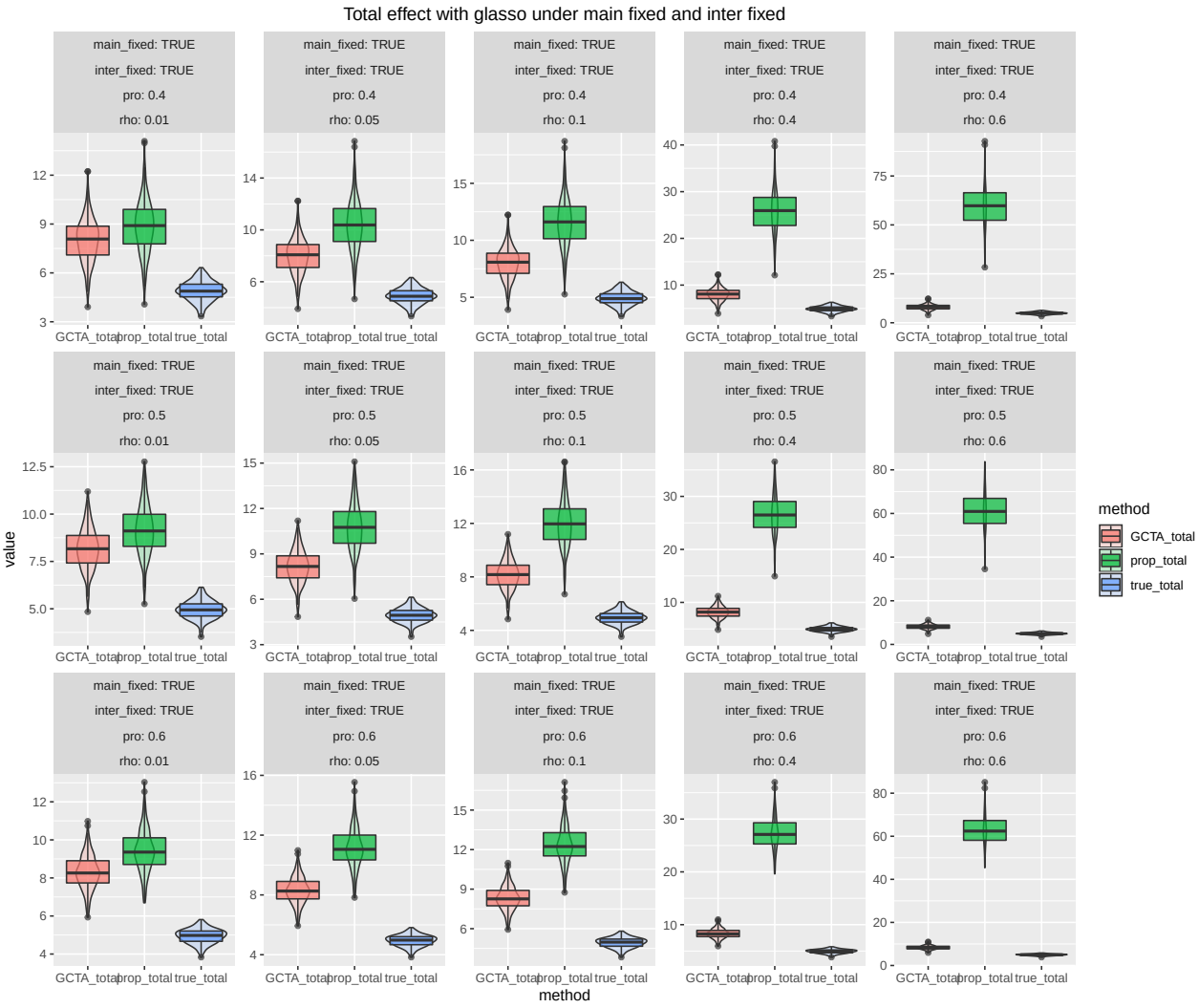
- $\Theta = \Sigma^{-1}$,
- $||\cdot||_1$ is for L_1 norm - sum of all the absolute values of each elements of Θ,
- S is the empirical covariance matrix.

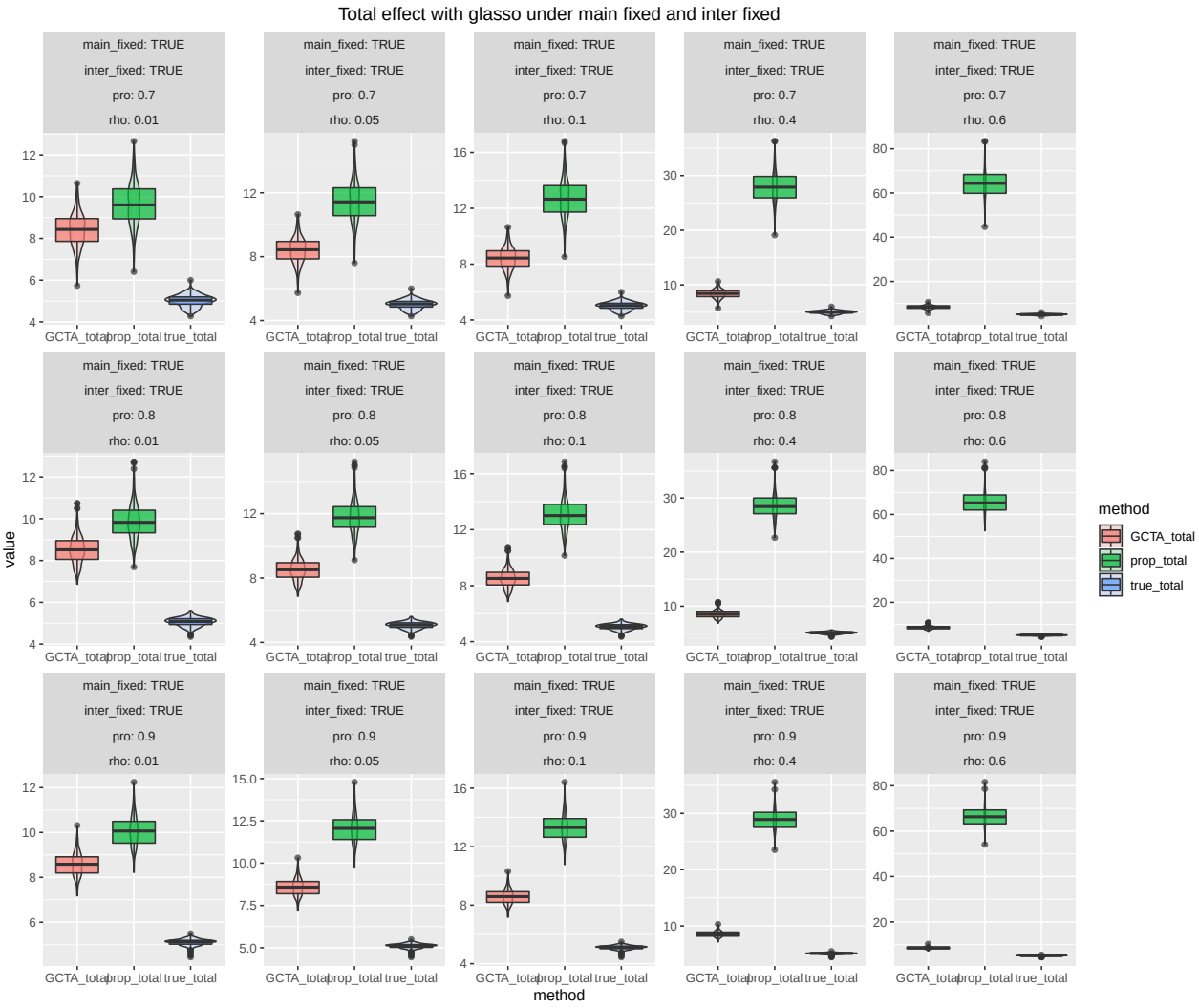
Note: as other lasso method, the key assumption of glasso is the sparsity of the covariance matrix Σ

2 Simulation result

2.1 Simulation result of the fixed fixed




Total effect with glasso under main fixed and inter fixed
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.4
rho: 0.01
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.4
rho: 0.05
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.4
rho: 0.1
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.4
rho: 0.4
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.4
rho: 0.6
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.5
rho: 0.01
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.5
rho: 0.05
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.5
rho: 0.1
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.5
rho: 0.4
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.5
rho: 0.6
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.6
rho: 0.01
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.6
rho: 0.05
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.6
rho: 0.1
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.6
rho: 0.4
main_fixed: TRUE
inter_fixed: TRUE
pro: 0.6
rho: 0.6
value
method
GCTA_total
prop_total
true_total
method
GCTA_total
prop_total
true_total



3 Conclusion

4 Further work