

Type I error and power simulation

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Simulation Set-up

$$\begin{bmatrix} Y_i \\ \hat{Y}_i \end{bmatrix} | Z_{ik} \sim N \left(\begin{bmatrix} \beta_G G + \beta X_i \\ \alpha X_i \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right)$$

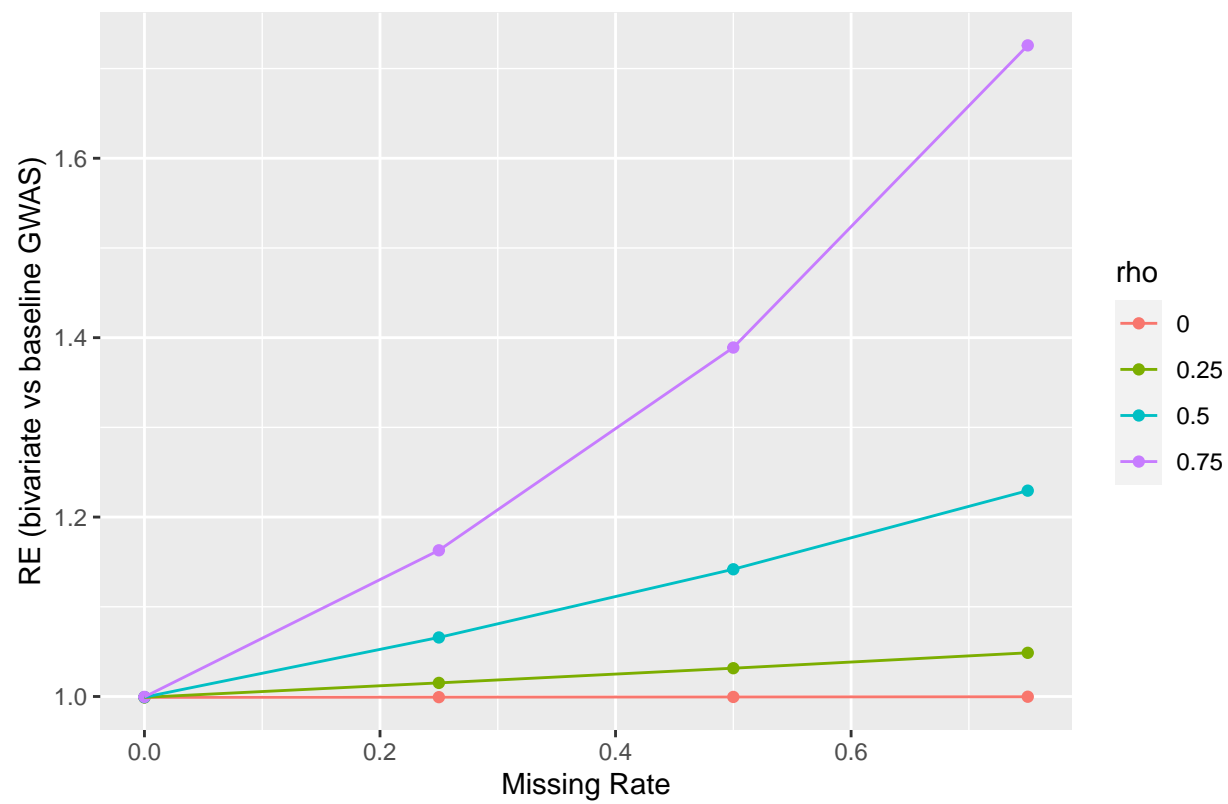
- $G \sim \text{Bin}(2, maf)$
- $maf = 0.25, X_i \sim N(0, 1)$
- $\alpha = \beta = 0.11, \beta_g = 0.11575982$
- missing rate $\in \{0, 0.25, 0.5, 0.75\}$
- $\rho \in \{0, 0.25, 0.5, 0.75\}$

Type I error

Table 1: Proportion of test making type I error

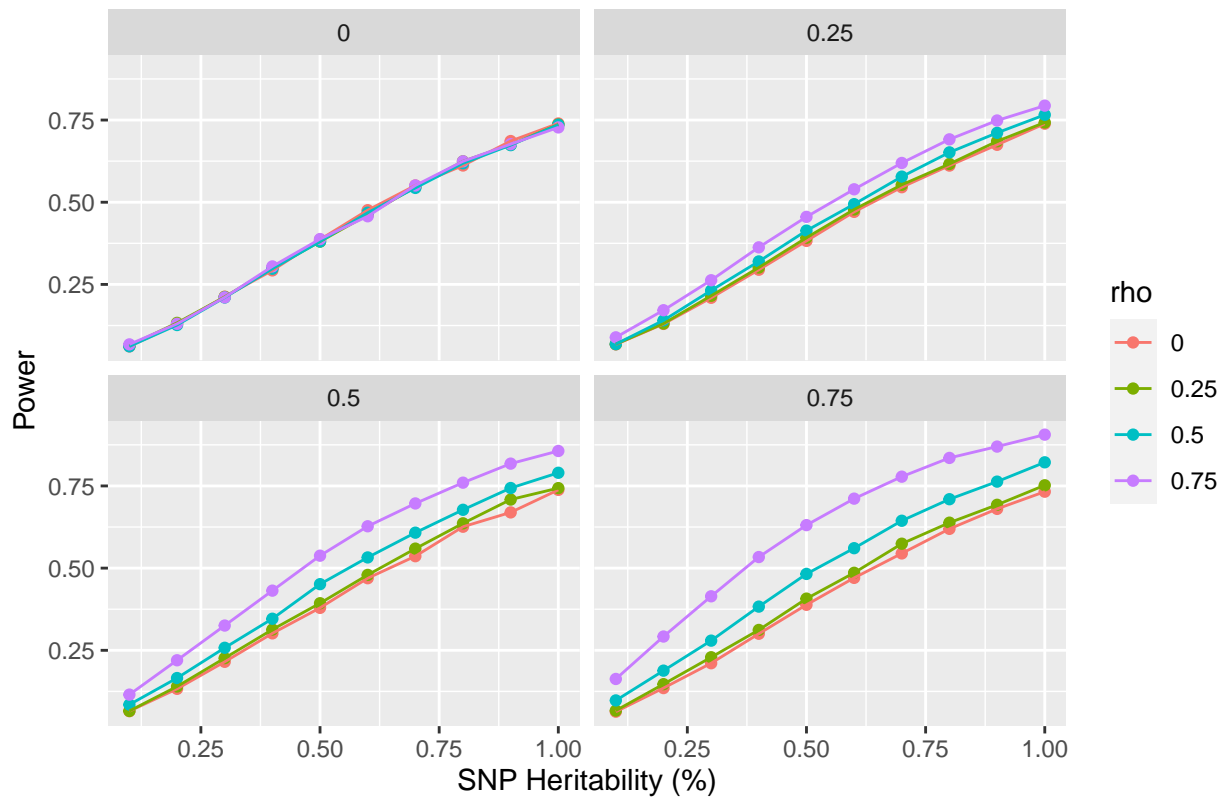
mssing	rho	t1e rejection	Chisq
0.00	0.00	0.0473	0.9749307
0.00	0.25	0.0509	1.0044826
0.00	0.50	0.0456	0.9787724
0.00	0.75	0.0483	0.9811161
0.25	0.00	0.0521	0.9964332
0.25	0.25	0.0551	1.0339412
0.25	0.50	0.0505	1.0167177
0.25	0.75	0.0480	1.0019893
0.50	0.00	0.0508	1.0003585
0.50	0.25	0.0500	1.0040915
0.50	0.50	0.0537	0.9967186
0.50	0.75	0.0494	1.0007287
0.75	0.00	0.0485	0.9916063
0.75	0.25	0.0489	0.9992889
0.75	0.50	0.0517	1.0103253
0.75	0.75	0.0524	1.0097825

Increased Power relative to baseline GWAS
SNP-heritability = 0.5%



Power as a function of heritability

Power of bivariate regression, stratified by percent of missing labels



Unlike the previous plot, SNP heritability plays no role in relative efficiency.

