

## variance comparision

This file is to compare the variance from the simulation. Based on the result, we calculate three types of simulations

1. Posterior variance: variance estimated from the posterior distribution, take average of 500 samples
2. Sandwich variance: variance estimated by sandwich method, taking average of 500 samples

$$\text{Cov} \left( \mu_k^{XZ}, \tau_k^{XZ^2} \right) = \frac{1}{n} \mathbf{H}^{-1} \left( \mu_k^{XZ}, \tau_k^{XZ^2} \right) \mathbf{J} \left( \mu_k^{XZ}, \tau_k^{XZ^2} \right) \mathbf{H}^{-1} \left( \mu_k^{XZ}, \tau_k^{XZ^2} \right)$$

3. MCMC variance: variance estimated by 500 simulations

Variance Estimation for  $\mu$

##	BA1	CA1	BA2	CA2
## Posterior	0.019739	0.019886	0.020057	0.019907
## Sandwich	0.000096	0.000087	0.000109	0.000067
## MC	0.134128	0.148982	0.118534	0.127756

Variance estimate for  $\tau$

##	BA1	CA1	BA2	CA2
## Posterior	0.010108	0.010052	0.010080	0.010121
## Sandwich	0.014216	0.012030	0.012815	0.017010
## MC	0.046812	0.040109	0.042449	0.039863