

# HW3 STAT5376

## Bootstrap

Li Sun

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1. Consider the law school data. Bootstrap it with  $n=15$  and compute

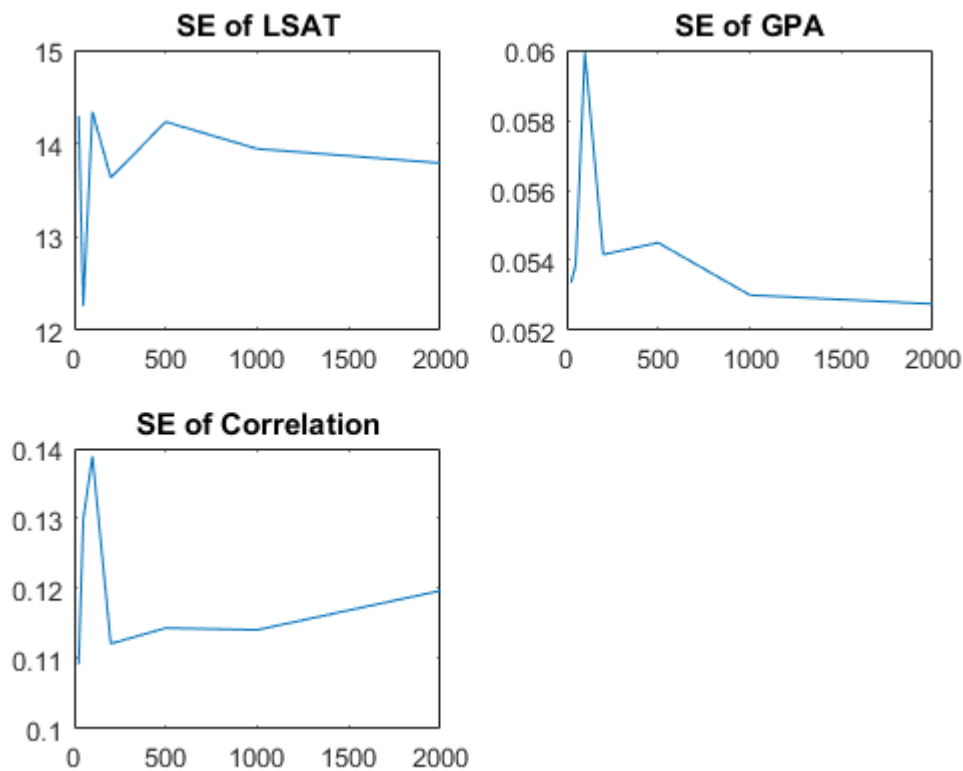
(a) means and correlation coefficient from the sampled data

$$\mu_x = 603.8667$$

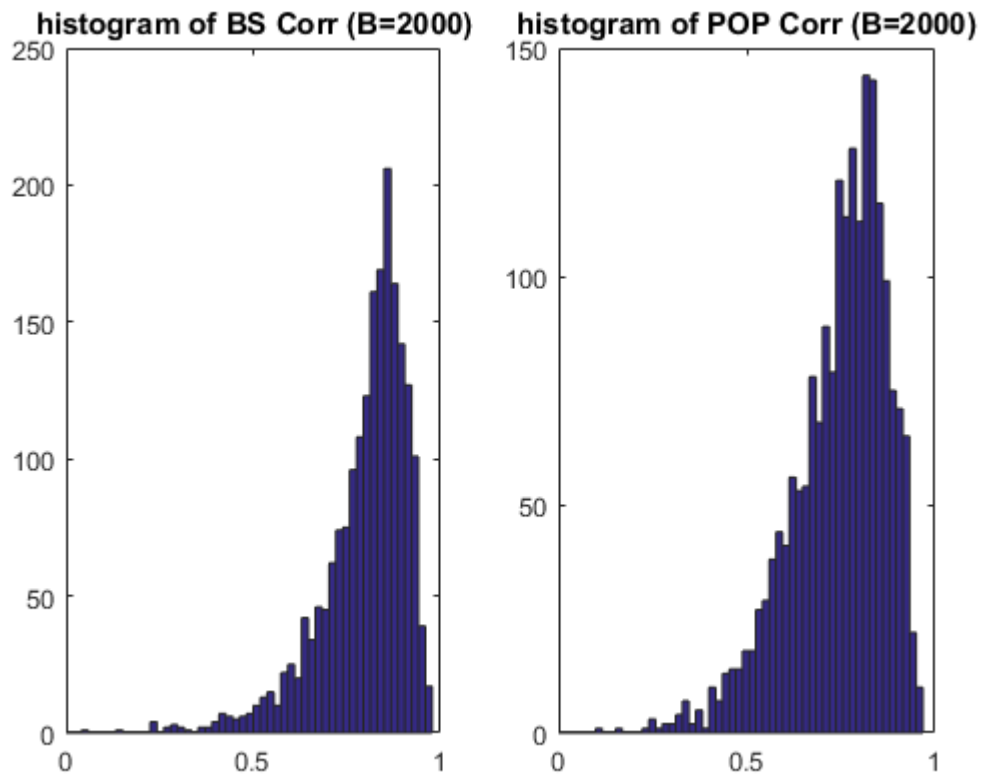
$$\mu_y = 3.142$$

$$\rho = 0.4753$$

(b) SE of estimates



(c) Plot histogram of bootstrap replicates of corr for the case  $B=2000$ .



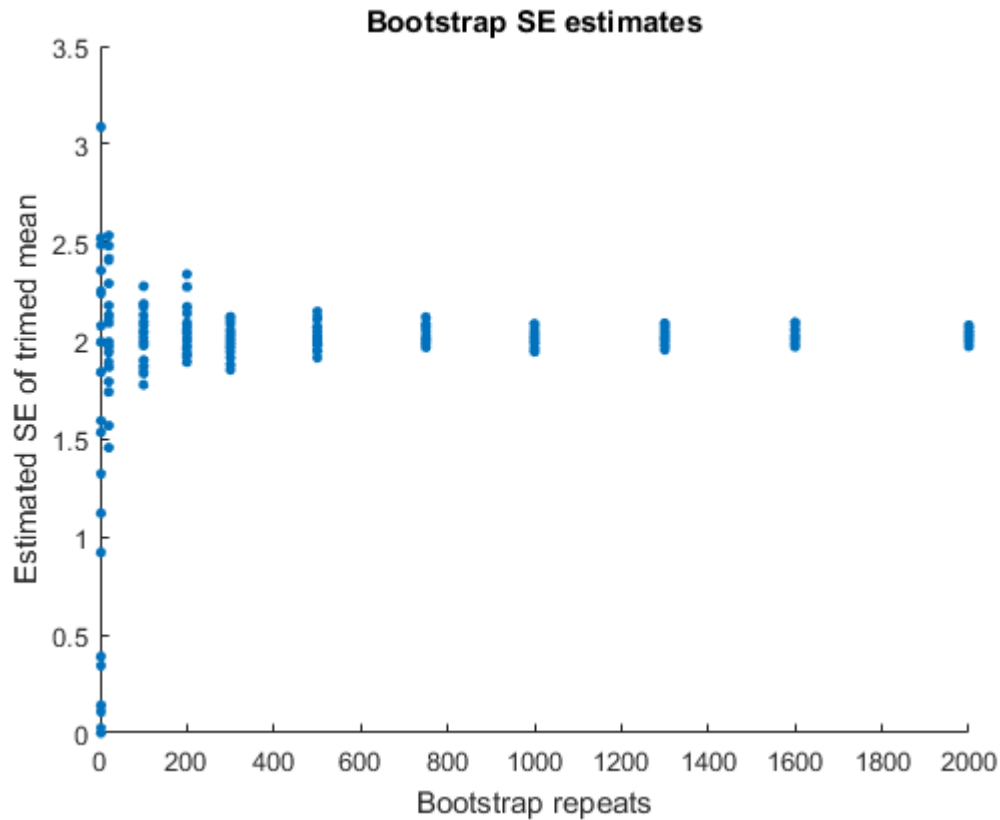
The two histogram centered at similar location but the first one(Corr estimates from Bootstrapping) seems to be spikier(smaller standard error). But generally very similar.

## 2. Estimating trimmed mean

(a)

B	25	100	200	500	1000	2000
SE	2.2349	2.0212	1.8934	2.0582	2.0164	2.0564

(b)How large should we take B to provide reasonable accuracy.



According to this figure, we can see the estimated of standard error of trimed mean estimator converges quickly when B goes up. And when B is above 1000, it seems good enough.

### 3. Estimating the bias of median estimating the mean.

I use 1000 repeats for bootstrap median estimate.

when  $n=10$ , Bias=0.0906

when  $n=20$ , Bias=0.1063

when  $n=100$ , Bias=-0.0574

The bias is based on the sample we simulated from the normal distribution.

All code please see <https://github.com/rikku1983/STAT5376>

Thanks!