

## Step 1

	Quality = 5	Quality = 4	Quality = 3	Quality = 2	Quality = 1	Quality = 0
$\sigma_q^2$ 1. round	0.00001	0.001	0.002	0.003	0.004	0.005
$\sigma_q^2$ 2. round	0.00002	0.002	0.004	0.006	0.008	0.010
$\sigma_q^2$ 3. round	0.00003	0.003	0.006	0.009	0.012	0.015
$\sigma_q^2$ 4. round	...	...	...	...	...	...

x 2  
x 3  
x 4

$\sigma_q^2$  is  
increasing  
with each  
round

$\sigma_q^2$  is increasing with decreasing data quality

## Step 2

Add random draws from  $\mathcal{N}$  with mean 0 and the respective  $\sigma_q^2$  as standard variation to the Top 10%-share variable

## Step 3

Run Model (1) with different Top 10%-share variables per round (10 x)

```
lm(PM2.5 ~ top10 + controls, data = data_me)
```

## Step 4

Simulate (nsim = 1000) approximated sampling distributions of Top 10%-share coefficients with  $\mathcal{N}(\text{mean} = \text{top10\_est}, \text{sd} = \text{top10\_se})$

## Step 5

Get point estimates and CIs  
(mean and 2.5% and 97.5% percentiles of the sampling distributions)