

CRIME4:

FD model

$$\Delta \log(\text{crime})_{it} = \alpha_0 + \alpha_3 d83_t + \dots + \alpha_7 d87_t +$$

$$\beta_1 \Delta \log(\text{avg sen})_{it} + \beta_2 \Delta \log(\text{polpc})_{it} + \Delta u_{it}$$

$$\hat{\beta}_1 = -0.066 \quad \hat{\beta}_2 = 0.284$$

usual se: $se(\hat{\beta}_1) = 0.025$

cluster robust se: $se(\hat{\beta}) = 0.031$

cluster robust se $\rightarrow$ allow for heterosk. and arbitrary correlⁿ within a cross-sectional unit (i.e. cluster) over time but not across cross-sectional units.

		time			
WNC	cty 1	2024	y ↓ crime	x ↓ unem.	u ↓ random weather shock
	cty 1	2025			
	cty 1	2026			
ENC	cty 2	2024			
	cty 2	2025			
	cty 2	2026			

Suppose $\rightarrow$ cross-sectional data

Schools	Score	Teacher Quality
1		
2		
3		
4		
$\vdots$		

$$\text{score}_i = \beta_0 + \beta_1 TQ_i + u_i$$

Can I include dummy vars. for each school?

What if data $\rightarrow$ panel $\Rightarrow$ schools observed
for multiple pds.?