

CRIME2:

$$\text{crime}_{it} = \beta_0 + \delta_0 d87_t + \beta_1 \text{unem}_{it} + \alpha_i + u_{it}$$

$$\hat{\delta}_0 = 7.94$$

$$\hat{\beta}_1 = 0.43$$

α_i : unobs. city characteristic

e.g. geography, industry composition

u_{it} : random / idiosyncratic errors e.g. weather shocks, protests / activism

$$\Delta \text{crime}_i = \delta_0 + \beta_1 \Delta \text{unem}_i + \Delta u_i$$

$$\hat{\delta}_0 = 15.4$$

$$\hat{\beta}_1 = 2.22$$

Violation of strict exog. $\rightarrow$ e.g. if past weather shocks (u_{i1}) corr. w/ future unem. (x_{i2})

e.g. if anticipation of future weather shocks (u_{i2}) corr. w/ past / current unem. (x_{i1})

Violation of contemp. exog. $\rightarrow$ e.g. if weather events corr. w/ unem. in same pd.

x_{i1} corr. w/ u_{i1}

x_{i2} " u_{i2}

viol. of contemp. exog. $\Rightarrow$ viol. of strict exog.
 $\nLeftarrow$

city	x	Δx
1	8.9	
1	8.9	0
2	7.9	
2	7.9	0
.		
.		
.		
50	6.4	
50	6.4	0

city	x	Δx
1	8.9	
1	9.9	1
2	7.9	
2	8.9	1
.		
.		
.		
50	6.4	
50	7.4	1