

Bad Weather, Safe Day? The Effect of Weather/Pollution on Crime

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Motivation

- Extreme weather has become a prevailing topic due to the increase in greenhouse gases and air pollution.
- Air pollution can affect behavior; toxic plants openings and closings can be a very good proxy that affect people resort themselves into the neighborhood so that change the crime rates around the area.
- Few economic literature have done on pollution and crime rate.

Questions

1. How does weather affect crime rate in the cities of research? (Does crime rate react to a certain temperature range?)
2. How does pollution overall affect crime rate in the cities of research? (Does opening or closing a polluting site affect the crime rate?)

What do I find?

- The violent crime rate increases with temperature and PM2.5
- The property crime rate decreases with PM10
- Temperature only affects the violent crime rate, not property crimes
- The turn around point is 28°C, it is slightly higher than previous studies which used aggregate weather and crime data.

Data

- Crime data
- Weather data
- Pollution data
- Toxic Release Inventory (TRI) Closing and Open Data
- Census variables

Empirical methods

- $Crime_{i,d,t} = \alpha_0 + \alpha_1 temperature_{i,d} + \alpha_2 PM2.5(or PM10_{i,d}) + \alpha_3 X_{i,t} + time_t + city_{it} + \varepsilon_{i,d,t}$
- $Crime_{i,d,t} = \alpha_0 + \sum_{b=1}^{13} \alpha_b tempbin_{i,d} + \alpha_2 PM2.5(or PM10_{i,d}) + \alpha_3 X_{i,t} + time_t + city_{it} + \varepsilon_{i,d,t}$
- $Crime_{i,j,t} = \gamma_0 + \gamma_1 1[Plant Operating]_{i,t} + \gamma_2 1[< 1 Mile]_{i,j} + \gamma_3 1[Plant Operating]_{i,t} * 1[< 1 Mile]_{i,j} + \eta_{i,t} + \tau_t + \gamma_4 X_{i,t} + \varepsilon_{i,j,t} *$

* Project in progress, this method adopts the Currie et al (2015)'s empirical work.

Results

- The violent crime rate rises about 1% with a 1 $\mu\text{g}/\text{m}^3$ PM2.5 increases, which is about 1,000 cases per day. However, PM2.5 does not show any influence on the property crime rate
- There is a decrease of about 3% to 4% with a 1 $\mu\text{g}/\text{m}^3$ PM10 increases, which equals about 3,000 to 4,000 cases per day

Results

