Connecting Outdoor Air Pollution to Healthy Financial Cognitive Skills

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Introduction

- We investigate the impact of air pollution on human financial cognition using highly granular data on consumer financial reports from 2012 to 2019.
- Our results offer important policy implications in the design of just-in-time behavioral interventions such as mortgage payment reminders to reduce suboptimal decisions arising from a lower financial cognitive ability on a heavily polluted day.

Background & Our contribution

Lower work productivity (Graff Zicin & Neidell 2012)

Reduced students' performance (Stafford 2015)

Our research focuses on: Individuals' ability to handle personal finance tasks

Empirical method

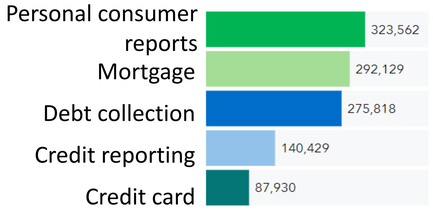
- Empirical estimation:

$$\log FinCog_{ct} = \beta_0 + \beta_1 AQI_{ct} + \boldsymbol{\Theta W_{ct}} + Cty_c + T_t + \epsilon_{ct}$$

The number of reported consumer financial complaints in county c on day t.

Air quality in county c on day t.

A vector of daily weather conditions (precipitation, snow, and temperature)



Values of daily AQI	Levels of concern
0-50	Good
51-100	Moderate
101-150	Unhealthy for sensitive groups
151-200	Unhealthy
201-300	Very unhealthy
>= 301	Hazardous

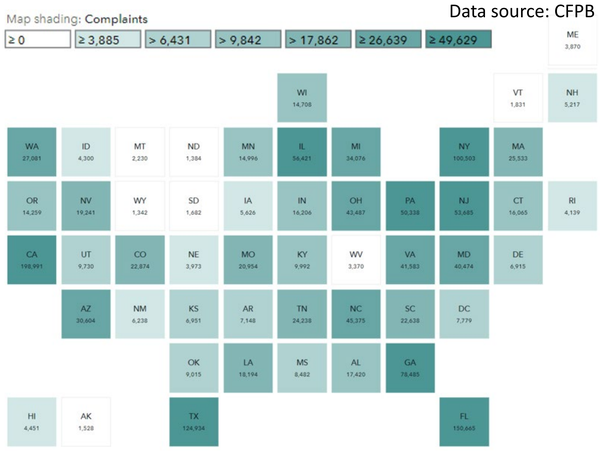
Additional controls:
- Cty_c is a vector of county fixed effects.
- T_t is a vector of year-month fixed effects and day-of-week fixed effects.

Preliminary Results

- Individuals' financial cognition is significantly **lower** when the ambient air pollution concentrations go up.
- The number of consumers reporting personal-finance-related issues drops by about **0.2%** for every 10 units increase in air quality index (AQI)
- The marginal impact is substantially stronger when the air quality is classified as unhealthy, very unhealthy, or hazardous.

AQI category	Est. change in total financial complaints
Good	0 (reference; baseline)
Moderate	-0.17%
Unhealthy for sensitive groups	-0.74%
Unhealthy	-5.36%***
Very unhealthy	-1.02%
Hazardous	-17.84%**

Data at a glimpse



- States with the most vs. least daily financial complaints per 1,000 people:
  - DC (11.57)
  - Georgia (7.69)
  - Florida (7.43)
  - Iowa (1.80)
  - West Virginia (1.83)
  - North Dakota (1.86)

Experimental method

- Supplementary factorial experiment (Summer 2023):

Human subject recruitment:
May – Aug 2023 (Wildfire season)

Target human subjects in California: 3,000 (60/day, 5 days/week, 10 weeks)

Randomization

- Control: **no** info about air quality
- Treatment 1: **Positive** info about air quality
- Treatment 2: **Negative** info about air quality

Assess: **Financial literacy** (Big 5)

- Questions we will answer:
  - 1. Does people's financial cognition depend on the actual air quality or information about the air quality?
  - 2. What is the impact of pollution-abatement strategies on financial cognition?

References

- Stafford, T. M. 2015. Indoor air quality and academic performance. *Journal of Environmental Economics and Management*, 70, 34-50.
- Graff Zivin, J., and Neidell, M. 2012. The impact of pollution on worker productivity. *American Economic Review*, 102 (7): 3652-73.

Acknowledgments

- This research is partially (50%) funded by the REP program at Texas State University for FY 2023.
- We are looking for further funding opportunities to advance our experiment this summer.

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