Behavioral Bias in Haze: Evidence from Air Pollution and the Disposition Effect in China

Jennifer (Jie) Li, INSEAD

Massimo Massa, INSEAD

Hong Zhang, PBC Tsinghua

Jian Zhang, HKBU

Discussion by Darwin Choi

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Main Findings

- This paper tackles a challenging empirical question
  - The *causal* impact of pollution on economic activities
- Examines one of the most important and robust behavioral biases: the disposition effect
  - Higher air pollution → stronger disposition effect
  - Correlation
  - Causality
    - Huai River: Regression discontinuity
    - Large decreases in Air Quality Index (AQI) due to strong wind: Not related to financial markets

Air Pollution and Brain Damage

- Motivation (Appendix C)
  - "Urban air pollution exposure may trigger toxic exposures in brain cells… This adverse behavior may lead to the development of any number of neurodegenerative diseases, including Parkinson's disease, Alzheimer's disease, or Gulf War Illness."

  - "Can air pollution cause permanent brain damage?"
  - *(We know we all have Permanent Head Damage when we did our PhDs…)*

Brain Damage

- This paper proposes the following channel
  - Higher air pollution

  →Lower cognitive skills

  →Stronger disposition effect

- Cognitive skills are not observable
  - While higher air pollution can cause stronger disposition effect, it is not necessarily due to lower cognitive skills
  - Note also that the effect of air pollution on the disposition effect is *temporary*
    - Unlike the permanent damages on the previous slide

Air Quality Index (AQI)

- Strong wind decreases AQI (improves air quality)
  - Both City A and City B have high AQI on Mon/Tue
  - Strong wind reduces City A's AQI on Wed, but not City B
  - City A's disposition effect is weaker on Wed/Thu/Fri

- AQI this week (source: aqicn.org)

Sun May 21
Hong Kong 68 – 137
Beijing 89 – 174

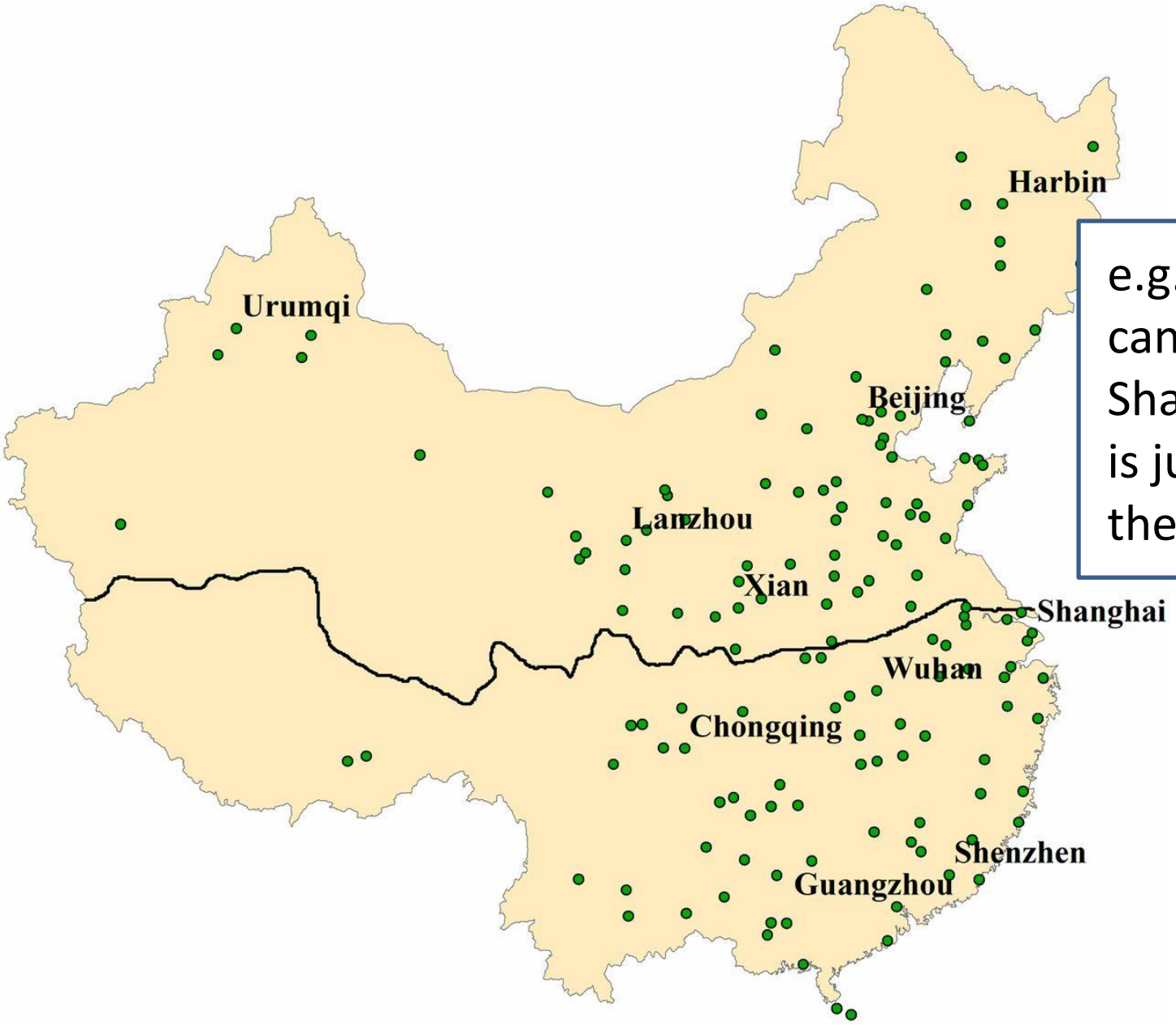
  - We are smarter in the conference?!

Alternative Channels

- Are there other channels beside cognitive skills?
  1. Investor composition
     - More dumb investors in high-AQI cities
  2. High air pollution makes investors stay indoor
     - Hong and Yu (JFM 2009): Gone fishin'
     - Schmittmann et al. (RoF 2015): Investors trade more on bad weather days
- Are results from the two tests consistent with these channels?

Investor Composition

- The strong wind test should rule this out
  - Investors in City A this week are very similar to investors in City A last week
- What about the Huai River test?
  - Cities that are just north of vs south of the river are different
  - Heating vs no heating
  - Economic activities can be different, population composition can be different



e.g., We cannot find a Shanghai that is just north of the river

Investor Composition

- The paper shows that both AQI and the disposition effect have a "jump" across the Huai River – That's good
- The paper also claims that "the cognitive bias of [urban] investors is unlikely to drastically change across a river except through the influence of a jump in air pollution" – I'm not sure
  - E.g., dumb investors are afraid of cold weather
  - They choose to live in cities that have heating, and they are dumber in the winter (because they stay indoor?)
- Suggestions
  - Show that, across the river, there is no jump in GDP, average outdoor temperature, investors' income, portfolio size, turnover, etc.

Stay Indoor

- The disposition effect: sell winners and hold losers
  - If you don't trade you hold winners and hold losers
  - Hold winners = weaker disposition effect
  - Hold losers = stronger disposition effect

- Table 9

	(1)	(2)	(3)	(4)
	PSW		PSL	
	Linear Specification			
AQI_hat	0.007	0.004	-0.012**	-0.011***
	(0.42)	(0.51)	(-2.11)	(-2.95)

- AQI affects the disposition effect through losers, not winners

Stay Indoor

- The strong wind test – Consistent
  - Strong wind reduces air pollution

  →Investors go outdoor and don't trade

  →Lower disposition effect (through holding losers)

- Huai River test – Consistent
  - Cities that are north of the river have higher AQI, and investors stay indoor and sell losers

- This does not kill the results that
  - Higher air pollution → Stronger disposition effect
  - But it may not be due to lower cognitive skills

Suggestions

- In the paper, AQI is the average hourly AQI over a day
  - Use AQI of trading hours vs non-trading hours
  - Low AQI at night will not affect trading activity through this channel, but will still affect cognitive ability
- Check if turnover is a function of AQI
- Examine cases where AQI is reduced by snow/rain
  - Although air quality is better, investors may still stay indoor
- In the paper, individual data are aggregated at the city level
  - Look at individual-level data: two investors purchase a fund at the same time (and both have capital gain), find evidence that one investor sells the fund when AQI is high

Summary

- I enjoyed reading the paper!
  - Very interesting
  - Great empirical design
- Higher air pollution → ? → Stronger disposition effect

	Huai River	Strong Wind
Lower Cognitive Skills (Temporary)	Consistent	Consistent
Investor Composition	Consistent	Inconsistent
Stay Indoor	Consistent	Consistent