

The Impact of Natural Disasters on Education: Evidence from Standardized Testing

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Goal

I attempt to answer two questions:

- ▶ **What is the causal effect of natural disasters on academic achievement as measured by standardized test scores?**
- ▶ What is the role of federal disaster assistance? Which counties apply for assistance?

Data

- ▶ **Natural disasters:**
 - ▶ Federal Emergency Management Agency (FEMA) declarations
 - ▶ Storms from the National Weather Service (NWS)
 - ▶ Work in progress: Data on heat waves
- ▶ **Public Assistance applications and payments** from FEMA
- ▶ **Standardized testing outcomes** from the Stanford Education Data Archive (SEDA):
 - ▶ Cohort standardized average scores by county in Mathematics & Reading Language Arts
 - ▶ Grades 3 through 8 for schoolyears 2008/2009 to 2017/2018

Empirical Strategy

- ▶ Event-study design:

$$y_{i,t,g} = \beta_{-5}D_{i,t-5} + \sum_{l=-4, l \neq -1}^8 \beta_l D_{i,t-l} + \alpha_i + \lambda_t + \zeta_g + \varepsilon_{i,t,g}$$

- ▶ Heterogenous treatment effects \implies simple TWFE is inadequate (de Chaisemartin and D'Haultfœuille, 2020; Sun and Abraham, 2021)
- ▶ Solution: Interaction-Weighted Estimator (IW) by Sun and Abraham (2021)
- ▶ Identifying Assumptions: Parallel Trends & No Anticipatory Behavior
- ▶ IW consistently estimates a weighted average of cohort average treatment effects on the treated (CATT)

Main Results: FEMA

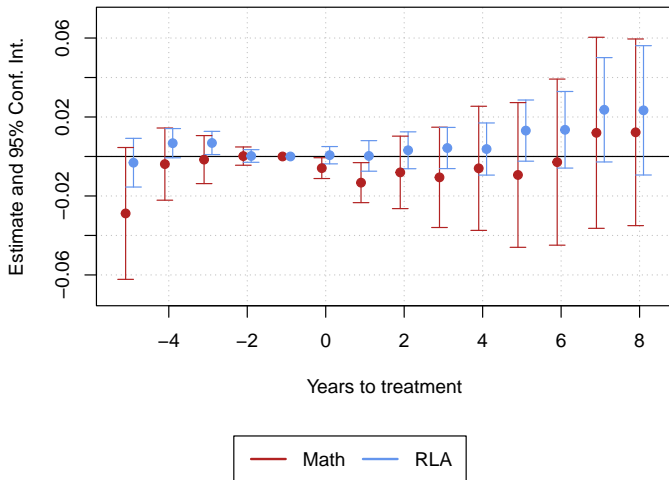


Figure: Dynamic Treatment effects in relative time: FEMA disaster data

Main Results: Subgroups, FEMA

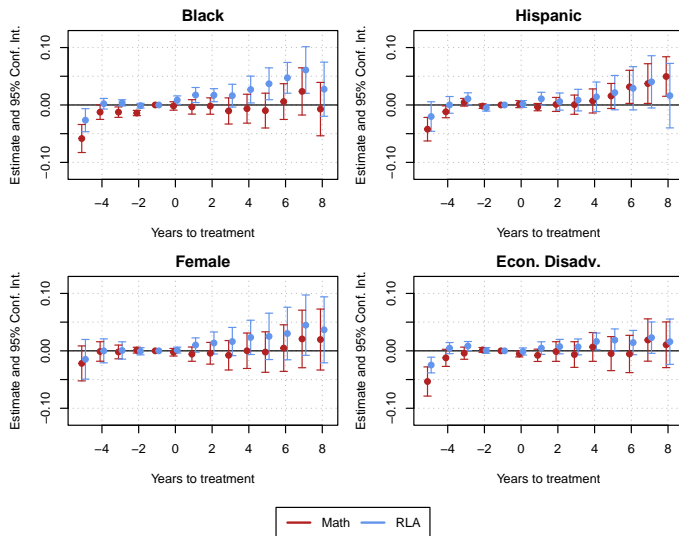


Figure: Dynamic Treatment effects in relative time: FEMA disaster data

Main Results: Storms

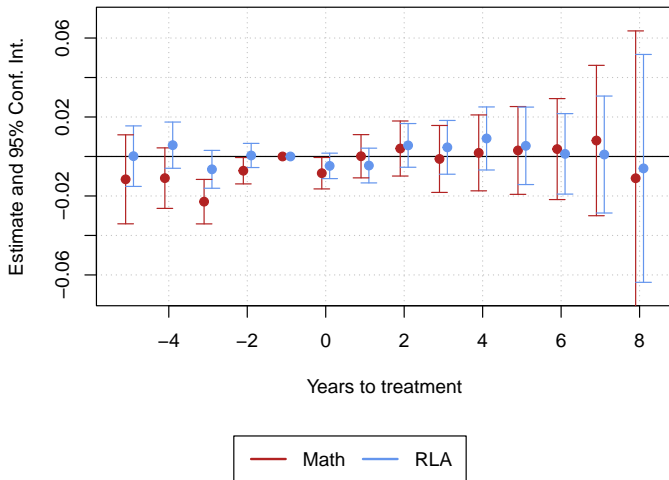


Figure: Dynamic Treatment effects in relative time: FEMA disaster data

Main Results: Subgroups, Storms

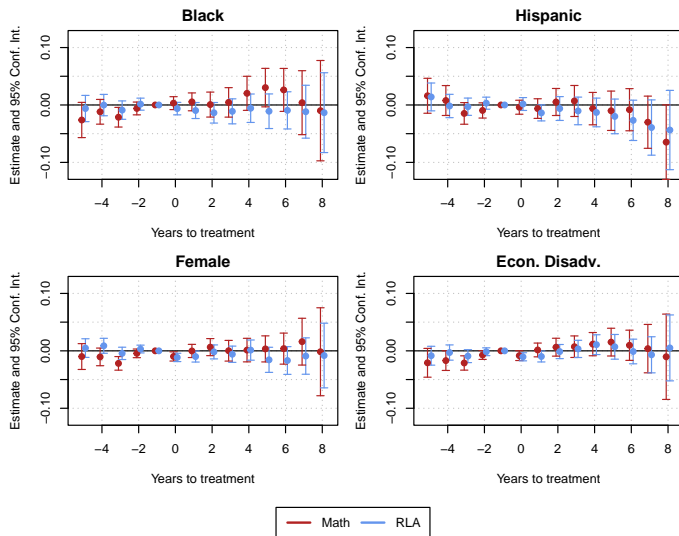


Figure: Dynamic Treatment effects in relative time: FEMA disaster data

Composition Changes?

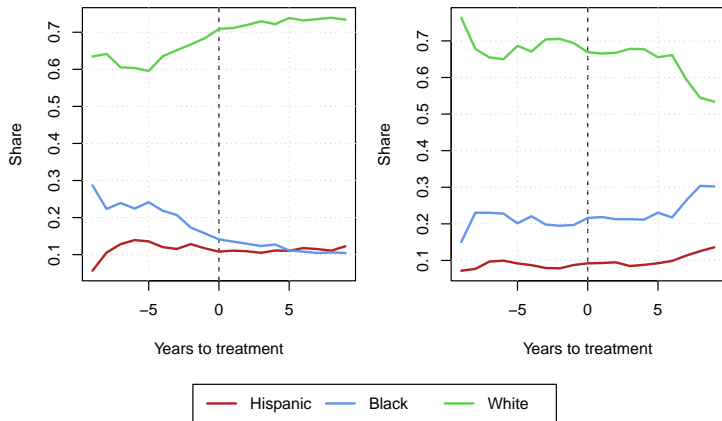


Figure: Aggregated ethnic shares by treatment timing based on FEMA disasters (left) and on NWS storms (right)

References

- de Chaisemartin, C. and D'Haultfœuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects.
American Economic Review, 110(9):2964–96.
- Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects.
Journal of Econometrics, 225(2):175–199.