Gittard (2023): MiningLeaks

Water Pollution and Child Mortality in Africa

Group 15 presentation

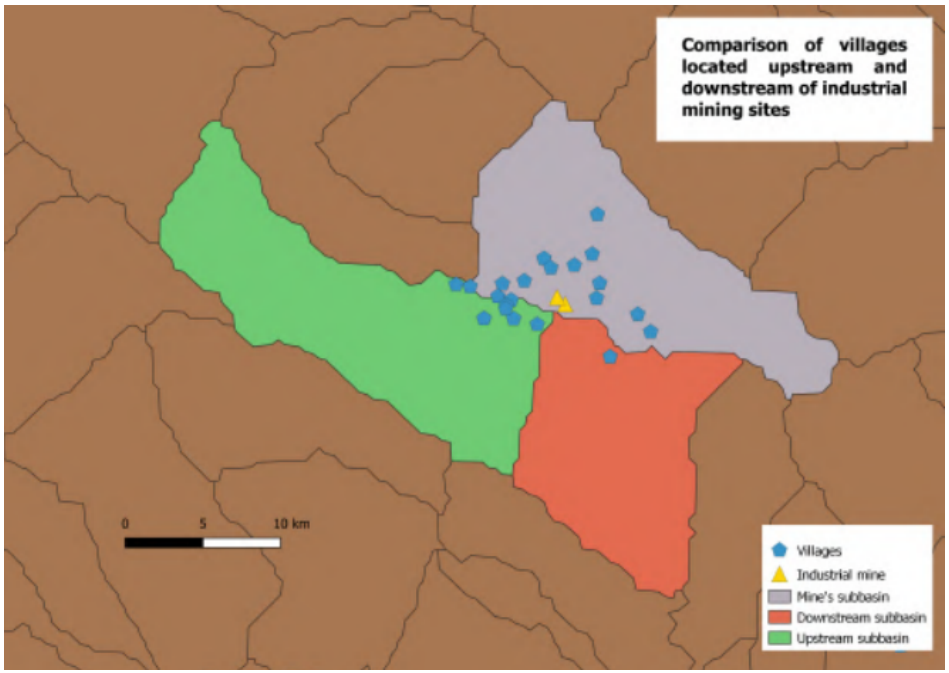
Econometrics, Fall 2023

Motivation and Research Question

- Ambiguous effects of industrial mining activity on local population's health: development, job creations, consumption, access to services vs exposure to pollution, conflicts, corruption, migration
- Focus on water pollution: What are the effects of industrial mining-induced water pollution on children's mortality in Africa?

Data and Context

- Demographic Health Survey (DHS), 26 countries 1986-2018
- SNL Mining and Metals + manual work : 2,016 mines crossing DHS

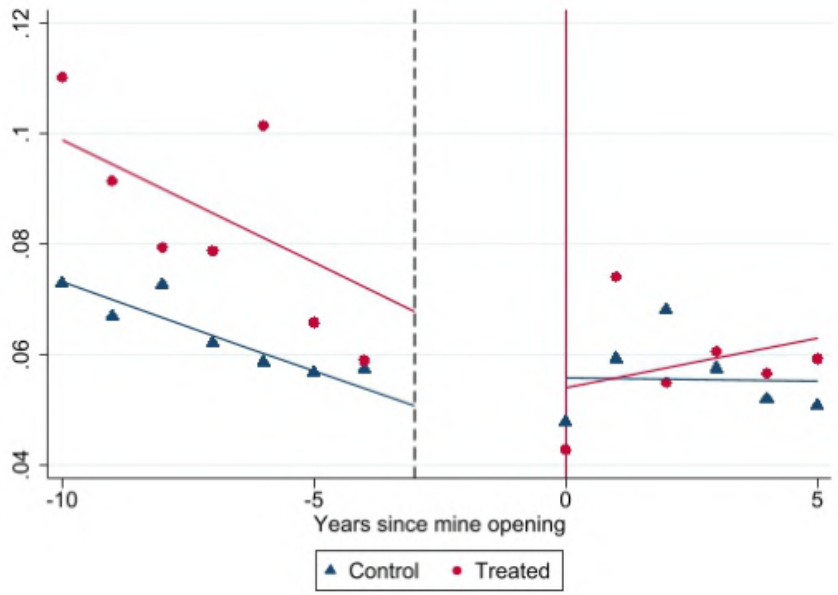


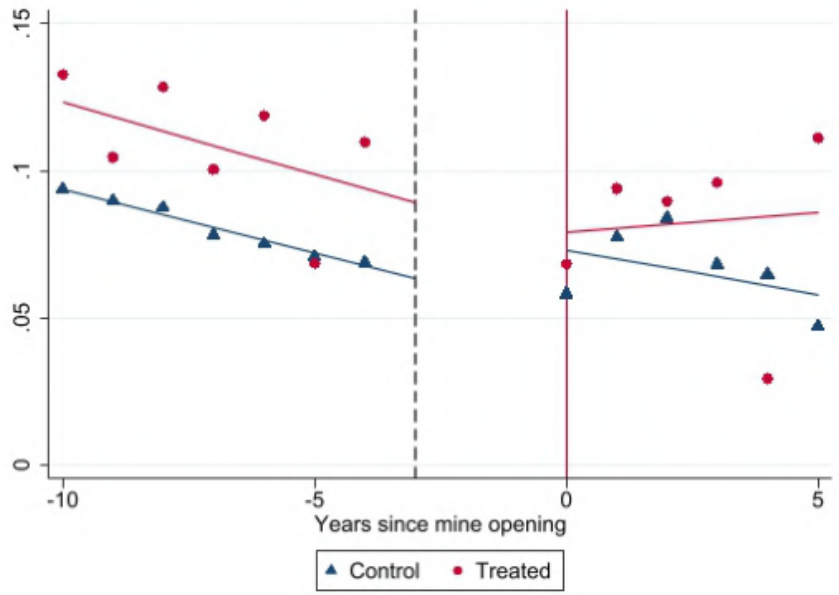
Estimation

- Two-way fixed effects using topographic position to proxy exposure to a mine. Matching strategy reduces bias when using distance as proxy.
- Compare 12 and 24 months mortality rates of villages upstream vs. downstream, before vs. after the opening of a mine

$$\begin{aligned}\text{Death}_{i,v,c,m,SB} = \alpha_0 + \alpha_1 Opened_{b,i,v} + \alpha_2 Downstream_{v,SB} + \\ \alpha_3 Opened_{b,i,v} \times Downstream_{v,SB} + \alpha_4 X_i + \\ \gamma_S B + \gamma_{SB-trend} + \gamma_{c,b} + \varepsilon_v\end{aligned}$$

Parallel Trends Assumption



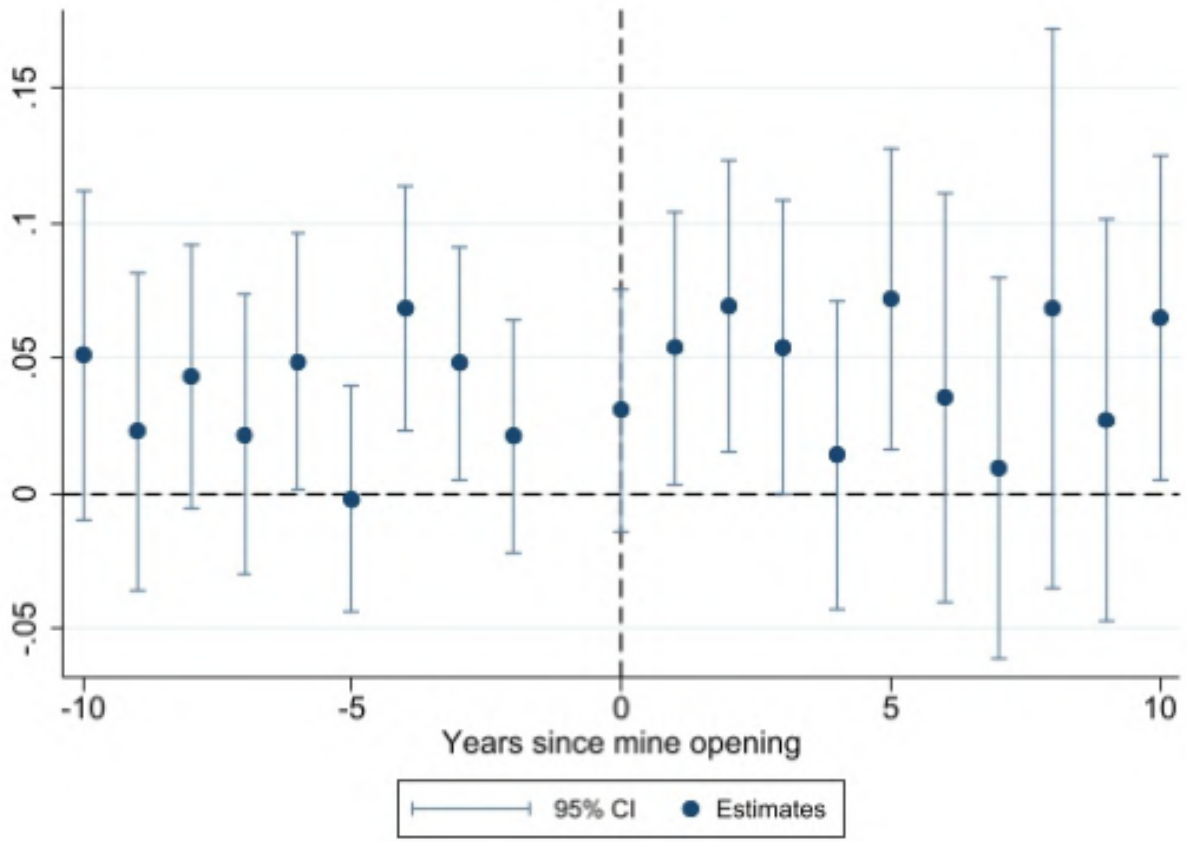


Main Results

	Death <12m		Death < 24m	
	All	Drop investment phase [t-1 ;t-3]	All	Drop investment phase [t-1 ;t-3]
	(1)	(2)	(3)	(4)
Downstream×Open	**0.000727**	**0.00967**	**0.0229****	**0.0273****
	[0.00756]	**[0.00866]**	**[0.00985]**	**[0.0109]**
Downstream	-0.0140**	-0.0201***	-0.0174***	-0.0197***
	[0.00612]	[0.00668]	[0.00673]	[0.00736]
Open	0.00707	0.00171	0.00213	-0.00727
	[0.00526]	[0.00647]	[0.00715]	[0.00905]
Birth order number	0.00371***	0.00357***	0.00488***	0.00477***
	[0.000745]	[0.000788]	[0.000918]	[0.000972]
Mother's age	-0.0108***	-0.0108***	-0.0126***	-0.0125***
	[0.00117]	[0.00125]	[0.00152]	[0.00163]
Mother's age square	0.000151***	0.000151***	0.000167***	0.000164***
	[0.0000185]	[0.0000196]	[0.0000237]	[0.0000252]
Years edu.	-0.00134***	-0.00128***	-0.00174***	-0.00183***
	[0.000287]	[0.000307]	[0.000365]	[0.000390]
Urban	-0.00628**	-0.00696**	-0.0121***	-0.0142***
	[0.00285]	[0.00307]	[0.00356]	[0.00381]
N	82571	75076	60814	55218
R2	0.0264	0.0278	0.0365	0.0385
Outcome Mean	0.0652	0.0666	0.0851	0.0873
Outcome Mean - Downstream	0.0657	0.0662	0.0887	0.090
Outcome Mean - Upstream	0.0650	0.0666	0.0844	0.0868

Being downstream of a mine opening increases the 2 year mortality rate by 27%

Event Study



Effects persistent up to 3 years after the mine opens, and start during the investment phase

Contributions

- The most complete database on industrial mine opening in Africa, increased external validity of result and wider heterogeneity analysis
- Empirical evidence of the effects of mining-induced water pollution on child mortality, results robust to placebo tests and de Chaisemartin and D'Haultfœuille (2020) heterogenous treatment effects estimator

References

de Chaisemartin, C. and D'Haultfœuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *The American economic review*, 110(9):2964–2996.

Gittard, M. (2023). *Climate Change, Droughts, and Water Pollution in Sub-Saharan Africa*. PhD thesis. Thèse de doctorat dirigée par Cogneau, Denis et Quirion, Philippe Sciences économiques Marne-la-vallée, ENPC 2023.