Masters Referee Report:
The Developmental Consequences of Superfund Sites

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The paper “The Developmental Consequences of Superfund Sites” by Claudia Persico et al. explores the long-term health impacts of gestation and growth of children that grew up near Superfund sites. The study includes “any Superfund site that either began or completed cleanup between early 1993 (when the oldest children in the data were conceived) and 2002 (when the youngest children in the data were born)” (Perisco, 1063). A Superfund site is an area identified as a source of extreme pollution of any kind (i.e., air, water, soil) that is taken over and cleaned by the EPA.

The authors primarily study children within a 2-mile radius of any Superfund site in the State of Florida; there are around 6,000 families within this radius. The authors only compare children born within the same household but across different stages of the cleanup process. This allows them to isolate the effect of cleaning the Superfund by comparing observations that should have had the same development environment except for the exogenous state of the environment. This does rely on some strong assumptions. First, there must be no time-varying effects within the household that fundamentally change the development environment. Another strong assumption made is that there are no fundamental differences between the families that moved between conceptions of their children and those that stayed in one place, both of which are included in the data. State-wide test scores, grade repeat probability, and disability diagnosis rate were used to measure development. These outcomes seemed to be uncorrelated with time-varying characteristics such as the mother’s education level or age.

The study and Superfund situation can be partially explained by the theory of externalities and seeking efficient outcomes as discussed in lecture but also differs in key ways. Firstly, in seeking efficient outcomes following the creation of the externalities, the government

seized all property rights, (All rights lie with the government). In fitting with the theory, the EPA is essentially micromanaging the actions of the firms who created the Superfunds to reach the socially optimal amount of pollution. Secondly, there are elements of the Coase theorem that explain why these externalities were created in the first place. In reality, there can be high transaction costs and asymmetric information that allow for companies or local agents with superior resources to create socially suboptimal outcomes. It follows that low-income families are disproportionately affected by the negative effects of Superfunds as they have the fewest resources to fight for their property rights.

That being said, the solution of EPA control does not fit completely within the definition of an efficient outcome. While they may lower asymmetric information for civilians, by assuming control, the EPA has absorbed the costs associated with the rights to the sites. This means that any market for transfers to the original property rights owners (citizens) is erased leaving them without compensation for their violated rights. Taxpayers, including those who were originally harmed, are made worse off by having to eat the costs of having to clean up the sites. Moreover, children with long-term adverse effects are not compensated solely from rights transferring to the EPA, social optimality would require additional transfers for previous exposure.

Two distinct but related noteworthy contributions have arisen from this paper. Firstly, it is one of the first and largest comprehensive studies about the long-term developmental and cognitive effects of pollution. While the study admits that it cannot give precise medical analysis such as differential effects between pollution types, it is still extremely useful to be able to quantify the net adverse effects of living near pollution as it can help spur further action and study. Secondly, this research should help to alleviate asymmetric information in the bargaining ability of people and governments to be able to protect property and health rights from

environmental externalities. A socially efficient outcome cannot be reached if the costs of the externalities cannot be quantified and accounted for.

There are two main weaknesses I would like to examine. The first is the operationalization of the outcome variables. This is not an issue necessarily specific to this paper, I am always skeptical of using standardized test scores as a measurement of ability. I don't think that it is a perfect encapsulation of skill/ability and most likely introduces OVB without the inclusion of a bunch of other school and demographic data. The second issue I have is the external validity of the results. Superfund sites can already be deemed the most extreme of the polluted areas in the United States and the negative effects of these sites are not evenly distributed across the income distribution. In conclusion, while these negative effects are informative, they only apply to a niche part of the population and might not even transfer accurately (in terms of scale) outside of Florida.

That being said, the internal validity of this paper stands out as a strength to me. The authors went to extraordinary lengths to examine the validity of their underlying assumptions. They tried multiple model specifications to test for differences in mother characteristics as well as school characteristics between births. The authors also find similar adverse effects for all families compared to only those that stayed which leads them to believe that there is no selection bias introduced by merging movers and non-movers. Overall, they do a pretty good job to the limits of my comprehension to investigate and confirm all assumptions and threats to the internal validity of their study.

Source:

Persico, Claudia, et al. "The Developmental Consequences of Superfund Sites." Journal of Labor Economics, vol. 38, no. 4, 2020, pp. 1055–1097., https://doi.org/10.1086/706807.