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READER'S REPORT ON ERIC ZOU, "WIND TURBINE SYNDROME: THE IMPACT OF WIND FARMS ON SUICIDE," OCTOBER 2017. Mr. Zou is a PhD candidate in the Dept of Economics at the Univ of Illinois at Champaign-Urbana. He can be reached at <http://www.eric-zou.com>.

This is an impressive paper. At this point it lacks only the extra level of review of the analysis embodied in journal publication. As a finishing graduate student in the Dept of Economics at Univ of Illinois at Urbana-Champaign, Mr. Zou has already written this under the supervision of faculty economists and statisticians. It is not a solitary effort, though he is sole author.

The data used are general, public, and large-scale, collected for reasons other than a study such as this. Even the sleep data were collected in a general way across the country by the CDC. Death records are indisputable, assuming that suicide is always indicated when present.

It is ingenious how Mr. Zou exploits large, nationwide, public datasets to approach the various issues. First, finding the step-up from one flat suicide rate to another flat but higher suicide rate at the time boundary between no operating turbines and operating turbines, and then refining the analysis by incorporating control counties whose centers of population density are more than 25 but less than 100 km from the turbines as controls, and accounting for seasonal differences in baseline suicide rate (or seasons in which turbine effects are more severe) by specifying that the "before rate" and "after rate" must be measured in the same month.

In these and other ways Mr. Zou analyzes the same data with subtly differing stringencies and restrictions, and bases his account of the robustness of his result on his finding the same results through different methods. The effect he highlights—that suicide rates jump about 2% when turbines go into operation—cannot be persuaded to go away by analyzing the data in different ways.

I like the comparison to other causes of death in the same places over the same months, as



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these do not change. There is a suggestion of a lesser increase in death caused by diseases of the nervous system, but this comparison is not significant. The suicide increase is significant, and highly so.

Mr. Zou cleverly uses other datasets (wind direction, the CDC survey that includes sleep disturbance) to home in on possible mechanisms for the disturbance—noise and sleep disturbance in particular.

The paper is politically balanced, couching its disturbing finding in the language of statistics and cost-benefit analysis, and pointing out that the life years lost per kilowatt-hour generated by wind is less than for a coal-powered electric plant (due to air pollution). One of the few questions I had was the lack of any reference for his estimate of how much power was produced annually by US wind turbines: I wonder if he used a figure based on name-plate capacity, and if not, what production databases he used. Day-to-day production figures are no longer publicly available here in New York State, as they were 6-8 years ago. In other states, researchers measuring turbine noise have also found such figures unavailable.

I have been asked about the significance of his 25 km radius. Mr. Zou's limit of resolution is the county with regard to death data, and he keys everything else to the county as the spatial unit of measurement. He uses counties with a utility-grade wind turbine installation within 25 km of the county's population center of gravity as the counties close to wind turbines. Counties 25-100 km away are used in parts of the analysis as control or natural comparison counties not exposed to wind turbines. The suicides are not necessarily increased out to 25 km—that is just the unit of spatial measurement he chose for the study, to adapt to his county-wide death data and to a 32x32 km unit wind direction dataset. Or this is my understanding of what he's doing. On one graph (A.2) where he appears to examine this choice, it looks like the average and the precision of the increased suicide rate are both at a maximum using a 20 km radius.

I think this paper overall is very powerful.



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