Review of "The Role of Management Actions in Compliance with an Environmental Conservation Regulation: Do Monetary Fines and Notification Programs Influence Regulatory Compliance Rates"

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This paper provides an exploration of compliance with an environmental regulation and the ways in which different initiatives designed to increase compliance actually do so. The policy is designed to avoid vessel strikes with North Atlantic right whales, a designated endangered species. In particular, the regulation, developed by NOAA, sets a maximum speed of 10 knots for vessels 65 feet or larger in designated areas at certain times of the year. The areas and times are designated to avoid harmful whale strikes by slowing marine traffic in areas where the right whales are likely to be at particular times of the year.

The fundamental research questions are whether the regulation actually slows down vessels, where and when it should, and whether different initiatives designed to promote compliance are effective. The main findings of the paper are that vessels do indeed show down and the rates of compliance increase with each year to regulation has been in effect (over four years). This occurs despite different sets of interventions at different times and with respect to different vessels that sought to promote compliance even further. The interventions ranged from non-punitive notifications to enforcement actions with monetary fines. The authors find that citations with monetary fines have the greatest impact and appear to have effects beyond those vessels immediately cited.

The paper addresses an important topic of compliance with an environmental regulation, and the particular application is very nice. Specially, the analysis is based on a really great source of data. Whether vessels are in compliance or not is determined based on speed transponder data that is automatically collected through a GPS systems for reasons that are not directly related to the policy. There is great data on particular vessels, the trips taken, location and speeds that are updated several times a minute. Wow! All of this means that the analysis provides a spectacular example of how technological advancements and data collection can be used to improve environmental management.

I think this paper has really great potential, but it is not there yet. I find the analysis and results currently in the paper suggestive, but there is much, much more that can be done with these really great data and quasi-experiments with the different policies. At the most basic level, the authors currently present suggestive descriptive statics that are consistent with the conclusions that are made. What the paper really needs, however, is a regression analysis that takes advantage of difference-in-difference techniques that are commonly used in social science research. I my opinion this is necessary to make the results more convincing and also to be publishable in a journal such as *JPAM* that takes methodology seriously.

There is so much that can be done here that is almost hard for me to know where to begin. By asking for a regression type of analysis, it is not that I am just asking for more technical machinery for its own sake. Instead, many of the conclusions and things of interest in the paper can be rigorously tested and more directly quantified. Some examples include the following:

- The differences between policy treatments (and no treatment) can be tested while controlling for things like time of year, weather, vessel type, trip duration, etc.
- Estimates can be based on differences in the speed for the same vessel using a fixed effects model. This can be based on differences between years and or periods of a trip just outside/inside a regulated area, on the same trip.
- Differences could also be identified using matching techniques and/or based on the exact window around when the speed restrictions turn on and off.

In the end, the way the paper is currently written things are not rigorously tested, and they could be in a really great regression framework that takes advantage of this truly outstanding dataset. While the results suggest something as currently presented, I think a more sophisticated statistical analysis is necessary for the paper to be publishable is a leading quantitative social science journal such as *JPAM*. I recommend that the authors carryout such and analysis, and if necessary find a collaborator that can work with them to do so, because these data and the research setting certainly warrant the effort.

In addition to the general comment above, here is a list of a few other smaller comments/questions that occurred to me while reading the paper:

1. I suspect a better title is possible
2. Though this reviewer is not Jay Shimshack, I know that he has done a lot of related research that could be cited in more detail and more effectively.
3. What about tides? Are these being adjusted for in the speed data that is reported? Also, tides are surely likely to affect the speed that vessels cruse at, by definition and also because of the desire to compensate to enjoy a tidal push. This seems very important to address and could be accounted for in a regression framework with a variable for tide at the time and location of the observation
4. Since so few vessels are subject to more than one intervention, it seems this could be noted and the table omitted. Though this is easily accommodated in a regression framework.
5. The paper could be more clear about which tables and figures are being discussed. In particular, it is helpful to mention that you are going to talk about a table or figure and then do so for a paragraph or two and not go back and forth with references to different ones at the end of each sentence.