Comments on Stephen P. Holland: "Spillovers from Climate Policy"

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This paper addresses an important question in the economics of environmental regulation – a question often given cursory lip service but rarely the subject of rigorous analysis. When an industry is subject to emission regulations for pollutant x, there may be changes in emissions of pollutant y, due either to changes in the technology of production or changes in the quantity of the underlying good produced. For instance, regulating carbon dioxide emissions can result in changes in emissions of particulate matter.

This is an important issue on many counts. A cost benefit analysis of a proposed regulation should appropriately take into account the benefits/costs of such spillovers. Furthermore, environmental justice issues are often important in regulatory debates and frequently environmental justice involves changes in pollutants which are not the ones being directly regulated. That is the case with carbon emissions in California. Environmental justice proponents are concerned that regulating carbon emissions will result in increases in criteria air pollutants (eg, particulates) in low income areas of cities.

Although Prof. Holland discusses the theory behind the issue of spillovers, his main contribution is in his empirical analysis. A central issue in measuring the spillovers from carbon regulation is that there is no carbon regulation. To address this issue, he estimates the change in CO2 emissions from a change in the price of NOx emissions, arguing that this price effect is the same as the change in NOx emissions from a change in the price of CO2. This is a very interesting way of dealing with this issue, exploiting the symmetry of the Hessian matrix of the profit function. Unfortunately, he does not have the price of NOx either so he proxies for this using NOx attainment status of different regions. Basically, if a region is non-attainment, NOx regulation is strict and if the region is in attainment, the regulations are weaker. Although this is not quite the same thing as a price of NOx, he is able to conclude that NOx and CO2 are gross substitutes, implying that if CO2 regulation is tightened, one would expect NOx emissions to decline. However, when output is included, this substitution effect disappears, suggesting that most if not all of the effect of regulation on emissions is due to a change in output, not substitution.

The empirical analysis focuses on fossil fueled power plants in California, which happen to be almost entirely natural gas fired. One justification for focusing on California is the large variation in local attainment with ambient air quality standards. It is unfortunate that there is not more heterogeneity in the California market, particularly considering that natural gas is not particularly carbon intensive in its emissions. It would seem that using a richer national data set on fossil fuel generation would yield much more general results. One would expect that the key variable, attainment status for NOx, would vary

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considerably over the country (not just California). However, additional analyses by Prof. Holland, not reported in the paper, suggest that there is not much change in attainment status outside of California, at least given the short time frame of the analysis. It would be interesting to see if and how results change with a richer data set.

Another issue has to do with the technology of production. Simply focusing on natural gas generation will not pick up the substitution that we would expect to see from carbon regulation as generation moves from carbon intensive fuels (eg, coal) to other fuels such as natural gas. Because the focus is on California, that effect will be underestimated in the model.

In conclusion, this paper represents a very important step forward in measuring the ancillary benefits and costs associated with carbon regulation.