

Title: Measuring the Effectiveness of the Regional Greenhouse Gas Initiative
Type of Submission: Research

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The purpose of this research project is to examine the effectiveness of the Regional Greenhouse Gas Initiative (RGGI) regarding its goal of reducing CO₂ emissions within and among its member states. Theoretically, by creating property rights to the atmosphere, which are then distributed to polluting firms through an allowance mechanism and enforced by the initiative, society will be able to achieve a desired level of emissions abatement at minimal cost (Coase, 1960; Ellerman, 2003). However, there is another theoretical argument that policymakers are prone to protecting domestic firms from the economic impacts of such a program by over-allocating allowance permits (Eyckmans and Kverndokk, 2010). The RGGI offers a reasonable quasi-experimental setting for testing this latter theoretical argument as all states in the treatment and comparison groups are subject to the same exogenous federal government factors, which cannot be said of other cap and trade emissions markets.

To test this theory, I gather annual panel data from 2001 – 2012 on CO₂ emissions, climate, state-level economic indicators, measures of citizen political views within the state, and the employment of other climate policy mechanisms (e.g. energy efficiency technology requirements) in order to control for factors affecting emissions that are exogenous from participation in the RGGI. Using this data, I employ both an OLS model and an instrumental variable (IV) fixed effects model to identify the effect of participation in the RGGI in reducing CO₂ emissions relative to non-participants. I use the average annual price of an allowance within the RGGI as an instrument for the endogenous treatment explanatory variable.

The preliminary results of the OLS model suggest there is not a statistically significant difference in CO₂ emissions between states participating in the RGGI and those not participating. However, there is reason to think that the treatment variable is endogenous, and that the results of the OLS estimation are biased. In order to account for this endogeneity concern, the IV model employs the allowance price to isolate the exogenous component of the treatment variable. The results of this estimation indicate that there is a statistically significant difference in CO₂ emissions between the treatment and comparison groups.

However, there are two confounding factors that prohibit a conclusion that participation in the RGGI leads to lower emissions relative to non-participants, while controlling for other factors. First, this analysis should examine emissions at a quarterly instead of annual level because allowances are auctioned every quarter. By aggregating the data to the annual level, much of the variation in emissions is likely lost. Second, the price of allowances in the RGGI may not be exogenous, which render them invalid as instruments. Given these concerns, the initial

results of the estimation are not suitably robust. Therefore, my future research on this project will focus on addressing these concerns.

Works Cited

Coase, R. H. (2013). The Problem of Social Cost. *Journal of Law & Economics*, 56(4), 837-877.

Ellerman, A. D. (2003). Are cap-and-trade programs more environmentally effective than conventional regulation?

Eyckmans, J., & Kverndokk, S. (2010). Moral concerns on tradable pollution permits in international environmental agreements. *Ecological Economics*, 69(9), 1814-1823.