

FLORIDA STATE UNIVERSITY

An Experimental Investigation of Economic Incentives of Policies, Institutions and R&D in Environmental Conservation, Sustainability and Renewable Energy

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Description: Policies and institutions aiming at reducing pollution and battling climate change often do not reach desirable results because actual decisions of governments and economic agents deviate from those predicted by theory. The methods of experimental economics allow for finding such deviations and their causes, and use the findings to modify theory and design better policies and institutions. In this project we construct a theoretical model of decisions in a dynamic environment with costs of pollution and climate change and employ laboratory experiments with human subjects to study actual behavior and explore responses to changes in the environment, production technologies, investment in clean technology and institutions.

Budget: \$43,217

Progress Summary

Research Objectives for Current Reporting Period: For the current reporting period, the first goal was to complete the analysis of experimental results from the first phase of the project – the development of an experimental testbed for the analysis of policies and institutions in an environment with dynamic costs of pollution. The second goal was to design and describe theoretically the more complicated experimental treatments involving a possibility for economic agents to invest in clean technologies and allow for different types of access to clean technology by other agents. The third objective was to produce, on the basis of the results of the first phase of the study, two manuscripts for submission to refereed journals.

Progress Made toward Objectives During Reporting Period: Theoretical models of behavior were developed for corresponding environments and total of 22 experimental sessions have been conducted.

The first set of experiments aimed at the investigation of the effects of termination uncertainty and meaningful environmental context in dynamic games with accumulating costs of pollution and climate change. We find that termination uncertainty has practically no effect in the absence of experience, with the exception of a strong end-game effect in the treatment with certain termination. Environmental context and experience, on the other hand, have a strong impact on behavior, reducing pollution and increasing payoff.

In the second set of experiments, we studied the effect of technological heterogeneity on production decisions and the level of pollution. We do not observe heterogeneity in behavior across types, however find that treatments with largest average pollution propensity lead to strongest adjustment in curbing pollution for all types.

In the third part, we allow subjects to invest in clean technology. The goal was, first, to see whether the presence of this option changes behavior as compared to the no-investment benchmark.

Secondly, we compare the impact of two different institutions regulating access to the developed clean technology: the *private access* institution only allowed for the technology to be used by the corresponding investor, whereas the *public access* institution allowed the benefits of the technology to spread around the entire society. Although theoretically the expected amount of investment and pollution under both institutions are the same, we found that agents invest more and pollute less in the public access treatment.

We completed data analysis for the first phase of the project and produced the following two manuscripts:

1. Pevnitskaya, S., Ryvkin, D. Behavior in a dynamic environment with costs of climate change and heterogeneous technologies: an experiment (under review).
2. Pevnitskaya, S., Ryvkin, D. The role of context and termination uncertainty in dynamic climate change games (in preparation for submission)

We also presented our results at multiple conferences and invited engagements.

During the next reporting period we plan to complete experimental sessions and data analysis for the treatments with investment in clean technology and institutions and generate one more manuscript.

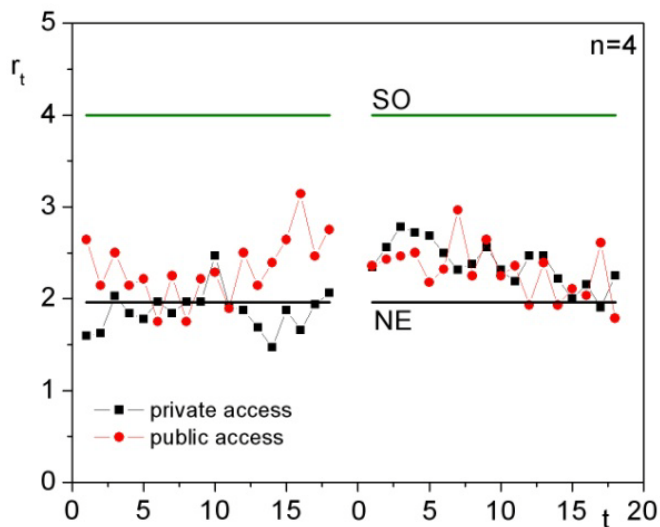


FIGURE 1. INVESTMENT IN CLEAN TECHNOLOGY

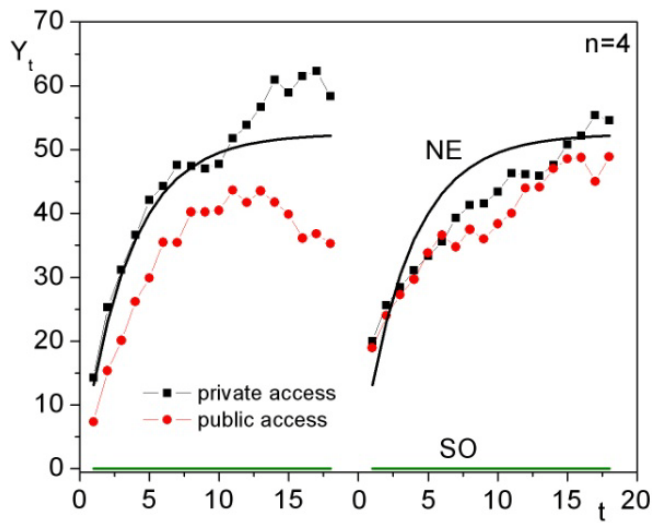


FIGURE 2. POLLUTION LEVEL