ON THE SOCIAL VALUE OF PUBLIC INFORMATION AND ENVIRONMENTAL REGULATION

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Overview

This paper presents an analysis of environmental policy in imperfectly competitive market with private information. We examine how environmental taxes should be optimally levied when the regulator faces incomplete and asymmetric information about production and abatement costs in an irreversible observable policy commitment game. In the first stage, facing costs uncertainties, the regulatory authority commits to a specific emissions tax level in order to reduce negative externalities. In the second stage, given the tax rule, firms are engaged in a competition à la Cournot and strategically choose outputs. Our modeling strategy is to consider linear-quadratic payoffs coupled with an affine information structure, which admits two components, that yields a unique linear Bayesian equilibrium of the game. The first component represents a publicly disclosed information and the second component is a private information which obeys a linear conditional expectation property. Linear equilibria are tractable, particularly in the presence of private information, have desirable properties like simplicity and flexibility, and have proved to be very useful as a basis for empirical analysis. Under this setting, our purpose is to analyze the influence of public and private information on the efficiency in setting environmental taxes. We show that a regulator facing only private information about costs cannot distinguish the two firms and the tax rules are equivalent. In contrast, in the presence of public and private information, the regulator can set firms' specific environmental taxes. Finally, we examine firms' incentives to share information about firm-specific marginal costs under ex ante environmental regulation through emission taxes.

Methods

The modelling framework for the analysis of environmental tax with abatement cost uncertainty and market power of polluting players aims to place our results in relation to the respective literature. Thus, our modeling strategy is to consider affine information structure which admits publicly disclosed and private value components. Our aim is to determine the Bayesian equilibrium of the game in environmental regulation.

Results

- We show that, facing private information only, the regulator cannot set firms-specific taxes.
- If the regulator has some firms-specific observable information, then differentiated emissions taxes may be optimally implemented.
- Public disclosed information clearly enhances the efficiency of emissions taxes design, i.e. equilibrium outcomes and the subsequent welfare depend on the available information that agents can observe.
- Information sharing under environmental regulation may occur when private costs are high and the cost differential between players in the marketplace is small.

Conclusions

Today, effort to enhance informational access may offer important lessons for environmental regulation moving forward. There are enormous opportunities to make the best use of available public disclosed information to enhance the quality of the environment. Disclosed information may be used to overcome a serious lack of information on polluted activities, and could have impact on firms' behavior and levels of pollution. Furthermore, by facilitating the dissemination of environmental information in a meaningful way and the fact that information disclosure satisfies the belief that the public has a right to know that they might be affected by third party pollution, our approach is politically more feasible to adopt and thus may not be considered as coercive "new" regulations.

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