POLLUTION REGULATION AND ABATEMENT BEHAVIORS OF STRATEGIC FIRMS UNDER ASYMMETRIC INFORMATION

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ABSTRACT

This research is motivated by an environmental problem which has been considered as a serious problem because it induces many dangerous effects. The environmental problem is mainly come from human's activities. Therefore, many countries that concern with environmental problem have stimulated various environmental policies to encourage firms to reduce pollutions. One of the difficulties in implementing environmental regulatory policy is that the regulator has less information about firms' abatement cost that the firms themselves do. This asymmetric information may result in inefficient policies.

The objective of this research is to find out the firms' abatement behavior when the regulator uses different pollution regulations including tax policy, permit policy and safety valve policy. As well as, to analyze whether the safety valve policy can decreases the information gap. The research uses theoretical model which has two periods and suppose that there are two strategic firms and a non-strategic regulator.

The results about firms' abatement behavior are different in different policies. In tax policy, both firms will over-abate in the first period and then under-abate in the second period. In permit policy with monopoly permit market, the seller will under-abate in the first period which induces buyer to over-abate. The total abatement levels in the first period are pre-determined by the amount of permits issues by the regulator. Then in the second period, the total abatement level will be lower than optimal. In permit policy with monopsony permit market, firms' behavior is determined by the relative strength of monopsony power and information power. If information power dominates monopsony power, the buyer will under-abate and the seller will over-abate in the first period, and vice versa. For safety valve policy, the analysis is divided into two possible cases: safety valve is not activated which means permit price does not reach tax rate, and safety valve is activated which means permit price reaches tax rate. In the case that safety valve is not activated, firms' abatement behaviors are the same as in permit policy in both kind of market. In the case that safety valve is activated with monopoly market, the seller will under-abate in the first period. The buyer's behavior, however, is determined by the relative strength of tax's information power and permit's information power. If permit's information power dominates tax's

information power, the buyer will under-abate which make both firms under-abate in the first period and result in overall over-abatement in the second period. On the other hand, if tax's information power dominates permit's information power, then buyer will over-abate. The total abatement level in the first period can be either over or under-abatement, and thus, result in total abatement level in the second period that can either under or over abatement opposite direction of the first period. In the case that safety valve is activated with monopsony market, the result and the algorithm are the same as monopoly market but the role and the function between the seller and the buyer are switched.

For the analysis about information gap reduction, sufficient condition that would guarantee that safety valve policy would reduce information gap for each cases are derived. Unfortunately, the interpretations of these conditional equations are found to be inconclusive. Attempts have been made to use linear functional forms for marginal cost and marginal benefit functions. However, the conditional equations are still too complicated to explain intuitively.

In term of policy implication, the results from this study suggest that the regulator should take into account the possible characteristics of permit market in designing the emission permit policy or safety valve policy. If the policies are implemented in a market which is not large enough, the permit market may be not a competitive market which may lead to inefficient policy.

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