

## Abstract

It is well known that global warming is a global externality. Therefore, when economies face global warming, they have market failure problems; this is a pure case of free riding. This dissertation focuses on two main points: GHG abatement strategies and game theory. Different solutions to local negative externalities are presented and compared. Then, global solutions are introduced under the Kyoto protocol. One of the main contributions of this thesis is to propose a game-theoretic interpretation of one of Kyoto's tools, namely, the joint implementation mechanism. A static game and a dynamic game have been modeled and solved in order to shed some light on this mechanism. Results have been analyzed and compared, and the main contributions could be briefly summarized as follow. First, the non cooperative and the cooperative JI games are Pareto improving. Even if one player's situation is worsened, globally there is a welfare increase. Second, it has been proved that contrarily to the current literature in the environmental field, not only the joint implementation is based on cost differentials but also on all the parameters given in the game such as the damage cost, investment efficiencies, revenue parameters, environmental targets and their shadow prices.

**Key Words:** GHG, Global externalities, Joint Implementation, Flexible mechanisms, Kyoto Protocol, Game theory, Differential games.