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Equilibrium pollution taxes in a two industry open economy☆

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Abstract

This paper involves strategic implications of environmental policy in case of two international oligopolies when countries take part in an international environmental agreement and have agreed on national target levels for a global pollutant. This set-up permits an analysis of the design of optimal emission taxes across domestic producers. By differentiating taxes between industries with different abatement cost, demand, and number of domestic firms, governments are in a position to raise national net foreign rents. It is argued that a single national emission trading programme encompassing all domestic producers cannot provide the equivalent strategic policy design.

JEL classification: F1; Q2; C7

Keywords: International trade; Industry cost differences; National emission targets; Strategic policy design

1. Introduction

In these years whether the relative level of environmental policy stringency has a major impact on the competitiveness of countries is being intensely

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discussed among industrialists, politicians and researchers. Although numerous empirical studies suggest little or no impact (see e.g. Jaffe et al., 1995; Beghin and Potier, 1997), recent empirical work finds that for many pollutants marginal abatement cost curves are fairly flat over a long range of environmental quality levels but eventually begin to rise steeply as emissions are increasingly reduced (Steininger, 1994). Therefore, impacts of environmental costs on competitiveness are likely to increase in the future in cases where environmental requirements are expected to rise. This issue is most relevant in the wake of the global warming treaty in Kyoto in Japan, where industrialized countries are committed to legally binding national limits on greenhouse gas emissions. The concern among policymakers for trade implications of prospective environmental measures may influence on the design of environmental policy across domestic sectors. Evidence for such trade strategic considerations in practice already appears from the discounts and exemptions in CO_2 taxes given in a number of European countries to CO_2 pollution-intensive sectors, such as chemicals, minerals and oil-refining. Also the widespread application of the so-called voluntary agreements between industries and authorities in Germany and the Netherlands gives scope for a purposeful design of emission requirements across sectors in order to minimize impacts on competitiveness when a national environmental target level is implemented.[1] From a global perspective this development is of concern since it may have serious distortionary effects on allocations of trade and environmental resources. In order to focus on this issue, the following analysis is concerned with sector-specific strategic environmental policy between two countries which participate in an international environmental agreement to reduce emissions of a pollutant harming the global environment.

There has been considerable theoretical work on the competitive impacts of environmental policy. An important field of analysis develops variants of the standard strategic trade policy framework to model national environmental policy in open economies when there is a strategic element to international trade (see Ulph (1994) for a survey). The models employed keep the basic assumption from the trade policy framework of Spencer and Brander (1983) (see Brander (1995) for a survey), of two firms each located in a separate country. The firms are in international competition and, prior to production decisions, their respective non-cooperative governments set environmental standards or taxes knowing that their policy affects production in both countries. For this reason strategic interactions between the governments arise. These analyses address a number of relevant policy issues and provide a broad understanding of the market structures in which dumping of environmental requirements to production processes may occur for trade-related goals. Conclusions reached in

[1] Andersen (1994) provides a thorough comparative study of environmental policy design in Denmark, France, Germany and the Netherlands. Douglas (1995) discusses voluntary agreements in Germany and the Netherlands.