

Trade Policies and Transboundary Pollution

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Abstract

The purpose of this thesis is to provide a theoretical analysis under imperfect competition of the following: (1) the effects of trade policies on pollution emission and the social welfare of an importing country; (2) the effects of lobbying activity by environmentalists on trade policies and pollution emission; and (3) the effects of eco-labelling programs on pollution emission and the social welfare of an importing country.

The models have three common key features. First, the analysis mainly focuses on transboundary pollution rather than domestic (local) pollution. Global environmental problems and transboundary pollution have become more serious rather than domestic environmental degradation. In the case of domestic pollution, changes in environmental policies increase the costs that are borne by domestic producers, which influences the competitiveness of the domestic firms. On the other hand, in the case of transboundary pollution, in addition to the competitiveness, the disutility from transboundary pollution directly affects the government's behavior. Therefore, generally, global environmental problems and transboundary pollution are more difficult to resolve than domestic pollution. I investigate how we can resolve those problems.

Second, the analysis also focuses on trade policies. There are many countries that are

reluctant to introduce strict environmental measures for fear of possible negative impacts on domestic economics. Therefore, it is very difficult to reach and maintain a comprehensive agreement of environmental measures. Although countries cannot intervene in other countries' policymaking, they can affect other countries' economic activities that generate pollution through trade policies. Moreover, some multilateral environmental agreements contain trade provisions. Whether or not trade policies should be allowed for the purpose of restricting pollution generating economic activities in other countries is an important question. As a first step to answer the question, it is inevitable to know when an importing country has an incentive to use such trade policies in the presence of transboundary pollution and whether or not an attempt to reduce transboundary pollution through trade policies is welfare enhancing for an importing country.

Third, the analysis is conducted under imperfect competition. Assuming imperfect competition, I can extract the strategic behavior of governments and firms, and examine how the strategic relationships influence the effect of trade policies and incentives for governments to use trade policies to protect the environment.

In Part I, I examine the effects of trade policies on pollution emission and the social welfare of an importing country. Chapter 2 provides a brief survey on trade policies and pollution emission and the general basic model.

Chapter 3 examines tariffs and quotas when the domestic market (the market of an

importing country) is monopolized by a foreign firm. After deriving the optimal tariff and quota level, I compare these policies in terms of the welfare of the importing country. I demonstrate that quotas may be preferable to tariffs only if the domestic government does not know the foreign firm's attitude to the environment and pollution is transboundary.

Chapter 4 extends Chapter 3 to the case of international oligopoly. I examine when trade policies enhance the domestic welfare and reduce transboundary pollution. In particular, I consider how the strategic relationship between firms and the structure of demand and supply influence the results. It is shown that the government can easily resort to trade policies if the target of the domestic government is to deal with not domestic pollution but transboundary pollution, and if outputs are strategic substitutes.

Taking into consideration the effects of changes in the foreign government's policy and the foreign monopolist's technology for dealing with pollution emission, Chapter 5 and 6 investigate the effects of specific and environmental tariffs on transboundary pollution and the welfare of the importing country. In particular, I focus on whether the domestic government can simultaneously achieve two goals of reducing transboundary pollution and improving the domestic welfare.

Chapter 5 deals with the case in which the foreign monopolist chooses the amount of investment in the pollution abatement technology after the governments announce their policies. I derive the conditions under which the domestic government can simultaneously

achieve the two goals. In each case (an environmental tariff or a specific tariff), the domestic government can simultaneously achieve the two goals under certain conditions. Even if the domestic government cannot seek for the two goals, it can at least improve the domestic welfare.

On the other hand, Chapter 6 deals with the case in which the foreign monopolist chooses the amount of investment before the policy announcement. I find that the domestic welfare may be smaller when the domestic government can set the environmental tariff than when the domestic government cannot set it.

In Part II, I shed light on the effects of lobbying activity by environmentalists on the determination of trade policies by the government of the importing country. Chapter 7 provides a brief survey on this issue and the general basic model with lobbying activity.

Chapter 8 extends the model developed in Chapter 5 and examines the effects of lobbying activity by domestic environmentalists on transboundary pollution and the domestic welfare under foreign monopoly. I demonstrate that the results depend on the order of policy setting by the governments. If the domestic government sets the environmental tariff rate first and then the foreign government sets the environmental tax rate, both transboundary pollution and the domestic social welfare unambiguously decrease due to lobbying activity by domestic environmentalists. On the other hand, when both governments choose their policies simultaneously, the domestic social welfare may be greater when lobbying activity is present

than when it is absent.

Chapter 9 extends the model developed in Chapter 4 and examines the effects of lobbying activity by domestic environmentalists under international oligopoly. I also investigate when the objective of environmentalists harmonizes or conflicts with the profits of domestic firms. This investigation is very important since lobbying activities by both environmentalists and firms often play important roles in determining environmental and trade policies.

In Part III, I am concerned with the effects of eco-labelling programs on pollution emission and the welfare in an open economy. Chapter 10 provides a brief survey on eco-labelling programs and international trade.

Chapter 11 examines the effect of the introduction of an eco-labelling program on pollution emission during both production and consumption under international oligopoly. Assuming that two types of consumers (consumers who have concern about environment and consumers who have no concern) exist, I find that the effects of eco-labelling program on domestic emission crucially depend on whether the pollution is emitted during production or consumption. I also find that even if the foreign firms cannot obtain the domestic eco-label, this does not necessarily mean that the foreign firms lose from the introduction of the domestic eco-labelling. The key factor is that the introduction of the domestic eco-labelling makes the market that each firm faces smaller but the competitive pressure in each market weaker.

Chapter 12 assumes the existence of multi-type consumers, and examines the effects of eco-labelling programs on pollution emission including transboundary pollution and on welfare. I demonstrate that if the marginal cost of producing the labelled goods is higher than that required to produce the unlabelled goods, and if both firms obtain the eco-label, an eco-labelling program necessarily decreases both domestic and foreign pollution emission. On the other hand, when only the domestic firm can obtain the eco-label, domestic pollution and total pollution may increase. Moreover, depending on the relative size of the marginal costs, the domestic government has an incentive to restrict the foreign firm's ability to obtain the domestic eco-label.

Additionally, four general remarks are in order. First, there are three important factors to determine the effect of trade policies. First factor is the demand structure. Second factor is for the case of international oligopoly. Whether the main target is transboundary pollution or domestic pollution influences the results. Third factor is the game structure. The results depend on whether the foreign monopolist chooses the amount of investment in the pollution abatement technology after or before the policy announcement. Whether or not the governments set their policies simultaneously also influences the results.

Second, although the government of the importing country can achieve the two goals simultaneously under certain conditions, it should be noted that situations in which the domestic government can achieve the two goals are very limited.

Third, although eco-labelling programs are not direct trade policies and those programs are often considered as systems to protect the environment, they can also be Technical Barriers to Trade (TBTs). As a result, they may be used to protect domestic industries from foreign rivals by setting the criteria for awarding the eco-labels in favor of domestic firms.

Fourth, it should be noted that some issues are beyond the scope of this thesis. I do not consider the behavior of the foreign government and technology changes under international oligopoly. I also confine my analysis to the case of Cournot competition. In the international trade theory, the results under Cournot competition are often different from those under Bertrand competition and from those with product differentiation significantly. The analyses that take into consideration those factors are my important future tasks.