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# Complete Information, Asymmetric Information and Environmental Tax Policy: the Application of Principle-Agent Model

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## Abstract

How should the environmental policy corresponding to the use of wealth and goods harmful to the environment under the circumstances of complete information and asymmetric information be formulated? This is the topic of discussion for this article. The main conclusions are: 1) Higher social emphasis on environmental pollution will lead to reduced consumption level of pollution goods. 2) With the implementation of tax policy, the government is able to reduce the quantity of pollution goods, increase the consumption level of more environmentally friendly goods, bring the society closer to optimal level, and enhance social welfare level. 3) The optimal rate of the subsidy (taxation) for the more environmentally friendly goods is  $t_2=t_1-\Delta \theta$ .

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*Keyword: complete information, asymmetric information, principal-agent model*

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## 1. Introduction

Environmental policy tool include: taxation, subsidy, and direct control. How should the environmental policy corresponding to the use of wealth and goods harmful to the environment under the circumstances of complete information and asymmetric information be formulated? This is the topic of discussion for this article. In this article the green tax reform, origin of environmental tax and the reason for imposition of environmental tax will be introduced in Chapter 2. Chapter 3 is about the application of principle-agent

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model under the circumstances of complete information and asymmetric information. Different tax treatments will be assigned to replaceable wealth and goods according to the extent of environmental pollution and the effectiveness of tax policy will be analyzed. In addition, the degree of recognition to environmental protection by society will be included in the analysis. Chapter 4 is the conclusion.

## **2. Green tax reform: pollution tax**

The international trend has been leaning toward solving environmental issues with economic tools assisted by legal tools such as the gradual imposition of pollution tax, energy tax and ecological tax among European countries, the environmental charges based on Environmental Law of United States, the environment (pollution) tax based on the law in Japan.

### 2.1 The origin of environmental tax:

Countries all over the world have adopted direct control methods for their environmental policies before 1970s with direction regulations of production technology, production process, and substances emission standards. However, since the late 1980s environmental policies began to emphasize economic tools and introduce market mechanism.

### 2.2 Purposes of imposition of environmental tax (Xepapadeas, 1998 ;Baumol, 1988)

#### (1) Internalization of external cost

The internalization of external costs by imposition of environmental tax on economic activities with negative external effects should force individuals or companies to reduced behaviours hazardous to environment based on economic incentives. As for determination of tax rate for environmental tax, ideally, economists would like to make it equivalent to the monetary value of damage to environment, which is so-called “Pigouvian Taxes” (Rosen, 2010).

#### (2) Provision of incentives

Environmental tax will provide incentives for changing consumer behaviours and reducing the generation of pollutants. This can reduce pollutant emission better than direct control.

#### (3) Minimization of cost of pollution control

Direct control is to ask companies to reduce pollutant emission without consideration of cost issue, while environmental tax will allow companies to decide whether to pay the tax or reduce pollution.

#### (4) Encouraging innovation of pollution prevention technology

The imposition of environmental tax will increase the costs of fuel, energy and pollution, such that companies will pursue new products and process with low pollution and the enhancement of pollution prevention technology for better competitiveness.

#### (5) Increase of revenue and decrease of excess burden

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