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## Economic-Environmental Analysis of Adoption of Green Tax Policy in Iran with Calculable General Balance Approach

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### Abstract

Environmental taxes, as one of the axes of sustainable development of countries, are effective policies in the field of controlling environmental factors using economic tools. according to importance of subject, the main purpose of this research is to investigate the effects of adopting environmental tax on economic indicators including welfare and poverty among Iranian households with a calculable general equilibrium approach. Based on this, in this study, the amount of loss caused by the emission of each ton of pollutant was considered as the basis for environmental tax. The results of the study showed that after the adoption of the environmental tax policy, GDP (Gross Domestic Product), private sector consumption and the income of urban and rural households will experience a decrease. Therefore, in terms of welfare, Iranian households are in a worse situation than the basic conditions. On the other hand, while improving the tax revenue of the government, as expected, with the reduction in the level of production and consumption in the country, the amount of emissions of pollutants such as carbon dioxide, methane and nitrogen oxide will decrease.

**Keywords:** Iran, Pollution Tax, Welfare, Carbon Dioxide, Public Balance.

**JEL Classification:** H23, Q53, O13.

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## 1. Introduction

Every country seeks to improve the economic structure and stability of stable and permanent incomes. One of these economic policies and programs is environmental tax. Imposing a tax on the emission of pollutants is a common policy that is recommended by economists to achieve some environmental goals and eliminate pollution.

Receiving a tax on pollution will reduce the emission of pollution. Karydas & Zhang (2017) test the effects of environmental tax reforms using an endogenous growth model in Switzerland. Also, Hu<sup>1</sup> et al. (2019) investigated the effects of pollution tax on pollution emission in a study. Metcalf (2019) showed in her study that pollution tax will have significant economic effects. Next, Ionescu (2020) showed that in developing countries, higher economic growth is associated with more pollution.

The main purpose of this research is to investigate the effects of adopting an environmental tax on economic indicators including welfare and poverty among Iranian households, and for this purpose, the calculable general equilibrium model was used. Also, in addition to the emission of pollutants caused by fuel consumption, the emission from the place of the production process has also considered.

## 2. Materials and methods

**Environmental effects** are calculated based on the exogenous coefficients of each sector or product. Based on this, the total amount of pollution for the pollutant is calculated as p:

$$EN_p = \sum_i \beta_i^p XP_i + \sum_j \pi_j^p \left[ \sum_i INT_{ij} + \sum_h XA_{jh} \right] + \sum_h \theta_h^p C_j \quad (1)$$

The most common environmental indicator is carbon dioxide (Bohringer & Loschel, 2006)<sup>2</sup>. In this study, an attempt was made to apply an environmental tax on greenhouse gases, including carbon dioxide, methane and nitrogen oxides, and its effect on different sectors of the economy.

The pollution tax policy was applied in the form of receiving a specific amount from each polluting unit (ton). Receiving the specified amount of tax from the polluters means

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1. Karydas & Zhang  
2. Hu et al.  
3. Ionescu  
4. Ionescu  
2. Bohringer & Loschel,

receiving different tax rates from the energy carriers. which was shown as below in the equations (Begin et al. 2002):

$$PQS_C = (\delta_C PD_C^{-\rho_C} + (1 - \delta_C) PM_C^{-\rho_C})^{-\frac{1}{\rho_C}} + \sum_P \pi_C^P \tau^P \tag{2}$$

$$XD_C = \delta_C \left[ (PQS_C - \sum_P \pi_C^P \tau) / PD_C \right]^{-\frac{1}{\rho_C}} XA_C \tag{3}$$

$$XM_C = (1 - \delta_C) \left[ (PQS_C - \sum_P \pi_C^P \tau) / PM_C \right]^{-\frac{1}{\rho_C}} XA_C \tag{4}$$

The above relations show the pattern of applying tax on the consumption of goods containing pollutants.

**The production tax collection policy** will be as follows:

$$PX_a (1 - TX_a) XP_a = (PVA_a . VA_a) + (PINT_a . INT_a) \tag{5}$$

The lower and upper limit for the amount of damage caused by various types of greenhouse gases can be seen in the reports of the World Bank (2019). These amounts was considered as the green tax scenario in this study.

### 3. Conclusions and Suggestions

The level of carbon dioxide emissions as the most important pollutant in Iran is at a high level compared to the world average. Therefore, the requirement to reduce it can be highly evaluated. The results of the study showed that pollution tax is collected through the reduction of the production level of the industrial and transportation sectors and the agricultural and energy sectors. According to the results that show the vulnerability of the country in front of the green tax policy, it is suggested that a comprehensive plan and practical action be developed to adapt and counter to reduce its negative effects. Therefore, the development of the service sector, which has a high potential, can be defended from an environmental point of view. Also, considering the negative effects in the agricultural sector, it is suggested that necessary measures be taken to support agriculture and domestic production so that it is not affected by the conditions after the implementation of the green tax policy.

Although at the highest level, pollution tax reduces about %21/32 of GDP and this figure is equivalent to %40/96 for total consumption. But it was observed that in the same scenario, the reduction of emissions of pollutants such as carbon dioxide, methane and nitrogen oxides varies between 12/40-22/60 percent. Therefore, while considering the effects of tax collection as desirable, especially from an environmental point of view and recommending its implementation, it is suggested to use the financial resources resulting from the implementation of this policy to support vulnerable households. Therefore, considering the effects of the environmental tax on the income level of households, the necessary support packages for urban and rural households should be considered in the future, because these households will face the negative effects of this policy. Finally, it is suggested that in addition to the fact that the government steps forward with more emphasis on the approval and implementation of the aforementioned policy, it should spend part of the income from the green tax on pollution-reducing technologies, especially polluting industries.