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KAPITEL 7 / *CHAPTER 7.* ENVIRONMENTAL TAXES IN THE GLOBAL PARADIGM OF ECONOMICS

ЕКОЛОГІЧНІ ПОДАТКИ У СВІТОВІЙ ПАРАДИГМІ ЕКОНОМІЧНОЇ НАУКИ

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Introduction

The need to greening a tax policy is dictated by the deterioration of the environment. Most countries in the world are reorienting their national financial systems under the influence of foreign experience, based on the best practices of greening the economy worldwide. Of course, the degree of effectiveness of tax system reform is primarily determined by the national specifics and mentality of the subjects to whom these reforms apply. However, globally, we consider it necessary to outline main systems of environmental taxes, which in one way or another have demonstrated their effectiveness.

7.1. Basic global systems of environmental taxation

Japanese system of environmental taxes. Compared to other industrialized countries, Japan has achieved great success in the economic and scientific areas. In Japan, there acts the law "On Combating the Atmospheric Air Pollution" adopted in 1970. According to this law, the country has a system of monetary compensation for damage to the health of persons affected by pollution caused by companies-emitters. This law is based on the classic postulates of the Pigouvian approach, the "polluter pays". Payments for water pollution take the form of penalties in Japan. The amount of the fine depends on the degree of pollution, which is determined by comparing the level of environmental damage with environmental standards. There are payments for air pollution caused by noise and concentration of harmful substances. It should be noted that in Japan there are some of the highest standards for air pollution, which exceed similar parameters of other countries by 2–3 times [1]. There are also special surcharges to payments for hazardous industries and goods, for excessive emissions of sulfur dioxide. In 2012, Japan introduced a carbon tax, citing it with the need to participate in solving the problem of global warming. This tax applies to all types of fossil fuels. As a result, in 2017, greenhouse gas emissions in Japan decreased by 1.2%. The Japanese environmental tax system is considered to be a binary one, as it is represented by a group of energy (64%) and transport taxes (36%) [2].

Taxes related to car use and gasoline consumption show the highest fiscal efficiency (55% and 26% respectively). According to the degree of greening of the tax system, Japan ranks second in the world ranking of the Green Tax Index [3].

American environmental tax system. In the United States, there are national peculiarities in the field of environmental payment collection. Thus, nature users are charged with special payments for the right to pollute the air, discharge wastewater, for the use of drinking water, for the placement of hazardous and solid wastes, and so

on. There is also a fee for the discharge of industrial wastewater. The amount of the fee is determined by each state separately depending on the category of environmental threat. For example, in the state of California, the fee for the discharge of toxic wastewater exceeds 16 thousand dollars [1]. A similar principle applies to soil contamination with toxic substances. Municipal wastes are also addressed at the state level and are most effectively addressed in Missouri. In order to stimulate the processing of car tires, the authorities introduced a special tax of 50 cents on each car tire [1]. A special feature of environmental taxes in the United States is their high level, which causes excessive tax pressure on nature users, and therefore industries with a high degree of pollution are exported to other countries with lower environmental standards and payments. At the same time, in the United States there is a large list of tax preferences and benefits that encourage economic operators to ecologically constructive economic activity. In 2008, a carbon tax was introduced in Canada, resulting in a reduction in fuel consumption. Thus, in British Columbia, fuel consumption decreased by 17.4% per capita [1]. Some imported cars in Canada are subject to a green tax. The tax is not applied to national vehicles and those exported from abroad. There is an environmental tax on non-environmental goods. The tax is levied on all products in aerosol packaging, pharmaceuticals, syringes, toxic products, etc. According to the level of greening of the national tax system, the United States ranks first in the world [3].

Pan-European environmental tax system. The idea of environmental tax reform was first put forward by the Scandinavian countries, and then the initiative was supported by other countries – Germany, Great Britain, and Italy. Of particular interest and wide application in the practice of environmental taxation are energy taxes as a tool of environmental protection, the increase of which was dictated by the need to reduce emissions of greenhouse gases, carbon dioxide in particular. In addition, energy taxes have a high potential to replenish budget revenues (4.72%) [4, p. 115].

Types of environmental taxes in the EU Member States include [5; 6, p. 38]:

1. Fee for water pollution (Germany, France, Austria, Finland, Ireland, Poland, Estonia, Latvia, Czech Republic, Netherlands).
2. Tax on harmful products:
   - 1.1. TV and computer disposal fee (Germany, Slovakia, Lithuania).
   - 1.2. Fees for products that do not meet certain environmental standards (Poland).
   - 1.3. Payment for products containing chlorofluorocarbons (Czech Republic).
   - 1.4. Landfill tax (all EU countries).
   - 1.5. Tax on fertilizers and pesticides (Norway, Denmark, Austria).
   - 1.6. Tax on disposable tableware (Belgium, Denmark, Latvia).
   - 1.7. Tax on plastic bags (Belgium, Denmark, Hungary, Ireland).
3. Tax on noise pollution (Czech Republic, Germany).

In general, energy (77%) and transport taxes (19%) are the most widespread in the EU. Pollution taxes constitute 3% and resource payments are about 1%.

7.2. Functions of environmental taxes

The effectiveness of environmental taxes is determined by the following. First, environmental taxes, as mandatory regular payments, replenish the revenue side of the budget, i.e. perform a fiscal function. Second, eco-taxes help to minimize the level of environmental hazards, encouraging rational tax agents to introduce safe technologies that are environmentally friendly, i.e. perform an eco-attributive function. Thus, we propose to study the effectiveness of environmental taxes through the prism of the analysis of their inherent functions and misfunctions (Fig. 1.).

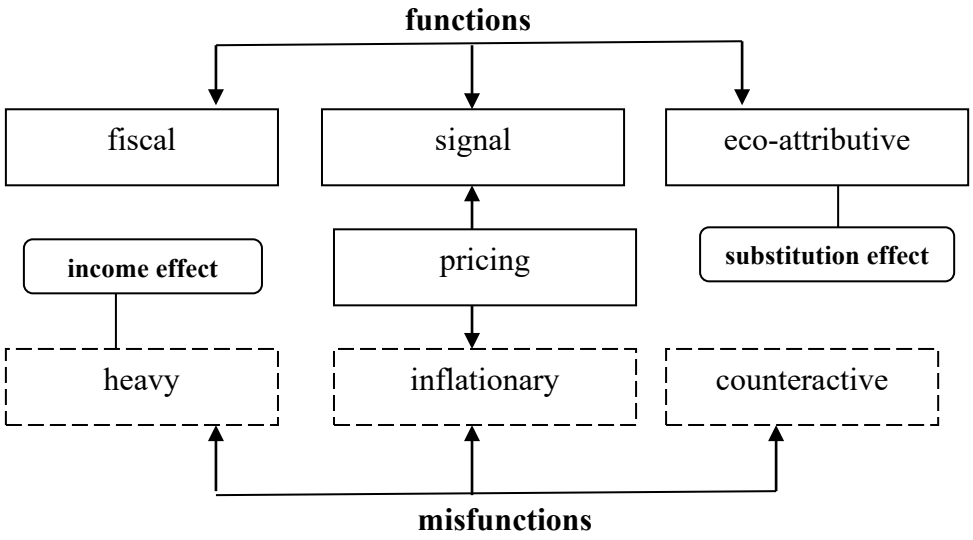

Figure1 – Functions and misfunctions of environmental taxes

The main effect of the application of environmental taxes should be a reduction in the tax base due to the transition to new technologies (substitution effect). Low environmental quality standards do not encourage economic agents to implement environmentally-related investment projects. It was revealed that in the practice of national nature management the substitution effect was not shown due to low, in comparison with the European, rates of ecological taxes. Based on this background, the fiscal function of environmental taxes also does not work.

Thus, it was found that the average value of the share of environmental tax in GDP was 0.11%, in budget revenues – 0.39%, tax revenues – 0.53% [7, p. 4]. Negative functions, or misfunctions, are manifested through the tax burden (heaviness, income effect, solvency trap), increase in the cost of the emitter's products (inflation) and the threat of a radically opposite result (resistance to state tax authorities and refusal from paying taxes).

7.3. Global models of environmental taxes efficacy

Pigouvian model. A representative of the Cambridge neoclassical school, A. Pigou, proposed to internalize the cost of pollution by setting an environmental tax

for the perpetrator. This tax was later called the "Pigouvian tax". Pigouvian tax (1920) is a tax on measured emissions, which serves as a means of regulating and correcting the impact of negative externalities. The purpose of the environmental tax is that it encourages the tax agent to reduce the level of environmental damage caused to third parties. In this case, the environmental tax is a tool to achieve a balance between the volume of production of the taxpayer and the losses of society, so the effective tax should be equal to the marginal social costs. The approach is based on the idea that the environment is public property (public good), so anyone who harms it harms society and therefore has to pay compensation for that damage. The environmental tax must be equal to the marginal loss of the recipient. The Pigouvian tax is the price of the right to pollute the environment. Theoretically, environmental taxes should help to ensure that market prices are more internalized and reflect the social costs of environmentally harmful industries and provoke reductions in the latter. The Pigouvian tax is an effective method of reducing the overall level of pollution, provided that the damage to society can be reliably estimated. This approach was later supplemented and developed in the theory of economic damage from environmental pollution in the Eastern Europe and the post-Soviet countries. The approach is based on the "polluter pays" principle. This principle is that the sources of pollution must either compensate for the damage or take measures to prevent negative impacts. Usually this principle is interpreted in such a way that the issuer must bear the costs of preventing and reducing the level of environmental pollution [8, p. 9]. The model is based on the economic assessment of natural resources. The main purpose of the tax is to minimize, compensate or prevent economic damage from environmental pollution. Under the economic damage caused to the environment, it is important to understand the estimated in monetary form actual or possible losses arising in the national economy due to pollution of natural components of the environment, or additional costs to compensate for such losses [9, p. 8]. This approach was introduced on an experimental basis in some regions of the Eastern Europe in the early 90's of the 20th century. The results of the experiment revealed the effectiveness of the introduction of payment for environmental pollution as a lever of economic pressure on the emitter company. Experience has shown that this approach allows the country's economy to develop with the least damage to the environment. This model is effective under conditions of stable intensive development of production and absence of hyperinflation. The development and practical implementation of the approach in Ukraine was carried out for the first time by the representatives of the Sumy school of nature management. Thus, the classic idea of the effectiveness of the environmental tax is based on the fact that such a tax is designed to reflect in monetary terms the damage caused by the tax agent as a result of pollution, as well as to compensate for the losses of society. Therefore, an environmental tax will be effective if its rate is equal to the marginal social costs.

The traditional coefficient approach to assessing the effectiveness of the tax system is based on the calculation of basic analytical indicators. In the arsenal of researchers there is a large set of indicators of fiscal performance of taxes, which, however, can be used as a methodological basis in relation to environmental taxes. Here are some of the main indicators [10, p. 11]:

- the share of total taxes in GDP (level of tax burden);
- the share of tax revenues in budget revenues;
- the share of taxes by industry and field of activity;
- tax indebtedness;
- tax collection rate;
- coefficient of tax elasticity;
- dynamics of taxes;
- fiscal efficiency ratio;
- tax cost index;
- tax multiplier;
- tax accelerator;
- tax loyalty ratio;
- effective tax rates.

Within this approach, a special scientific interest poses the study [4], in which the author analyzes the effectiveness of environmental taxes of the EU member states based on a comparison of specific environmental indicators (pollutant emissions) and macroeconomic indicators of environmental orientation (government spending on the environment). According to the results of the analysis, it was concluded that the environmental tax policy of the EU countries is effective, as with increasing environmental protection costs, the amount of revenues from the environmental tax increases, while the amount of pollutant emissions decreases. Environmental taxes in the EU are a source of funding for environmental measures, but in Ukraine such a link is not observed. Currently, within this approach research are being undertaken to test the hypothesis of macroeconomic and environmental performance of the carbon tax. Thus, in the work [11, p. 17] the author notes that the CO_2 tax, introduced in Sweden, contributed to the stabilization of primary energy consumption along with GDP growth for 1990-2015 by 69%, reducing greenhouse gas emissions for the analyzed period by 25%, reducing the share of organic fuels to 30% in 2016, a significant reduction in the country's dependence on fuel imports.

Scandinavian (structural) model for assessing the effectiveness of environmental taxes (2001-2003). This model was developed to find an answer to the question of compliance with the "polluter pays" approach in the practice of environmental taxes in Northern Europe [12]. For the purpose of analysis, all industries were aggregated into 4 groups (primary sector, secondary sector (manufacturing), energy, services), and households were included in the review. The approach is based on determining the share of energy consumption (or pollution) in each of the sectors and the corresponding share of accrued energy taxes. Based on the presence or absence of correspondences between the studied indicators, a conclusion is made on compliance with the principle of "polluter pays". A similar technique can be applied to any environmental taxes. The countries of the Northern Europe were the first to apply environmental taxes and implement green tax reforms. The study found that traditional energy taxes were introduced earlier and used as a fiscal tool, while the CO_2 tax was introduced in the 1990s to reduce emissions. The study found that in the case of payment of traditional energy taxes, the burden is shifted to households, and the principle of "polluter pays" in this case is not observed, which indicates the

inefficiency of this group of taxes. In the case of the carbon tax, in some countries (Sweden and Norway) there is a balance between those who pollute and those who pay for the damage done to the environment. In general, environmental taxes showed low environmental efficiency during the analyzed period, as the basic principle of their establishment of "polluter pays" in practice is poorly implemented. And if this principle is not followed, then the prices, which are partly determined by these taxes, send incorrect signals to economic entities. Those industries that enjoy tax benefits quite widely have little incentive to preserve the environment. Therefore, if the tax burden is not distributed in accordance with the "polluter pays" principle, it cannot be argued that environmental taxes contribute to sustainable development.

Contemporary econometric models. The arsenal of modern approaches to assessing the effectiveness of environmental taxes is represented by the works [13, 14]. Of particular scientific interest is the regression model for assessing the effectiveness of environmental taxes for 50 economically developed countries [13]. The working hypothesis of the study is the assumption that higher rates of environmental taxes help reduce pollution and reduce the production and consumption of non-renewable energy sources in the long run. The object of the study was the revenue from environmental taxes. Scientists claim that energy and transport taxes are fiscal in nature. The model examines the relationship between environmental tax revenues and the quality of the environment, which can be assessed through some environmental indicators. In particular, such variable indicators are: CO_2 emissions per capita, afforestation area, energy consumption per capita, share of fossil fuel consumption, electricity production from non-renewable sources per capita, electricity production from renewable sources per capita, concentration of fine particles in air, the level of water pollution by organic matter and electricity consumption per capita.

Conclusions

The process of greening the tax system, which began in European countries several decades ago as an experiment, has gradually spread to other countries. In the modern context, it should be a question of forming an effective system of environmental taxes, which is ensured by optimizing their structure. Thus, taking into account the world experience and national peculiarities of economic development, the question arises about the formation of fiscal and eco-attributive group of environmental taxes.

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