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# THE EVALUATION OF ENVIRONMENTAL TAXES IN HUNGARY AND SLOVAKIA

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## Abstract

This paper deals with the environmental impact of taxes. The relevance of the topic is given on the one hand by the climate change, which is increasingly coming to the fore, and on the other hand by the impact of taxes on the economy, which has also been in the focus of research. The natural, political, economic and, last but not least, the pandemic in the past few years have increasingly drawn the attention of humanity and the leaders of states to the importance of environmental protection. The goal of our study is to analyze environmental protection measures and the budgetary role of taxes levied in Hungary and Slovakia. As a result, conclusions will be drawn based on the obtained results and proposals will be formulated. The research focused on tax types that directly or indirectly contribute to environmental protection. We consider it important to present the possible effects of different tax types on environmental protection, as well as their economic importance. The theoretical part of the paper is based on scientific papers. The research is based on the analysis of secondary sources, primarily data published by the offices of Hungary, Slovakia, and the European Union. We analyze the development of the ratio of environmental taxes in relation to total tax revenues and GDP, as well as the changes in tax revenues from the three most important types of environmental taxes from 2011 to 2020.

**Keywords:** *taxation, environment, tax revenues*

**JEL Classification:** H20, H71, Q58

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## Introduction and theoretical background

The continuous deterioration of the state of the environment is not only a serious economic problem, but also a healthcare and political issue nowadays. From an economic point of view, taxation is also one of the effective tools through which the behavior of business entities can be influenced. The levied taxes can influence the decision-making of companies and individuals alike and thus have a negative impact on the environment.

There was almost no connection between the tax system of nation states and environmental protection a few decades ago. Over the years, the increase in environmental pollution and its negative effects have drawn the attention of governments to the importance of environmental protection and the adoption of measures to tackle the problem. This approach has also come to the forefront in taxation. Nowadays, more and more specific and strict principles are being adopted in taxation, thus more complex environmental protection taxes have also been imposed (Sipos, 2008; Ziolo, Bak & Cheba, 2019; Prokopenko, O., Mishenin, Y. V., Mura, L. & Yarova, I., 2020).

More and more people share the view that environmental protection and environmental awareness are not only a necessary evil any more. In spite of this, market forces are still not efficient enough to preserve environmental values to an adequate extent and quality.

From an economic point of view, environmental pollution is viewed as an external economic effect, i.e., it arises due to the presence of externalities. A basic feature of external economic effects is that they are not subject to buying and selling. Thus, practical problems may arise due to poorly defined ownership rights. Environmental pollution by companies can be cited as an example. In this case, companies believe that they have the right to pollute the environment through their activities, while the people living in the area believe that they have the right to clean air. This therefore leads to the inefficient appearance of externalities. In this case, if it is possible, both parties can benefit from changing external economic influences (Varian, 2008).

The theory of the internalization of externalities related to environmental goods has been elaborated by Arthur C. Pigou, who mentioned environmental taxes for the first time as early as in 1932. By defining environmental tax, he developed the theory of welfare economics, pointing out the insufficiency of resource allocation and the costs incurred as a result of environmental pollution (Pigou, 1932; Csikósová, et al., 2020).

An increased interest in environmental taxes appeared in the 1970s, when environmental pollution was increasing significantly, oil crises (shocks) were added, after which the question of energy saving measures had to be addressed. Ecological problems have increasingly become the subject of political debates and have made headlines. As a result, environmental awareness increased not only among end users and business entities, but also caused the gradual introduction of ecological aspects into the tax system of countries (Dubilová & Solík, 2010; Krajčířová, R., Ferenczi Vaňová, A. & Munk, M., 2016).

The first significant environmental taxes were introduced in the 1990s. Environmental taxes are not aimed at protecting the environment, but at encouraging polluters to take measures to reduce their environmental footprint and reduce emissions. The level of the environmental protection tax must therefore be determined in a way so that it is economically more beneficial for polluters to reduce the negative environmental effects. For example, if a company uses polluting old equipment, but its operation has low costs, then the task of the environmental tax is to increase the company's costs and thus make polluters invest in more environmental friendly technologies (Sipos, 2009; Dubielová & Solík, 2010).

The environmental protection policy and environmental protection aimed at reducing environmental impacts have become a significant world issues nowadays and are part of national and transnational economic policies alike. Environmental taxes are an important indirect economic tool for reaching environmental protection goals. These are indirect taxes in the form of consumption taxes, the purpose of which

is to avoid negative externalities, to adopt the principle of revenue neutrality for economic units, industries and sectors of the national economy in terms of cost reduction effects, technological changes, competitiveness, balance of payments, etc. (Csikósová, et al., 2020).

The theory of taxation determines the goals of levying taxes individually. Many authors have already tried to define the objectives of environmental taxes. Some authors distinguish between basic and additional criteria of environmental taxes. Those defined according to the “3E methodology” can be viewed in Table 1.

*Table 1 Overview of the basic and complementary criteria of the 3E methodology*

Criterion	Relevant question	Character criteria
Environmental efficiency	Has the application of the given criterion achieved the desired goal?	Basic
Economy	Is the tool implemented with minimal cost?	Basic
Efficiency	Is the best balance between benefits and costs achieved?	Basic
Public revenue	What volume of public revenue does the instrument generate?	Complementary
Innovations	What impact does the implementation of the given tool have on innovation activity? Does it speed it up or slow it down?	Complementary
Reach to economic subjects	What impacts on competitiveness does the implementation of the environmental instrument bring?	Complementary
Broader economic effects	What effects does the implementation of the given tool have on macroeconomic variables?	Complementary

*Source: Pavel a Vitek (2010), Spratt (2012), Csikósová (2020).*

Environmental taxes are additional taxes for businesses. Therefore, their introduction can naturally cause them being worried about losing their competitiveness. If the environmental protection taxes are reflected in the production costs of the companies, they are manifested in higher selling prices of the products. A higher price may result in a sales decrease and eventually, in an increase in unemployment. In globalized markets, it is also necessary to take into account situations where the production of certain products is transferred to countries in which no environmental taxes are imposed on the given product (Romančíková, 2008).

## Material and methods

The aim this paper is to analyze the importance of environmental taxes in Hungary and Slovakia. The development, role and importance of environmental taxes are presented (environmental taxes are also known as ecological and green taxes in the relevant literature). The tax revenues in the researched countries are analyzed through secondary data sources. Although Hungary and Slovakia border each other and both are member states of the European Union, there are differences between their tax systems. The period from 2011 to 2020 was chosen to be analyzed. The secondary data processed and analyzed in this paper were obtained from the Eurostat database, and therefore are sufficiently accurate in terms of exchange rate differences and time. Descriptive statistics and graphic methods were used throughout the research. From a methodological point of view, it was important to group the analyzed environmental taxes, which were the following ones:

- Energy (including fuel for transport):
  - energy products for transport purposes - unleaded petrol, leaded petrol, diesel, other energy products for transport purposes (e.g. LPG, natural gas, kerosene or fuel oil),
  - energy products for stationary purposes - light fuel oil, heavy fuel oil, natural gas, coal, coke, biofuels, electricity consumption and production, district heat consumption and production, other energy products for stationary use,
  - greenhouse gases, carbon content of fuels, emissions of greenhouse gases (including proceeds from emission permits recorded as taxes in the national accounts).
- Transport (excluding fuel for transport):
  - motor vehicles import or sale (one off taxes),
  - registration or use of motor vehicles, recurrent (e.g. yearly taxes).
  - road use (e.g. motorway taxes),
  - congestion charges and city tolls (if taxes in national accounts),
  - other means of transport (ships, airplanes, railways, etc.),
  - flights and flight tickets,
  - vehicle insurance (excludes general insurance taxes).
- Pollution
  - measured or estimated emissions to air,
  - ozone depleting substances (e.g. CFCs or halons),
  - measured or estimated effluents to water,
  - non-point sources of water pollution,
  - waste management,
  - noise (e.g. aircraft take-off and landings).
- Resources
  - water abstraction,
  - harvesting of biological resources (e.g. timber, hunted and fished species),
  - extraction of raw materials (e.g. minerals, oil and gas),
  - landscape changes and cutting of trees.

*Source: own processing based on data from Eurostat*

## Results and discussion

Environmental taxes provide significant revenues for the states nowadays, the effective use of which can greatly contribute, among other things, to the restoration of the environment. It is important to preserve the environmentally conscious behavior of individuals and companies, to prevent environmental damage, and to remedy the results of harmful actions in the past. This research focuses on the analysis of revenues from environmental taxes in Hungary and Slovakia.

Table 2 Total environmental tax revenue, 2011-2020 (Million EUR)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hungary	2,600.05	2,533.22	2,489.64	2,557.84	2,784.34	2,941.78	3,095.07	3,094.45	3,307.92	2,982.81
Slovakia	1,726.98	1,743.89	1,872.7	1,932.31	1,997.55	2,019.35	2,149.02	2,202.67	2,245.98	2,191.2

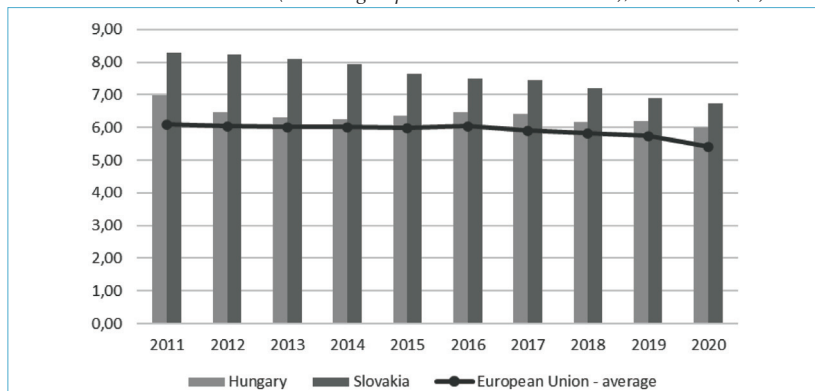
Source: own processing based on data from Eurostat

The evolution of revenues received from environmental taxes in Hungary and Slovakia in the period 2011-2020 can be seen in Table 2. It can be seen that the revenues received from environmental taxes were higher in Hungary in all years. In the case of Hungary, the development of the received revenues was varied. The increase in revenues was continuous, a smaller decline can be observed in the years 2012, 2013 and 2020. The lowest value was in 2013 (2,489.64 million EUR) and the highest value was in 2019 (3,307.92 million EUR) in the case of Hungary.

The values ranged between 1,726.98 million EUR and 2,245.98 million EUR in Slovakia. The lowest value was shown in 2011, and the highest value in 2019. The revenues from environmental taxes also increased continuously. In Slovakia, there was a decline only in 2020, but it was insignificant.

It can be observed that the revenues from environmental taxes ranged between 272,354 million EUR and 329,814 million EUR considering the European Union as a whole. A continuously growing trend can be observed here as well, which indicates that the leaders of the European Union member states are thinking more and more environmentally.

Figure 1 Total environmental tax revenue as share of total government revenue from taxes and social contributions (including imputed social contributions), 2011-2020 (%)

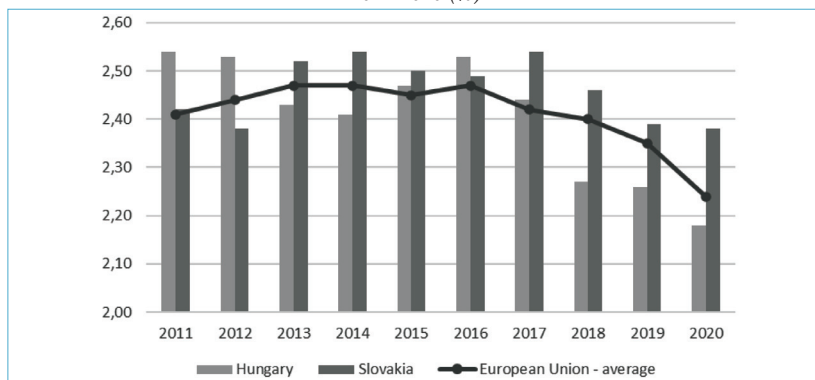


Source: own processing based on data from Eurostat

The contribution of environmental taxes to the overall tax and social revenues received as public finances was also analyzed. The values were in the range of 6-6.98% in the case of Hungary and in the range of 6.75-8.29% in the case of Slovakia. The European Union average ranged between 5.42 and 6.09 in the analyzed period. In the case of both examined states, higher values can be observed during the examined period, but in the case of Hungary, values closer to the European Union average can be observed.

It is also important to analyze the GDP contribution of environmental taxes. The average values in Hungary, Slovakia and the European Union are very similar. In the case of Hungary, the lowest value is in 2020 (2.18%), and the highest one in 2011 (2.54%). As for Slovakia, the lowest value is in 2012 and 2020 (2.38%), and the highest one in 2014 and 2017 (2.54%). The highest contribution in the EU was reached in 2013, 2014 and 2016 (2.47%), and the lowest one in 2020 (2.24%).

Figure 2 Total environmental tax revenue as percentage of gross domestic product, 2011-2020 (%)



Source: own processing based on data from Eurostat

As mentioned in the methodological part of the study, environmental taxes can be divided into energy taxes, transport taxes and taxes on pollution/resources. In the following, the revenues from these taxes are analyzed.

*Table 3 Energy tax revenue, 2011-2020 (Million EUR)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hungary	2,032.75	1,896.74	1,880.34	1,944.14	2,096.68	2,237.87	2,323.93	2,321.87	2,507.14	2,279.36
Slovakia	1,524.9	1,543.64	1,642.28	1,693.76	1,762.18	1,773.7	1,897.15	1,941.51	1,984.19	1,965.13

*Source: own processing based on data from Eurostat*

First, we analyze the revenues from the energy tax. We can observe that Hungary's revenues were higher than Slovakia's during the examined period. Slovakia's revenues, on the other hand, grew faster, as a result of which the difference between the revenues of the two states continuously decreased. It can be concluded that in the case of Hungary, Slovakia and the European Union, the most important group of environmental taxes are the taxes imposed on energy, based on the value of the revenues.

*Table 4 Transport tax revenue, 2011-2020 (Million EUR)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hungary	471.88	410.11	396.78	392.39	407.19	413.77	435.72	441.66	458.22	411.83
Slovakia	166.71	165.83	198.49	207.64	203.9	213.51	223.29	232.57	233.09	200.16
European Union	53,643	53,412	53,615	54,661	56,730	58,419	59,924	61,941	62,530	56,837

*Source: own processing based on data from Eurostat*

We examine the revenue from taxes imposed on transport in the next step. At first look, it can be established that compared to energy taxes, lower revenues were achieved in the case of Hungary, Slovakia and the European Union average. In the case of Hungary, the revenues were almost the double of those in Slovakia. Compared to the European Union average, both countries fall well short of it.

*Table 5 Revenue from taxes on pollution/resources, 2011-2020 (Million EUR)*

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hungary	95.42	226.37	212.52	221.32	280.48	290.14	335.42	330.93	342.55	291.62
Slovakia	35.37	34.42	31.94	30.91	31.47	32.14	28.59	28.59	28.69	25.91
European Union	9,337	9,721	9,705	10,073	10,562	10,532	10,660	10,610	10,666	10,635

*Source: own processing based on data from Eurostat*

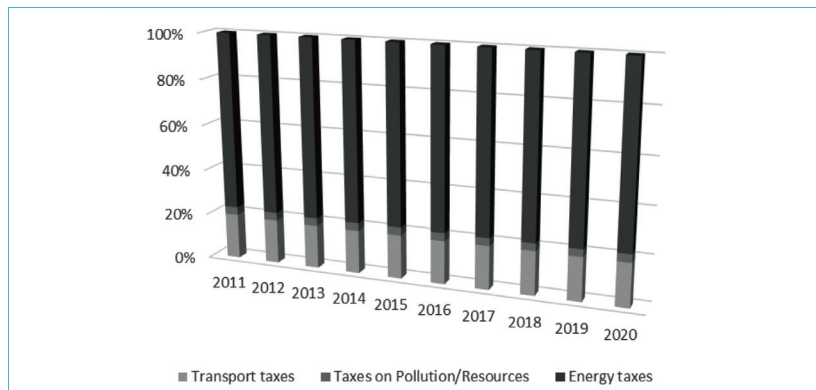
The third group of environmental taxes are taxes on pollution/resources. The evolution of revenues are presented in Table 5. We can observe that in the case

of Hungary, the development of revenues was very variable. The lowest value was reached in 2011 (95.42 Million EUR), and the highest value was reached in 2019 (342.55 Million EUR). The largest increase occurred in 2012, and then there was a continuous increase in the following years. A smaller decline can be observed in 2018 and 2020.

Much lower revenues were achieved compared to Hungary in the case of Slovakia. The lowest value was reached in 2020 (25.91 Million EUR) and the highest value was reached in 2011 (35.37 Million EUR). We can see a continuous decrease in revenues.

The lowest value of revenues was reached in 2011 (9,337 million EUR), and the highest value was reached in 2019 (10,666 million EUR) in the case of the European Union average. We can state that in the case of Hungary and the European Union average, a continuous increase in revenue can be observed. An opposite trend can be observed in Slovakia, where there was a continuous decrease in revenues.

*Figure 3 Environmental tax revenue by type in European Union – percentage of total environmental taxes, 2011-2020 (%)*

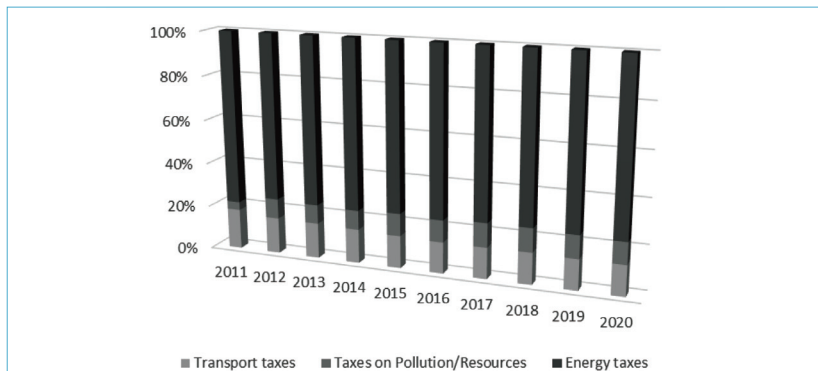


*Source: own processing based on data from Eurostat*

The composition of the environmental tax is determined by the energy tax, the transport tax and the tax on pollution/resources. The development of revenues in the European Union in the period 2011-2020 is shown in Figure 3. We can clearly see that the energy tax is the most important component of environmental taxes, which accounts for almost 80% of the revenues from environmental taxes. The second most important group of environmental taxes are taxes on pollution/resources.



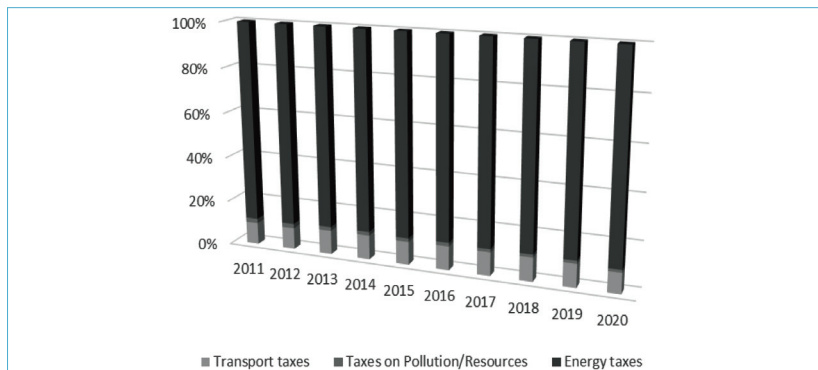
Figure 4 Environmental tax revenue by type in Hungary – percentage of total environmental taxes, 2011-2020 (%)



Source: own processing based on data from Eurostat

It can be concluded that the energy tax also plays the most important role, but the difference between the transport taxes and the taxes on pollution/resources is smaller, examining the composition of environmental taxes in the case of Hungary.

Figure 5 Environmental tax revenue by type in Slovak Republic – percentage of total environmental taxes, 2011-2020 (%)



Source: own processing based on data from Eurostat

It can be concluded that energy tax revenues are the highest among all environmental tax revenues, making up almost 90% in Slovakia. Transport taxes are the second most important, accounting for approximately 10%. The taxes on pollution/resources are in the last place. Their share was 2.05% in 2011, and then there was a continuous decrease during the whole period.

## Conclusion

Nowadays, a more environmentally conscious behavior of business entities and individuals can be observed. General state environmental protection measures are also becoming stricter, but the proportion of taxes related to the environment is decreasing and there has been no significant transfer of tax burdens from labor to green taxes (Bokázová, Haluš & Haščič, 2020).

It can also be observed that almost 80% of the revenues from environmental taxes are taxes on energy carriers, the amount of which is not adjusted according to the level of pollution. In the case of Slovakia, almost 90% of the revenues from environmental taxes come from taxes on energy carriers.

It was pointed out that the total environmental tax revenue as share of total government revenue from taxes and social contributions was around 6% in the countries analyzed. In our opinion, given the change in the way of thinking of individuals, companies and governments, the role of environmental taxes will increase in the near future. It is almost certain that this trend will also be seen in the development of tax revenues.

The system of fees paid for waste disposal or air pollution in the member states of the European Union does not encourage environmental awareness among end users and economic operators enough.

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