Maciej **CIEŚLUKOWSKI** • Mikołaj **JALINIK** • Joanna **PRZYBYLSKA**

GREENING OF THE NATIONAL TAX SYSTEM

Maciej **Cieślukowski** (ORCID: 0000-0001-6058-0113) – *Department of Public Finance, Poznan University of Economics and Business*

Mikołaj **Jalinik** (ORCID: 0000-0001-6748-3877) – *Faculty of Civil Engineering and Environmental Sciences, Bialystok University of Technology*

Joanna **Przybylska** (ORCID: 0000-0002-2514-1518) – *Department of Public Finance, Poznan University of Economics and Business*

Correspondence address:
Niepodległosci Avenue 10, 61-875 Poznan, Poland
e-mail: Maciej.Cieslukowski@ue.poznan.pl

ABSTRACT: Greening the tax system is one of the tools for achieving sustainable development. Domestic literature on the subject presents various suggestions for the improvement of the tax system in Poland. This paper attempts to make a general assessment of the extent of the Polish tax system environmental reform implemented between 2007 and 2021. The paper has a literary and empirical character. The empirical analysis was conducted using descriptive statistics methods. The assessment is mainly based on selected indicators: pro-ecological solutions in traditional taxes, the number of ecological taxes in the tax system, the fiscal efficiency of ecological taxes measured as a share in total tax revenues, and the economic importance of the examined taxes measured as a share in GDP. A comparative analysis of the national ecological levy system with the tax systems of EU countries was also conducted. A review of selected general taxes shows certain pro-environmental solutions but also solutions that seem controversial from the point of view of environmental protection and human life and that do not encourage entrepreneurs and consumers to be more environmentally friendly. A positive observation, on the other hand, was an increase in the number of environmental taxes and charges. However, these are still far less important from the economic and fiscal perspective compared to conventional taxes. The decarbonisation process of the economy and, the increase in public spending during the 2008 financial crisis and the crisis caused by the COVID-19 pandemic are not conducive to the greening of the tax system.

KEYWORDS: greening of the tax system, taxes and charges, environmental protection

Introduction

Greening of the tax system, the most advanced form of which is environmental tax reform, is an example of a tool that could help to achieve sustainable development. Domestic and English-language literature on the subject point out that this reform is not only conducive to environmental protection but also positively affects the economy in such aspects as welfare, the number of jobs, innovation and improved competitiveness. EU member states are implementing the green reform of their tax systems to varying extent. However, in recent years, changes in green taxes have depended to a large extent on the process of decarbonisation of the economy, which, on the one hand, reduces the fiscal importance of taxes levied on non-renewable energy and, on the other hand, delays the process of replacing fiscal labour costs with green taxes (EEA, 2022). A large number of qualitative studies and econometric simulations of the green reform of the national tax system were conducted between 1995 and 2005 (Bartniczak & Ptak, 2011). A preliminary review of the national tax system after 2005 indicates that several new taxes and charges of an environmental nature have been introduced into the system, especially in recent years. It is, therefore, worth analysing the recent developments and considering to what extent they contribute to the greening of the national tax system.

The aim of this paper is to make a general assessment of the extent of the Polish tax system green reform implemented between 2007 and 2021 through the analysis of domestic green taxes applicable in Poland against other European Union countries. The assessment is based on some indicators: pro-ecological solutions in traditional taxes, the number and types of ecological levies, their fiscal significance measured by the share in total tax revenues and their economic significance measured by the share in GDP. A comparative analysis of the national ecological levy system with the tax systems of EU countries was also conducted.

An overview of the literature

The concept of "greening of the tax system" consists of introducing solutions that are not only environmentally friendly but also can increase public revenues and have a positive impact on socio-economic development. Most often, it involves the implementation of environmental tax reform and the introduction of green taxes and charges. This subject is widely addressed in the relevant literature (see e.g. Nobanee & Ullah, 2023; Zhang et al., 2016). However, simpler forms of greening of the tax system are also worth. Table 1 presents the methods of greening the tax system, depending on the level of complexity and the objectives pursued.

Table 1. Methods of greening the tax system depending on the degree of complexity and the objectives pursued

Methods	Degree of complexity	Environmental objectives	Fiscal objectives	Socio-economic objectives
Elimination of environmentally harmful solutions from the system	+	+		+
Changes in existing taxes and charges that take greater account of the need to protect the environment	+	++		+
Introduction of environmental charges	++	+++	++	
Introduction of environmental taxes	++	+++	+++	
Environmental tax reform	+++	+++		++

+ small impact, ++ moderate impact, +++ large impact.

Source: authors' work based on Dębniak (2018), EEA (2016), Bartniczak and Ptak (2011), EEA (1996) and Barde (1994).

The first solution consists of ridding the tax system of environmentally harmful solutions. This may involve the elimination of entire taxes or certain elements, including concessions, exemptions, preferential rates, etc. An example of such a measure related to indirect taxation is the elimination of

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preferential rates with regard to less environmentally friendly products (the production processes of which require coal, oil or fertilisers). When it comes to income taxes, on the other hand, the list of deductible costs, allowances, and exemptions should be reviewed in detail. In the former case, some of the suggestions advocated include the reduction of the amount of deductible costs of fuel consumption, the abolition of the lump sum for mileage allowance, the reduction of tax-deductible depreciation write-offs on large passenger cars used for business purposes (Rogall, 2010). In the case of local taxes, aspects that need to be reviewed, in particular, are tax preference treatment with respect to transport vehicles and real estate. The aforementioned measures may contribute to a certain increase in prices and a reduction in the consumption of products and services that are not environmentally friendly. However, their effectiveness will largely depend on the complexity of the given tax system and the importance of the products and services concerned to the economy. The impact on fiscal and socio-economic objectives will be rather limited.

Another method involves the introduction of new solutions to existing taxation to encourage consumers and producers to make more environmentally friendly choices. Examples of such solutions include preferential rates in indirect taxes imposed on environmentally friendly products or increased rates imposed on products, the production of which has a negative impact on the environment. Other examples may be concessions and exemptions in direct taxes encouraging pro-environmental investments, e.g. the purchase of shares in green companies, investments in infrastructure generating renewable energy, etc. If such instruments are properly designed and attractive enough, they may have a significant positive impact on the natural environment.

Environmental charges and taxes reflect the "polluter pays" and "resource user pays" concepts, which are key principles of environmental policy. Without simultaneous reform of conventional taxes, the goals the aforementioned levies can achieve are primarily environmental and fiscal in nature. The difference between a charge and a tax is obvious, but the concepts of environmental charges and taxes are not as clearly defined in the literature on the subject and relevant regulations (Zhe et al., 2022; EEA, 2016). For comparative purposes, Eurostat includes these two categories under the broad definition of environmental tax imposed on a physical unit of something that negatively affects the environment and is subject, according to ESA (European System of Accounts), to taxation (EC, 2013). Eurostat lists 40 types of such tax bases, which can be grouped into four main categories of environmental taxes: taxes on energy, taxes on transport, taxes on pollution and taxes on resources. A similar classification of environmental taxes is also used by the OECD (2023). The European Environment Agency (EEA) classifies environmental taxes from the point of view of four criteria: the objectives set, the area of impact, the object of application and the tax base (EEA, 2000). Table 2 presents the classification of environmental taxes by Eurostat, the OECD and the EEA.

Table 2. Classification of environmental taxes

Eurostat, OECD	European Environment Agency
Taxes on energy (15 types)	Main area of impact: cost recovery charges, charges of a motivational nature, environmental taxes
Taxes on transport (7 types)	Main focus: taxes on energy, taxes on transport, taxes on pollution, taxes on resources
Taxes on pollution (14 types)	Object of taxation: taxes on pollution, products, capital goods, activity
Taxes on resources (4 types)	Tax base: taxes on fuel, water use, emissions, packaging etc.

Source: authors' work based on OECD (2023), EC (2013) and EEA (2000).

When it comes to EEA's classification of taxes from the point of view of the objectives pursued, the former are divided into charges for the use of resources (e.g. water abstraction charges) and earmarked charges for covering specific environmental expenditures (e.g. charges used to cover recycling costs). The aim of motivational taxes is to change the behaviour of producers and consumers. They are associated with the internalisation of environmental costs, translating into an increase in the price of products and services, which is expected to lead to a change in the structure of consumption and production. The level of these taxes (charges) is determined by the cost of environmental losses (Pigovian tax) (Rogall, 2010) or the cost necessary to achieve environmental objectives

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(Baumol and Oates tax model) (Andersen & Dengsøe, 2002). The latter tax group is designed to raise additional revenue, which should, by design, be earmarked for pursuing environmental objectives (EEA, 2022). However, it must be remembered that these taxes are not, in principle, targeted, so the appropriate allocation of the collected funds usually requires political consensus.

The most advanced form of greening of the tax system is environmental tax reform. It consists of partial or complete replacement of existing taxes (as well as charges and contributions) with green taxes while maintaining the principle of revenue neutrality, allowing the maintain the existing budget balance (Wallart, 1999). Economic theory and practice clearly indicate that a well-executed reform allows the achieve not only environmental objectives (the so-called first green dividend) but also additional fiscal and socio-economic objectives. Fiscal objectives are mainly reflected in the improvement of the very design of the tax system as a result of replacing environmentally and economically harmful solutions in conventional taxation with green taxes. Socio-economic achievements are mainly reflected in increased welfare, employment, innovation, improved market competition, strengthened social security system and reduced economic dependence on resource imports (Rogall, 2010; Hoerner & Bosquet, 2001; EEA, 2000). In the literature on the subject, these additional achievements of environmental taxes beyond environmental ones are considered the double dividend concept (Bovenberg, 1999; de Mooij, 1999). The employment-related version of the double dividend hypothesis has been particularly well studied and verified. The vast majority of empirical research and simulations confirm an increase in the number of jobs as a result of green taxes replacing social security contributions (Bosquet, 2000). An overview of green tax reforms in EU member states is provided, for example, by EEA (2022) and Borys (2006). An overview of such reforms in selected countries around the world is also provided by Zhe et al. (2022).

Determinants of the greening of the national tax system

The process of greening the national tax system should take into account at least several key factors. These are presented in Figure 1.

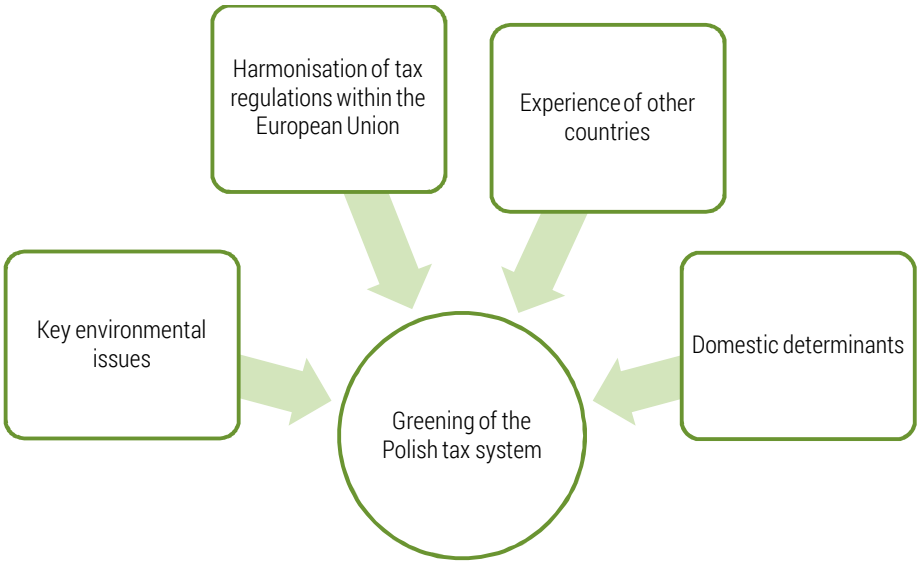

Figure 1. Determinants of the greening of the national tax system

The major current environmental problems are reflected in the strategic programmes of the European Union (Thieme & Galariotis, 2020; Decision, 2013; Decision, 2002). These problems are mainly due to overexploitation of non-renewable resources and excessive greenhouse gas emissions. Their result is life-threatening global warming (Popkiewicz et al., 2018). The EU's existing key environmental programme is the so-called European Green Deal, which aims to reduce greenhouse gas emissions by 55% by 2030 and to make the EU economy completely emission-free by 2050 (European Commission, 2019). The environment is a supra-national asset, so all countries should contrib-

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ute to reducing activities that are harmful to it. Tax instruments should be appropriately tailored to the identified problem.

Tax changes should be in line with existing tax harmonisation legislation. It is worth reminding here that the main objective of harmonisation is to remove tax barriers to the free movement of goods, services, labour and capital in the common market. So far, VAT, the most important excise duties and the taxation of capital movements between subsidiaries in different Member States have been harmonised. In contrast, income taxes, local taxes and charges generally remain the competence of the individual Member States. It should be stressed that although the greening of tax systems in the European Union is not subject to formal harmonisation, excise taxes on energy products (oil, gas, coal, electricity, etc.) were harmonised in the early 1990s and form an important part of green taxes. In addition, the EU in various strategic documents (e.g. European Green Deal, Europe 2020 Strategy) clearly indicates that green taxes are an important tool to achieve green objectives and encourage Member States to carry out appropriate reforms (European Commission, 2019).

When carrying out the reforms, it is advisable to draw on the experience of other countries. The process of greening the tax system started in Europe in the 1970s, and green tax reforms have been carried out since the 1990s (EEA, 2000). The region considered as the forerunner of the process is Scandinavia, followed by Western European countries. In recent years, selected central and eastern European countries have also been carrying out green reforms. The literature on the experiences of these countries is extensive.

The envisaged tax changes should also take into account local circumstances, in particular those that may hinder the increase or introduction of new taxes and charges. These include political consensus, an economically and politically strong coal mining sector, energy production based primarily on coal (e.g. in 2022, more than 80.0% of the country's electricity was produced from coal (Rynek elektryczny, 2024), the markedly lower average purchasing power of Poles compared to residents of Scandinavia and Western Europe (e.g. 2022 GDP per capita measured in PPS in Poland was 80.0% of the EU average for 28 countries (Eurostat, 2022), as well as very low awareness of Poles about taxes and public spending (FOR, 2017). In contrast, a positive phenomenon that is worth highlighting is the dynamically increasing level of environmental awareness among the population (NFOŚiGW, 2018; Kłos, 2015).

Environmental taxes and charges in Poland

The number of environmental taxes and charges in the period in question varies in the literature on the subject, depending on the classification criteria adopted by the authors. A very good overview of these levies up to the end of 2010 is given, for example, by Bartniczak and Ptak (2011). Taking into account the legal basis, it can be assumed that in the period from 2007 to 2010, there were 32 types of environmental charges regulated in 17 laws and 4 types of environmental taxes in Poland (EC, 2013)[1], namely excise duties: on energy products, electricity and passenger cars, and a tax on means of transport. The issue of environmental taxes and charges in Poland is addressed by such authors Kryk et al. (2011), as well as Małecka-Ziembińska (2022).

The general list of environmental levies expanded during the period in question. According to the classification adopted by Eurostat, the number of environmental levies in Poland increased from 15 to 28 in the period under study, with one group covering more than a dozen types of charges and penalties constituting the revenue of the National Fund for Environmental Protection and Water Management arising from several laws, including the Geological and Mining Law, the Water Law, the Act on Recycling of End-of-Life Vehicles, the Act on International Shipment of Waste, the Act on Waste, and the Act on Biocomponents and Liquid Biofuels (NFOŚiGW, 2021). In the first law alone, there are at least 6 types of charges related to the issuance of concessions, exploration, prospecting and exploitation of deposits, as well as waste storage and warehousing (Act, 2023).

[1] The authors also include value added tax, real estate tax, forest tax and agricultural tax into the group of taxes in question due to selected environmentally friendly solutions. Such an approach is, however, controversial, as many solutions with a negative impact on the environment can also be identified in the case of these taxes. The essential economic functions of these taxes are different from environmental taxes. Eurostat does not classify taxes on labour, income and excise duties on alcohol and tobacco products as environmental taxes.

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Table 3. Classification of environmental levies in Poland in 2007-2021

Types of environmental levies in Poland	Law
Taxes on energy	
• Excise duties imposed on energy products (6 products) and electricity, • Fuel surcharge, • Transition charge, • Emission charge, • RES charge, • Substitution charge, • Capacity charge, • Charges for concessions issued by the Energy Regulatory Office for energy generation and distribution.	• Act of 6 December 2008 on excise tax, uniform text. Journal of Laws of 2022, item 143 as amended. • Act of 27 October 1994 on toll motorways and the National Road Fund, uniform text. Journal of Laws 2022, item 2483 as amended. • Act of 29 June 2007 on the coverage of costs incurred by producers in connection with early termination of long-term contracts for the sale of power and electricity, uniform text. Journal of Laws of 2019, item 1874, as amended. • Act of 27 April 2001 Environmental Protection Law, uniform text. Journal of Laws of 2022, item 2556 as amended. • Act of 20 February 2015 on renewable energy sources, uniform text. Journal of Laws of 2022, item 1378, as amended. • Act of 8 December 2017 on the capacity market, uniform text. Journal of Laws of 2021, item 1854 as amended. • Act of 10 April 1997 Energy law. Journal of Laws of 2018, item 755 as amended.
Taxes on transport	
• Excise duty on passenger cars, • Vehicle registration fee, • Tax on means of transport, • Mandatory contributions from shipowners to the Inland Waterways Fund.	• Act of 6 December 2008 on excise tax, uniform text. Journal of Laws of 2022, item 143 as amended. • Act of 20 June 1997 Road Traffic Law, uniform text. Journal of Laws of 2022, item 988 as amended. • Act of 12 January 1991 on local taxes and charges, uniform text. Journal of Laws 2023, item 70 as amended. • Act of 31 July 2019 on financial support for inland shipowners, the Inland Waterways Fund and the Reserve Fund, uniform text. Journal of Laws of 2021, item 503.
Taxes on pollution	
• Charges for the use of the environment (charges for gas or dust emissions into the air, charges for the landfill charges), • Charges for greenhouse gas emission allowances, • Contributions to the Price Difference Payment Fund obtained from the auctioning of CO_2 emission rights, • Funds for the Indirect Emission Cost Compensation Fund obtained from the sale of greenhouse gas emission allowances.	• Act of 27 April 2001 Environmental Protection Law, uniform text. Journal of Laws of 2022, item 2556 as amended. • Act of 12 June 2015 on the greenhouse gas emission allowance trading scheme, uniform text. Journal of Laws of 2023, item 589. • Act of 7 October 2022 on special solutions to protect electricity consumers in 2023 in connection with the situation on the electricity market. Journal of Laws of 2023, item 269. • Act of 19 July 2019 on the compensation system for energy-intensive sectors and subsectors, uniform text. Journal of Laws of 2022, item 1312, as amended.
Taxes on resources	
• Tax on the extraction of certain minerals, • Recycling charge (for plastic bags), • Product charges, • Charges for waste management, • Charges and penalties constituting revenue of the National Fund for Environmental Protection and Water Management under separate acts (e.g. Charges for water abstraction, charges for exploration and exploitation of minerals), • Charges for removal of trees or shrubs, • Charges and penalties for substances that deplete the ozone layer.	• Act of 2 March 2012 on the tax on extraction of certain minerals, uniform text. Journal of Laws of 2018, item 228 as amended. • Act of 13 June 2013 on the management of packaging and packaging waste, uniform text. Journal of Laws of 2019, item 541 as amended. • Act of 11 May 2001 on the obligations of entrepreneurs with regard to the management of certain types of waste and on product charges, uniform text. Journal of Laws of 2020, item 1903 as amended. • Act of 13 September 1996 on maintaining cleanliness and order in municipalities, uniform text. Journal of Laws of 2022, item 2519. • Act of 9 June 2011 Geological and Mining Law, uniform text. Journal of Laws of 2023, item 633. • Act of 20 July 2017 Water Law, uniform text. Journal of Laws of 2022, item 2625 as amended. • Act of 20 January 2005 on recycling of end-of-life vehicles, uniform text. Journal of Laws of 2020, item 2056. • Act of 29 June 2007 on international shipment of waste, uniform text. Journal of Laws of 2020, item 1792. • Act of 14 December 2012 on waste, uniform text. Journal of Laws of 2022, item 699 as amended. • Act of 25 August 2006 on biocomponents and liquid biofuels, uniform text. Journal of Laws of 2022, item 403 as amended. • Act of 16 April 2004 on nature protection, uniform text. Journal of Laws of 2023, item 1336. • Act of 15 May 2015 on substances that deplete the ozone layer and on certain fluorinated greenhouse gases, uniform text. Journal of Laws of 2020, item 2065.

Source: authors' work based on EC (2013); Eurostat (2024).

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The second one covers the so-called water services charges which include 6 types of charges for water abstraction and discharge into the ground (Act, 2022). The indicated levies are classified entirely as taxes on resources. Table 3 shows the types of environmental levies in Poland from 2007 to 2021, broken down into the four main categories of environmental taxes used by Eurostat.

Among the types of environmental levies introduced after 2010, those that should be mentioned in particular include the tax on the extraction of certain minerals (Act, 2012), the product charge on packaging (Rozporządzenie, 2014), the charge on issued emission allowances under greenhouse gas emission trading (Act, 2015), the RES charge (Obwieszczenie, 2022a), the recycling charge on plastic shopping bags offered by commercial outlets (Obwieszczenie, 2019), the emission charge on the placing motor fuels on the market (Obwieszczenie, 2022b), as well as the so-called capacity charge (Obwieszczenie, 2021).

In addition, in recent years, several important instruments have been introduced to ensure the country's energy security, not only in the context of rising inflation caused by both the COVID-19 pandemic and the war in Ukraine but also in the context of the future development of the energy sector. In 2019, the so-called Price Difference Payment Fund was established, and funds from the auctioning of carbon emission rights amounting to more than PLN 4.6 million were paid into in 2020. The fund is to be used to compensate energy distributors who lost revenue in 2018 and 2019 due to the energy price freeze introduced by the government. In 2022 and 2023, electricity producers and distributors are obliged to make regular contributions to this Fund (Act, 2022).

In 2019, a state special purpose fund, the Indirect Emission Cost Compensation Fund, was also established as the main mechanism for the payment of indirect cost compensation to energy-intensive sectors and subsectors. Proceeds to the fund mainly come from the sale of greenhouse gas emission allowances from 2021, the so-called capacity charge also came into effect. It is levied on households and businesses according to their electricity consumption. Proceeds from the charge are to be used to modernise the power sector and develop the RES sector.

Environmental levies are either entirely allocated or split between a number of different funds and entities. Excise duties and charges for concessions issued by the Energy Regulatory Office constitute revenue for the state budget. The fuel surcharge constitutes revenue for the National Road Fund (76.90%), the Railway Fund (19.45%) and the Fund for the development of public utility bus transport (3.65%). The emission charge constitutes revenue for the National Fund for Environmental Protection and Water Management (95.0%) and the Fund for the development of public utility bus transport (5.0%). The substitution charge is allocated to the National Fund for Environmental Protection and Water Management. The remaining energy charges constitute the revenue of the Company Zarządca Rozliczeń S.A., which is a special purpose vehicle of the State Treasury established in 2007 to act as a settlement operator in the energy sector (Obwieszczenie, 2022c).

The vehicle registration charge is allocated to the state budget, while the tax on means of transport is credited to the municipal budget. The beneficiary of transport levies is also the Inland Waterways Fund, while the beneficiary of pollution levies is the National Fund for Environmental Protection and Water Management. Proceeds from the sale of greenhouse gas emission rights constitute revenue for the state budget and also contribute to the Price Difference Payment Fund, which is administered by Zarządca Rozliczeń S.A., and the state special purpose fund – the Indirect Emission Cost Compensation Fund.

Charges on resources, including product and recycling charges, mainly constitute the revenue of the National Fund for Environmental Protection and Water Management. Proceeds from the tax on the extraction of certain minerals contribute to the state budget, while charges for waste management and for the removal of shrubs and trees constitute municipal revenue. Fines for substances that deplete the ozone layer constitute revenue for the state budget.

Overview of selected taxes in terms of environmentally friendly solutions

The greening process of the national tax system should start with the identification and assessment of the currently applied environmentally friendly solutions that correspond to the identified environmental problems. A full review should encompass all taxes. The table below focuses solely on central and local taxes, which are generally not qualified as green taxes. What is particularly worth noting is the rate structure of the goods and services tax (GST). Table 2 shows selected preferential

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rates against the background of environmental problems identified in the EU environmental programmes for 2007-2023.

Table 4. Reduced rates of the goods and services tax in Poland against the background of selected environmental problems identified in the EU environmental programmes for 2007 – 2030

Environmental problem	Product or service	01.05.2004 – 30.04.2008	01.05.2008 – 31.12.2010	01.01.2011 – 31.12.2018	01.01.2019 – 31.01.2022	01.02.2022 – 31.12.2023
Insufficient recycling rate	Recyclable waste collection services	7%	7%	8%	8%	7%
Dwindling freshwater resources	Natural water	7%	7%	8%	8%	7%
	Water supply and sewage disposal services	7%	7%	8%	8%	7%
Over-exploitation of fishing grounds	Fish and other fisheries products	3%	5%	5%	5%	0%
Over-exploitation of forest resources	Forestry and logging services	3%	7%	8%	8%	7%
	Firewood	7%	7%	8%	8%	8%
	Printed books	0%	0%	5%	5%	5%
Climate warming due to greenhouse gas emissions	Passenger air transport	7%	7%	8%	8%	7%
	Dairy products	3%	5%	5%	5%	0%
	Meat and meat products	3%	5%	5%	5%	0%
	Live animals	7%	7%	8%	8%	8%
	Bicycle repair services	7%	7%	8%	8%	8%
	Bicycles	22%	22%	23%	23%	23%
	Electric cars	22%	22%	23%	23%	23%
Soil erosion	Chemical fertilisers; natural fertilisers	3%	7%	8%	8%	0%
Threats to human health	Pesticides and agricultural chemicals	3%	7%	8%	8%	0%
Threats to plant and animal species	Bees, fur animals, rabbits	3%	7%	8%	8%	8%

Source: authors' work based on Decision (2022), Decision (2013), Decision (2002).

At least several preferential rates in the GST presented in the table above are questionable. This is particularly the case for products and services related to resources that are currently heavily exploited or polluted, including water, fish, firewood, fertilisers and chemicals, water supply and wastewater collection services, forestry services and air transport. From the point of view of animal protection, it also seems unethical to give preferential tax rates for fur animals and rabbit breeders.

Preferential rates for food products should be the subject of a separate, detailed analysis. In 2022 and 2023, the rate was reduced to 0% for many food products due to high inflation. However, in the longer term, an increase in rates for selected products may be justified due to the following reasons:

food waste is an increasingly common problem in Poland. Research conducted in 2018 by CBOS and Eurostat shows that a statistical Pole annually wastes 235 kg of food, which places Poland fifth in the EU. In 2018, 42% of respondents admitted that they throw away food, compared to 34% in 2017 and 31% in 2016. The types of food most commonly wasted by Poles include bread, fruit and cold cuts (Forbes, 2018),

the farming of ruminants (e.g. cows and bulls) and the associated production of milk, dairy products and beef contribute to increased emissions of methane into the atmosphere, which is one of the strongest greenhouse gases (Popkiewicz et al., 2018).

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On the other hand, however, it is worth noting that in the case of the tax in question, the same rates are imposed on organic and non-organic goods and services. The net prices of the former generally exceed the net prices of the latter due to higher production costs. Preferential treatment of environmentally friendly goods and services can, therefore, provide a significant boost to demand and the development of this sector. Examples of goods and services that should currently be the focus of such measures include electric vehicles, public transport services provided by electric buses and organic food production. Possible changes in this area, however, must be preceded by a discussion within the European Union and appropriate changes to EU VAT directives. Examples of positive solutions in the case of the tax in question are preferential rates, stimulating the development of desirable services and sectors, including recycling services, beekeeping and bicycle repair services.

Environmental solutions introduced through other state and local taxes address various environmental problems. In the case of excise duties, a significant achievement in terms of environmental protection in the period under review was the alignment of excise duties on energy products (coal, coke, natural gas) and electricity with the requirements of the 2003 EU Energy Directive (Council Directive, 2003). Poland, like other Member States, was granted a transitional period for the introduction of minimum excise duty rates for the products in question. This period lasted in total from 1 May 2004 to the end of December 2012. The longest transition period was granted for coal and coke (Council Directive, 2004). Excise duties can help to reduce the consumption of certain products, while the proceeds from such levies can be used for renewable energy production (ECA, 2022).

When it comes to income taxes, what is worth noting is the list of deductible expenses and allowances. A positive and a relatively new solution are higher than in 2019 limits for depreciation write-off on electric cars compared to internal combustion vehicles from. These amount to PLN 225,000 in the case of the former and PLN 150,000 in the case of the latter (Act, 1991, Article 23(1)(4)). Another environmentally friendly solution is also the exclusion of incurred product charges (with some exceptions) from tax deductible costs. On the other hand, preferential taxation of certain branches of agricultural production and animal husbandry, including breeding of fur animals and rabbits, is debatable. It is also worth considering the elimination of increased deductible costs for commuting to work.

Examples of environmentally friendly solutions in the catalogue of reliefs include the relief for thermal efficiency improvement applicable to progressive income tax and flat-rate income tax, in force from 2019. This relief can be used by owners of single-family residential buildings. Other incentives expected to contribute to environmental protection in the medium and long term include income tax reliefs offered to entrepreneurs for innovations (R&D relief, IP Box relief, relief for the employment of innovative employees, prototype relief and relief for robotisation). The last three reliefs mentioned have been introduced as part of the so-called "Polish Deal" (Cieślukowski, 2023).

Several environmentally friendly solutions can also be found in local taxation. Forest and real estate taxes mainly consist of exemptions from taxation of areas that constitute valuable natural resources. In the case of the former, forests entered in the register of historical monuments, forests up to 40 years old and ecological sites are exempted from taxation (Act, 2022, art. 7). In the case of the latter, exemptions are granted for land in areas covered by strict, active or landscape protection, as well as buildings and structures permanently connected to the land located in national parks or nature reserves that serve directly and exclusively for the purpose of pursuing the objectives related to nature protection; land constituting wasteland, ecological sites, land covered with woods and shrubs (except if occupied for business activity), as well as land and structures within allotment gardens.

In turn, the agricultural tax provides investment relief for the construction or modernisation of facilities that serve for environmental protection and the production of energy from natural resources. What remains controversial, given the excessive carbon dioxide emissions of passenger cars, is their exclusion from the tax on means of transport. It should be recalled that this measure was introduced in 1997 in exchange for an increase in excise duties on motor fuels. It is also worth noting the possible negative environmental and climate impact of the real estate tax. This is due to the fact that the low taxation of real estate (on the usable area and not the value) encourages the conversion of agricultural land, meadows and pastures into building land. This results in soil degradation and drainage and changes the energy balance of the land towards increased carbon emissions (Popkiewicz et al., 2018).

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Research methods

The expected benefits of greening the tax system are referred to as the so-called double dividend. The basic and direct benefit should be expressed in the positive impact of the reform on the natural environment. On the other hand, additional effects are of an indirect nature and may be expressed in many additional benefits. In the original approach, the reform is mainly intended to improve the structure of the tax system by replacing traditional taxes with ecological taxes and to reduce unemployment. Research on greening the tax system is conducted in theoretical and empirical dimensions. An interesting review of the current literature in this area is provided by Nobanee and Ullah (2023). Theoretical studies are based largely on the general market equilibrium model (see e.g. Bovenberg, 1999). The aim of such studies is to find the optimal ecological tax that ensures the double dividend effect.

Empirical studies on the first and second dividends are very diverse. The impact of a given tax on the natural environment and various indirect effects is usually studied by comparing changes in the structure of a given tax and changes in the phenomenon being studied. Various models describing the relationships between variables are used for this purpose (see, e.g. Criqui et al., 2019; Andersson, 2019; Antweiler & Gulati, 2016; Li et al., 2014; Abdullah & Morley, 2014; Sartzetakis & Tsigaris, 2009).

Indirect effects in the form of improving the structure of the tax system are examined using typical indicators such as: the number of ecological solutions in traditional taxes, the number of ecological taxes in the tax system, the fiscal efficiency of ecological taxes measured as a share in total tax revenues, and the economic importance of the examined taxes measured as a share in GDP (see e.g. Dębniak, 2018; Małecki, 2016; Speck & Jilkova, 2009).

This paper is based on a literature review and empirical research. The theoretical part presents an analysis of literature on the subject, legal acts and source materials of various domestic and EU institutions.

The empirical part examines changes in ecological taxes in the structure of the national tax system using selected indicators: pro-ecological solutions in traditional taxes, the number of ecological taxes in the tax system, the fiscal efficiency of ecological taxes measured as a share in total tax revenues, and the economic importance of the examined taxes measured as a share in GDP. This part is based on the analysis of domestic and EU statistical data on environmental levies for the period 2007-2021. The main sources of domestic data are reports and studies of Statistics Poland, Social Insurance Institution (ZUS) and National Fund for Environmental Protection and Water Management, while EU data – Eurostat. The analysis was carried out using descriptive statistics methods (tabular description, graphical presentation of results, and determination of distribution measures using the arithmetic mean). This part also includes a comparative analysis of the national system of environmental taxes against the tax systems of other EU member states.

Results of the research

Size and structure of environmental levies in Poland

Between 2007 and 2021, total proceeds from environmental taxes and charges increased from 32.6 to over 78.1 billion PLN (Figure 2).

The level of proceeds from the various tax categories was fairly stable and similar to 2012, with a slight upward trend despite the 2008 financial crisis. In the case of excise duties, the increase was largely due to the gradual introduction of the mandatory minimum rates set out in the 2003 EU Energy Directive. In 2013, for all categories of taxes, with the exception of taxes on transport, a rather pronounced decrease in proceeds was recorded. In the case of energy taxes, this was mainly due to a decline in revenue from the so-called transition charge, while in the case of taxes on pollution and resources, it was mainly due to a decline in revenue from charges for the use of the environment and mining charges, which constitute revenue for the National Environmental Protection and Water Management Fund. The lower level of the former was due to the entry into force on 1 January 2013 of amended provisions on the deadlines for the payment of charges for the use of the environment

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(Act, 2012). The lower level of the latter in turn, was mainly due to a decrease in the extraction of rock minerals by approximately 30% (NFOŚiGW, 2018).

Figure 2. Proceeds from environmental taxes and charges in Poland from 2007 to 2021 (PLN million)
Source: authors' work based on Eurostat (2024).

Proceeds from all tax categories showed a general upward trend between 2014 and 2019, which was due to the good economic situation, the dynamic growth in the number of registered vehicles (GUS, 2019; GUS, 2017) and measures aimed at the elimination of loopholes in the indirect tax system (Cieślukowski, 2018). A noticeable decline in the proceeds from all tax categories, with the exception of the tax on pollution, was recorded in 2020. This was mainly due to the economic slowdown caused by the COVID-19 pandemic, the outbreak of war in Ukraine, rising inflation and the freezing of energy prices introduced by the government. In 2021, proceeds from taxes on energy and transport started to increase again. A particularly high increase (more than 27.5 % compared to 2020) was recorded for proceeds from the tax on energy, which was due to the introduction of the so-called capacity charge.

The main reason for the increase in total revenue from taxes on pollution between 2019 and 2020 was the dynamic increase in revenue from the sale of greenhouse gas emission allowances. In contrast, a marked decrease (by almost 49.0%) was recorded for the proceeds from taxes on resources over the period in question. This was due to a decline in the revenue of the National Environmental Protection and Water Management Fund, caused not only by the economic crisis triggered by the pandemic but also by the loss of revenue resulting from changes in the legislation. In particular, this was the case with the substitution charges under the Energy Law and the redirection of a part of the charges under the Water Law to PGE Wody Polskie (NFOŚiGW, 2021). Environmental levies accounted for an average of 8.1% of total revenue from taxes, charges and compulsory social security contributions in Poland in the period under consideration.

The structure of revenue from the analysed levies was quite stable until 2018. Energy taxes and charges, including excise duties levied on energy products and electricity, were of the greatest fiscal importance. Energy levies accounted for an average of almost 85.0% of total environmental levies during the period under consideration. This was followed by taxes on transport (average share in total environmental levies of 8.11%), and taxes on pollution – third (4.6%), with taxes on resources constituting the smallest share (2.5%). In the following years, the share of levies on pollution in total proceeds has clearly increased (to 20.2% in 2021) at the expense of the share of taxes on transport and resources. This was mainly due to a marked increase in proceeds from the sale of greenhouse gas

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emission allowances (from PLN 5.1 billion in 2020 to PLN 12.1 billion in 2021), high amounts of contribution to the Price Difference Payment Fund in 2020 (PLN 4.6 billion) and high amounts of contribution to the Indirect Emission Costs Compensation Fund in 2021 (PLN 1.7 billion).

The main sources of proceeds from environmental levies in the period in question were households, the sector of transport and logistics and industry (Fig. 3). The former accounted for 33.0% of proceeds from environmental levies on average, followed by the sector of transport (22.8%) and industry (14.7%). The structure of contributions in the first two sectors is very similar. Taxes on energy and transport constitute the largest share. In the case of households, the former accounted for almost 82.0% on average and the latter for 13.5%. In the transport sector, the taxes on energy accounted for as much as 93.6%, while the taxes on transport accounted for 3.5%. In contrast, the structure of contributions in the industrial sector was dominated by taxes on energy (88.6%) and charges on pollution (8.9%).

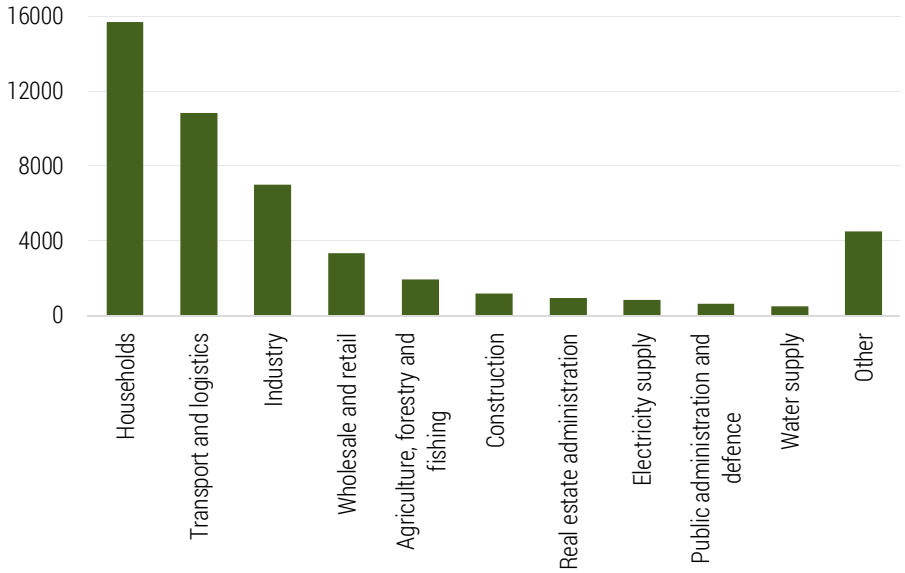

Figure 3. Average amount of environmental levies paid by the most important economic sectors in Poland in 2007-2021 (in PLN million)

Source: authors' work based on Eurostat (2024).

At the same time, in the sectors in question, there was a marked increase in the amount of levies during the period under consideration. This was mainly due to an increase in the amount of energy taxes and charges, which at the beginning of the analysed period was mainly due to the harmonisation of excise duty rates and at the end of it – due to the introduction of the so-called capacity charge.

Environmental levies in Poland compared to other EU member states

The share of total environmental levies in GDP in Poland ranged from 2.4 % to almost 2.9% in the period in question and was higher than the EU average. The average share of total environmental levies in Polish GDP in the period under review was 2.6%, while in the EU, it was less than 2.4%. The amount of the individual types of environmental taxes and charges in Poland measured both as a share of GDP and as a share of total tax revenue, also differed from the average EU statistics (Figures 4 and 5).

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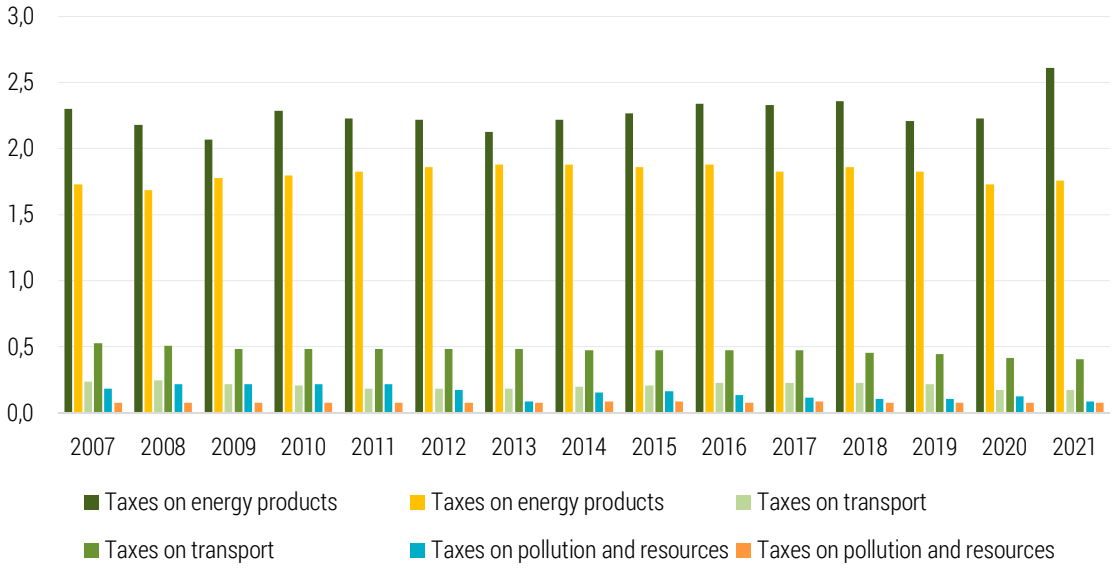

Figure 4. Share of environmental levies in Polish GDP compared to the average EU statistics in 2007-2021 (in %)*

* from 2020 onwards, the average for the 27 EU member states (excluding the UK).

Source: authors' work based on Eurostat (2024).

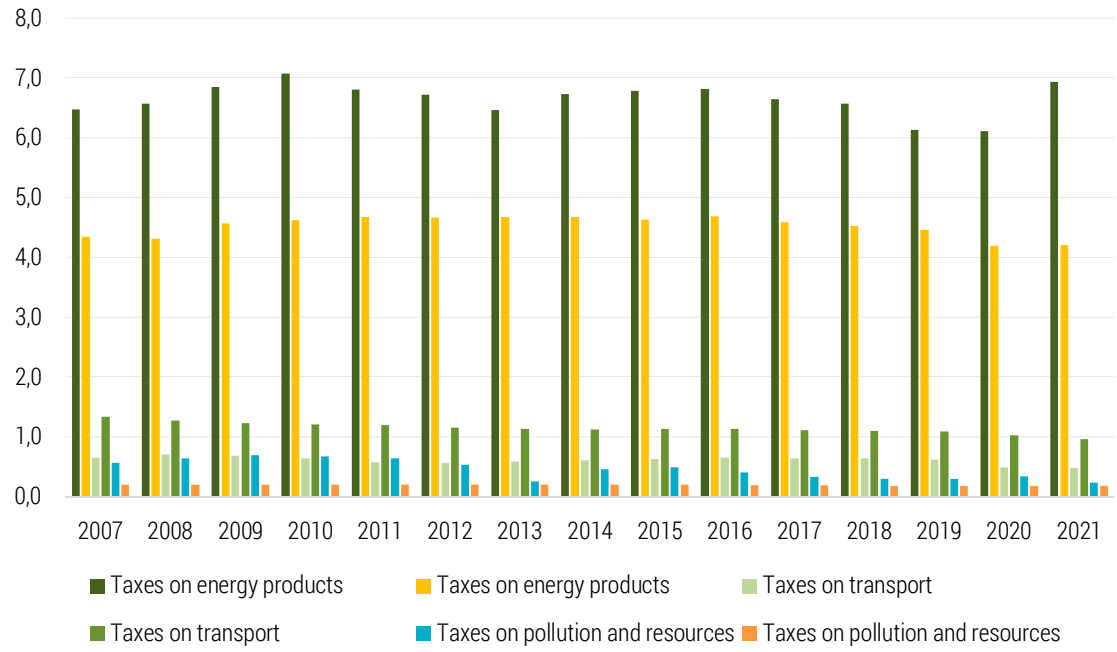

Figure 5. Share of environmental levies in total tax revenue in Poland compared to the average EU statistics in 2007-2021(in %)*

* from 2020 onwards, the average for the 27 EU member states (excluding the UK).

Source: authors' work based Eurostat (2024).

The levies on energy products in Poland are clearly of greater economic and fiscal importance than for most EU member states. The average share of these taxes in Polish GDP during the period under review was almost 2.3%, while the EU average was 1.8%. At the same time, these taxes accounted, on average, for almost 6.7% of total revenue from fiscal levies, compared to the EU average of 4.5%. The share of the taxes in question in both GDP and revenue from fiscal levies was fairly stable over the period analysed, except for a marked decrease recorded during the pandemic.

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The group of countries in the case of which the economic significance of energy taxes was similar to that of Poland (on average above 2.0% in GDP in the period analysed) included selected Central and Eastern European countries (Bulgaria, Estonia, Latvia, Slovakia and Slovenia) as well as Greece, Italy and Denmark. The share of energy taxes in GDP in the EU member states over the period analysed is presented in Figure 6. In other EU member states, the economic importance of the taxes in question was lower, with the average share of these taxes in GDP ranging from 1.2% in Ireland to almost 2.0% in Cyprus over the period under study. It is also worth noting that, in general, in Western European countries, the economic significance of these taxes was noticeably lower than in Central Eastern and Southern European countries.

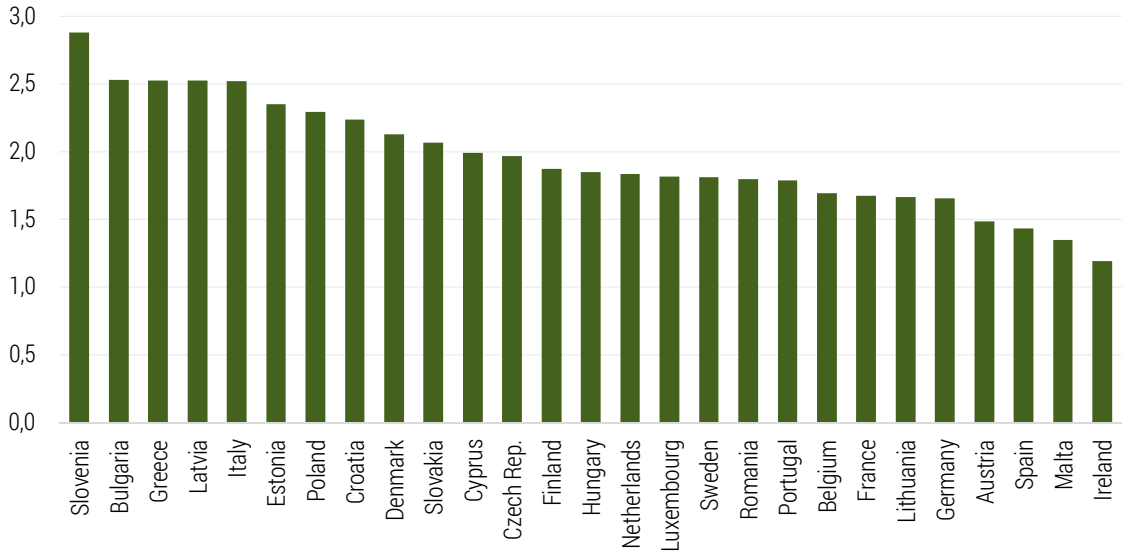

Figure 6. The average share of energy taxes in GDP in EU member states between 2007 and 2021 (in %)*

* excluding the UK.

Source: authors' work based on Eurostat (2024).

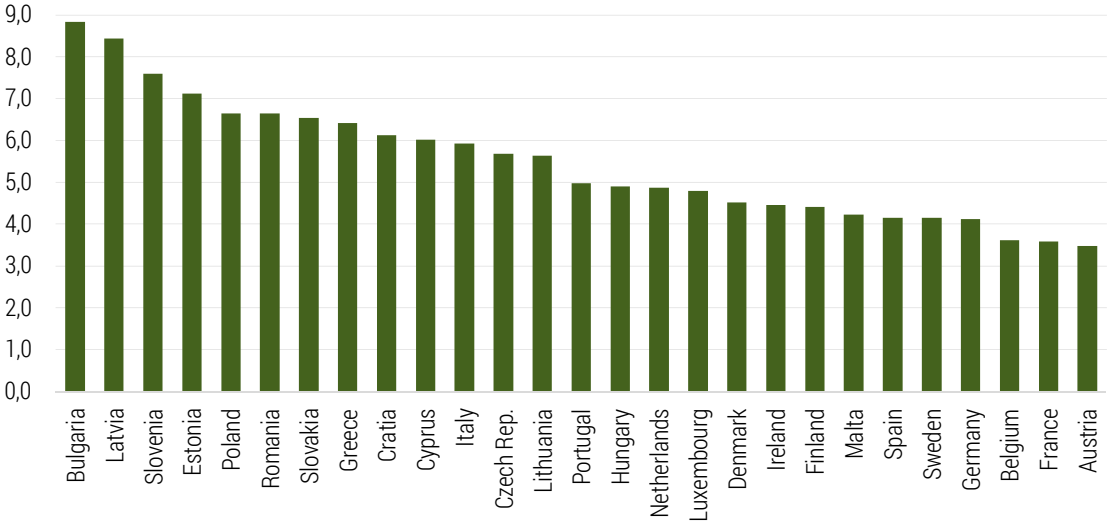

Figure 7. Average share of energy taxes in total revenue from fiscal levies in EU member states 2007-2021 (in %)*

* excluding the UK.

Source: authors' work based on Eurostat (2024).

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A similar observation was made for the fiscal importance of energy taxes. Their share in total revenue from fiscal levies was significantly higher in the Central, Eastern and Southern European countries compared to Western Europe (Fig. 7). An identical or higher average was observed for such countries as Bulgaria (8.8%), Estonia (7.1%), Croatia (6.1%), Cyprus (6.0%) Latvia (8.4%), Romania (6.6%), Slovakia (6.5%) and Slovenia (7.6%). In contrast, the lowest figures were recorded for Austria (3.5%), France (3.6%) and Belgium (3.6%).

The greater economic and fiscal significance of energy taxes in the countries examined is due to the fact that the taxes in question are harmonised excise duties that increase the price of products and thus account for a relatively larger proportion of the expenditure of residents of less wealthy countries than residents of countries with higher incomes. As a result, excise revenue accounts for a relatively larger share of total tax revenue in less wealthy countries than in more developed countries. Two exceptions are Italy and Denmark, which have relatively high excise duties on energy products.

The economic and fiscal importance of taxes on transport is considerably lower in Poland than in other EU member states. This is mainly due to the fact that passenger cars have been excluded from the taxation on transport in Poland. The share of revenue from the taxes on transport in GDP in EU member states over the period under review is presented in Figure 7. The clear leader in the EU in this respect is Denmark, where the average share of revenue from taxes on transport in GDP was almost 1.50% during the period in question. Denmark has a fairly advanced system of progressive taxation of transport vehicles, including a particularly high tax rate (150%) on passenger cars with a value of more than DKK 204 601 (approximately PLN 132 200) (Expatrist, 2023). It is also worth noting that the average share of the revenue from the taxes in question in GDP in the EU member states declined from 0.66 to 0.43% over the period i question. The decrease in this share in recent years was partly due to the introduction of tax reliefs for the purchase of electric or hybrid cars in most countries.

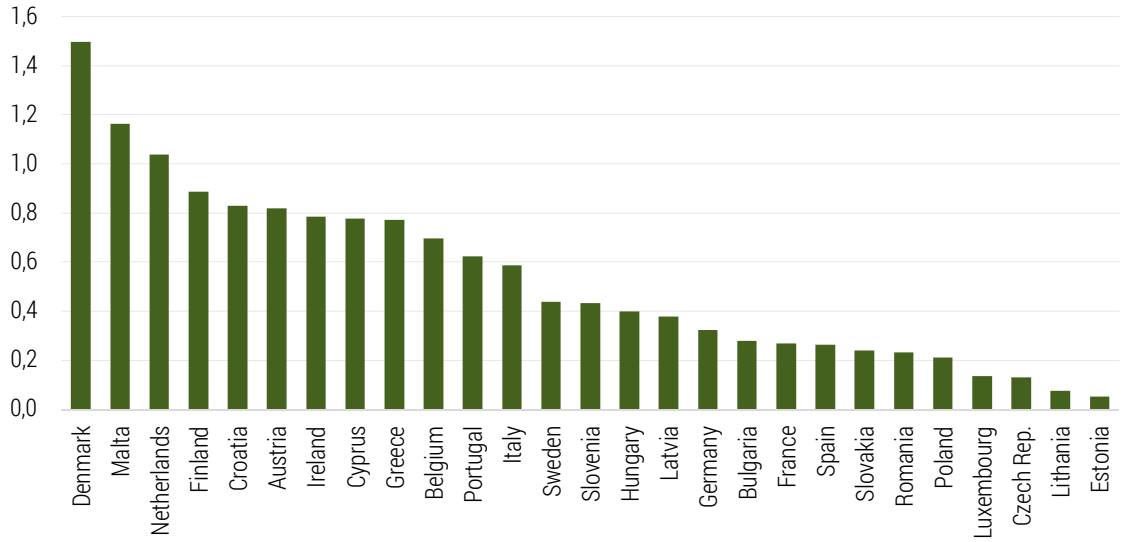

Figure 8. Average share of taxes and charges on transport in the GDP of EU member states 2007-2021 (in %)*

* excluding the UK.

Source: authors' work based on Eurostat (2024).

The economic importance of levies on pollution and resources in Poland, as in the other EU member states, is relatively lower compared to other environmental levies. The average share of these taxes and charges in the GDP of EU member states decreased slightly from 0.1 to 0.08% in the period analysed. However, the economic significance of the taxes in question was quite diverse across the countries (Figure 9). The unquestionable leader in this regard was the Netherlands, where the average share of the taxes in GDP was almost 0.46% in the period under consideration. The relatively high share in recent years was due to the higher tax rates for waste landfilling and incineration (2019) and the introduction of new taxes, including a domestic CO_2 tax on electricity production by companies

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participating in the ETS system and an additional tax on airline tickets (2021) (EC, 2013). In Poland, the rate was almost 0.16%. In Germany and Greece, the taxes examined were basically not collected.

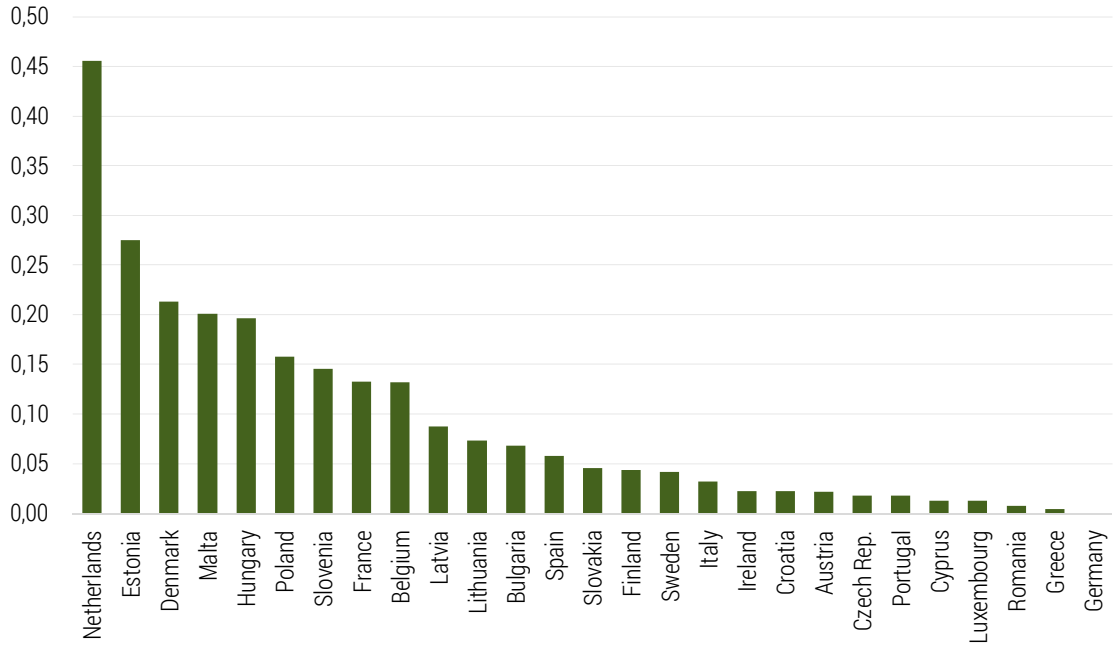

Figure 9. Average total share of taxes on pollution and resources in GDP in EU states from 2007 to 2021 (in %)*

* excluding the UK.

Source: authors' work based on Eurostat (2024).

Environmental tax reform

The environmental tax reform, at its most advanced form, consists of the replacement of primarily direct taxes and compulsory social security contributions with green levies while maintaining revenue neutrality. Figure 10 shows revenue from direct taxes (income tax, wealth tax and tax on capital gains), revenue from environmental levies and revenue from compulsory social security contributions in Poland from 2007 to 2021.

It can be seen that the proceeds from income and wealth taxes and revenue from social security contributions were significantly higher than revenue from environmental levies during the period in question. Revenue from all sources was generally higher, but the rate of growth varied. Revenue from social security contributions increased by almost 2.5 times in the period under consideration, revenue from environmental levies increased by 2.32 times, while revenue from income and wealth taxes increased by less than 2.24 times. Revenue from the tax on capital gains increased by less than 30.0%. The increase in revenue from social security contributions and income tax, especially after 2013, was mainly due to the good economic situation, the low unemployment rate and the dynamic growth in the number of insured persons (ZUS, 2018).

The structure of the proceeds from the levies in question translates into their fiscal importance as measured by their percentage share in total revenue from fiscal levies (Figure 10). Only the share of social security contributions increased in the period under review (by 4.7%), while the shares of other levies decreased. The largest decrease (by almost 45.0%) was recorded for proceeds from the tax on capital gains. The share of revenue from environmental levies decreased by only 0.6%, while the share of income tax decreased by 4.2%. At the same time, it can be seen from Figures 10 and 11 that the difference in fiscal importance between environmental levies, on the one hand, and social security contributions and income tax, on the other, was marked and fairly stable during the period under consideration. The changes introduced in the legislation regulating the types of levies in question did not have a major impact on their fiscal significance during the period analysed. Thus, it is difficult to identify any trend in the substitution of direct taxes and social security contributions with environmental levies.

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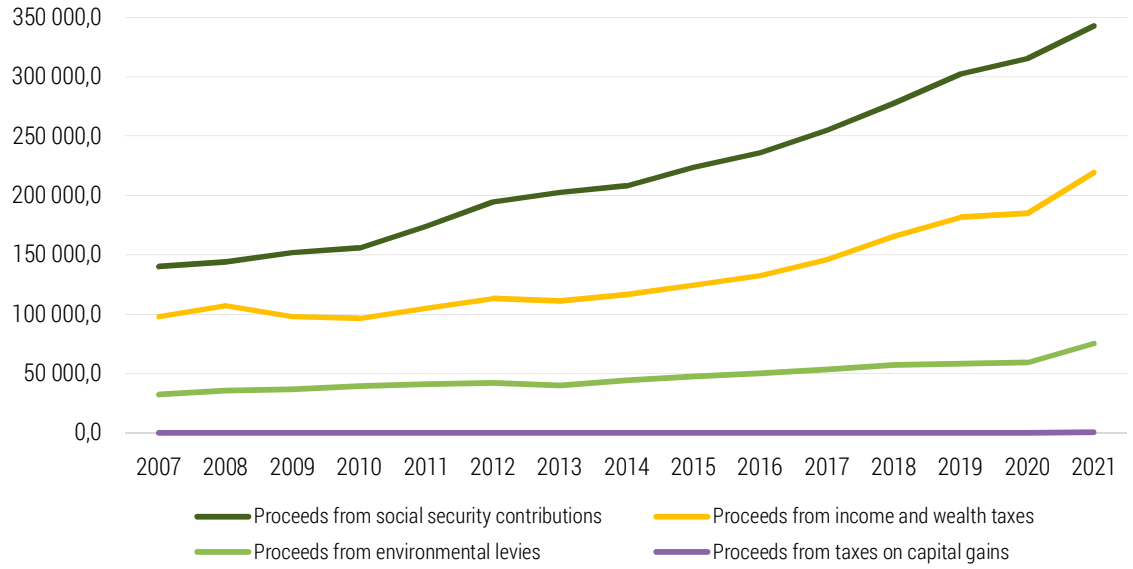

Figure 10. Fiscal importance of direct taxes, environmental levies and social security contributions in Poland from 2007 to 2021 (PLN million)

Source: authors' work based on Eurostat (2024).

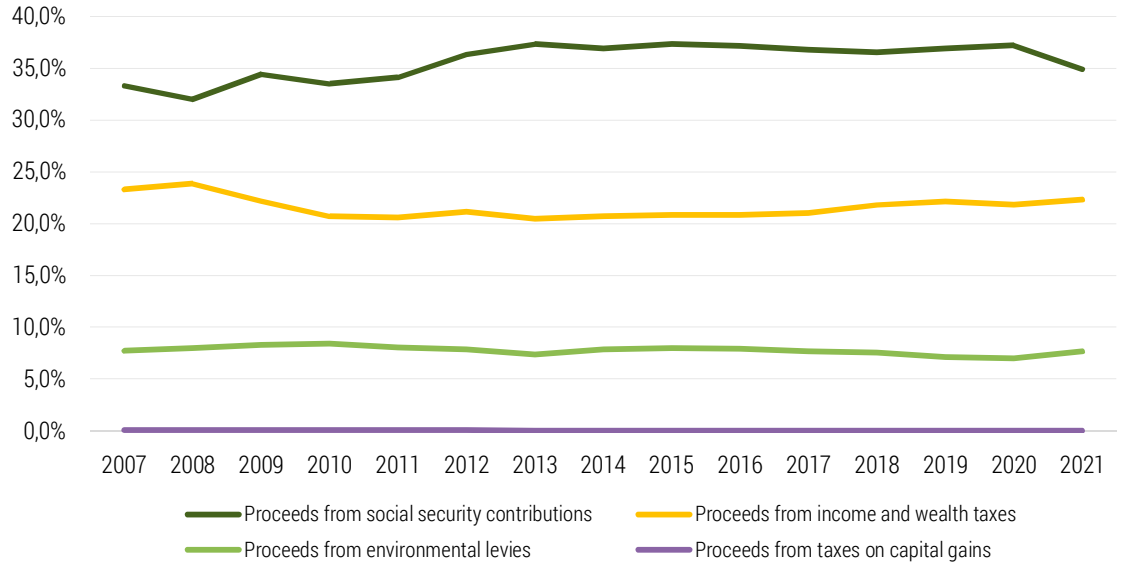

Figure 11. Fiscal importance (% of total revenue from fiscal levies) of social security contributions, direct taxes and environmental levies in Poland in 2007-2021

Source: authors' work based on Eurostat (2024).

Discussion/Limitation and future research

The environmental reform of the Polish tax system and green taxes in Poland and other EU member states are the subject of research in domestic and foreign literature. The study presented in this paper offers a fairly up-to-date and broader analysis of the topic in question. It analyses the sources of environmental tax proceeds by economic sector. In earlier publications, Bartniczak and Ptak (2011) present an overview of environmental levies in Poland up to the end of 2010. Kryk et al. (2011) present a detailed list of environmental levies in Poland in 2011 in the context of an analysis of applicable legislation. Leszczyłowska (2013) examines the fiscal significance of environmental

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taxes in EU member states between 2000 and 2010 and discusses changes in the design of these taxes after the 2008 financial crisis. Małecki (2016) compares environmental taxes in Poland to those applicable in selected EU member states and Norway in 2007 and 2013 using two indicators: the share of environmental taxes in GDP and total fiscal revenue. Dębniak (2018) discusses the importance of environmental taxation in EU member states from the perspective of sustainable development.

The English-language literature on the subject mainly addresses selected aspects of environmental taxes. For example, Gago et al. (2019) analyse vehicle taxation in the context of addressing the negative environmental impact of transport. Kapeller et al. (2021) analyse a European wealth tax as a tool for a fair and green transition. A more comprehensive approach to environmental tax reform in the European Union has been adopted by such scholars as Speck and Jilkova (2009), as well as selected research institutions and organisations. EEA (2022) presents changes in the fiscal importance of environmental taxes in EU member states between 2002 and 2019. The results of that research partly overlap with the findings presented in this article. Based on the analysis, it can be concluded that the share of environmental taxes in total tax revenue shows a general upward trend in CEE countries and a downward one in Western European countries. In a joint report, IMF and OECD (2021) present the importance of tax policy in reducing greenhouse gas emissions.

As far as the study presented in this paper is concerned, it is important to point out three potential problems and limitations. First of all, the time span of the analysis is limited to the period 2007-2021. It complements previous studies in the literature on the subject and is based on the statistical data available in the Eurostat database. Secondly, the data on revenue from taxes on pollution and resources in the Eurostat main database is inconsistent with the data contained in the detailed classification of taxes and charges in Poland. The analysis presented in this paper is based on the latter. Thirdly, it should be emphasised that the exact number and detailed classification of environmental taxes and charges in Poland is difficult to determine due to the different objects of taxation and the large number of legal regulations. For this reason, the number of these levies may vary between individual studies depending on the classification criteria adopted.

This paper presents the current status (as of 2021) of environmental taxes, gives examples of environmentally friendly and unfriendly solutions in other types of taxation in Poland, as well as compares the fiscal and economic significance of these taxes in Poland to other EU member states and makes an overall assessment of the state of the greening process of the national tax system. Further research on this process is recommended in the context of the decarbonisation of the economy. It should include:

- development of detailed criteria and methodology for assessing the progress in the greening process of the tax system (multi-criteria assessment),
- detailed analysis of environmental solutions in conventional taxation and proposal of environmentally friendly changes in applicable taxes,
- further analysis of the fiscal, environmental and economic significance of new environmental levies (e.g. capacity charge),
- the impact of new (potential) EU own resources (levies on plastics, greenhouse gas emissions, carbon taxes on imported goods) on the greening process of the tax system in Poland.

Conclusions

The paper is an attempt at a general assessment of the current state of greening of the national tax system. The assessment was based on such criteria as pro-ecological solutions in traditional taxes, the number and types of ecological levies, their fiscal significance measured by the share in total tax revenues and their economic significance measured by the share in GDP. A comparative analysis of the national system of environmental taxes against the tax systems of other EU member states has also been conducted.

Unfortunately, the current taxation system is not based on logically interconnected environmental levies and conventional taxes, which would allow for comprehensive protection of the environment and human health. The selected taxes reviewed contain both environmentally friendly solutions and solutions that are at least controversial from an environmental point of view. The former is

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mainly reflected in local taxation, with certain environmentally friendly solutions also present in income taxation. The most controversial ones are certain rates in the goods and services tax, in particular preferential rates imposed on products in the manufacturing process or consumption, which involves the exploitation of endangered resources and food waste.

A positive observation regarding the national tax system is the increasing number of environmental taxes and charges, among which energy levies are of the greatest fiscal and economic importance. However, although characterised by increasing fiscal importance, for the time being, environmental levies still play a relatively smaller role in the economy compared to income taxes and social security contributions. The share of environmental levies in total fiscal levies remained basically unchanged during the period analysed. Based on the size and structure of environmental levies in relation to income taxes and social insurance contributions, it can be concluded that the process of greening the Polish tax system is not well thought out. We are not dealing with a trend of replacing conventional taxes and social security contributions with environmental levies. New environmental charges introduced into the tax system mainly contribute to an increase in revenue from public levies in general.

The experience of selected EU member states, as well as scientific simulations, prove that a well-designed environmental reform of the tax system can have net benefits for the environment, the economy and human health. Thus, it can be an important tool for achieving sustainable development. However, recent studies also highlight that the greening process of the tax systems of individual EU member states may be hampered by the dynamic decarbonisation of the economy and the crisis caused by the COVID-19 pandemic. These factors entail increased public spending, including on industrial restructuring and on severance payments to employees. As a result, at least in the short or medium term, the fiscal importance of income taxes and social security contributions may again show an upward trend. On the other hand, decarbonisation will also result in a decrease in revenue from the charges for emissions and pollution.

However, the decarbonisation process should not discourage the introduction of appropriate reforms. The environmental reform of the national tax system should be one of the priorities of the state's socio-economic policy. Its implementation requires taking into account domestic and European political, economic and social conditions. In Poland, the implementation of such a reform may be facilitated by the rapidly increasing environmental awareness of the population.

The contribution of the authors

Conceptualisation, M.C., M.J. and J.P.; literature review, M.J. and J.P.; methodology, M.J. and J.P.; formal analysis, M.C.; writing, M.J. and J.P.; conclusions and discussion, M.C., M.J. and J.P.

The authors have read and agreed to the published version of the manuscript.

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Maciej CIEŚLUKOWSKI • Mikołaj JALINIK • Joanna PRZYBYLSKA

EKOLOGIZACJA KRAJOWEGO SYSTEMU PODATKOWEGO

STRESZCZENIE: Ekologizacja systemu podatkowego jest jednym z narzędzi osiągania zrównoważonego rozwoju. Krajowa literatura przedmiotu przedstawia różnorodne propozycje usprawnienia systemu podatkowego w Polsce. W artykule podjęto próbę ogólnej oceny zakresu zmian o charakterze ekologicznym w polskim systemie podatkowym w latach 2007–2021. Praca ma charakter literaturowo-empiryczny. Analizę empiryczną przeprowadzono z użyciem metod statystyki opisowej. Oceny dokonano głównie na podstawie wybranych wskaźników: rozwiązań proekologicznych w podatkach tradycyjnych, liczby podatków ekologicznych w systemie podatkowym, wydajności fiskalnej podatków ekologicznych mierzonej ich udziałem w dochodach podatkowych ogółem oraz znaczenia ekonomicznego badanych podatków mierzonego ich udziałem w PKB. Przeprowadzono również analizę porównawczą krajowego systemu danin ekologicznych z systemami podatkowymi krajów UE. Przegląd wybranych podatków tradycyjnych ukazuje zarówno pewne rozwiązania proekologiczne, jak i rozwiązania, które wydają się kontrowersyjne z punktu widzenia ochrony środowiska i bezpieczeństwa życia człowieka. Niektóre regulacje nie zachęcają też przedsiębiorców i konsumentów do proekologicznych postaw. Pozytywnym spostrzeżeniem jest natomiast wzrost liczby podatków i opłat środowiskowych. Jednak nadal mają one niewielkie znacznie fiskalne i gospodarcze w porównaniu z podatkami tradycyjnymi. Proces dekarbonizacji gospodarki oraz wzrost wydatków publicznych w okresie kryzysu finansowego z 2008 r. i kryzysu spowodowanego pandemią COVID-19 nie sprzyjają ekologizacji systemu podatkowego.

SŁOWA KLUCZOWE: ekologizacja systemu podatkowego, podatki i opłaty, ochrona środowiska

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