EVALUATION OF THE EXPERIENCE IN ENVIRONMENTAL TAX REFORMS IN THE EU COUNTRIES

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Abstract

The urbanizing world, where human labour has been replaced by the mechanized machinery, is becoming increasingly dependent on the resources provided by nature. The demand of humanity in natural resources continues to grow. Due to the limitedness of the goods provided by nature, a human must take a more responsible approach towards the available resources by using the resources that are renewed more often and by protecting non-renewable resources. Sustainable development is the field that analyses these paradigms. Social, economic, and environmental dimensions combined and the emphasis on one of the fiscal instruments for the purposes of sustainability bring forward the concept of environmental taxes. Environmental taxes may be interpreted as a fiscal instrument that transfers the tax burden from the "goods" onto the "bads". Income generated by these taxes is distributed for stimulation of the sustainable economy based on conservation of the nature and more environmentally friendly production. The taxes considered may not only allow reducing the pollution and stimulating sustainable development of the national economy, but also influence the changes of the national tax structure. This article analyses the concepts of sustainable development, environmental taxes, and environmental tax reform. The development of environmental taxes, energy, transport, resources, and pollution in the selected EU countries is analysed. The analysis has shown that environmental taxes are sometimes allocated between the countries irrespective of whether a country has already implemented the environmental tax reform or not. In any case, each country should put own effort into environmental issues and seek sustainability.

Keywords: Environmental taxes, tax reform, sustainable development

Introduction

The issues of sustainable development may be raised and answered on the universal level. Any human is able to contribute to his or her living environment and the living environment of their descendants. Each human being must act in the way that does not harm future generations. Three key dimensions form the basis of sustainability: environmental, social, and economic. Starting with oneself and aiming to develop sustainability, one faces certain challenges that may be addressed using certain measures. Environmental taxes are one of such measures. They may be referred to as a fiscal instrument that helps regulate the detrimental environmental impact.

Majority of researchers (Murcott, 2003; Carson, 1962; Heinberg (2010); Ekins, 2012; Bey, 2001, Ciegis, 2009; Brink et al., 2014; Beurman et al., 2006; Ciuleviciene, Slavickiene, 2014 and others) have analysed the potential benefit of sustainability and environmental taxes and have suggested that introduction of environmental taxes is one of the best ways to reduce the environmental damage. The present environmental taxes and their impact do not present any particular effect on the economy. This is related to comparatively insignificant amounts of revenue generated by the environmental taxes that are insufficient to cover the costs of environmental protection.

Environmental taxes regulating the interplay between economy and environment are the instruments of fiscal policy. Revenue generated by these taxes is allocated to stimulation of the sustainable economy based on conservation of nature, more environmentally friendly production. Such taxes lead to reduction of pollution and stimulate sustainable development of the national economy. They also influence changes in the national tax structure, i.e. increase the tax base that does not distort the market (taxes on goods and services causing negative environmental impact) and reduce the tax base that distorts the market (personal income tax, corporate income tax, etc.).

Research object: environmental tax reforms in the EU countries.

Research aim: to evaluate the experience of environmental tax reforms in the EU countries.

The following *objectives* have been set out to achieve the research aim:

- To provide theoretical reasoning for the links between sustainable development and environmental tax reform;
- To evaluate the developments of environmental taxes in the EU countries, which have implemented the environmental tax reforms.

Methods used: scientific literature analysis and summarisation, systemic reasoning, graphic systematisation of statistical data, summarisation and comparison.

Links between Sustainable Development and Environmental Taxes

The principles of sustainable development were formulated in 1992 at the Earth Summit in Rio de Janeiro. Leaders of more than 170 nations acceded to the Rio Declaration and Agenda 21 declared at the Summit. Countries then developed their national strategies on sustainable development on the basis of these documents and documents endorsed later at the Johannesburg World Summit attended by national and government leaders. Sustainable development is the development path of a modern state and society. It is based on three key elements: environmental protection, economic and social welfare (the Ministry of Environment of the Republic of Lithuania, 2011).

H. Daly (1996), the U.S. economist, has stated that sustainable development is the development that is sustainable from a social perspective, where the overall economic growth does not violate the limits of the life sustaining system. Legislation of the Republic of Lithuania interprets sustainable development as a trade-off between environmental, economic, and social goals that enables the society to reach the universal welfare for the existing and coming generations without violating the permissible limits of environmental impact. According to R. Goodland, G. Ledec (1987), sustainable development is the economic development that brings economic and social benefits without any risk of declining benefit in future. R. Ciegis (2004) views sustainable development as an approach that implies continuous improvements of the present quality of life by using resources at lower intensity in order to ensure that the reserves of natural resources and other assets remain at the same or even greater level for the future generations. There is a multitude of various concepts defining sustainable development. The main ideology of sustainable development was formulated in a more comprehensive way for the first time in the UN Report of the World Commission on Environment and Development: Our Common Future in 1987. The UN report (1987) defines sustainable development as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". According to R. Ciegis, A. Dilius, A. Mikalauskiene (2014), it is not a coincidence that this definition of sustainable development is the most quoted definition and might be considered as more comprehensive than many other definitions. Fair allocation of natural resources both among different generations and among the people living in the first, second, and third world countries, as well as reaching a positive consensus between environmental, social, and economic dimensions of development form the core of his arguments. According to T. Razauskas (2009), the concept of sustainable development is the priority in discussions over future prospects.

Sustainable development is defined as one of the key goals of various policies and referred to as the indicator of effective implementation of the policy. Particular attention is put on meeting the needs of future generations. The presented definitions of sustainable development suggest three key dimensions: economic, social, and environmental. Report published by the OECD: Institutionalising Sustainable Development (2007) presents the interaction between these three factors in the form of matrix (Table 1):

Table 1. Interdependency Matrix of Sustainable Development

From/To	Economics	Social	Environment
Economics	Poverty Alleviation	Related Impacts	Related Impacts
Social	Related Impacts	Human Development	Related Impacts
Environment	Related Impacts	Related Impacts	Conserve Ecosystem

Source: http://browse.oecdbookshop.org/oecd/pdfs/product/0307041e.pdf

The matrix represented by Table 1 explains the interaction between three variables: implementation of the economic goal of poverty reduction would inevitably cause an economic effect on social environment and environmental protection. By analogy, in case of implementation of the social goal of improvement of people's development, the economic environment and environmental protection would be affected as well. Implementation of the goal of environmental protection, i.e. ecosystem conservation, would affect the economy and social environment. Hence, the matrix reflects close reciprocal relation between the three components, and the Table suggests that the goal under one component would certainly cause effect on other components.

With the basis of the sustainable development concept formed of three equivalent components, namely, environmental protection, economic development, and social development, various political decisions, formation of legal regulation, implementation of various policies must account for the combination of environmental, economic, and social aspects (Medeliene, Zvaigzdiniene, 2012).

The domains of three components forming the concept of sustainable development: environmental protection, economic development, and social development, may influence each other. Therefore, the environmental domain, i.e. the natural capital, may determine the production level attributed to the economic domain which, in turn, may influence the unemployment level, i.e. a variable of social domain. The environmental domain may also be affected, as the growing production level may lead to growing pollution and damage to the nature. Damage to the environment may also affect the residents' health and mortality, which is attributed to the social domain (Ciegis, Dilius, Mikalauskiene, 2014). A. Andrejevic, J. Djuran, S. Filipovic et al. (2013) have suggested that the definition of sustainable development is

most usually based on four pillars: economic, social, environmental, and institutional domains.

Environmental quality and economic growth are interrelated. It is recommended to analyse the two variables together. The variables may be grouped into two types: natural resources and pollutants. Pollution increases after economic growth, while resources are used for economic growth. There is an empirical relation between an increasing GDP per capita and environmental quality. Increase of the income is accompanied by increase in environmental damage, and the environmental quality starts to improve as soon as certain point has been reached. This relation may be depicted by the shape of the upside-down letter "U", in other words, the relation is depicted by the Kuznets curve (as cited in Grossman, Krueger (1991), Lopez (1994), Arrow et al. (1995)) (Ciegis, Dilius, 2012).

The question of whether or not the three components – natural environment, economics, and society – are indeed of equal importance have lately been asked in an increasing number of sources. Nature would survive without society or its economy, and in most cases, after the so called "anthropogenic pressure" had been eliminated, it would have been much easier for the nature. Society and economy, on the other hand, could not exist without nature or its resources (Juknys, 2012). The OECD report on Institutionalising Sustainable Development (2007) emphasizes that, in contrast to the approach of conventional development, in sustainable development, importance is placed not only on the economic components, but also on other two components, as each of the three is of equal importance and inseparable from sustainable development. Energy, transport, industry, housing, agriculture, tourism may be attributed to the dimension of economic development. The dimensions of environmental development may cover air, water, landscape and biological diversity, waste. Social dimension may cover employment, poverty, health, education, culture.

A critical leap in the development of relationship between natural environment and human occurred at the beginning of XIX century. More technologies (in particular, agricultural technologies) were created, the intensity of machinery use increased during that period, thus speeding up the rates of natural resource depletion and the processes of environmental degradation. Major projects that have generated huge social profit but not accounted at all for the natural environment and its condition at the end of their implementation have also contributed to the situation in this period. This period is often referred to as the Golden Age. Businessman W. Mullholand is considered to be one of its founding fathers, as his business was predominantly focused on economic growth without any consideration of the external effects, such as social factors and the condition of natural environment (Murcott, 2003).

Advocates of sustainable development were united on different scales, in different periods, and, in the four decades, have emphasized four different issues. One of such issues is referred to by the researchers as ecosystem degradation, loss of biological diversity, which has had indirect impact on the human health and welfare. This issue was raised for the first time in 1960, when industrial production and use of pesticides affected depletion of nature and extinction of animals (Carson, 1962).

R. Heinberg (2010) has formulated five axioms of sustainability: 1) any society will collapse, if it uses resources in an environmentally unfriendly manner; 2) population growth and/or growth in resource consumption cannot be continuous; 3) sustainability will be achieved, when renewable resources are used at a lower rate or at a rate that is equal to the rate of their replenishment; 4) sustainability will be achieved, when non-renewable resources are used at a declining rate or at a rate that is equal to the possible rate of depletion (the rate of depletion is defined as the amount being extracted and used during a specified time interval (usually a year) as a percentage of the amount left to extract); 5) sustainability requires that the harmful effect of substances introduced into the environment from human activities be minimized and recycled to be harmless to biosphere functions. The society should observe own actions within the agenda of each axiom and, where needed, to transform certain actions in the view towards sustainable lifestyle.

According to A. Medeliene, I. Zvaigzdiniene (2012), two key functions of the economic mechanism of environmental protection are emphasized:

1. The first function is related to ensuring rational use of natural resources and funding for environmental protection. In other words, it is related to proper planning, collection, allocation and use of funds that are necessary for protection of the natural environment, its individual objects, ensuring rational use, restoration and replenishment of natural resources.

2. The second function is related to promotion (motivation). Economic instruments must encourage the society, individual natural persons and legal entities to comply with the legal environmental requirements, fulfil their respective duties in relation to protection of environment or its individual components, rational use of natural resources as provided for by the legislation, and choose the method of the operations that is the safest and most favourable for the environment.

The following regulatory measures are recommended in order to sustainable development (as cited in Bemelmans-Videc, Rist, Vedung, 1997) (Jasinskas, Kazakevicius, 2008):

1) laws, norms, standards;

2) economic measures (taxes and subsidies);

3) information transfer.

Environmental taxes perform three functions: increase the budget, promote environmental protection, and cover the costs of environmental protection.

In general, the functions and goals of environmental taxes may be claimed to be related to the goals and principles of sustainable development, thus being an effective measure for promotion of sustainable development.

Key Idea behind the Environmental Tax Reform

Environmental taxes are an economic measure that not only promotes the approach against pollution, but also leads to accumulation of funds for implementation of environmental projects and compensation of the environmental damage. Nonetheless, it is difficult to make accurate calculations of the environmental impact and determine the optimal tax rate. Environmental taxes are considered to be too low to be influential in terms of sustainable economic development (cited as in Hajer, 1997) (Jasinskas, Kazakevicius, 2008).

Environmental tax reform is the national tax system reform implying transfer of the share of tax burden from regular taxes onto taxation of an environmentally harmful activity (Ekins, 2012). Economic mechanism of environmental protection may be construed as one of the examples of practical implementation of the sustainable development ideology. Although the subject of economic measures of environmental protection has been analysed in works by researchers in the field of economics, the Lithuanian legal doctrine provides a rather fragmentary review of these issues (Medeliene, Zvaigzdiniene, 2012).

Based on tangible prospects only, it may be claimed that the overall use of resources and energy should change. The change, however, cannot happen by means of technologies only. Practice shows that technological change leads to social or even political changes. Any new technology should be developed in the social, political, and economic context in order to assess its role in terms of sustainable development. This is related to the three-fold nature of sustainable development in terms of environmental quality: environmental quality, economic welfare, and social justice (as cited in Elkington, 1997) (Bey, 2001). Same as an environmental tax reform, environmental taxes may determine the environmental quality, have certain effect on the social issues, or even influence the national economy. Taxes may be used to ensure limited consumption of natural resources and the source of national funds for environmental protection and preservation.

A. C. Pigou, professor at Cambridge University, was the first to propose the method of correction of socially adverse consequences caused by external costs in 1920. He explained that market equilibrium required

returning to the optimal level and proposing introduction of the taxes that would enable the market to convert the "external" costs into a business company's internal costs. Such taxes are referred to by researchers as "Pigovian taxes" (Ciegis, 2009).

Environmental tax reform means changes in the national tax system, when tax burden shifts from the economic functions, such as labour force (personal income tax), capital (corporate income tax) and consumption (VAT and other indirect taxes) activity that poses risk to the environment and use of natural resources. These factors may be referred to as the "bads" (Brink, Illes, Nanni, Watkins, Withana, 2014).

Environmental tax reform and ecological tax reform are two interchangeable terms. Environmental tax reform leads to the increase of taxes on the use of natural resources, polluting products, thus reducing other taxes, in particular those related to employment. The key idea behind such transformation is that the tax burden must be placed on the "bads" rather than the "goods". Transition to a more appropriate tax system and with the respective signals in place, "double dividends" may be generated. "Double dividends" are the argument for subsequent reduction of energy consumption as well as pollution after an increase of energy taxes. Lower taxes related to labour force will reduce the employment-related pressure, thus contributing to lower unemployment rates (Beuerman, Clinch, Dresner, Dunne, 2006).

Environmental tax reform (ETR) is a reform of the national tax system, when tax burden is transferred on the environmentally detrimental factors, for example, labour that causes pollution. The key emphasis of an ETR is put on its ability to redirect the incentives to the areas, where human efforts and resourcefulness may bring the greatest economic benefit, thus protecting the environment and social justice (European Environment Agency, (1), 2011).

Environmental taxes may bring certain additional benefit by reduction of pollution, which depends on how the ETR reforms the budget revenue. Such additional benefits may be grouped into two categories (as cited in Hourcade, 1996) (Beuerman, Clinch, Dresner, Dunne, 2006):

1. Economic "double dividends" (reformation of revenue generated by carbon dioxide taxation by reducing the distorting taxes may have positive effect on economic growth, employment, technological development).

2. Environmental "double dividends" (reduction of carbon dioxide emissions may occur in parallel with reduction of pollution).

Environmental tax reform promotes an approach that seeks to minimize an environmentally detrimental activity and encourages the market to develop and spread new technologies. With the innovative economy in place in the countries of the European Union (EU), there are possibilities for

new instruments and processes to be exported on a global scale under the eco-innovation initiative. ETR is an effective environmental instrument that may enable implementation of CO2 emission norms in the EU. The applied models provide almost identical outcomes related to labour efficiency and efficiency of the resource use. This is the signal that the ETR that is in line with the emission norm would lead to increase in the employment rates, reduction in the use of resources, and a minor effect on the gross domestic product (GDP) (European Environment Agency, (1), 2011).

The ETR is comprised of two elements. The first element is related to the resulting reluctance or complete abandonment of an environmentally detrimental activity by making it a costly undertaking. This is a desirable effect for a number of reasons: environmental damage, pollution that may affect human health and quality of life are reduced, natural resources and systems that make the society and economy stronger in present and in future are preserved.

The second element is as important as the first one. The second element covers allocation of revenue generated by the increased environmental taxes and the use of the income for positive economic and social results, for example, for improving the employment rates and motivation to work. Reformation of income carries particular importance in relation to the tax reform, as it increases the costs (e.g., product costs) when tax burden is transferred. For example, such items of necessity as energy and food may account for greater share of consumption expenses at less affluent households, which means that increase of energy and food prices may have disproportionately adverse effect on different households. By analogy, reduction of income taxes would be more beneficial to the employed share of population than to the unemployed or retired residents.

In fact, an ETR may cause different types of effects, and each of them may be subject to unequal distribution within the society. This covers direct results of increasing taxes (e.g., higher prices on certain goods); economic effects of the ETR on a wider scaler (e.g., creation of workplaces or inflation); and the environmental effect of ETR (e.g., cleaner environment) (European Environment Agency, (2), 2011).

Environmental policy measures are often defined as obstacles to economic activity. Nonetheless, a study by the Organisation for Economic Co-operation and Development has demonstrated that the opposite effect is also possible. Environmental taxes may be beneficial as creativity boosters towards more prosperous economy. Ecological taxes may also encourage innovations. This conclusion has been published in the study conducted by the Organisation for Economic Co-operation and Development (European Environment Agency, (1), 2011).

One of the aims of ETR policy formation may be minimization of regressive consequences, e.g., not accounting for energy consumption during a certain period in order to address households with minimum income (for example, overnight storage refrigerators were exempt from taxation during the night time as part of the ETR policy in Germany); setting higher tax rate for consumers who consume more energy (based on the premise that higher income household consumes more energy than households earning less income); subsidising the measures to allow households earning less income to use less energy or use it in a more efficient manner (as cited in Ekins, Dresner, 2004); or redistributing the system of benefits to the households earning lower income (Barton, Blobel, Ekins, Pollitt, 2011).

Ecological taxes may change the consumers' behaviour by encouraging the consumers to redirect their consumption towards less taxable goods. This not only may contribute to the goals of environmental protection, but also increase the revenue. Ecological taxes have less negative effect on the gross domestic product (GDP) compared to other types of taxes, such as direct taxes (e.g., personal income tax) or indirect taxes (e.g., value added tax). This important feature of ecological taxes implies that countries could apply such taxes by either supporting fiscal consolidation or reducing other taxes (European Union, 2013).

It has become clear that environmental taxes may have negative effect as well. These taxes may reduce competitive ability of national industries. Negative effect of taxes occurs when polluting industrial companies move to the countries that exercise less strict environmental requirements rather than implementing innovations to reduce the pollution. A country that has introduced higher taxes and implemented the "green tax reform" may not reduce the pollution it incurs, if a polluting company moves to a neighbouring country, and the taxes required to perform the necessary functions are not collected (having in mind that other taxes have been reduced). For the reasons explained above and, in general, seeking to improve their competitive ability, countries are reluctant to apply a "stick-only" principle to polluters, but provide support to and promote the competitiveness of ecologically more friendly entities that do not cause environmental pollution (as cited in Porter, Linde, 1995) (Jasinskas, Kazakevicius, 2008).

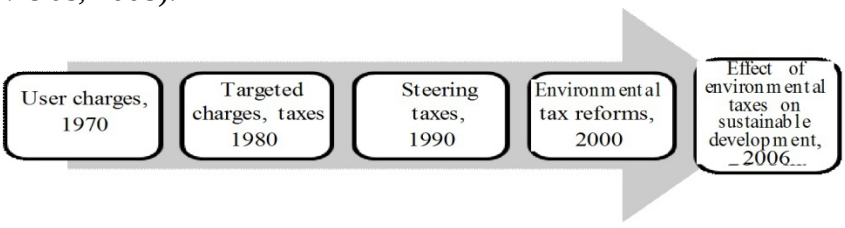


Fig. 1. Timeline of evolution of environmental taxes
Source: Ciuleviciene, Slavickiene (2014) Ekologiniu mokesciu reiksme darniam Lietuvos vystymuisi, p. 313.

The beginning of evolution of environmental taxes (Fig. 1) was associated with user charges. Charges were to be paid by people using certain environmental products or services (e.g., wastewater treatment). The concept of targeted charges/taxes was used for the first time in 1980, when revenue generated by the charges were spent on the environmental goals rather than on supply of services to an individual (e.g., revenue targeted to fund recycling of ecologically harmful products or services) (European Environment Agency, 2000).

Steering taxes, i.e. environmental taxes are aimed at taxation of the environmental damage without any detrimental market effect in order to collect as much revenue as possible into the national budget. They have been replaced by the environmental tax reform. This reform became effective in the mid XX century. It was determined at that time that there was a possibility to collect more ecological taxes and reduce other existing taxes on social security, business, etc. Environmental taxes were referred to by the EU strategy on sustainable development updated in 2006 as one of the economic measures to promote sustainable development. As a result, another stage of the environmental tax evolution has been identified (Ciuleviciene, Slavickiene, 2014).

D. Fullerton, A. Leicester and S. Smith (2010) have identified the following types of environmental taxes:

1) fixed emission taxes;
2) non-fixed emission taxes;
3) complex taxes.

Fixed emission taxes form a group of measures based on market and covering tax payment directly related to measurable or fixed pollution amounts. Established precise environmental taxes may be aimed at implementing political environmental goals. Polluters' tax base increases along with increasing pollution, and the polluters are subject to an additional tax proportionate to the increase in pollution. Polluters may reduce the pollution taxes by cutting down on the pollution.

Non-fixed emission taxes. Goods and services related to environmental damage may be subject to taxation at a higher rate in the processes of consumption or production (e.g., carbon taxes, taxes on batteries and fertilizers), while goods that are considered to be less environmentally damaging may enjoy a lower tax rate (e.g., preferable taxes on unleaded petrol). An alternative to direct emission taxation is establishment or alteration of an indirect tax rate (corporate profit, excise, or value added taxes) or introduction of environmental taxes that may be based on the sale of polluting goods or production costs.

Complex taxes. Application of emission taxes under authorizations may help reduce administrative costs by direct calculations and

measurements of pollution level. Nonetheless, this solution does not always achieve the most effective model of pollution reduction. Indirect use of taxes, in some cases, may lead to more effective promotion of environmental protection. Excise on various goods and subsidies on ecological technologies can ensure the required efficiency and change. Taxes may also be more effective when applied in combination rather than individually. Combination of several taxes, for example, fuel tax, tax on purchase of a new vehicle, tax on old vehicles and tax on vehicles inefficient in terms of fuel consumption and causing high level of pollution may achieve a result approximate to the general tax on pollution caused by vehicles that is virtually impossible to implement.

Environmental taxes may be grouped into four different types:

1) energy taxes;
2) pollution taxes;
3) resource taxes;
4) transport taxes.

Energy taxes cover the taxes on energy products used for transport and stationary purposes. The key taxable energy resources are petrol and diesel, natural gas, fuel oil, electricity, carbon, and all other products that cause negative external effect and are unacceptable in terms of ecology. These are the taxes on products that pollute the environment during the period of their validity or production. The main advantage of energy taxes is they become a form of taxation of the present consumption (value added tax, excise tax, and other forms of general sales taxes). As a result, this form of taxation is more effective and has lower administration costs, which makes it easier and cheaper to implement this type of taxation (He, Yu, 2012).

According to B. Benoit (2000), *pollution taxes* are related to taxes on measurable or calculable gases and harmful substances emitted into water or air. These taxes regulate the pollution by solid waste or acoustic pollution. An exception applies to CO2 tax that is attributed to energy taxes. The type of taxation considered is based on measurement of quality and quantity of the matter of emitted pollutants in harmful emissions. This is the most efficient in terms of ecology way to directly apply taxes to harmful source of pollutants. Nonetheless, in most cases, harmful emissions are difficult to measure.

Resource taxes are related to the use of water, forests, and mineral resources. Taxes on petroleum and gas mining are not included into this group of taxes, as the former may be calculated on the basis of consumption costs and have a different effect compared to other environmental taxes.

Transport taxes cover the taxes related to property and use of motor vehicles. Taxes on transport equipment and transport-related services are also included as one of the fiscal instruments. This tax may be directed

towards import of sale of vehicles or equipment (e.g., taxes related to engine capacity or amount of emissions by a certain vehicle) and may be recalculated on an annual basis. This type of taxation includes taxes on petrol, diesel, and other types of fuel used in transportation (Andrejevic, Djuran, Filipovic et al., 2013).

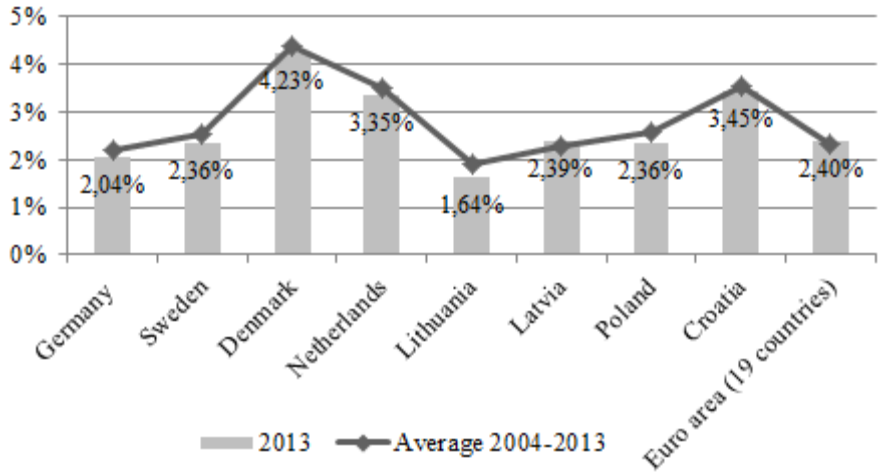
In view of such distribution of environmental taxes on energy, pollution, resources, and transport, the statistical analysis of environmental taxes is provided further.

Statistical Insights into Evolution of Environmental Taxes in the EU Countries

Environmental taxes may be viewed as one of the economic regulation instruments already implemented by majority of the old member countries of the European Union; a tax reform transferring a share of labour and/or income taxes on the environmental aspects. Situation analysis of environmental taxes is relevant for Lithuania and other members of the European Union which have not yet implemented the environmental tax reform.

Improvement of environmental taxes is implemented through environmental tax reforms. Implementation of the environmental tax reform was launched in most European countries at a larger or smaller scale back in 1990 (as cited in Ekins, 2012). In 1990, this tax reform was implemented by Sweden, in 1994 – Denmark, 1996 – the Netherlands, 1997 – Finland, 1999 – Germany, Italy, and Norway, in 1996 – the United Kingdom with later amendment in 2001 (Ciuleviciene, 2014).

Environmental damage, promotion of sustainable economy, protection of the nature vary from country to country. This depends on the possible pace of implementation of the protection against harmful effect. Eight members of the European Union have been chosen for the statistical data analysis. Four of the analysed countries – Germany, Sweden, Denmark, and the Netherlands – have already implemented the environmental tax reform. Other four countries chosen for the analysis – Lithuania, Latvia, Poland, and Croatia. Lithuania, Poland, and Latvia that have acceded to the EU in 2004 have not implemented the environmental tax reform yet, while Croatia has become a member of the EU quite recently, in 2013. In general, the choice of the countries for the analysis may be claimed to have been determined by the experience and establishment of the position in the EU, as well as implementation of the environmental tax reform.



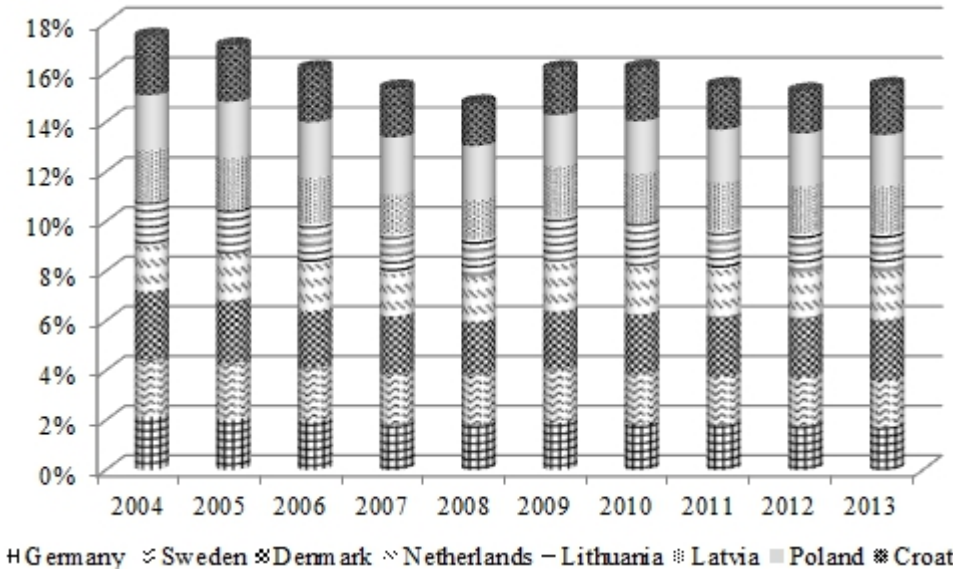
Source: developed by the authors according to the data presented in Eurostat database, http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

Fig. 2. Total share of environmental taxes in GDP (%)

Fig. 2 reflects the total percentage share of environmental taxes in GDP in Germany, Sweden, Denmark, the Netherlands, Lithuania, Latvia, Poland, and Croatia. It is evident that the countries which have implemented the environmental tax reform (Germany, Sweden, Denmark, the Netherlands), collect more environmental taxes than the countries (Lithuania, Latvia, Poland, Croatia) that have not implemented the reform.

The share of environmental taxes is the greatest, i.e. 4.23 %, in the German GDP. In Lithuania, the share of environmental taxes in the GDP is the smallest, i.e. 1.64 %. Croatia is notable for a rather high ratio of environmental taxes to GDP – 3.45 %. This is an indeed positive indicator for a country that has not implemented the environmental tax reform. The figure presents the total ratio of environmental taxes to GDP in the period from 2004 to 2013. Total average of the ratio of environmental taxes to GDP in the EU (19) is 2.4 %. The countries have demonstrated rather targeted compliance with the taxes provided for by the reform since 2004.

As mentioned above, *energy taxes* are one of the types of environmental taxes. Fig. 3 shows a percentage share of energy taxes in GDP in Germany, Sweden, Denmark, the Netherlands, Lithuania, Latvia, Poland, and Croatia.



Source: developed by the authors according to the data in Eurostat database, http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

Fig. 3. Share of energy taxes in GDP of the EU countries (%)

Fig. 3 shows that the greatest proportion of energy taxes in GDP in 2013 was registered in Denmark at 2.43 %. Nonetheless, the indicator was lower in 2013 compared to 2004 by 0.34 percentage point. Poland is among the countries applying the highest energy taxes accounting for 2.09 % of GDP in 2013. Nonetheless, the indicator was lower in 2013 compared to 2004 by 0.13 percentage point. Croatia stays abreast with the two countries mentioned above, as the percentage share of the collected energy taxes in GDP was 2.01 % in 2013. Again, compared to 2004, the indicator was lower by 0.38 percentage point in 2013. This decline is somewhat similar to the change in the share of the Sweden's energy taxes in GDP in 2013 by 0.39 percentage point compared to 2004. As Fig. 3 has suggested, the smallest percentage share of the collected energy taxes in GDP has been registered in Lithuania, where the share was 1.54 % in 2013. Compared to 2004, the share of energy taxes in Lithuania was smaller by 0.29 percentage point in 2013. In Germany, energy taxes accounted for 1.7 % in 2013, i.e. were lower by 0.43 percentage point compared to 2004. In the Netherlands, the percentage share of energy taxes in GDP in 2013 was 1.96 %, i.e. higher by 0.14 percentage point compared to 2004. In Latvia, energy taxes accounted for 1.87 % of the GDP in 2013, which was lower by 0.16 percentage point compared to 2014.

In general, the percentage shares of energy taxes in the GDPs of the analysed countries suggest that Denmark collects the biggest share of energy taxes. Latvia collects the smallest amount of energy taxes. The percentage share of energy taxes in the GDP is not as high as the share collected by

transport taxes both in the countries that have implemented the environmental tax reform and in the countries that have not implemented the reform. Germany is the 17th in the EU rating of energy taxes in the GDP, Sweden – the 11th, Denmark – the 6th, the Netherlands – the 12th, Lithuania – the 23rd, Latvia – the 13th, Poland – the 9th, Croatia – the 18th (European Union, 2014).

Fig. 4 represents the distribution of *transport taxes* in relation to GDP in each of the analysed countries.

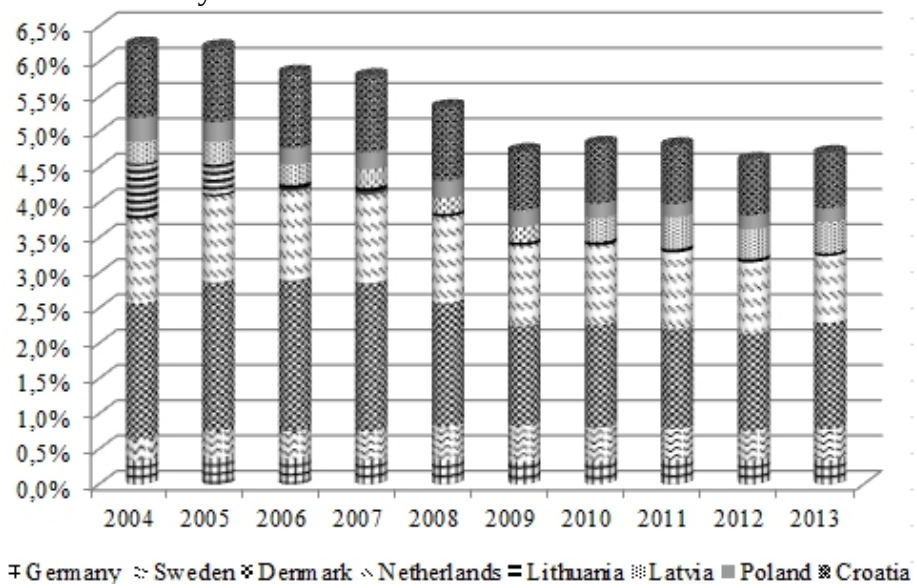


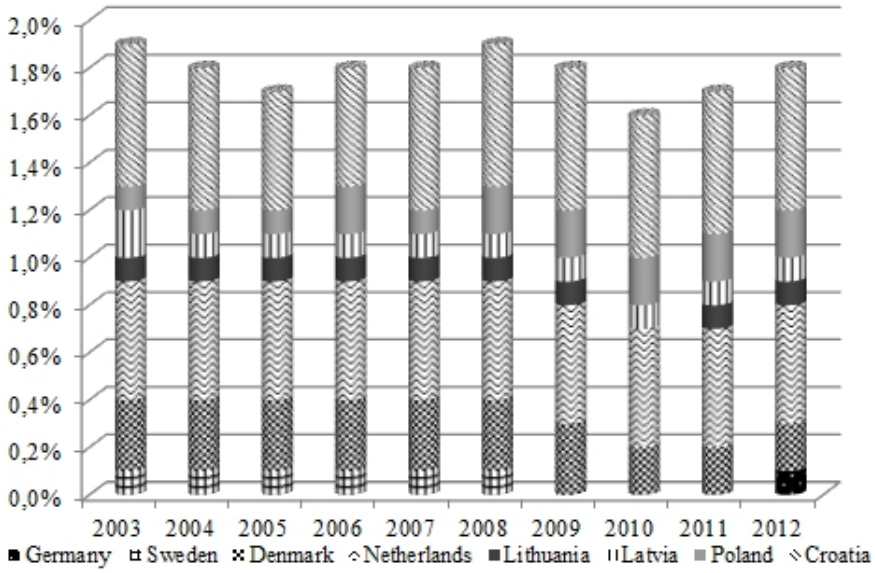
Fig. 4. Share of transport taxes in the GDP of the EU countries (%)

Source: developed by the authors according to the data in Eurostat database, http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

Fig. 4 clearly shows that Denmark applies the highest transport taxes among the analysed countries. Denmark's taxes accounted for 1.51 % of the GDP in 2013. Transport taxes in Germany reduced by 0.41 percentage point in 2013 compared to 2004. The figure shows that transport taxes applied by the Netherlands also account for a relatively large share in the GDP. Nonetheless, the share was lower by 0.25 percentage point in 2013 compared to 2004. Compared to other countries, transport taxes applied by the Netherlands are not the lowest as well. In 2013, transport taxes accounted for 0.8 % of the GDP. Nonetheless, same as in the countries analysed above, the share was lower by 0.25 percentage point in 2013 compared to 2004. Transport tax rates in Sweden are not as high as in Denmark or the Netherlands, although Sweden has implemented the environmental tax reform. Of all the countries, Sweden applies one of the most stable transport taxes. Compared to 2004, the ratio of transport taxes to GDP in Sweden remained without any changes in 2013, i.e. amounted to 0.34 %. The ratio of

transport taxes to GDP in the depicted countries that have not implemented the environmental tax reform is significantly different from the ratio in the countries that have implemented the reform. In Lithuania, transport taxes reduced considerably in 2013 compared to 2004 by 0.74 percentage point. Transport taxes applied in Latvia are higher than in Lithuania. Transport taxes applied by Latvia in 2013 were higher than in 2004 by 0.13 percentage point. In contrast, transport taxes applied in Poland reduced by 0.15 percentage point. The ratio of Croatian transport taxes to GDP is rather surprising: the taxes accounted for 0.8 % in 2013 and were higher than in Germany, Sweden or the Netherlands. According to the statistical data provided by the European Union (2014) on the proportion of transport taxes to the GDP, Germany is rated at the 18th place, Sweden – the 14th, Denmark – the 1st, the Netherland – the 3rd, Lithuania – the 28th, Latvia – the 15th, Poland – the 23rd, Croatia – the 6th place.

Fig. 5 presents the share of *pollution and resource* taxes in the GDP of Germany, Sweden, Denmark, the Netherlands, Lithuania, Latvia, Poland, and Croatia.



Source: developed by the authors according to the European Union, Taxation trends in the European Union (2014)

Fig. 5. Share of pollution and resource taxes in the GDP of the EU countries (%)

Fig. 5 shows that Croatia, the Netherlands, and Denmark are among the leading countries by the percentage share of pollution and resource taxes in the GDP. The largest amount of revenue is generated by the taxes in Croatia, and the share of the taxes in the GDP amounted to 0.6 % in 2013. The Netherlands were just slightly behind Croatia – 0.5 %. The share in Denmark was 0.2 % in 2013, i.e. lower by 0.1 percentage point compared to

2004. Pollution and resource taxes collected in Poland in 2013 made up the share of 0.2 % in the GDP. Lithuania, Latvia, Germany collected 0.1 % of the GDP in 2013. The smallest share of pollution and resource taxes is collected by Sweden. It did not collect anything, i.e. 0 %, before 2012, while in 2013, the share of the collected taxes in the GDP amounted to 1 %. By the EU pollution and resource tax rating, Germany is the 14th, Denmark – the 6th, the Netherlands – the 2nd, Lithuania – the 17th, Latvia – the 13th, Poland – the 8th, Croatia – the 1st, while Sweden remains the 22nd (European Union, 2014).

Environmental taxes are of key importance as a policy instrument that benefits improvement of the environmental quality by increase of taxes. This is an effective way to protect the environment, at the same time increasing the economic efficiency. On the other hand, the environmental tax reforms continue to be of rather limited effect. Introduction and administration of environmental taxes is a complex task that often does not bring any economic benefit to the country.

Conclusion

1. Sustainable development is ensured by applying environmental taxes as one of the economic measures. The key idea behind environmental tax reform is transfer of tax burden from a positive (e.g., labour taxes, etc.) taxable object to a negative (e.g., pollution, natural resource depletion, waste) object.

2. Environmental tax reforms have been implemented intensively since 1990. Finland, Sweden, Denmark, the Netherlands, Great Britain, Germany, and other countries have already implemented the reforms or are in the process of their implementation.

3. Countries that have implemented the environmental tax reforms have shown the greatest increase in the share of transport taxes in GDP.

4. Environmental taxes are an important instrument of environmental policy that brings benefit in terms of improvement of environmental quality by increase of taxes. This is an effective way to protect the environment and, at the same time, increase the economic efficiency in collecting state budget revenue. On the other hand, the environmental tax reforms continue to be of rather limited effect. Introduction and administration of environmental taxes is a complex task that often does not bring any economic benefit to the country.

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