

COMPARATIVE ASSESMENT OF ENVIRONMENTAL TAXES IN THE EUROPEAN UNION STATES

Astrida Slavickiene, Prof. Dr.
Vida Ciuleviciene, Assoc. Prof. Dr.
Aleksandras Stulginskis University, Lithuania

Abstract

Environmental taxes are tools of economic regulation. The analysis of environmental tax situation shows that most of the elder European Union (ES-15) states have already carried out the tax reform, whereby part of labour and/ or revenue (profit) taxes is shifted to environmental taxes. There are very few research papers which usually analyze separate taxes or the situation in a concrete state, but not in their group. Such research papers do not reflect the whole tax situation and there is no comparative analysis and evaluation. The object of the research is to identify the significance of environmental taxes and tendencies of development and evaluate the influence of environmental tax reform on the shift of tax burden. The period of research is 1999-2012, while some ratios are analyzed for the period of 1995-2012. The analysis of the dynamics and structure of environmental taxes in EU-15 and EU-12 countries shows that environmental taxes account for a similar percentage of GDP in both EU-15 and EU-12 states and their share in tax revenue is significant. The revenue of environmental taxes have an increasing tendency and the growth rate in the EU-15 and EU-12 countries equalized. Different tendencies in the structure of environmental taxes may be observed in EU-15 and EU-12 states. The results of environmental tax reform show that the burden of labour tax load reduces, whereas environmental tax load increases.

Keywords: Environmental economics, state policy, environmental taxes

Introduction

The environment is affected by various fiscal measures, such as environmental taxes. The improvement of environmental taxes is achieved through environmental tax reforms. In many European states environmental tax reform was started on a larger or smaller scale in 1990 (Ekins et al., 2012). Sweden carried out this tax reform in 1990, Denmark in 1994, the

Netherlands in 1996, Finland in 1997, Germany, Italy and Norway in 1999, the United Kingdom in 1996 and 2001. The question is how the reform of environmental taxes can influence the redistribution of tax burden among labour and other taxes. This issue is important for all the states: for those which have already carried out the reform, and those which are ready to carry it out (Heine et al., 2012). The results of scientific research (Oueslati, 2013) show that in Sweden, Finland, Germany, the Netherlands, the United Kingdom, Italy, Norway, which have already carried out the environmental tax reform, the revenue from this tax share in the total collected tax burden increased by 2 per cent, and their share in GDP- increased in some countries even by 9 per cent. Thus, well-prepared tools of fiscal policy encourage greener economy.

The relevance of research is highlighted by the new approach of the leaders of world countries and the EU states towards environmental taxes. Concerning the transition towards eco-efficient economy, on 4-5 November 2009 The European Union Social Committee agrees with Sweden that economic crisis means both threat and an opportunity to refuse usual tax model and to develop a tax strategy, efficient from the ecological point of view, which is useful for everyone and will help to revive economy, increase competitiveness and create new jobs, and at the same time to transform the energy base and reduce emissions substantially.

In 2012 United Nations Conference on Sustainable Development „Rio+20“ took place in Rio de Janeiro, Brazil. It was agreed that although many countries of the world are of different levels of development, the important issue is to find appropriate policy of sustainable development, including green economy policies. This measure should provide mutual opportunities for all countries to develop. It was found that while introducing green economy, policy-making options can be offered, except for rigid rules. Thus, green economy means not only the protection of nature from the rapidity of economic processes, but also helps to stop poverty, to improve sustainable development, to encourage social contribution, to increase public welfare and develop appropriate jobs for people. Environmental taxes are tools to introduce green economy.

Foreign scientific publications have paid special attention recently to environmental and green taxes. Theoretical and practical issues on environmental taxes and taxation were analyzed by J. Albrecht (2006), A. Bruvold (2009), P. Ekins, S. Speck (2000), E. Fernandez et al. (2011), D. Fullerton et al. (2010), G. Gloom et al. (2008), D. Heine et al. (2012), J. A. Hoerner, B. Bosquet (2001), B. Bosquet (2000), M. Nakada (2010), W. Oueslati (2013) and others. In J. Albrecht' s (2006) view, environmental taxes can create markets for environment-friendly products and new technologies. This author notes that most European Union states have old

environmental tax traditions. However, recent data shows that the revenue from "green" taxes share in GDP is slightly decreasing in EU-15 countries. A. Bruvoll (2009) claims that the aim of environmental taxes is to adjust the market. In her view, the calculation of environmental taxes and the determination of their influence extent is complicated because various international institutions, such as the Statistical Office of the European Union, the Organisation for Economic Co-operation and Development and the European Environment Agency calculate all the taxes related with energetics, transport and pollution. P. Ekins (1999) analyzed environmental taxes according to their types and identified the trends of development.

E. Fernandez et al. (2011) analyzed the effects of macroeconomics on the reform of environmental taxes. Similar research was done by W. Oueslati (2013). His model allows to simulate various effects of environmental taxes and determine their short- and long-term influence on human welfare. The aim of research by D. Fullerton et al. (2010) was to determine the environmental tax considering carbon footprint. D. Heine et al. (2012) suggest taxing fossil fuels and relate it with further fuel use emissions; to relate fuel tax with transport congestions and other external factors. In other words, harmonize pollution contents with end-users. B. Bosquet (2000) provides the concept of environmental tax reform related with the shift of tax burden from labour, revenue and profit taxation to pollution, resources and waste tax. The issues of tax burden shift were thoroughly examined by D. Krechowicz (2011). E. Fernandez et al. (2011), M. Nakada (2010) and other research papers provide numerous combinations of tax reform structure and suggestions how to achieve double benefit.

Environmental tax reforms and their results in separate countries were analyzed by J. A. Hoerner, B. Bosquet (2001), G. Vandille (2005), P. Ekins (1999 ir 2000) and other researchers. J. A. Hoerner, B. Bosquet (2001), G. Vandille (2005), used the information on Environmental accounts and carried out the analysis of environmental tax development in Belgium. They made evaluations of environmental taxes in this state and compared them with the EU average. The study revealed a true situation who actually pay certain environmental taxes in Belgium according to their types and economic activity, and identified negative correlation between the environmental taxes paid and investment. When an energy tax was introduced in Belgium, social insurance contributions paid by employees were reduced by 1.5 per cent. In other words, the tax burden was transferred. According to M. S. Andersen et al. (2011), when the reform of environmental taxes was carried out in Italy in 1999, some of the compulsory health insurance contributions were eliminated, when the rates were reduced from 46.4 to 34.1 per cent.

T. Barker et al. (2007) simulate environmental taxes in Germany and the United Kingdom using two different econometric models: E3ME and GINFORS. In 2002 S. Bach et al simulated German revenue tax reforms together with environmental tax reforms. According to them, the environmental tax reform in Germany increased the number of jobs by 250,000 and reduced the CO₂ emission from 2 to 2.5 percent. J. Kloka et al. (2006) discuss the results of environmental tax reform in Denmark, analyze obstacles to the implementation of reform and develop further tendencies of tax reform. Advantages and disadvantages of environmental tax reform in EU are analyzed by A. Slavickiene, V. Ciuleviciene (2013).

International organisations pay substantial attention to environmental taxes and their reforms. OECD (Taxation, Innovation ..., 2010) prepared a study which examines and summarizes the results of "green" tax reforms in every OECD country – Finland, Norway, Sweden, Denmark, the Netherlands, France, Germany, Italy and Switzerland. The study also evaluates the benefits of environmental taxes and reveals the effects related with double dividends theory. This theory claims that environmental taxes provide double dividend: 1) the benefit is received when the taxation of environmentally harmful material is increased and environment- friendly material and technologies are developed; 2) the revenue received from environmental taxes may be used to reduce labour and revenue taxation. Double dividend is also considered the advantage of environmental taxes by other researchers (G. Gloom et al., 2008).

Back in 2001, when the European Commission, OECD, International Energy Agency and individual experts prepared recommendations how environmental taxes should be developed in countries and what market tools should be used for the environmental purposes (EU Environmental ..., 2005). For analysis purposes environmental taxes are classified into four groups: energy taxes, transport taxes, pollution taxes and resources taxes. However, most often the third and fourth groups are merged into one (Environmental taxes ..., 2013; EU Environmental ..., 2005).

In EU-15 and EU-12 member states there are no comparative evaluations of environmental taxes. Most of the EU-15 states have already carried out this reform and their experience may be of great value for the EU-12 states which are now getting ready or starting to introduce these reforms.

The object of the research – environmental taxes.

The aim of the research – to identify the significance and trends of development of environmental taxes and evaluate the impact of environmental tax reform on the shift of tax burden.

The method of the research. In order to carry out the research, the analysis and synthesis of scientific literature was used. The EU member states are classified into two groups: older (EU-15) and newer (EU-12). The research does not include Croatia, which joined the EU in 2013. Older (EU-15) countries: Ireland, Austria, Belgium, Denmark, Greece, Spain, Italy, The United Kingdom, Luxembourg, the Netherlands, Portugal, France, Finland, Sweden, Germany. Newer (EU-12) countries: Bulgaria, the Czech Republic, Estonia, Cyprus, Latvia, Poland, Lithuania, Malta, Romania, Slovenia, Slovakia and Hungary, which joined the EU during the period of 2004-2007.

In order to achieve a more objective evaluation, the period chosen for the research is long, fourteen years –1999-2012, i.e. since the EU members introduced the euro. Some ratios are analyzed from the period of 1995-2012. Only Hungary's figures are analyzed from the period of 1995-2011, because the figures of 2012 are not provided. The research uses environmental accounts indicators, as they best illustrate the situation. The research uses a definition of environmental taxes provided by Eurostat, which is applied for all the EU member states to carry out comparative evaluations, to analyze the tax structure, dynamics, tax base, revenue, etc. (Environmental taxes ..., 2013). In order to analyze the structure and changes of environmental taxes, the definition by Eurostat is used (Taxation trends ..., 2013) , according to which environmental taxes are defined as taxes which are applied for negative impact on the environment and natural resources, especially non-renewable resources. Some researchers, however, apply other classifications. L.M. Phil et al. (2010) classifies environmental taxes into two groups according to their impact on environment: 1) taxes according to the level of direct polluting emission – CO₂; for instance, the taxation of plastic bags, etc. 2) taxes according to indirect connection between taxation and the environment, for instance, fuel taxation.

In order to evaluate the trends of development of environmental taxes, the following indicators were analyzed: the total amount of environmental taxes according to the countries and their groups, for million EUR; environmental tax share in gross domestic product (GDP) according to the countries and their groups; percentage; environmental tax share in total tax and social contribution amount, according to the countries and their groups; percentage; the structure of environmental taxes according to the main types: energy, transport, pollution/ resource taxes; percentage.

In order to evaluate the trends of development of environmental tax empirically, various statistical methods were applied. For the generalization of research results, a graphic method and logical analysis were used.

The results of the research

Environmental taxes make a significant share of revenue, collected from taxes. They account for a substantial part of the country's GDP. In 1999 environmental taxes accounted for 3.3 per cent of GDP in the EU-15 countries, and 2.8 per cent of GDP in the EU-12 countries. It can be said that at the beginning of the period of research the share of environmental taxes in GDP in older EU countries was by 0.5 percentage point higher than in newer EU states. The largest share of environmental taxes in GDP was in Denmark (5.2 percent) and the Netherlands (3.8 per cent), i.e. in those states where the environmental tax reform was carried out. Whereas the smallest share was in Germany (2.3 per cent), which was the first to introduce the reform of environmental taxes, and Spain (2.3 per cent). However, we must take into consideration the fact that East and West German reunification may have influenced the indicators. Speaking about the EU-12 countries, the largest share of environmental tax in GDP was in Slovenia (4.2 per cent) and Malta (3.9 per cent), the smallest – in Estonia (1.7 per cent), and Slovakia (2.0 per cent).

In 2012, in the EU-15 countries the environmental tax share accounted for 3 per cent of GDP, whereas in EU-12 countries – 2.6 per cent. The tendencies of change are similar: in the EU countries the share of environmental taxes decreased by 0.7 percentage point and in the EU-12 – by 0.3 percentage point. In all the EU-15 countries, except for Austria, environmental tax share in GDP decreased. Whereas in the EU-12 countries there is no one tendency: the most significant increase was in Estonia (1.1 percentage point), and the greatest decrease – in Romania (2.0 percentage point) and Lithuania (1.3 percentage point) (Figure 1).

Significant correlation can be observed between economics and ecology: high quality ecology serves many economic activities to create added value and jobs. According to the Environmental policy review of 2007 (Environment Policy ..., 2007) , in 2006 alone, the total turnover of European economics, related with environmental taxes, was about 405 billion EUR. Over four billion (4.4 bn) jobs were created, 1.8 billion of which – in environmental protection and management areas. Revenue from environmental taxes slightly decreased during the period of 2004-2008, but since 2009, with the recovery of economics, started increasing again.

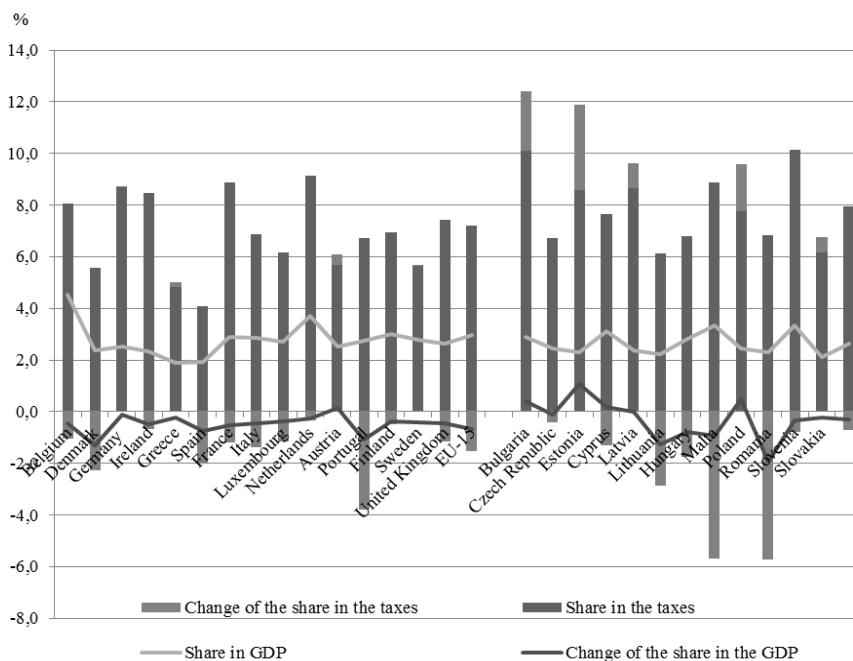


Figure 1. Environmental tax share in GDP and total revenues and social contributions during the period of 1999-2012, per cent

The scope of environmental taxes was influenced by the global economic crisis in 2008. It is also noted in other research (Taxation trends ..., 2013; Steps towards ..., 2013), that the crisis influenced smaller revenue collected from taxes. Compared with 1999, in 2012 EU-15 states the total amount of revenues from environmental taxes increased by 55,5 billion EUR, in other words, 4 billion EUR annually. In 2012 the total revenue from environmental taxes accounted for 124.1 per cent of 1999 level; while the average annual increase is 1.7 per cent. One per cent of the growth rate generates substantial amount of revenue, i.e. about 2.6 billion EUR. This increase was achieved in all the EU-15 states, except for Portugal, where the revenue from environmental taxes decreased during the period analyzed. Higher growth rate was achieved in EU-12 states, where the revenue from environmental taxes increased by 11.8 billion EUR (2.2 times) or 903 million EUR (6.2 per cent) annually. This was determined by the increased amount of revenue from the environmental taxes in Estonia (13.7 per cent), Bulgaria (10,7 per cent), Slovakia (9,5 per cent). According the European Commission since 2009 there have been hardly any differences of change tendencies of environmental tax revenue between the EU-15 and the EU-12 countries (Taxation trends ..., 2013).

In the EU-15 countries revenue from environmental taxes were more dynamic than in the EU-12 countries during the period analyzed. This was largely determined by the introduction of environmental tax reform.

Environmental taxes account for a substantial share in general tax revenues and in their redistribution. During the period of 1999-2012, in the EU-15 countries environmental taxes accounted for 7.5 per cent on average, and in the EU-12 countries, 8.1 per cent respectively, in the total amount of taxes and contributions. The significance of environmental taxes and the share increase is obvious in some of the EU-12 countries when a longer period- 1995-2011 is analyzed. In Estonia from 2.7 to 8.6 per cent., (+5.9 percentage point), in Latvia from 3.2 to 8.9 (5.7 percentage point), in Bulgaria from 5.9 to 10.5 (4.6 percentage point), in Poland from 4.9 to 7.9 (3.0 percentage point). This growth was determined by the rapid increase of pollution tax. During this period, in the EU-15 countries pollution taxes increased by 4.9 per cent, and in the EU -12 countries by 5.9 per cent annually. In other states, however, including Lithuania, the share of environmental taxes decreased from 6.8 to 6.2 (by 0.6 percentage point), in Malta from 11.7 to 9.6 (by 2.1 percentage point), in Cyprus from 10.7 to 8.2 (by 2.5 percentage point).

A significant increase of energy taxes is noticed in the structure of environmental taxes: in the EU-12 countries – even by 6.5 per cent annually on average. The share in environmental taxes also increased by 3.1 percentage point, while in the EU-15 countries the share of these taxes decreased by 1.8 percentage point. In the EU-15 countries energy taxes increased less rapidly – by 1.5 per cent. The rate increase of transport taxes accounted for 1.9 per cent in the EU-15 states and even 3.8 per cent in the EU-12 states, respectively, on average, annually. An interesting fact to observe is that during the period of 1999-2012, in the EU-12 states the share of transport taxes in environmental taxes decreased by almost 3 percentage points, while in the EU-15 states the share slightly increased (by 0.7 percentage point). What concerns pollution tax share in the EU-15, it increased by 1.3 percentage point during 1999-2012 (during 2011-2012 alone – by 0.4 percentage point), and in the EU-12 countries decreased respectively by 0.1 and 0.2 percentage point.

Having analyzed the results of environmental tax reform in some of the older EU member states (Table 1), we can state undoubtedly that as a result of reforms, that percentage share of environmental taxes in the total amount of taxes increases, whereas the share of labour taxes decreases. A particularly evident case of labour taxation decrease is noted in Finland (3.3 per centage point) and the Netherlands (2.7 percentage point). This finding is also confirmed by the expert from the World Bank B. Bosquet, who did

research in 2000 and the results show that tax revenue may be increased, at the same time aiming to achieve environmental purposes.

Some aspects show that the reforms of environmental taxes should be continued. First of all, we need to collect more revenue in order to consolidate the fiscal position of the state. Secondly, it is essential to regulate the process of greenhouse emmissions, which is not substantially reduced.

Table1. Results of environmental tax reform in some of the EU-15 countries

Country	Year of the reform	Share of tax change in the post-reform years (in percentage points + -)	
		Environmental taxes	Labour taxes
Netherlands	1996	+0,52	-2,70
United Kingdom	1996	+0,13	-1,70
Finland	1997	+0,58	-3,30
Germany	1999	+0,29	-1,50
Italy	1999	+0,34	-1,00

Prepared by the authors according to Eurostat data base

Analyzing according to the country groups, the biggest share in the structure of taxes and social contributions in the EU-15, is the Netherlands, where the environmental taxes accounted for 9.7 per cent , Ireland – 8.9 per cent, and Denmark – 8.4 per cent. It should be noted that two out of three countries mentioned above have already carried out the reform of environmental taxes. The smallest share of environmental taxes in the tax structure is in France (4.1 per cent), Spain (5.0 per cent), and Belgium (5.1 per cent). Among the EU-12 states, the largest share of environmental taxes is in Bulgaria (10.5 per cent), Poland (9.6 per cent), and Slovenia (9.3 per cent); and the smallest share in Malta (1.9 per cent), Hungary (6.2 per cent), and Slovakia (6.5 per cent). As a rule, it can be noted that in the countries with higher environmental taxes, the labour taxation is lower (Figure 2).

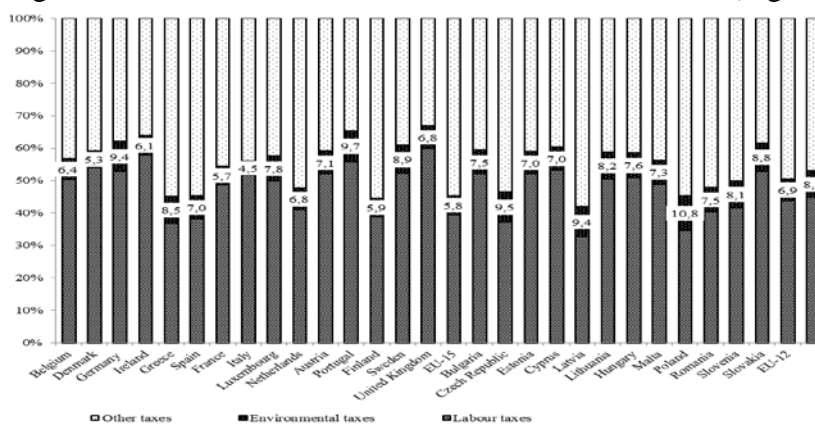


Figure 2. Structure of environmental, labour and other taxes in 2011, per cent

During the period of 1995-2011, the share of revenue from labour taxes decreased in the total amount of tax revenue. This was influenced by the fact that many EU-15 states, since 1995, have made a shift of tax burden from labour taxes to environmental taxes. In the EU-15 country group in 2011 environmental taxes accounted for 6.8 per cent on average, and in the EU-12 – 8.0 per cent.

Thus, the keystone is that the introduction of the environmental tax reform and the increase of environmental taxes is compensated by reducing other taxes and contributions, most often revenue tax and social security contributions, which are paid by employers. There is evidence that the reforms of environmental taxes make influence on the redistribution of the tax burden.

Conclusion

Environmental taxes account for a similar share in GDP, in percentage points, in both EU-15 countries and the EU-12 countries. They form a significant part in tax revenue.

There is a growing tendency of environmental tax revenue. The rate of revenue increase in the EU-12 countries were more rapid at the beginning of the period analyzed. However, in the recent years the growth tendencies in the EU-15 and the EU-12 have become very similar. They are best described by a parabolic equation.

Different tendencies in the tax structure may be observed in the EU-15 countries and the EU-12 countries. The results of the environmental tax reform show that in the states where the reform was carried out, the burden of labour taxes decreases, and environmental taxes increase.

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