



FOUNDATION FOR ECONOMIC & INDUSTRIAL RESEARCH

**Differential taxation and its impact on the promotion and
achievement of public policy objectives**

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Executive Summary

Excise duties are an important source of tax revenue, helping to improve resource allocation by internalising the external costs associated with consumption or production, and discouraging the consumption of products that are considered harmful. The present study examines, through the international and Greek experience, cases of special taxation or subsidy of products, the production, use or consumption of which is associated with significant external influences. Emphasis is placed on whether differential tax treatment is a policy tool able to promote innovation and improve social welfare, such that it can constitute an integral part of taxation policy in Greece.

INTRODUCTION

Taxation, apart from the collection of revenues to finance various activities of the State, is a tool to address the negative externalities associated with the production, use or consumption of certain products (e.g. pollution, greenhouse gas emissions, health risks and the consequent burden on the public healthcare system, etc.) and the achievement of respective individual policy objectives, including environmental protection, health protection and the control of public health expenditure.

The application of special or additional taxation on a product may be based solely on the ease with which its tax base can be determined (quantity or price of the product), or on the strong consumer preference for it, which makes its demand relatively inelastic in terms of price, leading to maximisation of tax revenues with the least possible impact on social welfare. Gradually, however, improvement of the ability to determine tax bases, such as income and property, has led to establishment of the view that special product taxation should be used primarily to limit the use or consumption of products that have adverse effects on the environment, human health or other fields.

JUSTIFICATION AND FINANCIAL IMPLICATIONS OF EXCISE DUTIES

Excise duties on commodities have generated substantial revenues in the past, when governments were unable to reliably monitor the imposition of general taxes, such as, for example, VAT. However, excise duties have (or should have) different characteristics and target compared to other types of taxes aimed at the redistribution of income or collection of public revenues with the least possible distortions in the economy.

The imposition of excise duty on products associated with negative externalities can drive demand in the direction of less harmful substitutes, but it can also stimulate innovation to develop products that reduce negative externalities, such as electric cars and renewable energy technologies.

Of course, when planning the implementation of excise duties, parameters such as the possible creation of inequalities between consumers of different incomes, the impact on the level of tax compliance and the possible additional administrative costs must be taken into account. Inequalities, for example, can arise when low-income consumers are taxed proportionally more than higher-income consumers after the imposition of excise duty on a specific product. In addition, the increased price of a product as a result of the introduction or increase of excise tax increases the possibility of tax evasion or illegal trade in the product, while the administrative costs of effective management of the excise tax system may rise.

Even when there are no direct external influences, state intervention through excise taxation may be justified in cases of information failure. The imposition of excise duty to limit the long-term negative effects on the health of young people arising from the consumption of tobacco and beverage products, as well as the taxation of activities such as gambling, are examples of taxation by reason of information failure.

Another example of excise tax is that of a charge for services provided by a public good. A typical example, in this context, are vehicle taxes. Here, the capacity to use roads is facilitated via the payment

of annual taxes or tolls complements the effort to limit the external impacts, such as noise, pollution, traffic congestion and the cost of accidents, which arise from the use of vehicles.

The imposition of excise duties can also lead to the development of new products, that is, to act as an incentive which reinforces innovative activity, which is one of the key drivers behind economic growth and the creation of highly skilled, productive and financially rewarding jobs. Innovation may be discouraged if tax policy makers place taxes on an existing product and a new innovative substitute product equally, in order to reduce tax revenue due to substitution, or if they fail to implement a stable framework of tax and other incentives for the latter. This will have the effect of sustaining negative externalities and slowing down economic growth.

Tax expenditures are considered to be special provisions of the tax code, such as exceptions, exemptions, tax credits and differential tax rates, which benefit specific activities or groups of taxpayers. In essence, they perform a similar function to government expenditure, but, since they are not accounted for in the (national) budget, in certain cases the required transparency and accountability is lacking. Tax incentives that affect product prices are included in tax expenditures, and affect the outcome in markets that are characterised by externalities. The differential taxation of substitute product groups, aimed at directing demand towards products with fewer negative externalities, is an important example in this context. Subsidies are essentially the other side of the coin as far as taxes are concerned (negative taxes), and their level is, at least in theory, determined in the same way as taxes are determined.

EXCISE DUTIES IN GREECE

Excise duties or additional taxation of products have always been an important source of revenue for the Greek state, especially in the past, when there were difficulties in determining tax bases such as income. Although the primary goal has always been the collection of public revenues, the imposition of excise duties on specific products in Greece gradually began to focus more and more on achieving other public policy goals, such as the protection of the environment or health.

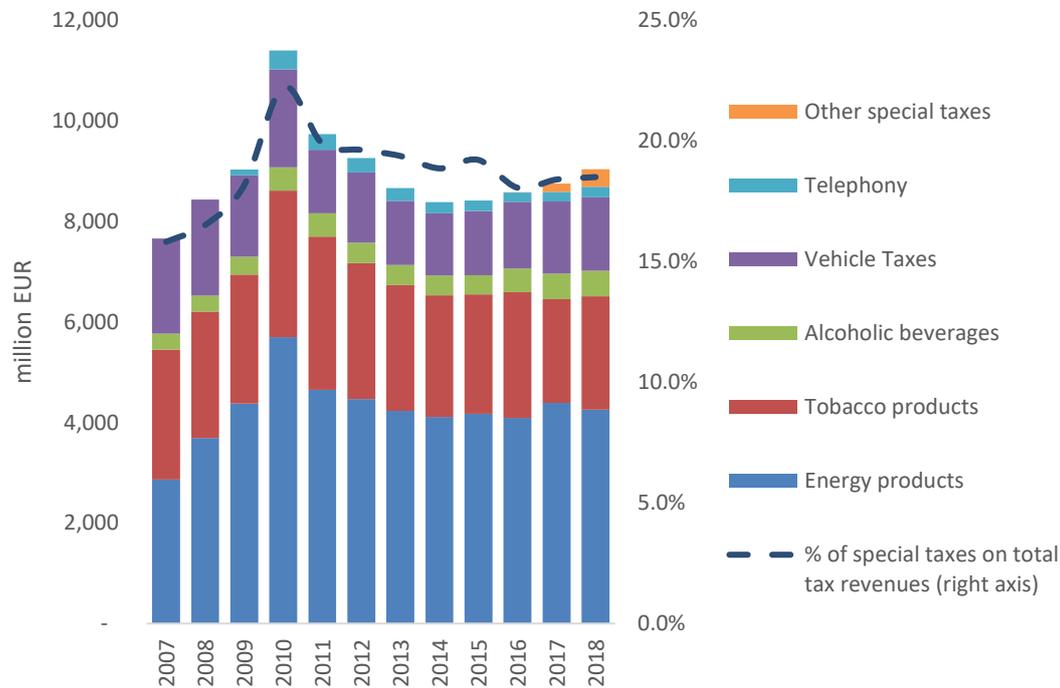
However, the policy of special tax treatment in Greece is not limited to products or procedures that clearly have negative externalities. Especially during the drastic fiscal adjustment of the Greek economy in the decade following 2010, excise duties were applied primarily to strengthen the tax revenues either by increasing tax rates on products already subject to excise duty, imposing new special taxes on products that did not carry obvious negative external effects, and/or abolishing tax expenditures as a whole for natural persons.

Excise duties in Greece are imposed on a number of products and services. The overwhelming majority are fuel and other energy products, tobacco products and alcoholic beverages, for which, in any case, there are respective Community directives determining the manner and minimum levels of taxation to be imposed. However, excise duties also extend to cover other categories of products and services, such as vehicles, coffee, overnight stays in tourist accommodation, mobile telephony, subscription TV, e-cigarette liquids and plastic bags. In some of these categories there is no obvious connection to any attempt to correct negative externalities, but taxation on the contrary arises as a need to increase tax revenues (e.g. coffee, the 'overnight stay' tax) and/or as a charge for use of public goods (e.g. road tax). Apart from the taxation of vehicles, individual energy products and e-cigarette liquids, there are no significant figures for differential taxation in the other categories of taxable products.

In total, tax revenues from excise duties in Greece amounted to approximately €9 billion in 2018. About half of this revenue (47%) came from taxation of energy products. Taxes on tobacco products accounted for a quarter of excise duty revenues, while vehicle tax revenues accounted for 16%. Taxes on alcoholic beverages accounted for 6% of excise tax revenues, almost as much as the other remaining excise duties (telephony, overnight stay tax, etc.).

Excise taxes accounted for an average of 18.7% of total tax revenues (excluding social security contributions) in Greece in the period 2007-2018. Their contribution peaked in the early years of the financial crisis in 2010 and 2011, when tax rates were increased dramatically (Figure 1).

Figure 1: Revenues from excise duties in Greece by category, 2007-2018



Source: Ministry of Finance.

In the period of fiscal adjustment in the Greek economy during the decade following 2010, excise duties were predominantly applied to strengthen tax revenues, by increasing tax rates and the introduction of new special taxes. At the same time, the use of tax expenditure to promote public policy objectives was downgraded. This policy did not rely on any analysis of the wider economic consequences, including that of the negative externalities that would likely be curtailed by increased taxation. The results were evident in the respective markets, where demand fell sharply. However, the application of high rates of tax also had undesirable effects, such as an increase in the illicit trade of products subject to excise duty, while the revenues generated systematically fell short of the expectations and targets that had been set.

INTERNATIONAL PRACTICES IN DIFFERENTIAL TAXATION

The use of differential taxation to achieve environmental goals enjoys a wide range of applications internationally. These either focus directly on reducing emissions or waste, or aim to enhance innovation and new product development, such as in the case of support for renewable energy sources and electric cars. In these fields, this study indicatively examines cases of support for RES in Italy, the imposition of carbon tax in Sweden, the provision of incentives for vehicles with low CO₂ emissions and the imposition of environmental tax on plastic bags. The application of differential taxation to other products is also considered, such as beer in the Netherlands and Denmark, and tobacco products in Sweden.

Examples from international practice show that a combination of different tools and mechanisms contributed to the achievement of the policy objectives they were intended to serve. Tax differentials have proved to be a successful strategy to increase consumption of beer with a lower alcohol content as well as helping the development of new products both in the Netherlands, which uses scaled rates,

and in Denmark, which applies a flat rate tax. Similar results can be seen in Sweden, where the aim of tobacco product policy is to encourage consumers who cannot or do not want to quit smoking to use 'snus' (*powdered dipping tobacco*), which is thought to be a less harmful alternative to cigarettes.

However, in a more complex market, the benefits of differential taxation are maximised through use of a broader policy framework that is able to address the particular relationships between different market players. Italy has seen the implementation of a wide range of direct and indirect schemes designed to support power generation from renewable energy sources, including guaranteed injection prices, Green Certificates and a simplified energy sales and purchase regime. The results of this strategy have been particularly positive, given that energy dependence has fallen, while at the same time, the share of RES in energy production has increased significantly with support for new renewable energy technologies.

Fiscal instruments, such as carbon tax or emissions trading schemes, are the most effective policies to ensure that energy prices cover environmental costs and that innovative 'clean' technologies are promoted, while they also continue to serve as a revenue source. The use of one policy instrument does not negate the application of the other, but the right combination can be effectively applied to different parts of sectors of the economy. In Sweden, for example, a minimum carbon tax threshold for industry has been determined, while differential tax treatment was applied to sectors of manufacturing industry that fall with the Emissions Trading System as well as to the remaining sectors.

Wherever a broader policy framework is applied, it is important that it is reviewed regularly to ensure that it adapts to new circumstances and responds to developments. A important aspect of Sweden's carbon tax reforms was their gradual implementation in combination with overall changes to environmental taxation, as well as the functioning of the EU Emissions Trading System (EU ETS), which was incorporated later. The combination of gradual reforms with political commitment is an important parameter in the successful implementation of such a framework, since it provides the necessary time for the sectors affected to adapt and switch to more efficient and less environmentally harmful energy sources or technological solutions. Similarly, Norway also implements an extensive incentive strategy for low-emission cars. A clear and stable policy framework, combined with the respective political commitment on the part of the government, is crucial to creating credible long-term conditions in the automobile market. The overall message from the majority of Norwegian political parties is that it should always be economically viable to choose cars with zero or low emissions over cars with high emissions, which is achieved by applying 'the polluter pays' principle to vehicle taxation.

Furthermore, the active engagement and self-commitment of market players is crucial to the strengthening of efforts to achieve the goals of each strategy. In the United Kingdom, for example, in addition to waste prevention programmes, a voluntary agreement has been reached between organisations which account for 80% of plastic packaging consumption, bringing together businesses from across the entire plastics value chain with UK government organisations and NGOs to reduce plastic waste.

The choice of where revenues from differential taxation are to be directed is also important. In the broader context of waste prevention programmes, the UK has invested in microplastics research and innovation in the field of plastics, on the condition of equivalent funding from industry. At the same time, the results of Sweden's approach to environmental taxation have highlighted the importance of shifting the tax burden by reducing other tax rates, in order to mitigate the negative effects of excise duties on income distribution and business competitiveness.

CONCLUSIONS

Excise taxes are an important source of tax revenue, they help to improve the distribution of resources by internalising the external costs associated with product consumption or production, they discourage

the consumption of products that are considered harmful, they serve as a charge for the use of public goods, such as roads, and can promote progressive taxation (e.g. taxes on luxury goods). The imposition of excise duties can also lead to the development of new substitute products, i.e. act as an incentive to reinforce innovation, which is one of the key drivers behind economic growth and the creation of highly skilled, productive and rewarding jobs.

The correction of negative externalities is the primary justification for excise duties, although the need to collect revenues from the taxation of basic goods carried greater weight in the past, even where these goods did not present negative externalities. Excise duties affect the respective production processes or product markets, limiting negative externalities and, at the same time, help to generate tax revenues that can offset the resulting external cost. In addition, if demand for excise goods is inelastic, then according to the Ramsey rule the effects of taxation on social welfare are limited. This results in a dual benefit (revenue plus reduction of negative externalities) that might be used to reduce distortions in other areas of the tax system.

Proper planning of excise duty policy is of great importance in fiscal terms, as well as in terms of correcting negative externalities and improving social welfare. Excise duties should encourage innovative activity aimed at developing substitute products or alternative production processes that present comparatively fewer negative externalities or cause less damage than those that are subject to excise taxation. Differential taxation, or even subsidies for specific products or activities, such that there are appropriate incentives to reduce negative externalities from production or consumption, can contribute to this. In other words, it is advisable for tax treatment to be differentiated according to the extent of the negative externalities, or for subsidies to be similarly scaled in accordance with positive externalities.

1. INTRODUCTION

Taxation, apart from the collection of revenues to finance various activities of the state, is a tool to address the negative externalities associated with the production, use or consumption of certain products (e.g. pollution, greenhouse gas emissions, health risks and the consequent burden on the public healthcare system, etc.) and the achievement of respective individual policy objectives, including environmental protection, health protection and the control of public health expenditure.

The application of special or additional taxation on a product may be based solely on the ease with which its tax base can be determined (quantity or consumption price of the product), or on the strong consumer preference for it, which makes its demand relatively inelastic in terms of price, leading to maximisation of tax revenues with the least possible impact on social welfare. Gradually, however, with the improvement of the ability to determine tax bases such as income and property, the view that excise duties should be used primarily to limit the use or consumption of products that have adverse effects on the environment, human health or other fields has become an established one.

For example, excise duties on fuel, tobacco and alcoholic beverages serve the above purposes, and the European Union has indeed determined tax rules and minimum tax rates for these products. Applicable excise duties may of course vary (using differential tax rates), especially in cases where the magnitude of the negative impact or the risk posed by consumption is taken into account.

Differential tax rates can be applied in all areas of taxation, including taxation of income, property and consumption (e.g. differential tax treatment for income from different sources, differential rates of VAT, property tax based on specific characteristics of the property in question). For the purposes of this study, our interest is focused on differential taxation of groups of product, which are usually subject to excise duties or other tax incentives, and which can be considered as close substitutes (e.g. conventional and electric cars, energy products with different carbon emission levels, tobacco products with different levels of risk, beverages with different ethyl alcohol content, etc.).

Experience shows that, in principle, differential excise duties significantly affect the respective product markets. This can also happen indirectly, by providing tax exemptions (or even product subsidies) to promote the use or consumption of products that limit negative externalities. Excise duty rates lead to changes in consumer behaviour (e.g. significant reductions or shifts in consumption), but, at the same time, can fuel technological and innovative activity to create products that have fewer negative externalities. In this sense, they are an effective tool for improving economic prosperity and achieving public policy objectives, provided that there are adequate mechanisms in place to control the possible trafficking in illegal (untaxed) similar products, such that any differing treatment introduced through differential taxation leads to the desired result.

Based on the above, it is of particular interest: a) to examine case studies, from international and Greek experience, of the application of excise duties to products, the production, use or consumption of which is proven to be associated with significant externalities, with a focus on the extent to which differential excise taxation is a tool that improves social well-being and b)

the identification of certain principles on which the design and implementation of excise duties or associated incentives in our country should be based.

In particular, the study includes the following. The second chapter provides a brief analysis of the rationale and financial implications of excise duties. The third chapter describes and analyses excise taxes as they applied to products in Greece, with emphasis on the policy objectives they serve, the type of taxes applied, the level and variation in tax rates, the tax revenue collected, and the consequences for the market as they arise from historical changes in tax rates. The fourth chapter presents examples of international practices with a wider application of differential taxation of products in order to achieve public policy objectives, with reference to the innovative activity caused by it. The study concludes with the fifth chapter, which summarizes the main findings and offers guidelines for policy planning with regard to differential taxation in Greece.

2. RATIONALE AND FINANCIAL IMPLICATIONS OF EXCISE DUTIES

2.1. Introduction

Taxes¹ are the main source of state revenues used to finance government expenditure², given that the provision of public goods and the functioning of the public administration system would be impossible without collection of tax revenues. Taxation is also a tool for correcting the negative external effects (externalities) that stem from the production or consumption of certain goods and services. The negative externality of any activity is the cost which affects a third party who has not chosen to bear that cost. Examples of negative externalities are pollution and traffic congestion.

Tax policy drastically affects the performance of an economy, changing the distribution of resources between public and private goods (allocation function), as well as the distribution of income and wealth among households (distribution function). At the same time, taxation is an essential tool of macroeconomic management and policy, seeking, as needed at any given time, to stabilise the economy (stabilisation function) in the context of the primary objectives of achieving full employment and growth of the economy (Musgrave, R. and Musgrave, P., 1989). An efficient tax system manages to generate sufficient revenue with the least possible distortions in the allocation of resources and is at the same time able to achieve income distribution that is generally considered to be fair.

Taxes can be divided into those imposed: a) on current production and b) on property³ (Drakos, 1996) (Figure 2.1). The first category includes taxes on income of individuals and legal entities and taxes on expenditure (general taxes on the consumption of goods and services, such as VAT, and excise duties on products such as tobacco, petroleum products, alcohol, etc.). The second category includes taxes that may relate to the transfer or possession of property (such as the Single Property Tax - ENFIA), which can be levied on the total value of a person's assets before or after the deduction of any liabilities. From an economics point of view, social security contributions can be considered as a type of income tax, especially in distributive insurance systems⁴ which show a weak relationship between contributions and benefits to insured persons. An important element of the tax system are all types of tax incentives, which

¹ According to the Organization for Economic Co-operation and Development (OECD), taxes represent a compulsory unrequited payment to general government. The term 'unrequited' is used in the sense that the benefits provided by government to taxpayers are not directly in proportion to their payments.

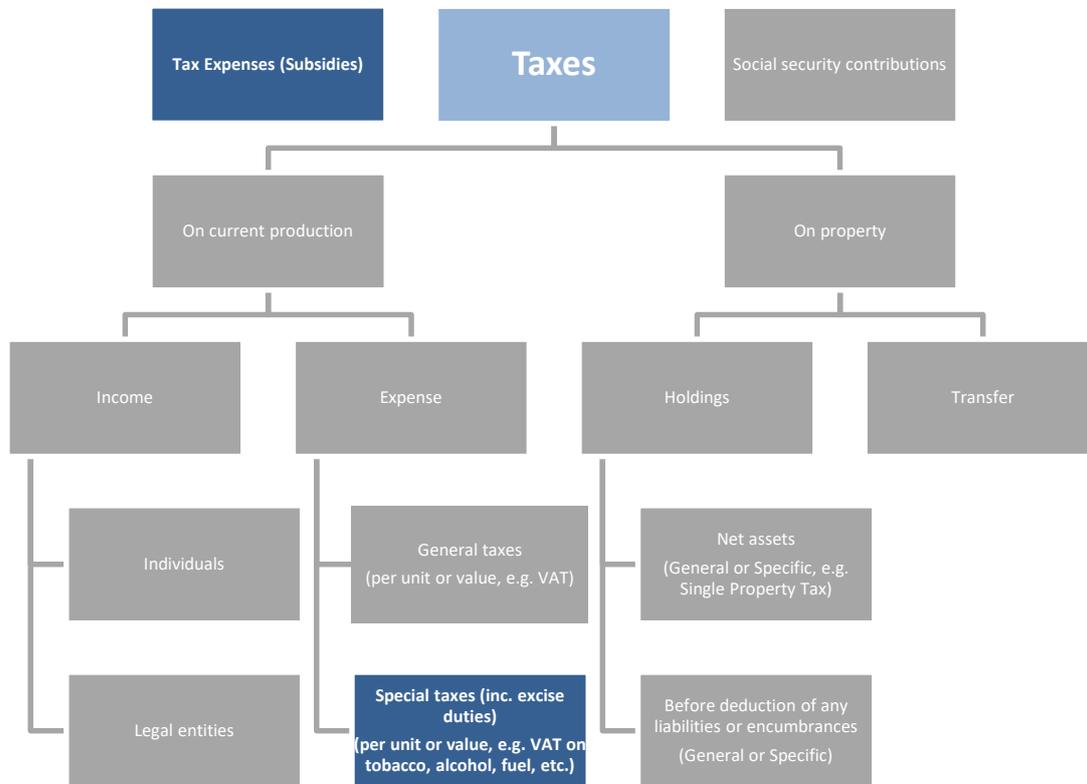
² Other sources are borrowing and printing money. More broadly, taxes could also be said to cover the various charges that are however levied on voluntary transactions which involve the element of reciprocity, in contrast to taxes, which are not associated with a specific quid pro quo (Georgakopoulos, 1979). Government borrowing through voluntary (and not mandatory) transactions in the market, create an obligation for the state to repay the debt in the future and are charged with interest. In addition, increasing the money supply to finance government spending creates inflationary pressures in the economy and represents a form of 'hidden' tax, since it leads to a fall in the purchasing power of sources of income that are not adjusted for inflation (including wages, pensions and rents).

³ A different distinction can be made between direct and indirect taxes, based on the (erroneous) perception that direct taxes are not passed on from taxpayers to other individuals, while indirect taxes are passed on. Direct taxes include income and property taxes, while indirect taxes include taxes on transactions and consumption.

⁴ The two main types of insurance systems are distributive and funded. Under the distributive system, current employees pay the pensions of current retirees through their contributions, while under capital-funded pension schemes the contributions of each employee are invested in a fund account, the performance of which, in combination with life expectancy, will determine the amount of pension they are to receive.

constitute a distinct category of tax expenditure. In essence, tax expenditures are negative or reimbursable taxes, and they may relate to subsidies, tax deductions and/or tax exemptions.

Figure 2.1: Indicative classification of taxes

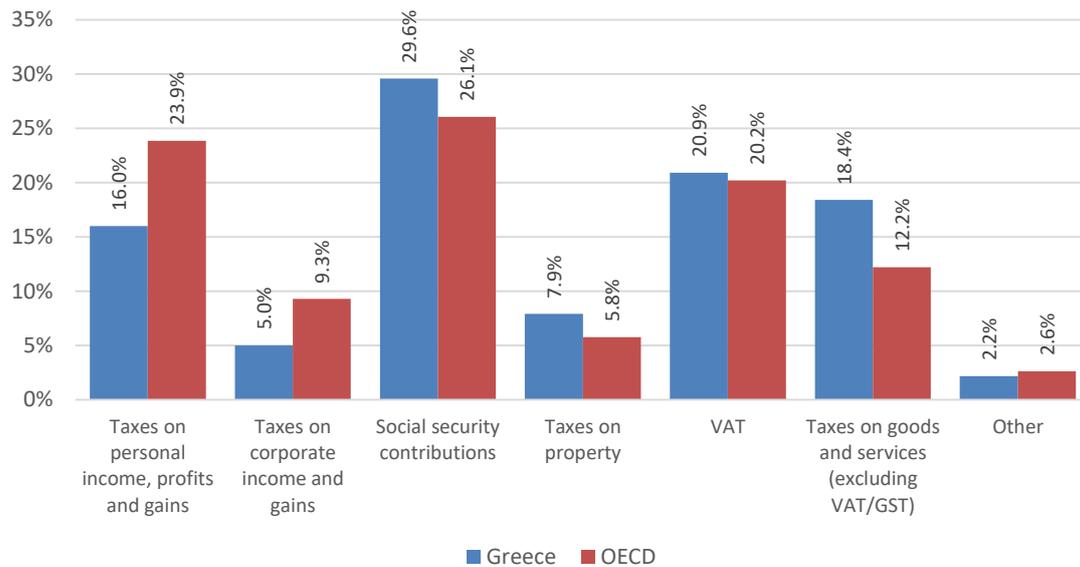


Source: Adapted from Drakos, G. (1996).

The tax base on which any tax is calculated is based on financial figures such as income, consumer spending and property held by an individual, a family or a business. The tax corresponding to each tax base unit constitutes the tax rate, which may be a fixed rate per unit or proportional, based on the level applicable to the tax base and at the same time, either fixed, progressive or regressive, depending on whether the final amount of tax payable remains constant, increases or decreases as the tax base increases.

The structure of the tax system is determined by the tax rates applied on the tax base and is reflected in the composition of tax revenues in the individual tax categories. Tax revenues in Greece are based primarily on consumption tax (VAT and excise duties) which account for a total share of 39.3%, and secondarily on social security contributions (29.6%) and taxes on the income of natural and legal persons (21%) (Figure 2.2). In contrast, the primary source of revenues in OECD countries is on average accounted for by income tax, followed by excise duties and social security contributions. Property tax generally accounts for a smaller share of total revenues: in 2017, the OECD average amounted to 5.8% of total revenues, a smaller percentage than is the case in Greece (7.9%). Compared to 1990, the tax structure in Greece shows weak convergence with the OECD average (Table 2.1). The share of excise duties in tax revenues has fallen in Greece by almost three percentage points, while the share of property and income taxes has increased accordingly.

Figure 2.2: Distribution of total tax revenues in Greece and the OECD, 2017



Source: OECD

Table 2.1: Revenue per type of taxation (% participation in total)

Tax category	1990		2017	
	Greece	OECD	Greece	OECD
Taxes on income and profits	19.9	37.5	21.0	33.2
Social security contributions	30.2	22.0	29.6	26.1
Property taxes	4.6	5.7	7.9	5.8
Excise duties	42.5	30.9	39.3	32.4
Other taxes	2.8	3.9	2.2	2.6
Total	100.0	100.0	100.0	100.0

Source: OECD

Of interest for the purpose of this study is the fact that, in Greece, the increased proportion of consumption tax does not arise from Value Added Tax (VAT), but from other specific product taxation (excise duties). This may indicate reduced efficiency in other areas of the tax system and/or comparatively higher rates of excise duty. In any case, however, it seems that the proper design of excise duty policy in Greece assumes even greater importance than it does in other countries⁵.

2.2. The purposes and implications of excise duties

Excise taxes can play an important economic role when, as is the case in reality, income taxation is not optimal. They constitute relatively important sources of tax revenue, they help to improve the distribution of resources by internalising the external costs associated with product consumption or production, they discourage the consumption of products that are

⁵ In this study, we adopt a broader view, in accordance with which excise taxes, in the form of negative special taxation, are considered to include the various incentives provided through the pricing system to limit adverse externalities. Details of the scope of application of negative excise duties in each country are not available to better facilitate determination of the importance of excise taxation within each tax system with greater accuracy.

considered harmful, they serve as a charge for the use of public goods, such as roads, and can promote progressive taxation (e.g. taxes on luxury goods).

According to partial equilibrium analysis, the taxation of a product affects the market through the results as far as income and income and substitution are concerned. The income effect refers to the decrease in demand for a product, which is caused by the decrease in the purchasing power of consumers due to the imposition or increase of a tax. The substitution effect refers to the increase in the relative price of the product in relation to other products that are not taxed or on which a lower tax is imposed, and it implies a change in quantitative demand for the product due to a change in the respective prices. Taxes that cause substitution effects can be considered to be distortionary (Baumol et al, 1970). Market distortion occurs when the clearing price of the market differs from the price that would be achieved under conditions of perfect competition. Market distortions cause economic inefficiency, unless there are negative externalities related to taxable production-related or consumer activities, which need to be appropriately internalised in order for the market to be efficient.

The harmful nature of a product can create negative consumption-related externalities. This type of externality implies that consumption of the product has an impact on those who do not consume it (Buchanan et al., 1962). Such products have to be subject to special taxation in order to limit demand for them and in consequence limit the negative external effects resulting from their use, while the income generated by their taxation can be used to offset/compensate for the remaining external costs. Externalities, however, must have a significant impact in order to be taxed, given that if a government decides to tax any kind of externality, it may be forced to intervene across the board (Cnossen, 2005).

In designing their taxation policies, governments seek to limit the use of products that are harmful to the environment, human health or which have wider implications for society in general. To this end, policymakers have a variety of tools at their disposal, such as regulations setting out specific product specifications, user licences, as well as excise duties (including special consumption and environmental taxes). Taxes of this kind may be levied at any stage of production or distribution. The determination of tax liability is usually derived from a quantitative assessment of the size of the externality. However, it should be noted that sometimes other approaches to correcting negative externalities can be more effective than taxation.

Excise taxes have (or should have) different characteristics and focus than other types of taxes aimed at redistribution of income or collection of public revenues with the least possible distortions in the economy. The imposition of excise duty on products associated with negative externalities can drive demand in the direction of less harmful substitutes, but it can also stimulate innovation to develop products that reduce negative externalities, such as electric cars and renewable energy technologies.

When planning the implementation of excise duties, parameters such as the possible creation of inequalities between consumers of different incomes, the impact on the level of tax compliance, and the possible additional administrative costs must be taken into account (Cnossen, 2005). Inequalities, for example, can arise when low-income consumers are taxed proportionally more than higher-income consumers after the imposition of excise duty on a specific product. In addition, the increased price of a product as a result of the introduction or

increase of excise tax increases the possibility of tax evasion or illegal trade in the product, while the administrative costs of effective management of the excise tax system may rise.

Despite the potential problems, excise duties serve the need to offset external costs⁶ against a corresponding increase in tax revenues, and can affect the behaviour of producers or consumers in order to limit respective external costs (Cnossen, 2005a). Excise duty may only partially achieve the above objectives, with a margin of compromise between them. In this context, the economic theory of taxation, which has its roots in the works of Ramsey (1927) and Pigou (1920), gives some guidance for appropriate policy planning with regard to excise duties. Ramsey's theory of taxation seeks to analyse the optimal structure of taxes in the context of the least distorting effect on product markets given the expected tax revenue. According to Pigou, taxation seeks to integrate the external costs of harmful behavior into prices, with the aim of changing behaviour and either offsetting external costs

EXCISE TAXES AND TAX REVENUE

The Ramsey rule suggests that in order to minimise the loss of prosperity while increasing revenue, policymakers should impose higher taxes on products with inelastic demand (Cnossen, 2009). Tax on a product creates additional costs for the producer or the consumer, which are mainly borne by those for whom demand is inelastic in relation to product price. The taxation of products with inelastic demand in terms of price may lead to lower quantitative demand, but it also leads to a greater increase in tax revenues in the case of products with relatively elastic demand in relation to price.

Excise duties on commodities have generated substantial revenues in the past, when governments were unable to reliably monitor the imposition of general taxes, such as, for example, VAT. Administrative costs were low, since specially taxed basic commodities are easy to identify, their sales volume is high, and the number of producers is usually small. These features render taxation as indicated by Ramsey to be enforceable and lead to an increase in revenues (Cnossen, 2005a). If the only taxes available are on products and resource allocation problems are ignored, the Ramsey rule indicates that the administrative costs of taxation imposed to increase tax revenues will be minimised when excise duty is levied on commodities, but at different rates of tax.

The impact of excise duties depends to a large extent on the price elasticity of demand for the product in question, i.e. on the response of consumers to changes in price - assuming that the tax is passed on via prices. With inelastic demand, taxing one product is likely to displace other forms of consumption because it will reduce income spent on other products. The concept of cross-price elasticity of a refers to the sensitivity associated with consumption of other products to changes in the price of the taxed product. Depending on the nature of the shift in consumption, the capacity of the tax to achieve the desired objectives may be strengthened or weakened. For example, if the tax is intended to reduce the consumption of potentially unhealthy products with inelastic demand, and consumers end up reducing their consumption of healthier products in addition to the taxed good in question, then the tax may prove to be a failure.

⁶ or achieving external benefits, in the case of tax incentives or subsidies (negative taxation).

EXCISE TAXES AND EXTERNAL COST

As previously mentioned, negative externalities arising from production or consumption of a specific product occur when the real cost for society as a whole is greater than the total private cost resulting from its production or consumption. In other words, when there are negative externalities, the social cost is not covered by the private cost of the specific activity. In such a case, production or consumption of the product reaches a higher level than that which is socially efficient. Tax policy makers are able to take externalities into account and impose excise duties on the harmful product or production process. Taxes that take into account the negative externalities of a product by incorporating its external costs are referred to as Pigovian or Pigouvian taxes. A Pigouvian tax is one which is levied on any activity that creates significant negative externalities (carries costs that are not included in the selling price). This type of tax is intended to correct undesirable market outcomes. This is achieved by imposing the tax at a rate equal to or approaching the social cost of the negative external impact.

On the other hand, where positive externalities present themselves, those who receive the benefit do not pay for it. As a result, the market may not be able to sufficiently supply the product. This would indicate the need for a subsidy (negative tax), which assists producers or consumers in paying for socially beneficial products and encourages increasing production thereof.

Given that Pigouvian taxes are cost effective when they internalise negative externalities (Vollebergh, 2012), the determination of their respective rate should be based on cost-benefit analyses. Where there is a uniform rate of tax, rational consumers and producers decide whether it is more efficient to reduce the cost of externality or to pay the tax, a fact which will lead to a societally beneficial outcome. This means that the characteristics of the tax, such as how it is levied and the level of the rate, should be determined on a case-by-case basis.

Another dimension to the above is given by the double-dividend hypothesis, according to which the replacement of taxes by Pigouvian taxes can bring both a reduction in external costs and a reduction in distortions in the economy arising from the imposition of other taxes (Tullock, 1967). When Pigou tax revenues are used to reduce the rates of other distortionary taxes, then tax policy can be revenue-neutral overall, and at the same time this would provide justification for an increase in Pigouvian tax rates (Pearce, 1991). However, the rates and nature of existing taxes, licences, and regulations greatly influence the outcomes arising from an additional Pigouvian tax, while the manner in which tax revenue is used greatly affects the success of the tax. Since each tax creates a cost for a market player, governments should use Pigouvian tax revenues to reduce other tax rates in order to reduce market distortions (Fullerton et al., 1997).

Activities that cause a higher burden should be taxed to a greater extent, which goes hand in hand with differentiated taxation and the ultimate pricing of activities with negative impacts (Vollebergh, 2014). For example, the imposition of high tax rates on the use of fossil fuels is justified if their consumption is reduced and an impetus is given to the search for their more effective use. Negative impacts on the environment should be calculated in terms of price having indicatively taken into account the varying energy or carbon content of each form of fuel, an approach that can be seen to gather strength as the ease of substitution between

energy products increases, with the result that consumers are ultimately making decisions primarily on the basis of environmental costs.

Criticisms of Pigouvian taxation focus primarily on the inability of governments to accurately determine the marginal social costs created by a negative externality. One possible approach would be to set a minimum acceptable threshold for negative externalities and to impose taxes to achieve this (Baumol, 1972). Another problem is the reciprocity of social costs, in the sense that a negative externality may not be entirely attributable to one source, but there may be joint responsibility, in which case the costs should be borne accordingly.

EXCISE TAXES AND THE FAILURE OF INFORMATION

Even when there are no external influences, state intervention through excise tax may be justified in cases of information failure (Cnossen, 2010). The imposition of excise duty to limit the long-term negative effects on the health of young people arising from the consumption of tobacco and beverage products, as well as the taxation of activities such as gambling, are examples of taxation by reason of information failure.

EXCISE TAXES AND USAGE CHARGES

Another example of excise tax is that of a charge for services provided by a public good. A typical example, in this context, are vehicle taxes. Here, the right to road use obtained via the payment of annual taxes (duties) or tolls is complemented by the effort to limit the external impacts, such as noise, pollution, traffic congestion and the cost of accidents, which arise from the use of vehicles.

EXCISE TAXES AND INNOVATION

The imposition of excise duties can also lead to the development of new products, that is, to act as an incentive which reinforces innovative activity, which is one of the key drivers behind economic growth and the creation of highly skilled, productive and financially rewarding jobs. If tax policy-makers tax both the original and the innovative substitute product equally so as not to reduce tax revenue due to substitution, or if they do not implement a consistent framework for tax and other incentives, they will discourage innovation, which apart from continuing to maintain negative externalities, will result in reduced competitiveness and a slowing down of economic growth.

For example, in the field of environmental policy it has been pointed out that the policy tools used should also aim to enhance innovation in order to develop "clean" technologies (OECD, 2010; ESA, 2011; IEEP, 2013). Policy makers have a variety of means at their disposal, including regulatory tools (command and control), marketable licences, subsidies, etc., but nevertheless if they do choose to impose a tax, the price to be paid for pollution should account for creation of incentives for innovation. In this context, Pigouvian taxation is preferable to other regulatory instruments, which are less effective. Pigouvian tax rates are easier to apply and less affected by uncertainty (Masur and Posner, 2015), while at the same time they provide clear incentives to reduce environmental impact (e.g. from pollutant emissions and waste) and search for "cleaner" alternatives. Furthermore, taxation prevails over other policy instruments, since the latter tend to be aimed at reducing pollution rather than preventing it (OECD, 2010). However, given that Pigouvian taxes offset external costs, innovation should reduce marginal external costs in order to justify the lower tax on the innovative product,

since reducing the producer's marginal private costs alone will not lead to the optimal outcome.

2.3. Tax expenses and subsidies

Tax expenditures are considered to be special provisions of the tax code, such as exceptions, exemptions, tax credits and differential tax rates, which benefit specific activities or groups of taxpayers. In essence, they perform a similar function to government expenditure, but, since they are not accounted for in the (national) budget, in certain cases the required transparency and accountability is lacking. Tax incentives that affect product prices are included in tax expenditures, and affect the outcome in markets that are characterised by externalities. The differential taxation of substitute product groups, aimed at directing demand towards products with fewer negative externalities, is an important example in this context.

Grants, on the other hand, are direct or indirect financial aid that is often used to cover a specific type of burden or to support a desirable activity in the public interest. A tax increases the price that consumers have to pay and reduces the price that producers receive. Conversely, a product subsidy reduces the price paid by consumers and increases the price received by producers, with the public usually bearing the cost of the difference.

Subsidies are essentially the other side of the coin as far as taxes are concerned (negative taxes)⁷, and their level is, at least in theory, determined in the same way as taxes are determined. However, there are two basic differences between taxes and subsidies. The first is that subsidies can cause other companies to enter an industry and thus, for example in the case of environmental taxes, there is a risk that while the emissions of individual business undertakings may be reduced, the industry's overall emissions as a whole may increase. The second is that pollution abatement subsidies run counter to "the polluter pays" principle, with the result that they are likely to give unfair incentives with regard to who is responsible for reducing pollution.

On a practical level, subsidies may refer to: a) Grants, b) Soft loans, c) Tax allowances, such as opportunities for accelerated depreciation (tax expenses). In general, subsidies can offer a solution to problems that might lead to market failures. For example, government grants can increase research and development (R&D) incentives and, combined with a relatively large spillover of research results, help the rapid and wider spread of a new improved technology. The crucial question concerns the extent and direction of subsidies, that is, what amount and whether they should be given to all or some business undertakings, given that firstly, it is particularly difficult to estimate the expected performance of R&D and secondly, subsidies create distortions in the market when the amount is allocated at the expense of other sectors of the economy.

⁷ I. Katsoulakos, "Microeconomic Policy: Measures and applications", (1998).

Box 2.1: Justification for the use of subsidies

The use and application of subsidies can be justified in three ways. **Firstly**, for development policy reasons a government may wish to support the development of an industry, usually when it is in its infancy (Infant industry⁸). For example, if available private capital is insufficient, an industry could be strengthened through state subsidies in order to become competitive. However, in this case, when the industry is developed enough to be considered self-sufficient, subsidies should be abolished. The **second argument** in favour of subsidies is when a large, important company is facing serious difficulties and risks being shut down. Under such circumstances, the government has at least three options: a) not to intervene and let market forces determine the outcome, b) to let the company go bankrupt, but intervene in order to prevent the impact of bankruptcy on other sound business undertakings, (c) to subsidise the undertaking at risk immediately in order to keep it in operation, thus avoiding the consequences of bankruptcy. The **third argument** is connected with environmental policies, in which subsidies could be used to encourage businesses and industries to behave in an environmentally friendly manner and to avoid the potential costs imposed by environmental policy and the economic consequences for their competitiveness.

2.4. Conclusions

The correction of negative externalities is the primary justification for excise duties, although the need to collect revenues from the taxation of basic goods carried greater weight in the past, even where these goods did not present negative externalities. Excise duties affect the respective production processes or product markets, limiting negative externalities and, at the same time, help to generate tax revenues that can offset the resulting external cost. In addition, if demand for excise goods is inelastic, then according to the Ramsey rule the effects of taxation on social welfare are limited. This results in a dual benefit (revenue plus reduction of negative externalities) that might be used to reduce distortions in other areas of the tax system. Excise tax should also encourage any form of innovative activity aimed at developing substitute products or alternative production processes that present fewer negative externalities by comparison with those that are subject to excise tax. This is where differential taxation comes in, or even subsidies for specific products or activities, so that appropriate incentives to reduce negative externalities from production or consumption can be provided. In other words, it is advisable for excise duties to be differentiated according to the extent of their negative externalities (or for subsidies to be scaled in accordance with positive externalities). The increased importance of excise tax revenues in Greece, but also the effectiveness of excise duties in reducing negative externalities, indicate the importance of proper planning and implementation of excise duties in the Greek economy.

⁸ A. Bhattacharjea, "Infant Industry Protection Revisited," *International Economic Journal*, XVI, (2002), 115-133.

3. EXCISE DUTIES IN GREECE

3.1. Introduction

Excise duties or supplementary taxation of products have always been an important source of revenue for the Greek state, especially in the past, when there were difficulties in determining tax bases such as income. Although the primary goal has always been the collection of public revenues, the imposition of excise duties on specific products in Greece gradually began to focus more and more on achieving other public policy goals, such as the protection of the environment or health. This has perhaps become even clearer due to the harmonisation of Greek legislation with European Union rules, which set minimum thresholds for excise duties on products such as fuel, cigarettes and alcoholic beverages, with a view to ensuring the smooth functioning of the single market together with a high level of protection of the environment and health. But the application of special tax treatments to specific products and services, in the form of tax expenses, has in the past been a tool for achieving social policy objectives (e.g. tax deductions for medical expenses, mortgage interest payable for acquisition of a first house, life insurance) or to enhance the penetration of technological applications with positive externalities (e.g. tax deductions for the installation of solar heating systems, natural gas, etc.).

However, the policy of special tax treatment in Greece is not limited to products or procedures that clearly have negative externalities. Especially during the drastic fiscal adjustment of the Greek economy in the decade following 2010, excise duties were applied primarily to strengthen the tax revenues either by increasing tax rates on products already subject to excise duty, imposing new special taxes on products that did not carry obvious negative external effects, and/or abolishing tax expenditures as a whole for natural persons.

In this context, the purpose of this chapter is to catalogue the main excise duties on products and services applied in Greece, with emphasis on presentation of the proportional weight they carry in tax revenues overall, and the identification of representative cases of differential taxation within the individual product categories that are subject to excise duties, as well as examination of the impact of recent changes in excise taxation, in light of the public policy objectives they served.

3.2. Main excise taxes in Greece

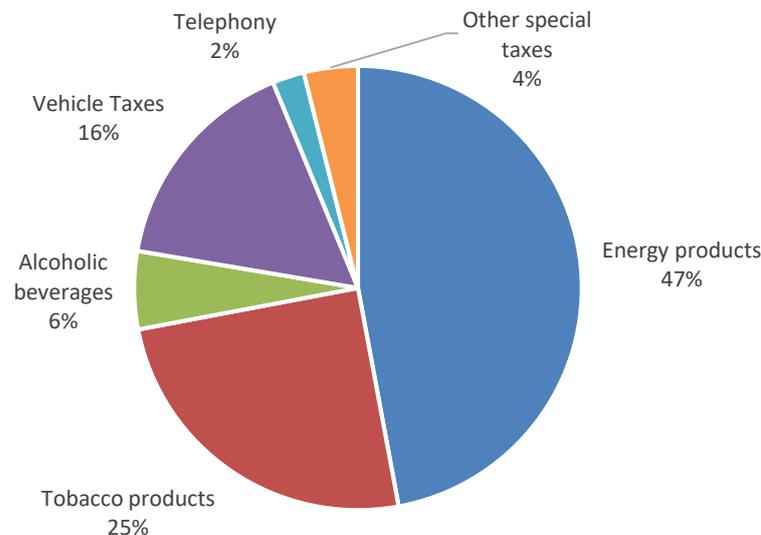
Excise duties in Greece are imposed on a number of products and services (Figure 3.1). The overwhelming majority are fuel and other energy products, tobacco products and alcoholic beverages, for which, in any case, there are respective Community directives determining the manner and minimum levels of taxation to be imposed. However, excise duties also extend to cover other categories of products and services, such as vehicles, coffee, overnight stays in tourist accommodation, mobile telephony, subscription TV, e-cigarette liquids and plastic bags. In most of these categories there is no obvious connection to any attempt to correct negative externalities, but taxation on the contrary arises as a need to increase tax revenues (e.g. coffee, the 'overnight stay' tax) and/or as a charge for use of public goods (e.g. road tax).

Figure 3.1: Main excise taxes and duties applicable in Greece



In total, tax revenues from excise duties in Greece amounted to approximately €9 billion in 2018. About half of this revenue (47%) came from taxation of energy products (Figure 3.2). Taxes on tobacco products accounted for a quarter of excise duty revenues, while vehicle tax revenues accounted for 16%. Taxes on alcoholic beverages accounted for 6% of excise tax revenues, almost as much as the other remaining excise duties (telephony, overnight stay tax, etc.).

Figure 3.2: Revenues from excise duties in Greece by category, 2018

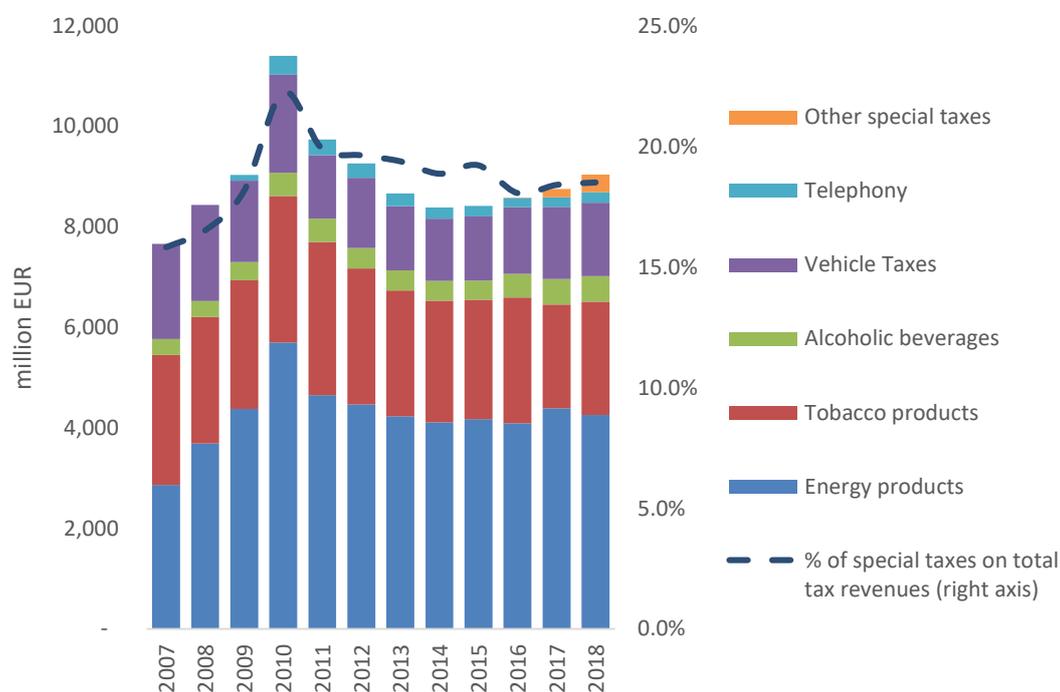


Source: Ministry of Finance. IOBE analysis

Excise taxes accounted for an average of 18.7% of total tax revenues (excluding social security contributions) in Greece in the period 2007-2018 (Figure 3.3). Their contribution peaked in the early years of the financial crisis in 2010 and 2011, when tax rates were increased dramatically. Gradually, however, the decline in economic activity and the reduction in consumption of taxable products, resulting from the rise in their prices due to tax rate increases, has reduced their share of total tax revenues. The subsequent introduction of new excise duties, the selective increase of specific excise tax rates, and the stabilisation of the economy helped create a small recovery of excise tax revenues and halted their dwindling

participation in tax revenues as a whole, with the latter nevertheless remaining relatively high compared to the period prior to the financial crisis.

Figure 3.3: Revenues from excise duties in Greece by category, 2007-2018

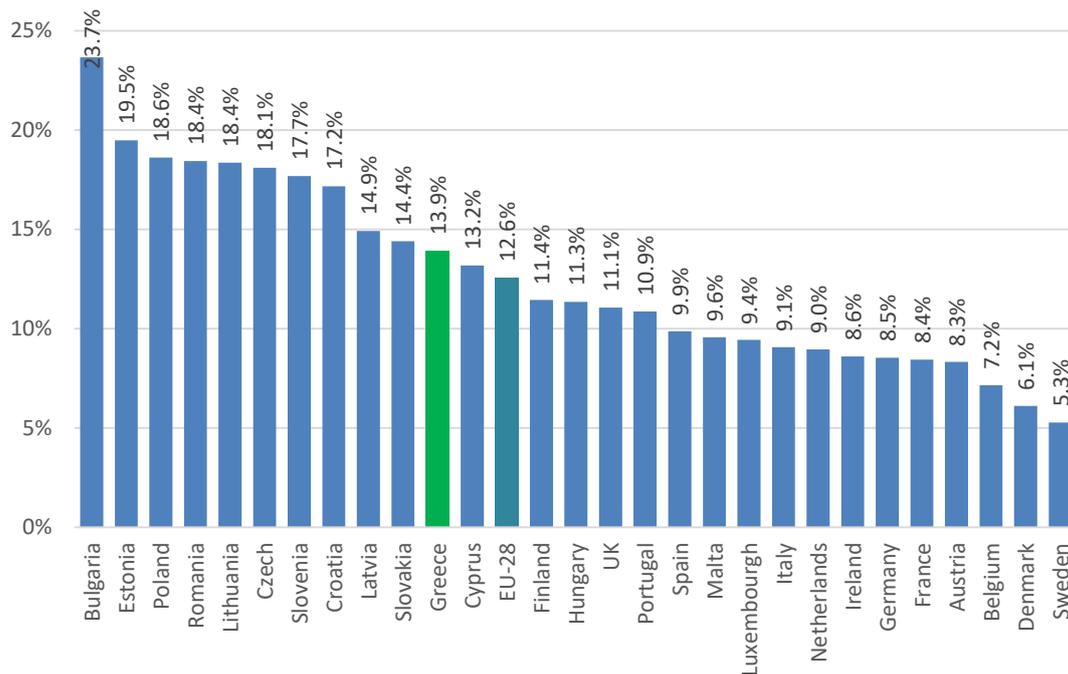


Source: Ministry of Finance

Compared to the other Member States of the European Union, the share of revenues derived from basic excise duties (on energy, tobacco and alcohol) in Greece is higher than the average, even by comparison with the more developed Member States, indicating the increased importance of excise duties in Greece (Figure 3.4). This is due to differences in the structure of the economy, taxation policy and the efficiency of the tax systems of the individual Member States of the European Union, which have the freedom, given that the requisite provisions of the relevant regulations and directives are satisfied, to apply their tax policies in accordance with their own particularities, as well as imposing excise duties on the products of their choice.

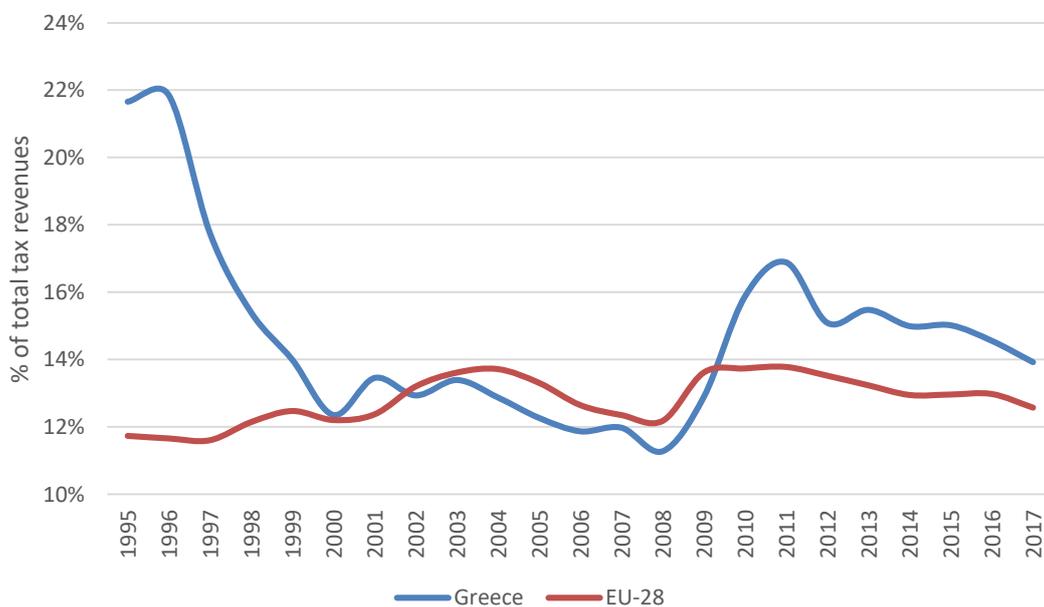
It is worth noting that until the mid-1990s Greece's revenues depended much more heavily on excise duties (Figure 3.5). There has been a gradual convergence towards the EU average, although after 2009 the increases in excise tax rates in Greece have led to reinforcement of the participation of excise tax revenues as a proportion of total tax revenues.

Figure 3.4: Participation of excise duty revenues in total tax revenues in EU Member States, 2017



Source: Eurostat, DG TAXUD (EC).

Figure 3.5: Share of excise duty revenues in total tax revenues in Greece and the EU-28, 1995 - 2017



Source: Eurostat, DG TAXUD (EC).

ENERGY PRODUCTS AND ELECTRICITY

The determination of excise duty rates on petroleum products and other energy products in Greece is in line with the provisions of Directive 2003/96/EC⁹, by which uniform minimum tax

⁹ Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity

levels for all energy products are fixed according to their use, e.g. for heating or motor fuel, and type of consumption, e.g. household or business (Table 3.1).

Table 3.1: Current excise duty rates applied to energy products in Greece, 2020

	Product	Excise Duty (€)	Unit
a)	Leaded petrol	681	1,000 lt
b)	Unleaded petrol	700	1,000 lt
c)	Unleaded petrol with special additives	700	1,000 lt
d)	Aviation gasoline	697	1,000 lt
e)	Gasoline type jet fuel	697	1,000 lt
f)	Diesel fuel (motor fuel)	410	1,000 lt
g)	Diesel fuel (heating)	410	1,000 lt
h)	Diesel fuel used for purposes other than (f) and (g)	410	1,000 lt
i)	Heavy fuel oil	38	1,000 kg
j)	Kerosene (motor fuel)	410	1,000 lt
k)	Kerosene (heating)	410	1,000 lt
l)	Kerosene used for purposes other than (j) and (k)	410	1,000 lt
m)	Liquefied petroleum gas (LPG) used as motor fuel	410	1,000 kg
n)	Liquefied petroleum gas (LPG) and methane for industrial, artisanal, and commercial use in motors other than type (m)	120	1,000 Kilograms
o)	LPG and methane used as heating fuel and uses other than (m) and (n)	60	1,000 Kilograms
p)	Natural gas used as motor fuel	0	Gigajoule mixed calorific value
q)	Natural gas used as heating fuel		Gigajoule mixed calorific value
	- for domestic use	0.3	
	- for use by all other consumers	1.5	
r)	Natural gas for other uses		Gigajoule mixed calorific value
	- for annual consumption > 3,600,000 GJ (> 1,000,000 MWh)	0.3	
	- for annual consumption from 1,800,001 to 3,600,000 GJ (from 500,001 to 1,000,000 MWh)	0.35	
	- for annual consumption from 360,001 to 1,800,000 GJ (from 100,001 to 500,000 MWh)	0.4	
	- for annual consumption from 36,000 to 360,000 GJ (from 10,000 to 100,000 MWh)	0.45	
	for annual consumption < 36,000 GJ (< 10,000)	1.5	
s)	Coal, lignite and coke used as heating fuels		Gigajoule
	- for business use	0	
	- for non-business use	0	
t)	Coal, lignite and coke for uses other than (s)	0	Gigajoule
u)	Electricity		MWh
	- for business use	2.5	
	- for non-business use	5	
v)	Benzol (benzene) - Toluol (toluene) - Xylol (xylene) - Other aromatic hydrocarbon mixtures of which 65% or more by volume (including losses) distills at 250° C by the ASTM D 86 method - Mixtures of the above products	372	1,000 kg
w)	Benzol - Toluol - Xylol - Xylol - Xylene mixed isomers - Ethylbenzene - Mixtures of the above products	372	1,000 kg
x)	White spirit	20	1,000 kg
y)	Other light oils	12	1,000 kg
z)	Biodiesel and mixtures thereof, as defined by JMD (Supreme Chemical Council - SCC) 52/2016, used as motor fuels, either as-is or admixtures with diesel fuel as per the above case (f)	410	1,000 lt

Source: Ministry of Finance.

The tax treatment of energy products, in accordance with Directive 2003/96/EC, also takes their environmental impact into account, given that the European Union recognises taxation as one of the means available to achieve climate change-related goals. Within the framework of environmental protection, the least harmful energy products are given preferential treatment and exemptions in order to promote their use.

For example, in Greece the tax burden on natural gas for heating purposes is comparatively less heavy than the applicable rate on heating oil, significantly contributing to the increasing use of natural gas, which has less impact on the environment. The same applies to taxation of

natural gas and liquefied petroleum gas as motor fuel. Provisions are even made for certain exemptions or reductions in the tax level, mainly due to the absence of stronger harmonisation at Community level, the risks of losing international competitiveness, as well as social or environmental considerations.

MANUFACTURED TOBACCO AND CIGARETTES

The structure and minimum level of excise duty rates on manufactured tobacco are set out in Directive 2011/64/EU, which aims to ensure the smooth functioning of the internal market and secure a high level of protection for human health. Cigarettes are subject, at a minimum, to a proportional tobacco tax calculated on the retail price, as well as to a flat-rate tobacco tax calculated per unit of product, which may range from 7.5% to 76.5% of the total tax burden. The total tax burden is derived from the sum of: a) fixed excise duty, and b) proportional excise duties plus VAT. In accordance with Directive 2011/64/EU, fine-cut tobacco is taxed at a minimum of EUR 60 per kilo or 50% of the weighted average retail price of the previous year. There are similar provisions for other tobacco products. In Greece, excise duties are levied on manufactured tobacco per tax unit (TU), which corresponds to 1000 cigarettes or 1 kg of fine-cut tobacco, and they are structured as follows:

1. With regard to cigarettes:
 - a) A fixed tax is imposed on product units in the amount of EUR 82.50 per TU, which is the same for all categories of cigarettes, and
 - b) a proportional tax is also imposed, at a rate of 26%, calculated on the weighted average retail price per TU and is the same for all categories of cigarettes

The total amount of excise duty calculated as per above items (a) and (b) may not be less than EUR 117.50 per TU.
2. For fine-cut tobacco, the current rate of excise duty is 170 euros per TU.
3. Cigars and cigarillos, carry excise duties fixed at a rate of 35% of their retail price per VAT.
4. For other smoking tobacco products, the excise tax rate is EUR 156.70 per TU.

It is useful to note that, in practice, the tax treatment of the above sub-categories of tobacco products does not show much differentiation, given that the damage they can cause to human health and the cost to health systems are not attributable to specific categories of tobacco products. On the other hand, the taxation of e-cigarette liquids (i.e. substitutes with potentially reduced health risks) is at a lower rate.

TAXATION OF PASSENGER VEHICLES

The taxation of passenger vehicles in Greece includes the taxes that burden the acquisition of the vehicle and the taxes pertaining to its possession and use. The first category of taxes includes, in addition to VAT, the vehicle registration fee, and the second includes road taxes, the luxury tax, and the Special Fuel Consumption Tax.

The vehicle registration fee is imposed on the pre-tax net retail price of the vehicle, and there is a gradual increase in the rate charged, based on specific retail price scales (Table 3.2). Electric vehicles are completely exempt from the passenger vehicle registration fee, while hybrids are entitled to a 50% discount.

Table 3.2: Vehicle Registration Fees per Net Retail Price Scale

Net Retail Price (€)	Euro 6c-d (%)	Hybrids (%)	Electric (with zero emissions) (%)
<14,000	4%	2%	0%
14,001-17,000	8%	4%	0%
17,001-20,000	16%	8%	0%
20,001 - 25,000	24%	12%	0%
> 25,001	32%	16%	0%

Source: ACEA

For conventional vehicles, the registration fee is determined by both retail price and emissions. Specifically, for vehicles emitting more than 121g CO₂/km the emission factor applied increases in stages (Table 3.3), while for vehicles with emissions of up to 100g CO₂/km, the registration fee is reduced by a factor of 95%.

Table 3.3: Euro 6c-d Vehicle Registration Fee Rates

Net Retail Price (€)	Pollutant emissions g CO ₂ /km	Pollution rate							
		0-100	101-120	121-140	141-160	161-180	181-200	201-205	>250
<14,000		95%	100%	110%	120%	130%	140%	160%	200%
14,001-17,000		3.8%	4.0%	4.4%	4.8%	5.2%	5.6%	6.4%	8.0%
17,001-20,000		7.6%	8.0%	8.8%	9.6%	10.4%	11.2%	12.8%	16.0%
20,001 - 25,000		15.2%	16.0%	17.6%	19.2%	20.8%	22.4%	25.6%	32.0%
> 25,001		22.8%	24.0%	26.4%	28.8%	31.2%	33.6%	38.4%	48.0%
		30.4%	32.0%	35.2%	38.4%	41.6%	44.8%	51.2%	64.0%

Source: ACEA

Road tax is an important element in vehicle use taxation. For passenger vehicles in circulation and registered before 2010), road tax is calculated on the basis of cc, and according to the year of first registration (Table 3.4). Hybrids with engines smaller than 1,549cc are exempt from road tax, while hybrids with engines having cc exceeding 1,549cc pay 60% of the road tax due.

Table 3.4: Road tax based on cc (before November 2010)

Cubic Centimeters (cc)	Amounts in EUR			
	Passenger vehicles (<2000)	Passenger vehicles 2001-2005	Passenger vehicles 2006-2010	Hybrids (60%) 2006-2010
0 - 300	22	22	22	0
301 - 785	55	55	55	0
786 - 1,071	120	120	120	0
1,072 - 1,357	135	135	135	0
1,358 - 1,548	225	240	255	0
1,549 - 1,738	250	265	280	168
1,739 - 1,928	280	300	320	192
1,929 - 2,357	615	630	690	414
2,358 - 3,000	820	840	920	552
3,001 - 4,000	1,025	1,050	1,150	690
> 4,001	1,230	1,260	1,380	828

Source: Law 4346/2015 (Government Gazette, Series I, No 152A/20.11.2015)

Road tax in Greece for vehicles registered after November 2010 is calculated on the basis of pollutant emissions (Table 3.5), while hybrids are a special case where tax is payable on the basis of emissions regardless of engine size (cc).

Table 3.5: Road tax based on pollutant emissions (for classified vehicles registered after November 2010)

Emissions CO ₂ /km	€ per g CO ₂ /km
0 - 90	0.00
91 - 100	0.90
101 - 120	0.98
121 - 140	1.20
141 - 160	1.85
161 - 180	2.45
181 - 200	2.78
201 - 250	3.05
> 250	3.72

Source: Law 4346/2015 (Government Gazette, Series I, No 152A/20.11.2015)

From the above it is clear that taxation of passenger vehicles in Greece presents significant differentiation, which is aimed at achieving policy goals including reduction of CO₂ emissions in the transport sector. In addition, however, it also incorporates elements of progressiveness, since large-capacity vehicles, which usually carry higher pre-tax prices, are subject to higher proportional taxation.

In general, incentives to increase demand for low-emission vehicles are the foremost area of differential tax treatment and may include purchase subsidies or tax relief, reduced road tax or other benefits, such as free access to urban centres, or incentives related to the free use of bus lanes, parking etc. It should be noted that almost all European Union countries have policies designed to encourage the purchase and use of low-emission vehicles, with tax deductions relating to vehicle acquisition and use, and taxation of company cars.

ALCOHOL AND ALCOHOLIC BEVERAGES

European Directives¹⁰ lay down the provisions on the harmonization of the structures of excise duties on alcohol and alcoholic beverages, and at the same time set minimum tax rates for application by the Member States based on alcohol quantity and content of each product (alcohol, beer, intermediate products, wine, and fermented beverages other than beer and wine). Tax rates are subject to periodic evaluation and adjustment, taking into account the proper functioning of the EU internal market, competition between different categories of alcoholic beverage, the true value of the taxes levied, and the broader objectives of the respective Directive. On the basis of Law 2960/2001 as currently in force, in Greece the excise duty imposed on alcohol and alcoholic beverages is structured as follows:

- For ethyl alcohol at 20°C, the rate of excise duty is fixed at two thousand, four hundred and fifty euros (EUR 2,450) per hectolitre of anhydrous ethyl alcohol. A reduced rate of excise duty, fixed at fifty percent (50%) of the standard rate, is applicable in the case of ethyl alcohol intended for use in the production of ouzo or contained in tsipouro and

¹⁰ Council Directives 92/83/EEC and 92/84/EEC

tsikoudia (local pomace brandies) and is fixed at one thousand, two hundred and twenty-five euros (EUR 1,225) per hectolitre of anhydrous ethyl alcohol¹¹.

- For beer, excise duty¹² is set at five euros (5) per degrees Plato, by volume and hectolitre. A reduced rate of excise duty, fixed at fifty percent (50%) of the current standard rate, is applicable in the case of beer produced in our country or other Member States of the European Union by small independent breweries, provided that their production output does not exceed 200,000 hectolitres of beer per year, and is fixed at two euros and fifty cents (EUR 2.50) per degree Plato, by volume and hectolitre.
- With regard to intermediate products, the rate of excise tax imposed¹³ is fixed at one hundred and two euros (EUR 102) per hectolitre of final product, apart from certain exceptions¹⁴ where the rate is set at fifty one euros (51) per hectolitre of final product.
- No excise duties are imposed on plain or sparkling wines.
- In the case of beverages made by fermentation excluding wine and beer, the excise duty imposed¹⁸ is fixed at twenty euros (EUR 20) per hectolitre of final product. Products in this category are exempt from excise duty when used for the production of vinegar.

Based on the above, differential tax treatment of alcoholic beverages mainly appears to be focused mainly on individual product categories, as well as the protection of local spirits. In addition, the reduced tax on beer production by microbreweries has led to significant growth in this segment of the market for beer.

MOBILE PHONE PREPAID CARD USERS AND SUBSCRIBERS

In 1998¹⁵ a charge was imposed in favour of the State known as the 'mobile telephony subscriber's fee', which was to be borne by subscribers of companies supplying mobile telephony services. The mobile telephony subscriber's fee was modified in 2009¹⁶ and the details were re-defined under legislation as follows:

- 12% on monthly bills up to 50 euros
- 15% on monthly bills between 50.01 and 100 euros
- 18% on monthly bills between 100.01 and 150 euros
- 20% on monthly bills of 150.01 euros and above

At the same time, during 2009 a tax was imposed in favour of the State, known as the 'prepaid mobile phone card tax', which is calculated at a percentage of 12% of the cost of mobile phone card call time. The tax is calculated on the value of the talk or communication time supplied, regardless of the way in which it is granted, before VAT is levied.

COFFEE - ELECTRONIC CIGARETTE (VAPE) LIQUIDS

As far as coffee products and e-cigarette liquids are concerned, in 2016¹⁷ excise duty was imposed on imports from third countries, products originating from other Member States of

¹¹ According to a ruling of the European Court of Justice, the reduced on tsipouro must be abolished.

¹² Law 4389/2016 (Government Gazette, Series I, No 94/27. 5.2016).

¹³ Law 3845/2010 (Government Gazette, Series I, No 65/06.05.2010).

¹⁴ Exceptions pertaining to products as defined in Annex III, Part B, paragraphs 6 & 7 of Commission Regulation (EC) 606/2009 (OJ 193/24.7.2009).

¹⁵ Article 12, Law 2579/1998 (Government Gazette, Series I, No 31/17.02.1998)

¹⁶ Article 33, Law 3775/2009 (Government Gazette, Series I, No 122/21-7-2009)

¹⁷ Article 58, Law 4389/2016 (Government Gazette, Series I, No 94/27-05-2016)

the European Union, and domestically produced products (Table 3.13). The imposition of the tax on coffee products was simply a revenue collection measure.

Table 3.6: Excise tax rates on coffee and e-cigarette products

	Product	Excise Duty (€)	Unit
a)	Refill liquids, included in electronic cigarettes under CN code 85437090 or 38249092	0.10	1 millilitre
b)	Roasted coffee	3	1 kilogram
c)	Unroasted coffee	2	1 kilogram
d)	Instant coffee	4	1 kilogram
e)	Preparations based on extracts, essences and concentrates of coffee, and preparations with a basis of coffee	4	1 kilogram

Source: Ministry of Finance

OVERNIGHT STAY TAX

With the introduction of Law 4389/2016¹⁸ A tax was imposed in favour of the State, known as the 'overnight stay tax', which is borne by the persons occupying accommodation and it is charged per day of use and per room or apartment, as follows:

Main hotel accommodation:

- 1-2 star hotels 0.50 euros
- 3 star hotels 1.50 euros
- 4 star hotels 3.00 euros
- 5 star hotels 4.00 euros

Rented furnished rooms and apartments:

- 0.50 euros

The introduction of the overnight stay tax was a collection measure with the clear aim of increasing tax revenues.

SUBSCRIPTION TV TAX

Law 4389/2016 also imposed a proportional fee in favour of the State, under the title "subscription TV tax", which is borne by subscribers to the companies providing subscription TV services. This fee is imposed on each monthly bill of each pay-TV connection and is calculated at ten percent (10%) on the total monthly bill, including the flat fee collected in favour of the company, before VAT. The introduction of the subscription TV tax was purely a revenue-generating measure.

3.3. Impact of recent changes in excise duties in Greece

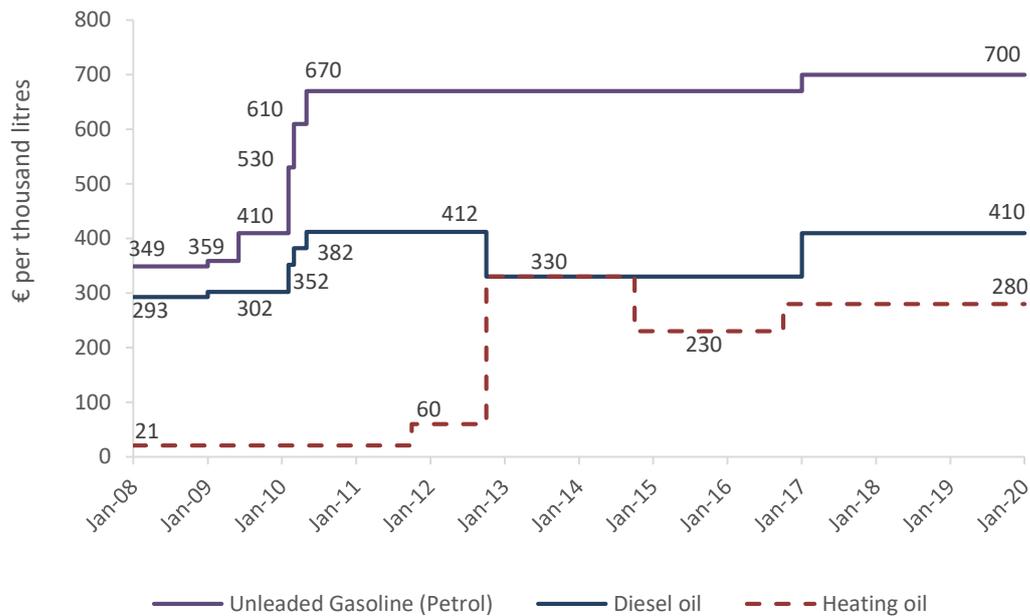
FUEL

In order to limit state budget deficits, tax rates on liquid fuels, among other products, were increased drastically at the beginning of 2010 in Greece. Increased rates were particularly high in the case of unleaded petrol, while in the case of diesel fuel, its use for commercial purposes was taken into account and the increase was less harsh. In order to address the illegal use of

¹⁸ Article 53, Law 4389/2016 (Government Gazette, Series I, No 94/27-05-2016)

heating oil for motor purposes, parity for excise tax rates on diesel and heating oil was introduced in October 2012. As a result, the tax burden on the latter has increased fivefold. Subsequently, other changes were made to the taxation of fuels. In all cases, however, the goal of changing rates was to collect revenues, since it was thought that inelastic demand for fuel with regard to price would generate predictable revenues and, at the same time, mitigate the impact of taxation on social welfare.

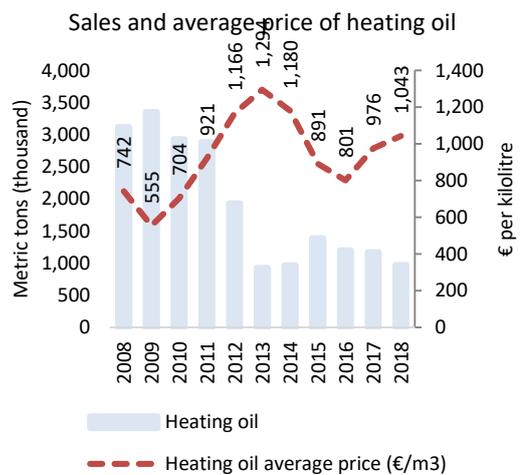
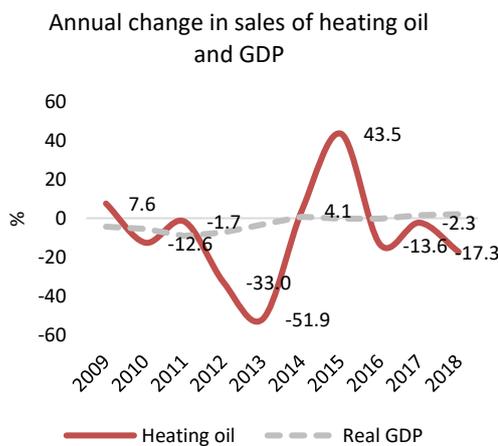
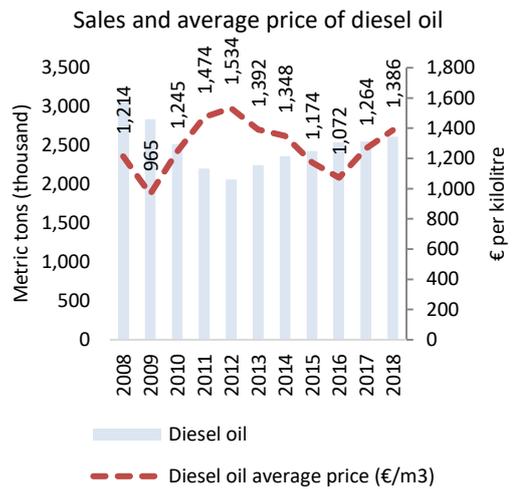
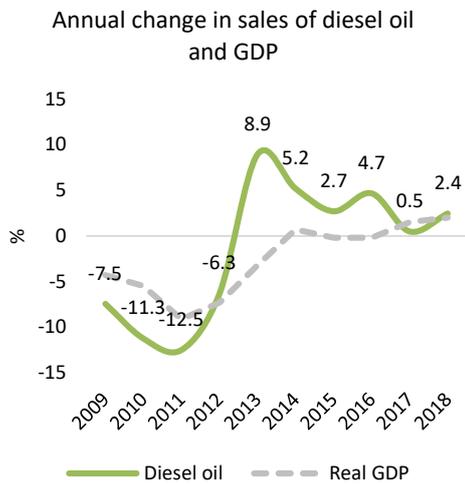
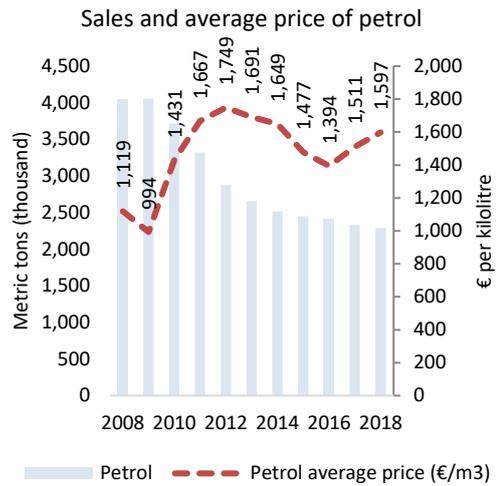
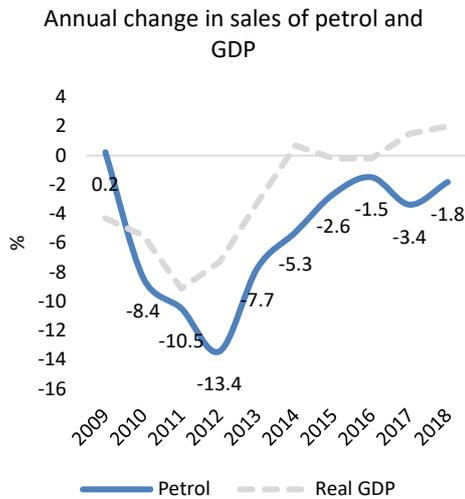
Figure 3.6: Excise duty rates for liquid fuels, 2008-2020



Source: Ministry of Finance

But what were the effects of this taxation policy on the development of the market, taking into account other factors that affect it? **Petrol** sales declined as GDP and household disposable income declined (Figure 3.7). The sharpest fall in sales comparative to GDP, is due to a) the sharp increase in the final price of petrol over the period 2009-2013, due to increased taxation and international oil prices and b) the shift of consumers to the diesel car market, after the lifting of the ban in major urban centers in January 2012, which was strengthened by the lower price of diesel compared to petrol due to the smaller tax burden. The downward trend continued in the period 2017/2018, since despite a small increase in GDP, international prices and taxation on petrol rose. The reduction of fuel consumption per kilometre travelled by new cars also played an important role.

Figure 3.7: Sales and average fuel prices, 2008-2018



Source: Eurostat, European Commission, and the Hellenic Petroleum Marketing Companies Association. IOBE analysis.

Sales of **diesel fuel** followed the fluctuations of GDP in the period 2009-2011, although they fell more rapidly (Figure 3.7). After 2012, parity between excise duties on diesel and heating oil (by which the use of heating oil as motor fuel was restricted), the lifting of the ban on diesel fuel, and increasing tourism activity all had a catalytic effect. Accordingly, after 2012, diesel sales show positive annual rates of change, which slowed down in the two year period 2017/2018, when taxation and international prices of the product increased.

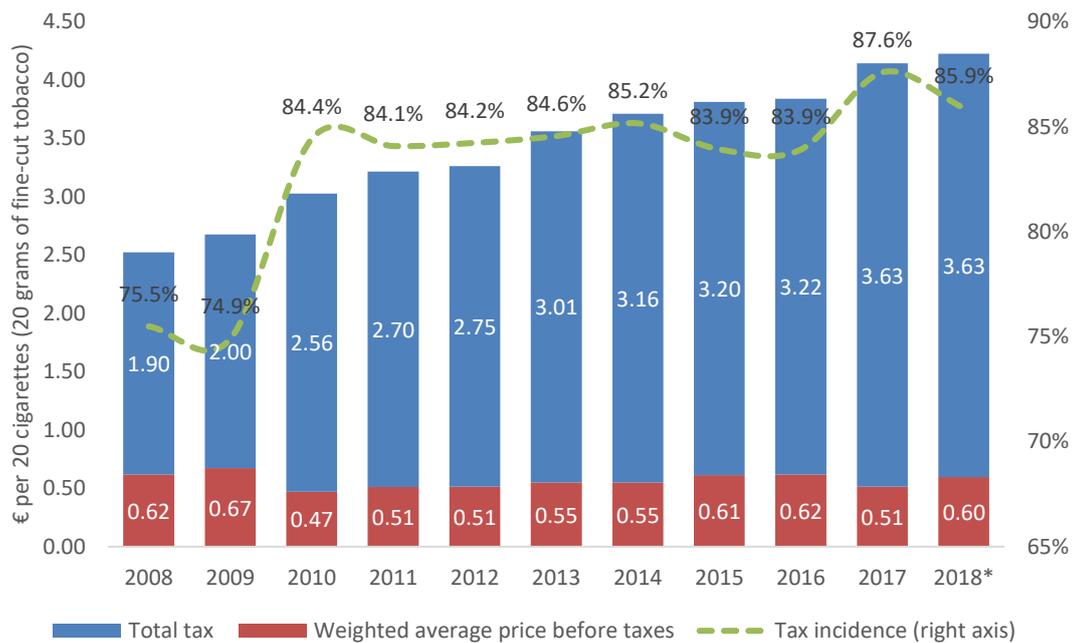
The size of the annual changes in sales of **heating oil** does not seem to be closely correlated with changes in GDP over the period 2009-2018. The sharp rise in heating oil prices in 2012/2013, due to the equalisation of excise duty rates between diesel and heating oil, led to a sharp decline in sales (Figure 3.7). The de-escalation of prices in 2015 which continued to gather pace even more strongly in 2016, in combination with the relative stabilisation of the economy and its recovery (albeit to lower levels than in the past) and the differentiation of excise duties on diesel and heating oil, was accompanied by a significant increase in heating oil sales. However, first of all, they have been kept low and, secondly, they depend to a large extent not only on weather conditions, but also on the availability and cost of alternative methods of heating. The renewed increase of taxation and international prices in 2017, combined with the milder weather conditions, led to a considerable drop in demand for heating oil in 2018.

In all cases, excise duties on fuel were used for revenue collection purposes, although the size of increase in additional revenues did not live up to expectations. The tax rate increases caused prices to rise and fuel consumption to fall. The country's environmental goals may have been favoured through this, but with a potential cost in terms of social welfare, since the rates and their increases were not based on any form of cost-benefit analysis which could have taken into account the negative externalities arising from use of specific fuels.

TOBACCO PRODUCTS

Excise duties on tobacco products in Greece were relatively stable until 2009, but from January 2010 onwards they have shown major changes in an upward direction. The total tax burden per product unit has almost doubled between 2008 and 2018. Excise duty on cigarettes has increased by 10 percentage points since 2009, with the total tax burden increasing by 12 points to reach nearly 86% of their weighted average price (Figure 3.8). The total tax burden on fine-cut tobacco has increased by 11 percentage points since 2009.

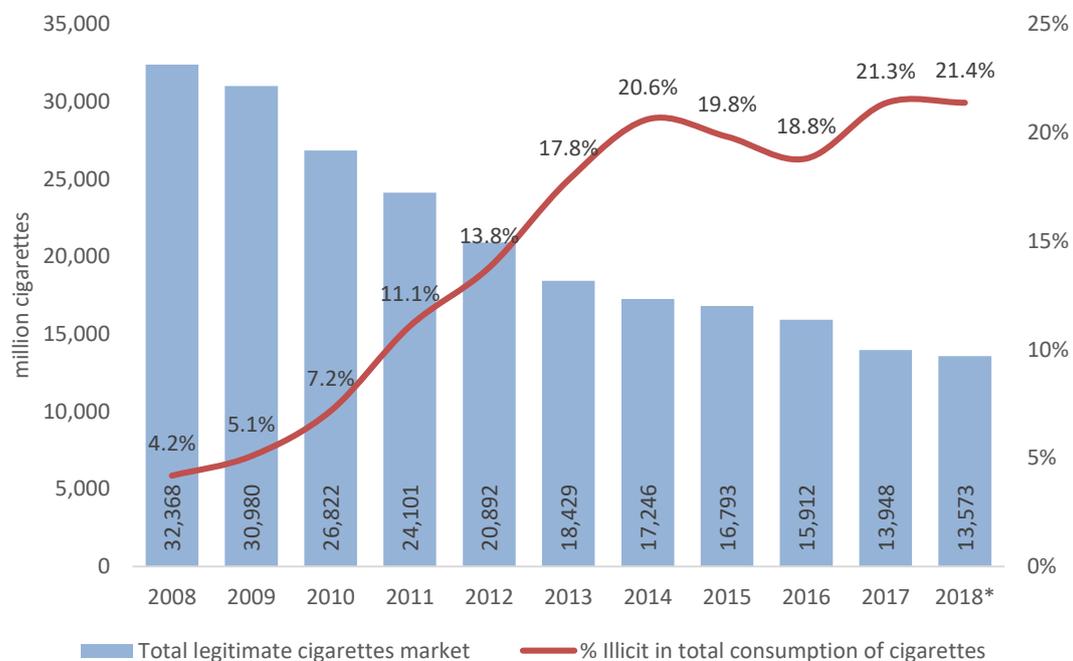
Figure 3.8: Weighted average price of tobacco products (cigarettes and fine-cut tobacco), 2008-2018



Source: Nielsen, IOBE analysis.

Sales of legal tobacco products have been steadily declining in recent years, mainly due to the sharp decline in disposable income and rising tobacco prices, due to increased taxation (Figure 3.9).

Figure 3.9: Penetration of illegal or duty-free cigarettes, 2008-2018



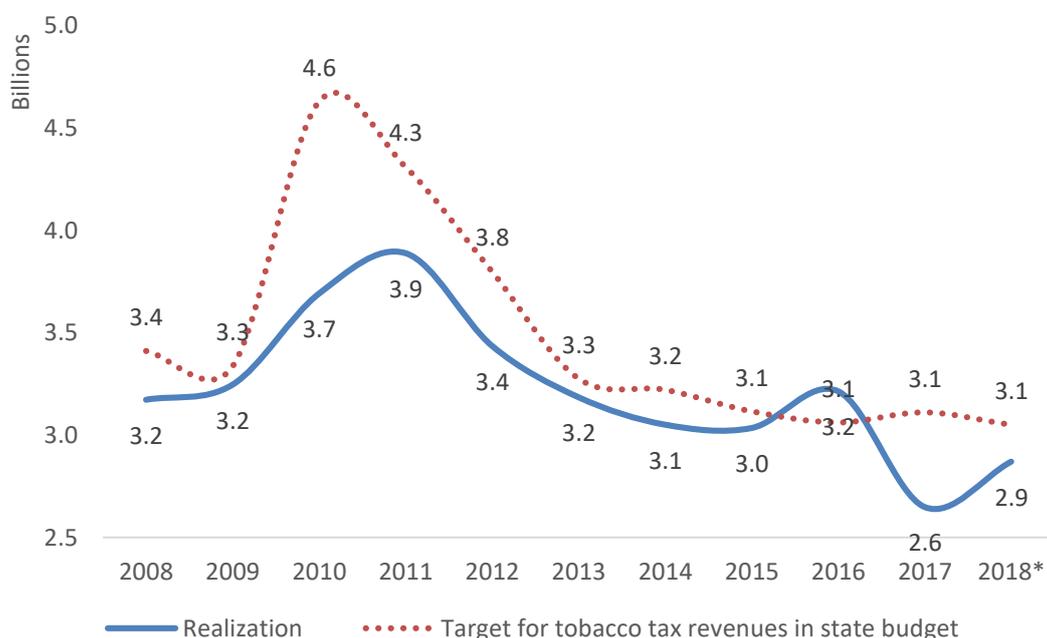
Source: Nielsen, KPMG (Project Sun), IOBE estimates (2018).

Demand for legal tobacco products has also been affected by the availability of illicit products, the purchase of tobacco products from neighbouring countries at lower prices, the ban on

smoking in public places, the falling number of smokers and the availability of substitutes such as e-cigarettes. In fact, the consumption of illicit cigarettes increased dramatically, accounting for an increasing share of total consumption. This was due to the high payoff from illegal trade due to the high rate of taxation, the difficulty of guarding land and sea borders, the ineffectiveness of control mechanisms, and the substantial differences in the price of tobacco products prevalent in neighbouring countries.

However, despite the increase in rates, the deviations in revenue from state budget targets were considerable (Figure 3.10). Deviations between budgeted revenues and revenues actually generated has been systematically negative. Indeed, the differences were even greater when large increases in taxation of tobacco products were applied.

Figure 3.10: Greek government revenues from the taxation of tobacco products



Source: Ministry of Finance, IOBE estimates.

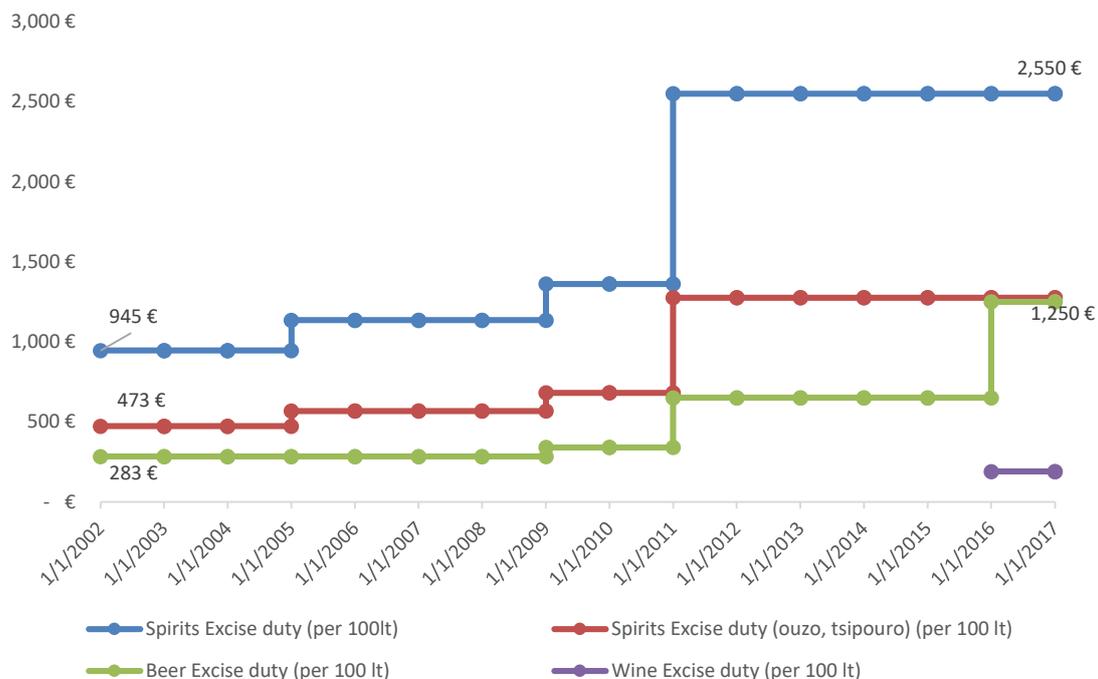
The expectations of the Greek tax authorities of the revenues to be gained from tobacco taxes and their potential future development, especially after tax rate increases, have to be regarded as unrealistic based on the outcome. The systematic monitoring and evaluation of the developing market for tobacco products, i.e. the relationships leading to product substitutions (legal and illegal), is an essential factor in shaping expectations of additional revenues that increased tax rates on tobacco products might bring.

In conclusion, the increases in excise duties on tobacco products in Greece in recent years, which were aimed at increasing government revenues, have had a series of consequences for the economy, which are often overlooked in the planning of taxation. Tobacco market development and taxation data have confirmed that although tax increases on tobacco products have led to some reduction in consumption, they did not yield the desired revenues and have led to an increase in the illicit trade in tobacco products.

ALCOHOLIC BEVERAGES

The tax regime for alcoholic beverages in Greece was stable until 2009, with periodic adjustments made in order to incorporate changes in the overall price level and to stimulate public revenues. The last increase in excise duties on alcoholic beverages prior to the successive increases after 2009, had taken place in 2005, with an increase of 20%, and excise duties on beer had not increased at all. Alcoholic beverages have undergone eight (8) tax increases since 1998. Four (4) of these took place within 18 months in the period 2009-2010, leading to more than double the excise duty being imposed on alcoholic beverages, from EUR 1,135 per 100 litres of ethyl alcohol in 2008 to EUR 2,550, with the last increase taking place in July 2010¹⁹. The overall increase in excise duties in 2010 stood at 87% compared to 2009 levels, and reached 125% compared to the tax regime in place during the period 2005-2008. A similar percentage increase in excise duties on beer was seen during the same period. However, the increase in 2016 fixed the tax on beer at half the level of other alcoholic beverages (Figure 3.11).

Figure 3.11: Excise duty on alcoholic beverages, 2002-2017

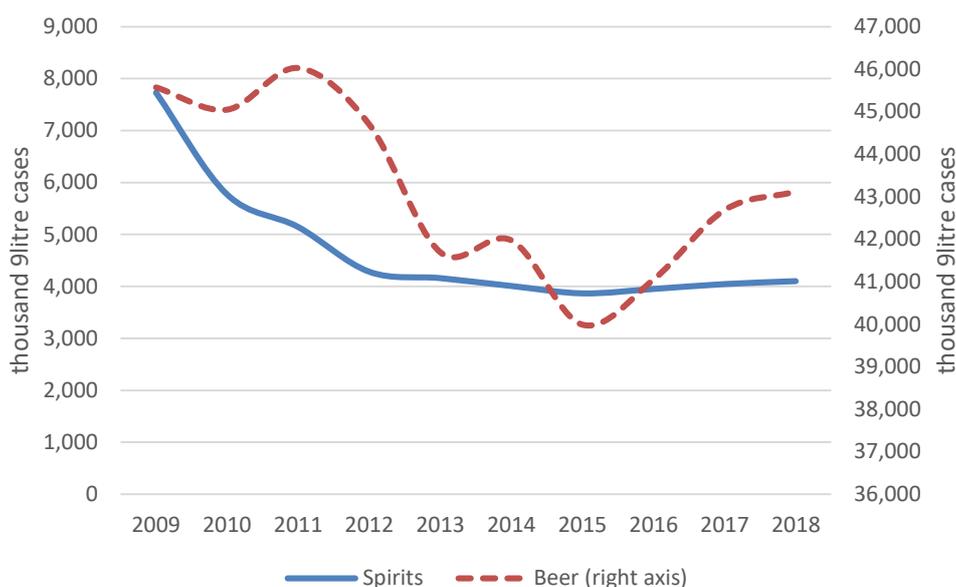


Source: IOBE.

The recorded sales of alcoholic beverages were negatively affected by the overall developments in the economy and the increases in the rates of indirect taxes that have been applied to alcoholic beverages since 2009. Thus, after 2009, there was a rapid decline in sales of officially recorded alcoholic beverages (Figure 3.12). Beer was a substitute choice and it initially maintained its sales levels, although it too suffered losses in subsequent years, which continued up to 2015.

¹⁹ Association of Greek Chemists' fund contributions and stamp tax are included.

Figure 3.12: Total sales of alcoholic beverages and beer in Greece, 2009-2018

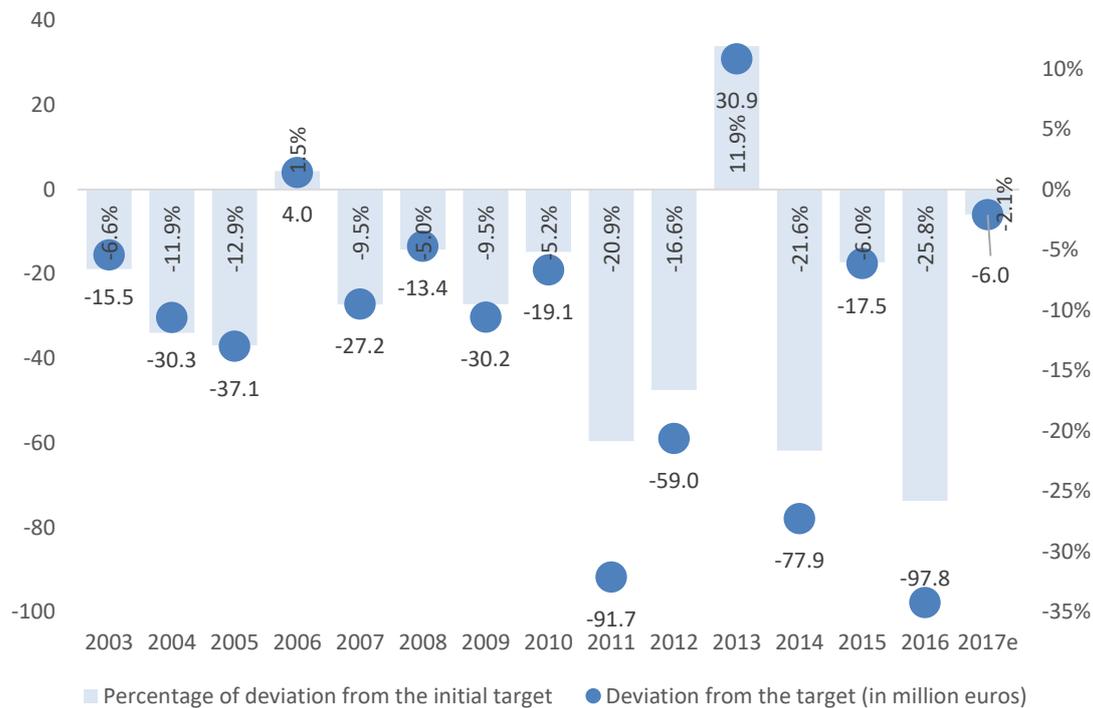


Source: Source: Ministry of Finance, General Chemical State Laboratory, IWSR, IOBE analysis.

Tax revenues rose in 2009 and 2010, after significant increases in rates, followed by a decline and relative stabilisation at lower levels. It is also worth noting that the tax increases on beer have had a positive effect on revenues (without this meaning that budget targets have been met), both because beer has acted as a substitute for other alcoholic beverages and because the extent of the illegal trade in beer is limited. Beyond the fluctuations in revenues, it is of particular importance to achieve the goals set in the budget for revenues from excise duties. However, over time, deviations can be seen between the revenues from taxation on alcoholic beverages actually collected compared to budget targets (Figure 3.13).

Excessive taxes reduce tax revenues, affect employment and growth, and place too much pressure on consumers. A recent study by the European Union Intellectual Property Office (EUIPO, 2016) estimated that intellectual property rights infringements in the alcoholic beverages sector has reduced sales by EUR 740 million or 4.4% of the total market. According to the study, the consumption of illegal alcoholic beverages constitutes a substantial threat to health. The size of illegal markets is directly linked to excessive increases in taxes on legal products. One estimate cited in this study puts Greece in second place in the EU with a percentage of 11%, the ranking criterion being the magnitude of lost sales of legal alcoholic beverages in relation to total sales in the domestic market.

Figure 3.13: Deviation of alcoholic beverage tax revenues from budgeted targets



Source: IOBE (2018).

In relation to the effectiveness of alcohol taxation in addressing public health issues, it has been observed internationally (Manning, Blumberg, & Moulton, 1995) that a tax increase on beverages already heavily taxed primarily affects the consumption of persons who are not alcohol-dependent (not addicted to alcohol), which limits the effectiveness of taxation as a health policy tool. In addition, it leads to a substitution for cheaper legal beverages that are not taxed (e.g. wine) or taxed at lower rates (e.g. beer), are legally non-standard (e.g. bulk 'tsipouro' and 'tsikoudia' (*pomace brandies*), wine) or untaxed (illegal) drinks. Therefore, the increased tax may not ultimately reduce per capita consumption of alcoholic beverages, but merely shift the consumption to cheaper, untaxed or illegal products that may have a negative impact on public health.

3.4. Conclusions

Tax revenues in Greece depend to a large extent on the special taxation of products and services, which, in addition to the collection of revenues, aims to achieve other public policy objectives, such as the protection of the environment and health. Accordingly, proper planning of excise duty policy is of great importance in fiscal terms, as well as in terms of correcting negative externalities and improving social welfare. Fuel, tobacco products, acquisition and use of passenger cars, and alcoholic beverages are the product categories that account for the major part of excise duty revenues in Greece. Apart from the taxation of vehicles, individual energy products and e-cigarette liquids, there are no significant figures for differential taxation in the other categories of taxable products.

In the period of fiscal adjustment in the Greek economy during the decade following 2010, excise duties were predominantly applied to strengthen tax revenues, through increased tax rates and the introduction of new special taxes. At the same time, the use of tax expenditure to promote public policy objectives was downgraded. This policy did not rely on any analysis of the wider economic consequences, including that of the negative externalities that would likely be curtailed by increased taxation. The results were evident in the respective markets, where demand fell sharply. However, the application of high rates of tax also had undesirable effects, such as an increase in the illicit trade of products subject to excise duty, while the revenues generated systematically fell short of the expectations and targets that had been set.

4. INTERNATIONAL DIFFERENTIAL TAXATION PRACTICES

4.1. Introduction

This chapter presents some of the international practices employed with regard to differential taxation of products, and examines the impact on society and the economy, depending on the primary policy objective pursued in each case. The use of differential taxation to achieve environmental goals has a wide range of applications, which either focus directly on reducing emissions or waste, or aim to enhance innovation and new product development, such as in the case of support for renewable energy sources and electric cars. In these fields we consider the examples of RES support in Italy, the imposition of carbon tax in Sweden, the provision of incentives for vehicles with low CO₂ emissions, and the imposition of environmental taxes on plastic bags. However, we also consider the application of differential taxation to other products, such as beer in the Netherlands and Denmark, and tobacco products in Sweden.

4.2. Renewable energy sources in Italy

Renewable energy sources (RES) are considered to be sustainable alternatives to traditional fuels such as coal, gas and oil. Renewable energy sources cannot be depleted, since they are naturally replenished, they have reduced or even zero impact on the environment, they have low operating and maintenance costs and they help reduce dependence on energy imports, enhancing the safety of each country's energy supply. On the other hand, the disadvantages of RES include the dependence of production on unpredictable weather conditions and the relatively higher (private) costs in relation to traditional energy sources²⁰. The development of RES through financial support or subsidisation of the market price of the energy they produce, is an example of the internalisation of positive externalities.

In Italy, as in the other Member States of the European Union, RES energy production grew significantly in the 2010s. Italy had always been heavily dependent on fossil fuels and energy imports, which it has previously sought to reduce by using nuclear energy. The first plant of this kind was built in 1959 and by 1978 three more had been put into operation. However, following the 1986 Chernobyl accident in the USSR, the Italian government decided to phase out the nuclear power plants, with the latter being decommissioned in 1990. In the same year, primary energy production in Italy relied 75% on fossil fuels (solid fuels, natural gas and oil) and 25% on RES, with hydroelectric production accounting for 42.6%, geothermal energy 46.6%, and biofuels for 10.6%. After the decommissioning of the nuclear power plants, Italy was highly energy dependent²¹ (about 84%) and in combination with the rise in oil prices due to the Gulf War, emphasis was placed on the further development of energy production from hydroelectric and geothermal power plants.

In 1995, Italy introduced consolidated legislation²² pertaining to excise duties on petroleum products, electricity and natural gas. It described the rates, exemptions and reduced tax rates for specific uses. Among other things, the production of electricity from RES, the consumption of natural gas for own-use in industry and biofuels were exempt from taxation. Petroleum,

²⁰ International Energy Agency - <https://www.iea.org/fuels-and-technologies/renewables>

²¹ From Eurostat data, based on its definition of energy dependency: (Imports - Exports) / (Gross domestic consumption + consumption of seafaring shipping and aviation).

²² DECRETO LEGISLATIVO 26 ottobre 1995, n. 504 - GU n. 48 del 29-11-1995 - Suppl. Ordinario.

natural gas for heating and for use in transportation and electricity generation were taxed at reduced rates.

In line with Directive 2001/77/EC on generation of electricity from RES and the setting indicative national targets for each EU Member State, Italy set a target in 2003 to increase the share of RES in electricity production to 25% by 2010. To achieve this goal, in addition to the use of excise duties, a broad framework of direct and indirect support mechanisms for energy generation from RES was set up. At the same time, the liberalisation of the wholesale electricity market²³ in 2004 and the retail market²⁴ in 2007 represent important developments.

Directive 2001/77/EC was replaced by Directive 2009/28/EC, which then set mandatory targets for the share of gross domestic electricity consumption from RES as part of total energy consumption in EU Member States. For Italy, the goal was to increase the share of RES in *total energy consumption* from 5.2% in 2005 to 17% in 2020. On the basis of the Italian Energy Action Plan, this target was broken down into sub-targets, namely 26.4% for the electricity sector, 17.1% for the cooling and heating sector, and 10.1% for the transport sector.

Since the early 1990s, RES energy production in Italy has been supported by the CIP6 mechanism, according to which entities generating electricity from renewable sources had the right to resell it to the Energy Services Operator (GSE) at a price higher than the market rate. In 2001, the Italian government implemented a similar Feed-in-Tariffs mechanism called "Conto Energia 1", which offered financial incentives to grid-connected photovoltaic (PV) producers. Payment (compensation) to the producers was calculated over a period of 20 years and it was intended to strengthen investments in photovoltaic systems. In addition, in 2002 a "Green Certificate" mechanism was put in place, which provided incentives for the production of electricity from RES. This mechanism required electricity suppliers to supply a minimum percentage of electricity generated annually by facilities using renewable sources. This percentage increased from year to year, while after 2007 the amount of energy produced from RES and used in the calculations of the minimum percentage, was adjusted by a multiplier that depended on the type of energy source, which helped some sources more than others. The Green Certificate system was modified in 2012, and new facilities receive a fixed tariff depending on the energy produced, while the duration of incentives is fixed as equivalent to the average life of the respective technological type of RES system.

The guaranteed injection rates (feed-in-tariffs) is a system of financial support that aims to accelerate investments in new RES technologies in electricity generation. RES producers enter into long-term contracts with the System Operator, which provide for predetermined compensation for the energy produced, which is usually higher than the average prices created in wholesale electricity markets. The level of guaranteed prices covers the cost of installation and operation of each RES generating plant, as well as the required return on investment, thus contributing to the financing of investments in new RES technologies. The

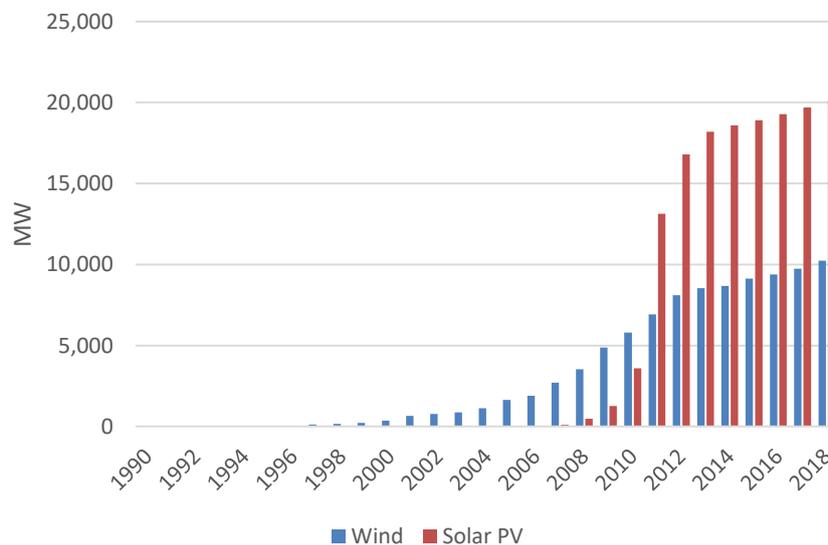
²³ Riordino del settore energetico, nonché delegate al Governo for the reassetto delle vigenti disposition in matter di energia. Official Version: Gazzetta Ufficiale della Repubblica Italiana; EU number: 2004/215; Post Date: 2004-09-13; Page: 00003-00048.

²⁴ Conversione in legge, con modificazioni, del decreto-legge 18 Aug 2007, n. 73, urgent need for urgency in the provision of free trade in goods and services. Official Version: Gazzetta Ufficiale della Repubblica Italiana; EU number: 188; Post Date: 2007-08-14.

diversification of guaranteed prices for energy produced through different RES technologies allows policy makers to encourage the development of one technology over another. In addition, guaranteed prices often incorporate a mechanism for reducing prices over time to encourage reductions in the costs of technology²⁵. The difference between guaranteed prices and the prices created in the electricity market essentially constitutes a form of special tax or subsidy, which is paid primarily by the consumers of electricity based on the quantity they consume and/or other criteria. However, since the higher this difference, the greater the burden on consumers, care must be taken when planning the respective RES promotion policy in order to avoid possible undesirable side effects.

Since the early 2000s, there has been a substantial response to the economic and regulatory incentives that were introduced in Italy to encourage development of RES. Investments in new RES electrical power generation technologies, initially in wind farms and, subsequent to implementation of the guaranteed injection price system, in photovoltaic plants, have led to a drastic increase in the installed capacity of the new RES installations (Figure 4.1). From the perspective of energy and climate policy objectives, the share of RES in total electricity production (including hydroelectric power and geothermal energy) has increased from around 20%, which was the average during the period 1990-2008, to 40% in 2018, with wind farms and photovoltaic plants making the greatest contribution to this development (Figure 4.2). As a result, the carbon intensity of CO₂ emissions from electricity generation in Italy was reduced by half, from 0.50 tCO₂/MWh in 1990 to 0.26 tCO₂/MWh in 2017. In a broader context, encompassing the energy sector as a whole, the Italian economy's dependence on energy imports was reduced to 76% in 2018 from more than 85% in the mid-2000s (Figure 4.3).

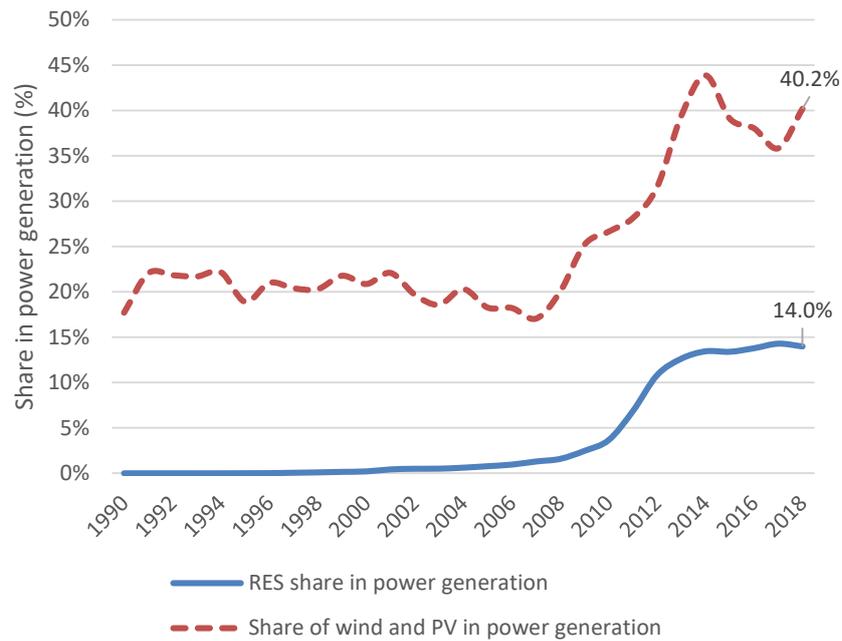
Figure 4.1: Installed capacity of wind farms and photovoltaic plants in Italy



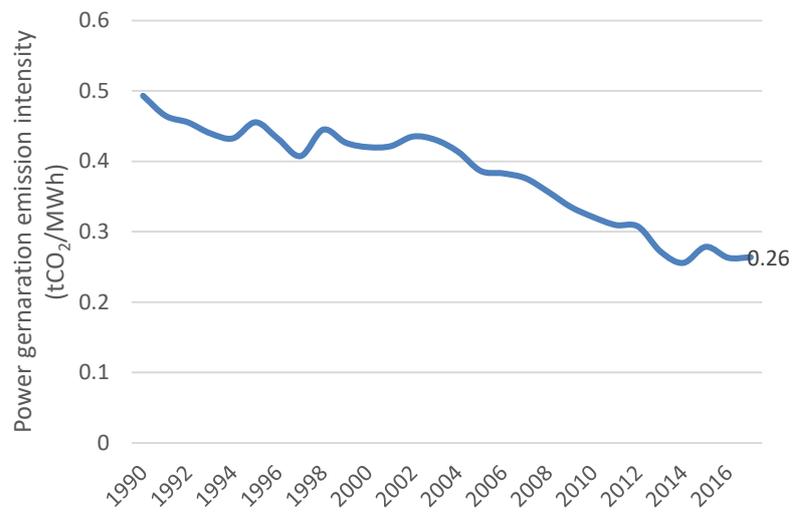
Source: Eurostat.

²⁵ Couture, T., Cory, K., Krecyk, C., Williams, E., (2010). Policymaker's Guide to Feed-in Tariff Policy Design. National Renewable Energy Laboratory, U.S. Dept. of Energy.

Figure 4.2: Participation of RES in the production of electricity in Italy

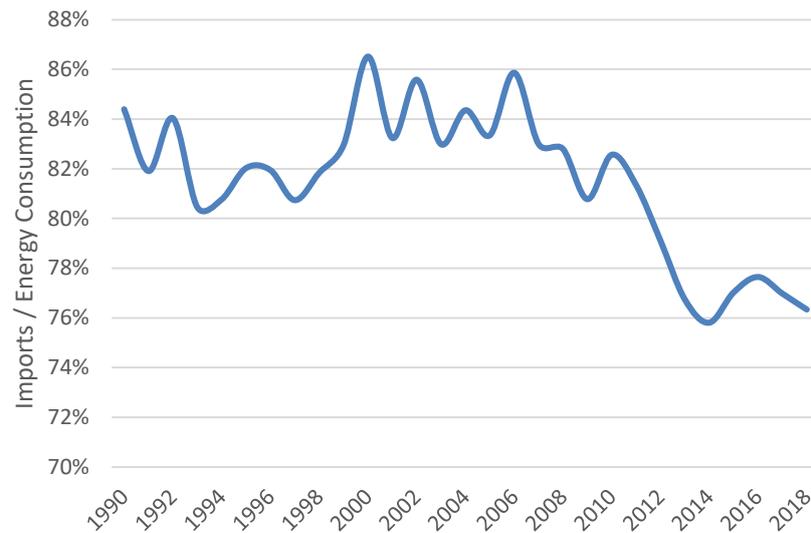


Source: Eurostat.

Figure 4.3: Power generation emission intensity in Italy (tCO₂/MWh)

Source: Eurostat.

Figure 4.4: Index of dependence on energy imports in Italy



Source: Eurostat.

The success of the policy for development of RES technologies and applications can of course be measured by the penetration achieved by RES in the electrical energy market. As far as Italy is concerned, it is clear that the penetration of RES is substantial and is increasing, while at the same time the reduction of energy dependence is unquestionable. However, an additional important indicator of the success of the relevant policies implemented on an international scale is the improvement in the competitiveness of RES technologies, as reflected in falling installation costs. This prevents, at least in the early stages of development, investments in RES technologies without additional financial support. At the global level, the costs of generating electricity from new RES technologies, including wind farms, photovoltaic plants and centralised solar thermal power plants, had dropped dramatically by 2018, and in some cases their production costs were directly competitive with the production costs of conventional power plants.²⁶ (Figure 4.5).

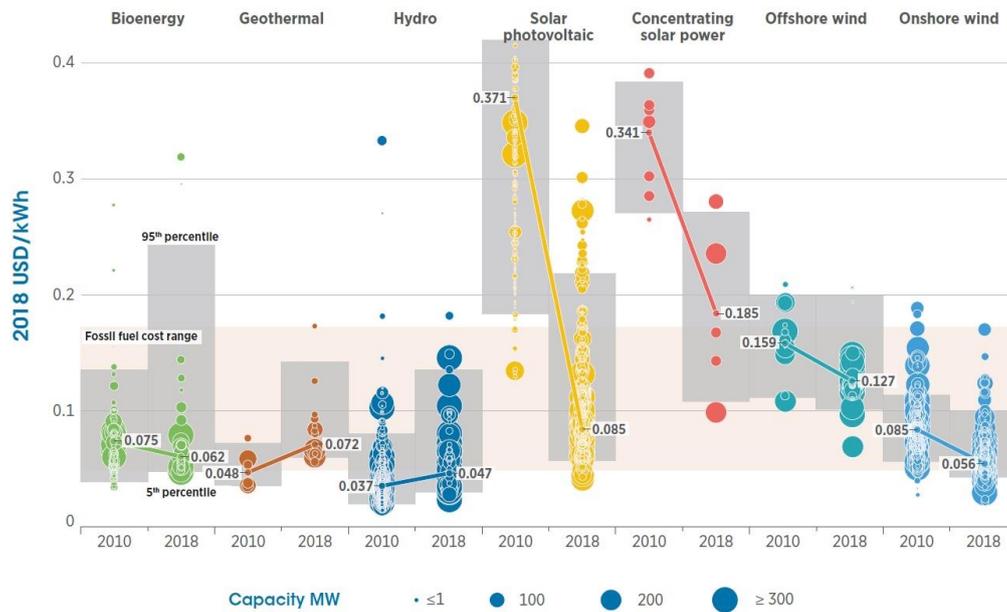
The reduction of installation costs originates from the reduction of costs and improvement of the technological efficiency of the parts and materials used, due to research and development (R&D) and/or the achievement of economies of scale, and the effect of the learning curve²⁷.

In any case, incentive and differential treatment policies which seek to internalise the positive externalities arising from the development of technologies or products (or respectively to reduce the negative external influences by using alternative technologies or products), are able to achieve the development of innovations and improvements, which in the long run are able to bring a net benefit to society.

²⁶ Renewable Power Generation Costs in 2018, International Renewable Energy Agency.

²⁷ Kavlak, Goksin & Mcnerney, James & Trancik, Jessika. (2018). Evaluating the causes of cost reduction in photovoltaic modules. *Energy Policy*. 123. 700-710. 10.1016/j.enpol.2018.08.015.

Figure 4.5: Global Weighted-Average Levelised Cost of Electricity (LCOE) from Renewable Sources (2010-2018)



Source: Renewable Power Generation Costs in 2018, International Renewable Energy Agency.

A typical example in the field of RES technologies is the significant drop in the unit installation costs of photovoltaic systems, which has fallen worldwide by 96% between 1980 and 2012. Improvements in system efficiency accounted for the biggest share of falling costs, followed by the falling price of materials and silicon, the reduced use of silicon, the reduction in the size of photovoltaic panels, the scale of production and improvements in the efficiency of the production process. Public and private R&D, economies of scale and the learning curve have also had a major impact. Although the impact of each factor on reduction of costs changes over time, the contribution of R&D has been particularly important over time.

The above improvements would not have been achieved if targeted RES financial support policies had not been implemented, which proved to be an effective complement to publicly funded R&D^{28, 29}. RES support policies can continue to help reduce costs through technological improvements, but they should nevertheless continue to be complemented by publicly and privately funded R&D to reduce the risk of depletion of capacity to improve current production, until new materials and technologies are developed that can drive down costs even further³⁰.

²⁸ Hoppmann, J., Peters, M., Schneider, M., Hoffmann, V.H., 2013. The two faces of market support—how deployment policies affect technological exploration and exploitation in the solar photovoltaic industry. *Res. Policy* 42, 989–1003.

²⁹ Trancik, J.E., Brown, P.R., Jean, J., Kavlak, G., Klemun, M.M., Edwards, M.R., McNerney, J., Miotti, M., Mueller, J.M., Needell, Z.A., 2015. Technology Improvement and Emissions Reductions as Mutually Reinforcing Efforts: Observations from the Global Development of Solar and Wind Energy. Technical Report. Institute for Data, Systems, and Society, MIT.

³⁰ Kavlak, G., McNerney, J., Jaffe, R.L., Trancik, J.E., 2015. Metal production requirements for rapid photovoltaics deployment. *Energy Environ. Sci.* 8, 1651–1659.

4.3. Carbon tax in Sweden

The carbon tax is a special environmental tax imposed on the use of fossil fuels based on their carbon content³¹. Together with greenhouse gas emission rights trading allowance (ETS) systems, carbon taxes are key policy tools which can be used to limit the use of fossil fuels, the combustion of which is linked to climate change or other negative externalities.

With carbon tax, the tax authorities set a price based on the carbon content per unit of fuel or the volume of emissions arising from the use of fossil fuels which must be paid by those using them. In this way, businesses and consumers are encouraged to take measures, such as using alternative fuels and the adoption of new technologies, which can lead to a reduction in greenhouse gas emissions. At the same time, the “carbon price” gives indirect impetus to innovation in the development of new “clean” technologies.

Compared to an emissions trading scheme, carbon tax offers a higher degree of certainty with regard to costs payable by taxpayers, but not the level of reductions of greenhouse gas emissions that might eventually be achieved. Under conditions of certainty the two systems are equivalent³². But in reality, since the environmental damage per unit of CO₂ cannot be accurately calculated, a trading system may be more effective in limiting the total amount of CO₂ and therefore its potential impact.

According to the International Monetary Fund (IMF), fiscal instruments, such as the carbon tax or the emissions trading scheme, are the most effective policies ensuring that fuel and energy prices incorporate the relevant environmental costs. Carbon pricing helps develop cleaner technologies, cleaner fuels and energy savings, while providing a significant source of tax revenue³³.

There are countries that only impose a carbon tax, others that are part of a trading system, and others that use a combination of the two (Figure 4.6). Internationally, about 40 countries and more than 20 cities, states and provinces are already using carbon pricing mechanisms, and more are planning to implement them in the future. Overall, current carbon pricing systems account for about half of their emissions, which translates to approximately 13% of annual global greenhouse gas emissions³⁴.

All Member States of the European Union (EU), as well as Iceland, Liechtenstein and Norway, participate in the EU ETS (EU ETS). On the other hand, fewer EU countries apply carbon taxes (Table 4.1). Carbon taxes can be levied on different types of greenhouse gases, including carbon dioxide, methane, nitrous oxide and fluorinated gases, while the share of carbon emissions covered varies from country to country. Sweden is one of the leading countries in the implementation of carbon tax in Europe, and has at the same time the highest tax rates per each unit of emissions.

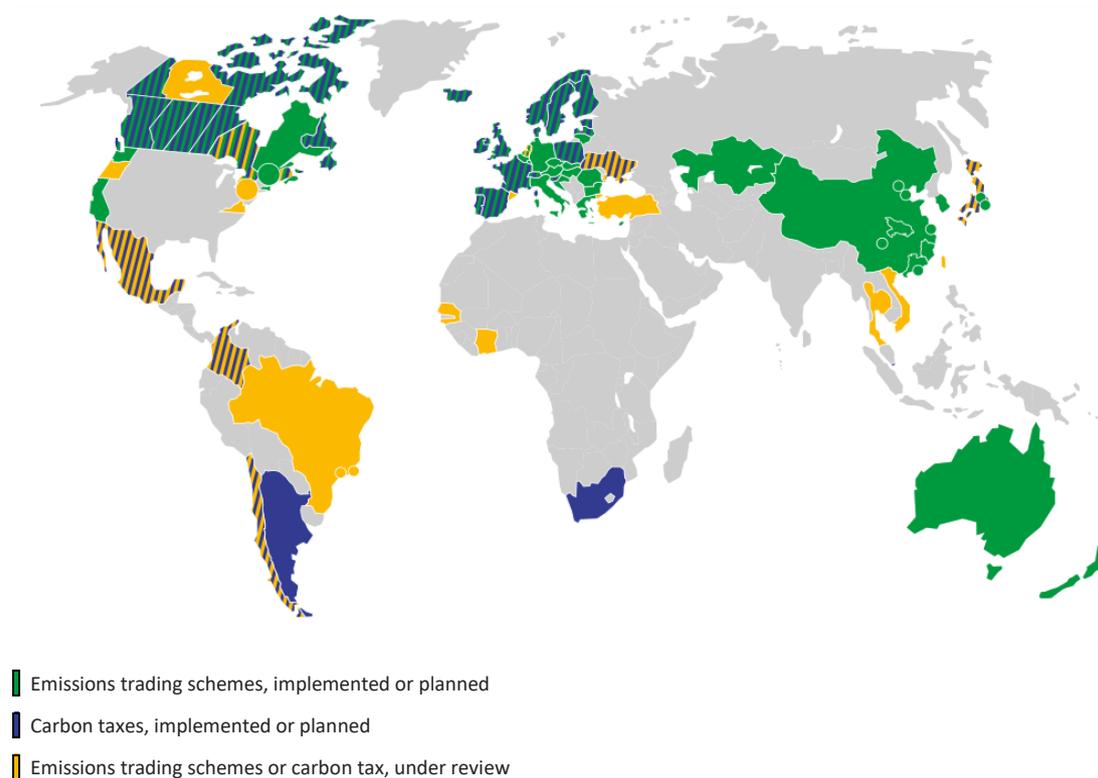
³¹ The term carbon tax is also used in the case of taxes imposed on emissions of any greenhouse gas or combination of greenhouse gases emitted in any economic sector, calculated on the basis of the carbon dioxide (CO₂) equivalence of these gases. CO₂ equivalence describes, for a given mixture and quantity of greenhouse gases, the amount of CO₂ that would have the same global warming potential (GWP) over the same period of time.

³² "Which Is Better: Carbon Tax or Cap-and-Trade?" Grantham Research Institute on Climate Change and the Environment, London School of Economics, 21 Mar. 2014

³³ IMF Factsheet, March 2016 - <https://www.imf.org/external/np/exr/facts/pdf/enviro.pdf>

³⁴ <https://www.worldbank.org/en/programs/pricing-carbon>

Figure 4.6: Emissions trading schemes and carbon taxes worldwide (2019)



Source: World Bank Group - State and Trends of Carbon Pricing 2019.

Table 4.1: Carbon tax rates in European countries (2019)

Country	Carbon tax (€/tCO ₂ e)	Share of covered emissions (%)	Year of implementation
Denmark	23.21	40	1992
Estonia	2.00	3	2,000
Finland	62.00	36	1990
France	44.60	35	2014
Iceland	27.38	29	2010
Ireland	20.00	49	2010
Latvia	5.00	15	2004
Norway	52.09	62	1991
Poland	0.07	4	1990
Portugal*	12.74	29	2015
Slovenia	17.00	24	1996
Spain	15.00	3	2014
Sweden	112.08	40	1991
Switzerland	83.17	33	2008
Ukraine	0.33	71	2011
United Kingdom**	20.34	32	2013

Source: Taxing Energy Use 2019 - OECD, Carbon Pricing Dashboard 2019 - World Bank.

* Portugal links carbon tax rate to last year's EU ETS price.

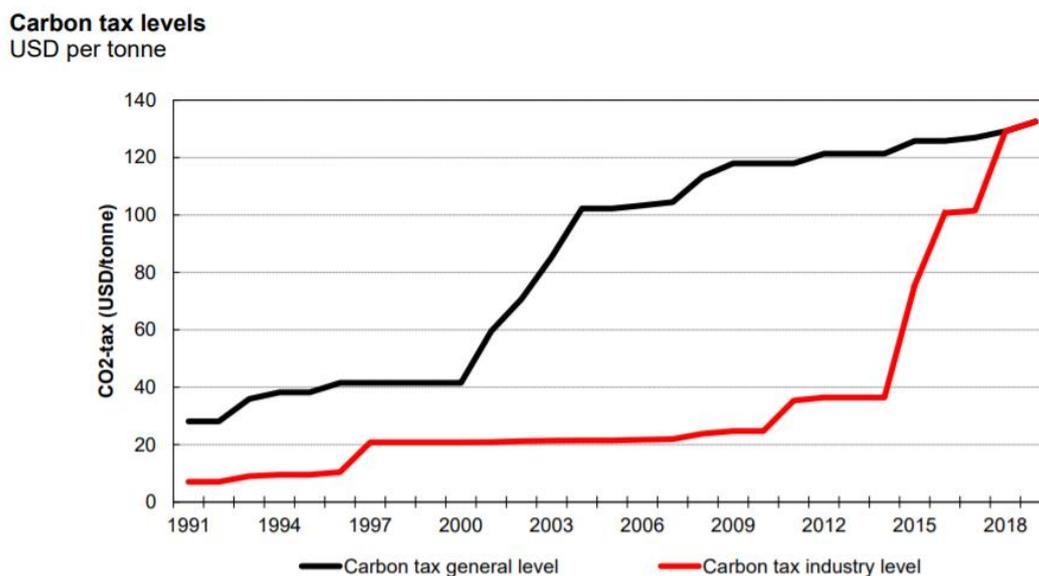
** The UK carbon tax rate is set at the difference between the price of the EU ETS and the country's annual augmented carbon price target.

Sweden introduced a CO₂ tax in 1991, in addition to energy taxes (which were simultaneously reduced by 50%), as part of a fiscal reform aimed at shifting the tax burden from labour taxes

to environmental taxes³⁵ and VAT. The reduction in income taxes corresponded to 4.6% of GDP for the same year and it was only partially offset by revenues collected from CO₂ and SO₂ taxes, which amounted to 1.2% of GDP. Based on current exchange rates, the carbon tax rate in Sweden was around €23/tCO₂ eq in 1991, increasing to €84/tCO₂ eq in 2004 and further increasing to €110/tCO₂ eq in 2020.

The carbon tax rate has undergone several changes, which originated with the need to strengthen the competitiveness of the Swedish economy, given that without the introduction of specifically targeted tax cuts Swedish industry would have been facing a particularly high overall tax burden (Figure 4.7). Until 1993, industry and households were charged the same rates for energy and CO₂ taxes, but after the country's economic crisis in the early 1990s, the unit tax on energy and CO₂ was dramatically reduced for industry, agriculture, forestry and fisheries. From 1993 onwards, these economic sectors were exempt from energy tax payments and were liable only for a reduced CO₂ tax, while from 1998 onwards, CO₂ tax rates for industry have remained virtually stable in real terms.³⁶

Figure 4.7: Carbon tax rates in Sweden (1990-2018)



NOTE: from 2008 industry outside EU Emissions Trading Scheme (EU ETS)

Source: Lessons learned from 25 years of carbon taxation in Sweden (2018) - Ministry of Finance, Sweden.

In 2008, differential tax treatment was introduced between sectors of manufacturing industry covered by the EU Emissions Trading System (EU ETS) and sectors not covered by it. For manufacturing industry to which the EU ETS applied, the minimum carbon tax was reduced in 2008 from 21% to 15% and it was abolished in 2011. On the other hand, since non-ETS sectors generally have lower energy intensity, an increase in carbon tax is not expected to have a

³⁵ Speck, S., Andersen, M.S., Nielsen, H., Ryelund, A. and Smith, C., 2006, The Use of Economic Instruments in Nordic and Baltic Countries 2001–2005, Nordic Council of Ministers, TemaNord 2006:525, Copenhagen.

³⁶ Weishaar, Stefan E. (2018). Introducing Carbon Taxes at Member State Level - Issues and Barriers. WIFO Working Papers, No. 557.

major impact on their competitiveness³⁷. Thus, for sectors outside the EU ETS the minimum carbon tax was increased from 21% to 30% in 2011, and to 60% in 2015.

An important aspect of Sweden's carbon tax reforms was their gradual implementation in combination with overall changes to environmental taxation, as well as the functioning of the EU Emissions Trading System (EU ETS), which was incorporated later. Gradual reforms and the political commitment to future changes in the scope of the taxes in question are important parameters when implementing these taxes, since they allow essential time in which the sectors affected can adapt and switch to more efficient and less environmentally harmful energy sources.

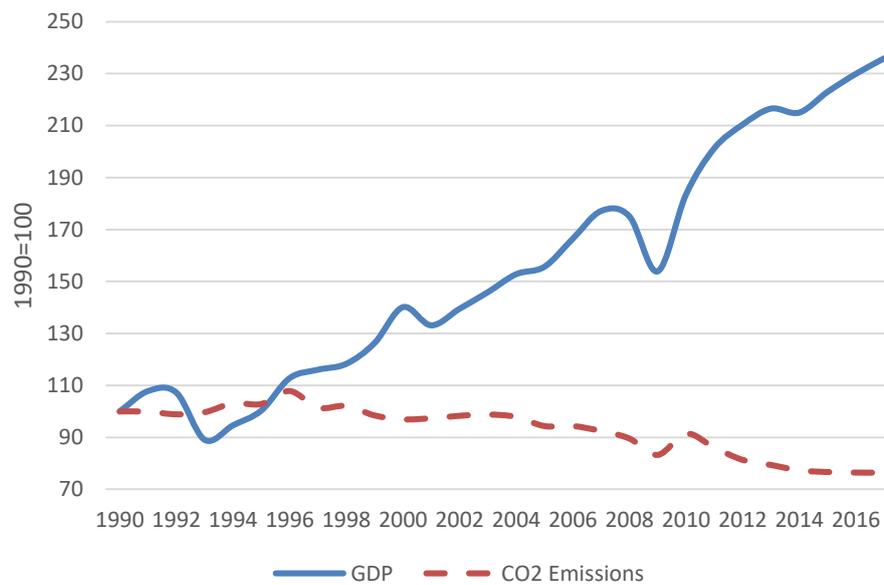
The 1991 tax reforms in Sweden were not intended to be revenue-neutral. They aimed to reduce personal income tax and partially offset it by increasing VAT and other energy and environmental taxes. During the period 2001-2010, tax reforms gave emphasis to the reduction of taxes for the low-paid and the reduction of social security contributions, while revenues from the then new carbon tax were to be used to finance these reductions.

It is worth noting that in the late 1980s the Swedish economy was at a disadvantageous position. Due to increased tax burdens, the reduction of income tax had become a political priority and in order to reduce the budget deficit, new tax bases had to be defined, such as in the case of carbon tax³⁸. The manufacturing sector in Sweden has resisted the carbon tax, fearing the negative impact on competitiveness, however, good governance and general support for the new policy proved crucial to the successful introduction of the new tax. The reduction in income tax combined with increasing concern about environmental damage created a base for support from households. The initial resistance from manufacturing industry resulted in the adoption of exemptions and reductions which came in the form of reduced social security contributions, together with schemes to improve energy efficiency and special provisions for high-intensity energy industries. Thus, support from households and the compromise with the requirements of manufacturing industry created the appropriate conditions for political support of the new tax by most of the parties involved. The broader policy framework was reviewed as a whole and was regularly updated to meet changing circumstances and respond to developments as appropriate. The consensus approach to environmental taxation followed by Sweden has highlighted the importance of redistributing the tax burden in order to mitigate the negative effects on income distribution and business competitiveness.

³⁷ Hammar, Henrik; Åkerfeldt, Susanne. (2015). CO₂ Taxation in Sweden - 20 Years of Experience and Looking Ahead. Report for Ministry of Finance, Sweden.

³⁸ Sterner, T. (1994), Environmental Tax Reform: The Swedish Experience, Environmental Policy and Governance 4:6.

Figure 4.8: GDP and greenhouse gas emissions in Sweden, Base year



Source: Eurostat.

The implementation of carbon tax in Sweden has resulted in a reduction in greenhouse gas emissions, without hindering the country's growth. From 1990 to 2005, when the EU ETS was implemented, greenhouse gas emissions were generally declining and had fallen by around 10%. Subsequently, from 2005 to 2015, the downward trend continued, with the total reduction of greenhouse gas emissions since 1990 reaching 26% (Figure 4.8). Despite implementation of the EU ETS in 2005, the carbon tax has been adjusted to complement ETS in relation to targets set by the country. This has resulted in a reduction in greenhouse gas emissions, despite the change in the regulatory framework and the temporary failure of the first phase of the ETS in the period 2005 to 2007. Nevertheless, the success of the carbon tax as implemented in Sweden is demonstrated by the upward trend of the country's GDP in the same period.

CO₂ emission pricing is essential in the context of the application of “the polluter pays” principle¹². Policy instruments must be cost-effective, technologically neutral, preferably internationally coordinated, and must avoid multiple exceptions and special arrangements. In this context, carbon tax can be very effective, since it is easy to manage and adjust, ensures that different fuels are taxed according to actual emissions, while the additional administrative costs of adding it to existing energy taxes are virtually negligible.

4.4. Low-emission vehicles in the EU and Norway

Growing needs for road transport of people and goods create environmental, social, and economic challenges, while at the same time they are to a large extent responsible for air pollution, releasing pollutants that are particularly harmful to both human health and the environment.

Recognising the importance and impact of climate change on the economy and the natural environment, the European Union (EU) has designed and implemented a series of strategies aimed at transforming the climate crisis into an opportunity with significant environmental

and socio-economic benefits. The European Climate and Energy Strategy 2030 aims,³⁹ among other things, to reduce greenhouse gases by at least 40% compared to 1990, and to increase the share of RES in the energy mix to at least 32% of gross energy consumption.

The transport sector is crucial to the achievement of these goals in all Member States, given that it accounts for 25% of total EU greenhouse gas emissions. It is the second largest sector in the EU in terms of greenhouse gas emissions, after the energy sector. In addition, it is the only sector in the EU for which the level of emissions has continued unabated since 1990. Road transport is responsible for 72% of transport sector emissions in the EU, while the use of private cars and light trucks produces 12% of total CO₂ emissions. For this reason, especially for the road transport sector, legislative arrangements are in progress which are aimed at the gradual reduction of emissions and promotion of vehicles that cause less environmental disturbance.

In 2016, the European strategy for low-emission vehicles has established a common basis for the transition to environmentally-cleaner transportation through optimisation of transport systems and more intensive use of low-energy alternatives. Then in 2017 the EU proposed a revision to the Clean Vehicles Directive⁴⁰, through which conditions were created for an integrated framework to assess the energy and environmental impact of vehicles which takes into account the effects on energy consumption and the environment over the useful life of the vehicle. In addition, the Clean Mobility package of measures aimed to create basic alternative fuels infrastructures, as well as identifying mobility issues and technologies that are necessary to achieve the targets for 2025 and 2030. In addition, a framework was presented for CO₂ emissions specifications of private passenger cars and light trucks for the period after 2020, and⁴¹ zero and low emissions vehicles (ZLEVs) were defined as passenger and light trucks with emissions of less than 50g CO₂/km.

The Greek institutional framework for reduction of emissions from private transport vehicles is in the process of harmonisation with the European framework. The Greek National Energy and Climate Plan, published in November 2019, envisages, among other things, improving energy efficiency and reducing the carbon footprint of transportation, while aiming to achieve a 30% share for electric passenger vehicles in new registrations by the year 2030. It also sets average CO₂ emission ceilings for new passenger car registrations and a reduction of 37.5% by comparison with 2021⁴².

EU policy texts recognise how important it is for Member States to provide incentives for consumers in order to boost sales of energy-efficient cars. This was the reason why, in 2013, the EU presented a guide to the basic principles of incentives planning, which pertained to light vehicles (private passenger cars and light trucks), heavy vehicles (buses, trucks) as well as two and three-wheeled motorcycles. The financial incentives used can be grants or tax

³⁹ COM/2014/015 - Climate and energy policy framework for the period 2020 to 2030.

⁴⁰ Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles.

⁴¹ Regulation 2019/631/EU of the European Parliament and of the Council of 17 April 2019 setting CO₂ emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011.

⁴² Average CO₂ emissions for 2021 are projected to be lower than in 2020, the latter being a year in which average emissions are estimated to be 95g/km.

breaks, while the use of negative incentives (penalties), making the purchase of energy inefficient vehicles uneconomical, is not ruled out. In any case, the European guide recommends taking into account four principles when planning and implementing incentive systems:

- Technological neutrality: incentives should not be limited to vehicles with a specific technology, as this may limit the spread of other technologies with a correspondingly low environmental footprint.
- Common performance criteria: incentives concerned with vehicle performance based on pollutant emissions, measured using a specific, common methodology.
- Proportionality: incentives must take into account the overall performance of the vehicles. An example would be a horizontal incentive for all vehicles with CO₂ emissions below a certain level, which does not appear to be a priori compatible with the guide.
- Level of incentive: it should not exceed the purchase price difference between an energy-efficient and a conventional vehicle.

Use and acquisition incentives are important to boost the market share of low-emission vehicles, but even more important are incentives to purchase new vehicles. It is accepted that the new low-emission vehicles incorporate new technologies, the development of which requires significant research and development (R&D) costs, which are eventually integrated into vehicle prices. At the same time, it is considered that the purchase of a vehicle with low emissions creates positive externalities, since in addition to the benefits for the owner, a positive result is created for society as a whole, due to reduced fuel consumption and reduced pollutant emissions (Table 4.2). In addition, there are benefits to be gained from reduced fuel imports and the reduction of dependence on fossil fuels, while the positive impacts on productivity, and public health, among others, should also be taken into account.

Table 4.2: Benefits and costs of low-emission vehicles

Private Individuals		Society as a whole	
Benefit	Cost	Benefit	Cost
<ul style="list-style-type: none"> • Lower fuel consumption; • Unrestricted access to the city centres; • Reduced or zero vehicle registration and road tax; 	<ul style="list-style-type: none"> • Higher costs of purchase, given that low-emission vehicles incorporate new, more expensive technologies, resulting in a higher purchase price than for a conventional car; 	<ul style="list-style-type: none"> • Fewer emissions, meaning mitigation of climate change and better air quality, especially in urban areas; • Reduced fuel imports and improved trade balance; • Productivity, health, property prices, etc. 	<ul style="list-style-type: none"> • Lower state revenues from excise duties (fuel tax)

On this basis, it is deemed necessary to subsidise a portion of the higher purchase costs in order to boost sales of low-emission vehicles, which offers a positive benefit for consumers themselves, the environment and the climate. Subsidy programmes in the EU 28, the US, China and elsewhere, are moving in this direction. Incentives to buy electric, hybrid and all categories of low-emission vehicles in EU countries are varied, and differ from country to country (Table 4.3) depending on the specifics of each market.

Table 4.3: Subsidy for the purchase of lower emission vehicles, EU28, 2013-2018

Country	2013	2018
Austria	Electric vehicles are exempt from road tax Hybrids have an added benefit, with reduced registration fees for vehicles with emissions below 120g CO ₂ /km	BEV and FCEV vehicle purchase subsidies of EUR 3,000 up to 2020 and EUR 1,500 for PHEVs and EREVs
Belgium	Exemption of electric vehicles from the registration fee in Flanders & subsidy of EUR 2,500 in Wallonia	Brussels: Financial incentives for companies to purchase electric vehicles (expired on 29/3/2019) Flanders: Purchase incentive, with a EUR 4,000 subsidy for BEVs and FCEVs (passenger cars and light trucks)
Finland	Electric vehicles pay the minimum rate of 5% of the environmental tax	Incentive to purchase: EUR 2,000 for BEVs (up to EUR 50,000 in value)
France	Subsidy of between EUR 1,000 and EUR 2,000 for cars with emissions below 110g CO ₂ /km	Bonus-malus system: Subsidy of up to EUR 6,000 for cars with pollutant emissions of less than 20g CO ₂ /km Vehicles with emissions below 117g CO ₂ /km are exempt from emissions penalties Car withdrawal programme: subsidy of up to EUR 5,000 for the purchase of new or used BEVs and PHEVs.
Germany	1-year exemption of electric vehicles from road tax	Environmental incentive: EUR 4,000 for BEVs and FCEVs EUR 3,000 for PHEVs and EREVs
Greece	Exemption of electric and hybrid vehicles from the respective vehicle registration fees	
Ireland	Exemption of electric vehicles from the registration fee up to EUR 5,000 Plug-in hybrids up to EUR 2,500 and hybrids up to EUR 1,500	Subsidy of up to EUR 5,000 for BEVs (until 31 December 2021) Subsidy of up to EUR 5,000 for BEVs (until 31 December 2019)
Italy	Electric vehicles are exempt from road tax for 5 years, & pay 75% thereafter	Bonus-malus system: Subsidy of up to EUR 6,000 for cars with pollutant emissions of less than 20g CO ₂ /km (1 March 2019 - 31 December 2021). Penalty: up to EUR 2,500 for cars with emissions over 250g CO ₂ /km
Netherlands	Exemption of electric vehicles from the registration fee Hybrids are exempt if their pollutant emissions are less than 88g CO ₂ /km	Exemption from purchase tax for fully-electric vehicles and plug-in hybrids
Portugal	Exemption of electric vehicles from the registration fee Hybrids (50%)	
Romania	Exemption of electric and hybrid vehicles from the respective vehicle registration fees	Withdrawal programme: EUR 10,000 for BEVs (with an additional EUR 1,500 for withdrawal of vehicles over 8 years old) - until 31 December 2019 EUR 4,500 grant for new HEVs
Slovenia	-	Purchase incentives: EUR 7,500 for BEVs - EUR 4,500 for BEVs (light and heavy trucks) EUR 4,500 for PHEVs (passenger and light trucks) and EREVs - EUR 3,000 for BEVs (light trucks)
Spain	Purchasing incentives from several local government authorities of between EUR 2,000 and EUR 7,000 to buy electric or hybrid vehicles	Purchasing incentives for BEVs, FCEVs, PHEVs, EREVs: Up to EUR 5,500 for passenger cars - EUR 6,000 for light vehicles - EUR 8,000 for medium vehicles - EUR 15,000 for heavy vehicles
Sweden	Exemption from road tax for 5 years on those vehicles that consume minimal energy	Purchasing incentives: 60,000 Kroner (EUR 5,759) for BEVs 10,000 Kroner (EUR 960) for PHEVs with pollutant emissions below 60g CO ₂ /km
United Kingdom	Subsidy at 25% of the value, with an upper limit of GBP 5,000	Government subsidy (through vehicle dealerships): Passenger car subsidy at 35% of the value of BEVs, (up to GBP 3,500 or EUR 4,011)

Source: ACEA.

Incentives are imposed differently in each country. In cases some the incentive is a fixed amount, while in others it is proportional to the value of the vehicle. At the same time, since the course of action in the EU28 is not to subsidise specific technologies⁴³ but to subsidise the outcomes in relation to efficiency and the consequent reduction of pollutants, most

⁴³ SWD (2013) " Guidelines on financial incentives for clean and energy efficient vehicles

programmes classify the subsidy provided according to the category of vehicle to which they apply (electric, hybrid, etc.). Higher amounts are usually offered as incentives to purchase electric vehicles, followed by hybrids or plug-in hybrids. These programs have been in effect for a number of years and have led to increased market shares for low-emission vehicles in the countries where they are implemented.

Box 4.1: Incentives for electromobility in Greece

The transition to a low-emission economy in the transport sector is based on measures for the promotion and operation of the market for electric vehicles which aim to shape an integrated framework for the development of the Greek market of low and zero emission vehicles, under the European Commission communication entitled 'A European Strategy for Low-Emission Mobility' (COM(2016)0501)

On the basis of Law 4710/2020 (Government Gazette, Series I, No 142/23-07-2020), financial incentives are offered for the replacement by withdrawal of light trucks and taxis with the corresponding new exclusively electric vehicles or hybrid electric vehicles with external charging and pollutant emissions of up to 50g CO₂/km, as well as for the purchase or leasing of such vehicles by private individuals. Incentives are also offered for the supply and installation of electric vehicle recharging points, and free parking is available to electric vehicles with pollutant emissions of up to 50g CO₂/km, for which a special sticker is issued by the Ministry of the Interior. Other financial incentives relate to the issuance or modification of licences for the installation or operation of electric vehicle manufacturing units and goods or items related to electric vehicles located in the Region of Western Macedonia and the Arkadia Regional Unit in the Peloponnese Region, areas economically affected by the move away from lignite as resource for electricity generation. Lastly, in addition to the registration fee, an emergency environmental tax will be imposed for the import of Euro 4 and 5a technology cars, with the proceeds going towards promotion of e-mobility, while the import of older technology cars is to be prohibited.

Tax incentives are also provided for the promotion of electric vehicles, with reduced tax rates for companies producing electric vehicles and goods or items related to electric vehicles, but also through tax depreciation on assets, investment costs, and zero or low emission means of transport. Other tax incentives aim to boost the employment of such companies in areas affected by the move away from lignite, where increased deductions are offered against specific zero or low emission vehicle costs with regard to employees, businesses and the environment. Also, for both individuals and businesses, income exemptions for tax purposes are offered on expenses or concession of low or zero emission vehicles, i.e. up to 50g CO₂/km.

In addition to these financial and fiscal incentives, attention has been paid to the organisation of the electricity market and definition of the role and obligations of participants, who are registered in the newly-established Register of Infrastructure and Electricity Market Agencies. In addition, spatial and urban planning regulations have accounted for parking and charging points, with special arrangements for licenced taxis and disabled persons, while the framework for the development of publicly accessible recharging infrastructure has been created. Lastly, the operating conditions of the market for maintenance and repair of electric vehicles have been determined as far as infrastructure arrangements and supporting business activities are concerned, including repair workshops and technicians.

Of interest, however, is the case of Norway, where the penetration of low-emission vehicles is particularly strong. Norway has a long history of offering incentives for electric cars, dating back to 1990⁴⁴. A clear and stable policy framework, combined with the respective political commitment on the part of the government, is crucial to creating credible long-term conditions for the electric car market. The Norwegian parliament has decided that,

⁴⁴ European Alternative Fuels Observatory - <https://www.eafo.eu/countries/norway/1747/incentives>

nationwide, by 2025 all new cars sold should be zero emission⁴⁵ (electric or hydrogen). The government has decided to keep the incentives for cars with zero emissions until the end of 2021, when they will be revised depending on market developments. The overall message from the majority of political parties is that it should always be economically viable to choose cars with zero or low emissions over cars with high emissions, which is achieved by applying 'the polluter pays' principle to vehicle taxation.

The vehicle registration fees for all new cars are calculated based on the weight of the car, CO₂ and NO_x emissions, and since the registration fees are tiered, large cars with high emissions thus become much more expensive than corresponding conventional cars. In recent years, however, registration fees have been gradually adjusted to place more emphasis on emissions and less on weight. Particularly strong incentives apply to the purchase of zero emission vehicles (ZEVs), given that electric cars (Battery Electric Vehicles - BEVs) are exempt from registration fees and import tax. VAT exemption and registration fees are granted only to BEV owners, and this difference is crucial to the lower purchase price of BEVs compared to Plug-in Hybrid Electric Vehicles (PHEVs).

In addition, Norway has introduced a special licence plate for electric vehicles, which allows authorities to choose location-based incentives, such as free parking and use of bus lanes, while also raising awareness of clean vehicles on the roads. On the basis of this licence plate, local municipal authorities in Norway, as of 2016, have jurisdiction to determine categories and exemption rates. This has led to different approaches at the local level. For example, electric cars pay the same parking fees in Trondheim, half the fee in Bergen city centre compared to their conventional equivalents, and are subject to differential parking fees in Oslo, where 20% of municipal car parks are allocated to electric cars and parking and recharging are free. In addition, public funding has been provided for fast charging stations every 50 km on main roads, while a regulation has been drafted on the requirements for charging spaces in new buildings, which must allocate a minimum 6% of parking space to electric cars.

At the same time, electric cars were exempted from paying tolls for the use of regional and national road networks, while from 2019 they pay tolls, but with a lower fee than ICEs. Since 2009, electric cars have also been entitled to free access on most ferries connecting sections of the national road network, while for non-national railway crossings, local authorities decide on toll fees. The Norwegian parliament has decided to apply the 50% rule, which means that local governments and municipalities cannot charge more than 50% of the price charged for conventional ICE vehicles for ferries, tolls and public parking facilities.

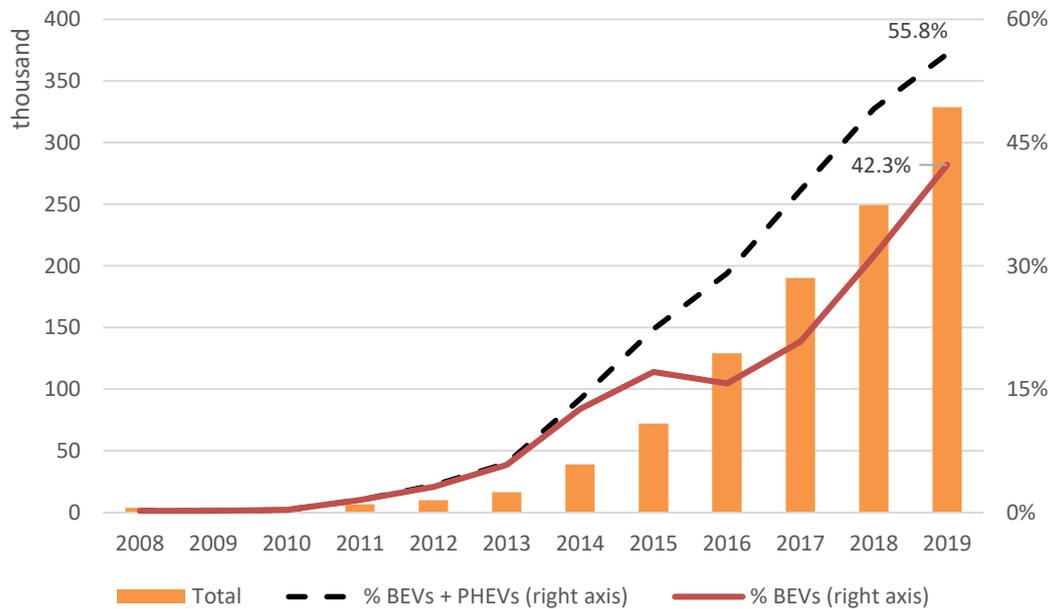
Norway's policy on low-emission vehicles has led to a dramatic increase in their market penetration over the last decade (Figure 4.9). In 2019, the low emission vehicle fleet exceeded 328,000, a figure that represents about 12% of the total fleet of vehicles using all types of fuel⁴⁶. To date, the share of sales of new low-emission vehicles amounts to more than 55% of total new vehicle sales. In addition, the necessary infrastructure to support the alternative

⁴⁵ Norwegian Electric Car Association - <https://elbil.no/>

⁴⁶ Statistisk sentralbyrå – Statistics Norway - <https://www.ssb.no/en>

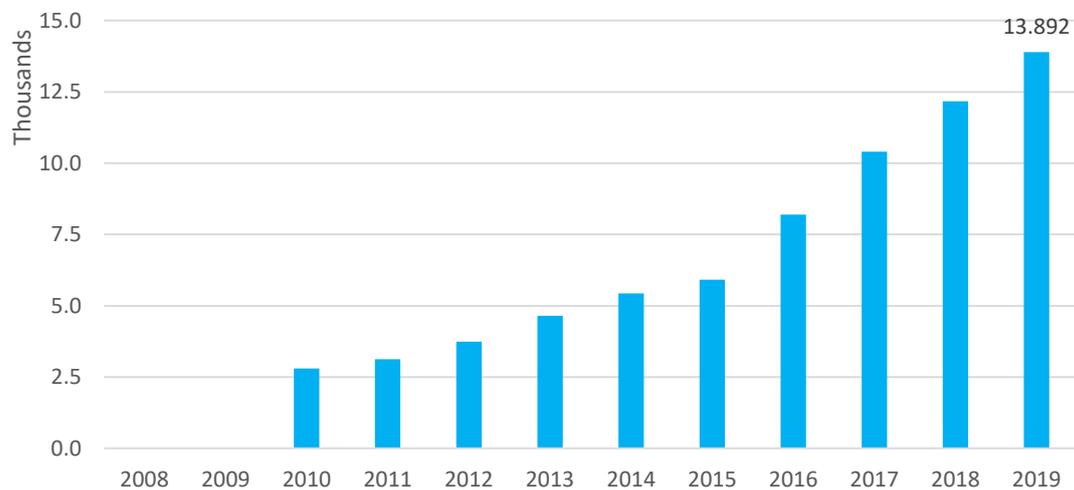
fuel car market, for example refuelling stations, have increased almost fivefold in the last decade and in 2019 they numbered nearly 14,000 (Figure 4.10).

Figure 4.9: Population of alternative fuel passenger cars and percentage of new alternative fuel vehicles in the total new fleet in Norway, 2008-2019



Source: European Alternative Fuels Observatory.

Figure 4.10: Total number of alternative fuel stations in Norway, 2008-2019



Source: European Alternative Fuels Observatory.

4.5. Beer in the Netherlands and Denmark

European legislation allows Member States to impose reduced rates on certain low-alcohol beverages⁴⁷. A typical example of such taxation is beer with a low or zero alcohol content. Pursuant to Article 6 of Directive 92/84/EEC, the minimum rate for excise duties on beer is set at EUR 0.748/hl/°Plato or EUR 1.87/hl/°alc. However, Article 1 of the same Directive states that beers with an alcohol content of up to 2.8% may be taxed at a reduced rate, without a minimum threshold. The use of a reduced rate distinguishes between products based on their alcohol content, in relation to the predetermined limit of 2.8%, creating in essence two tax scales. Five EU Member States (Denmark, Finland, France, Malta and Sweden) make use of the reduced rate option (Table 4.4).

Table 4.4: Excise duty on beer in the EU-28, 2019

	Excise Duty €/hl/°Plato	Excise Duty €/hl/°alc.	Reduced Excise Duty €/hl/°alc.	VAT %
Austria	2.0			20
Belgium	2,0043			21
Bulgaria	0.7669			20
Cyprus		6.0		19
Czech Republic	1.242			21
Germany	0.787			19
Denmark		7.5137	0.0	25
Estonia		16.92		20
Greece	5.0			24
Finland		36.5	9.6	24
France		7.49	3.75	20
Croatia		5.3814		25
Hungary		5.0149		27
Italy	2.99			22
Lithuania		7.11		21
Luxembourg	0.7933			17
Latvia		6.8*		21
Malta	1.93		0.45	18
Poland	1,8203			23
Romania	0.7295**			19
Sweden		19.5547	0.0	25
Slovenia		12.1		22
Slovakia		3.587		20

Source: DG Taxation and Customs Union - Excise duty tables - Part I - Alcoholic Beverages – 2019.

* Minimum tax EUR 12.5/100Lt

** Calculated based on the exchange rate between the Romanian leu and the euro

However, the EU regulatory framework sets minimum rates, but does not impose a specific method of taxation, which each country can choose according to its objectives. Accordingly, five (5) of the EU-28 countries tax beer at tiered rates (Spain, Ireland, the Netherlands, Portugal and the UK), which translates into an additional charge for beer with a higher alcohol content (Table 4.5).

⁴⁷ Council Directive 92/83/EEC of 19 October 1992 on the harmonisation of the structures of excise duties on alcohol and alcoholic beverages.

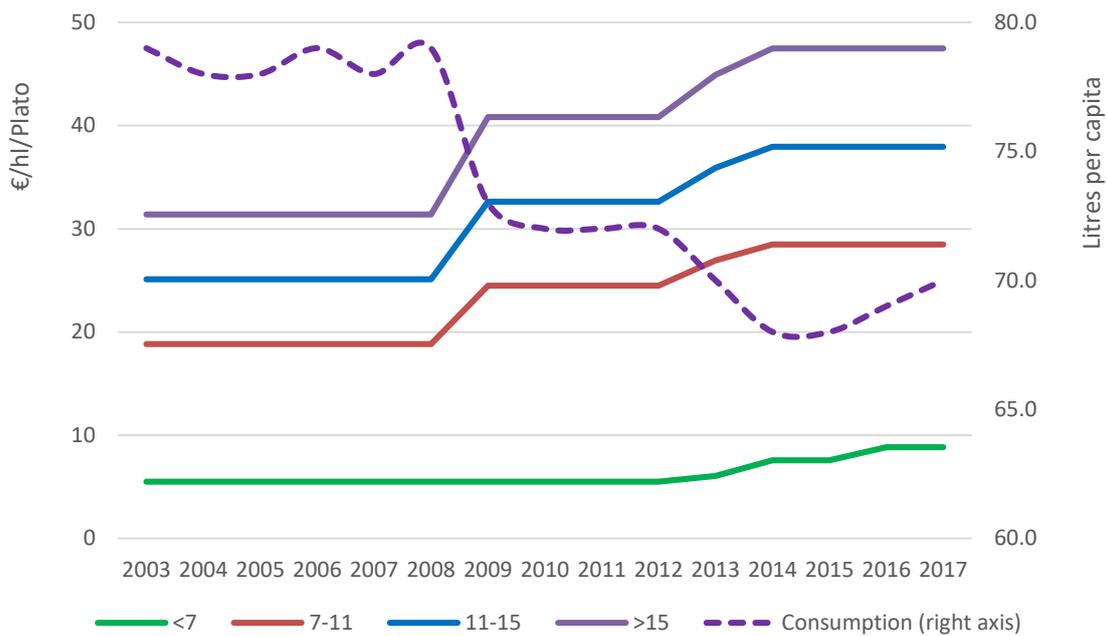
The Netherlands, which uses five (5) tiers to tax beer based on the Plato degree by volume and hectoliters, increased excise duty in 2009, which resulted in a 10% drop in per capita beer consumption. Additional increases imposed in the period 2013-2014 further reduced consumption, and despite the slight upward trend in consumption since that time, losses were not recovered until 2017 (Figure 4.11).

Table 4.5: Tiered excise duties on beer in the EU-28, 2019

	Beer tax criteria	Excise Duty €/hl/°Plato	Excise Duty €/hl/°alc.	Reduced Excise Duty €/hl/°alc.	VAT %
Spain	<1.2°alc			0.0	21
	1.2-2.8°alc		2.75		21
	<11°Plato and 1.2-2.8°alc		7.48		21
	11-15°Plato		9.96		21
	15-19°Plato		13.56		21
	>19°Plato	0.91			21
Ireland	<1.2°alc			0.0	23
	1.2-2.8°alc			11.27	23
	>2.8°alc		22.55		23
Netherlands	<1.2°alc			8.83	21
	<7°Plato		8.83		21
	7-11°Plato		28.49		21
	11-15°Plato		37.96		21
	>15°Plato		47.48		21
Portugal	0.5-1.2°alc			8.34	23
	<7°Plato	10.44			23
	7-11°Plato	16.7			23
	11-13°Plato	20.89			23
	13-15°Plato	25.06			23
	>15°Plato	29.3			23
UK	1.2-2.8°alc			9.4524	20
	2.8-7.5°C		21.4194		20
	>7.5°alc		27.8071		20

Source: DG Taxation and Customs Union - Excise duty tables - Part I - Alcoholic Beverages – 2019.

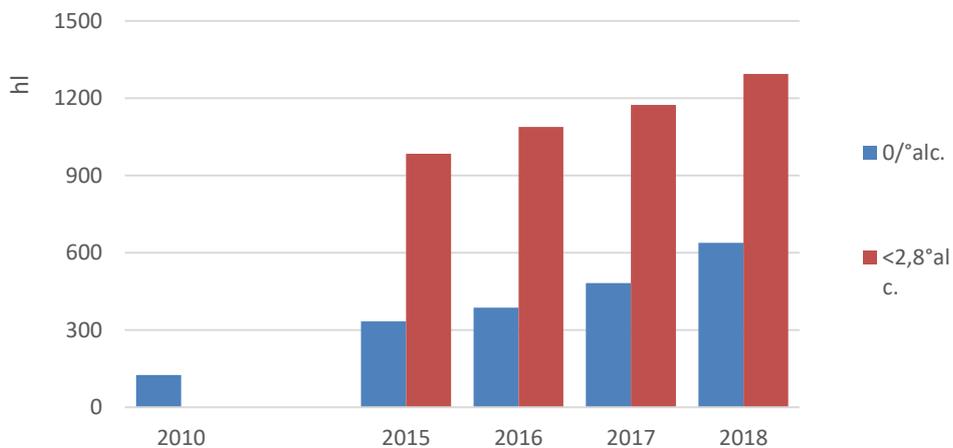
Figure 4.11: Excise duty rates per degree Plato and per capita beer consumption in the Netherlands, 2003-2017



Source: DG Taxation and Customs Union - Data on taxation (2003-2017), The Brewers of Europe - Beer Statistics (2010, 2012, 2014-18).

The lowest rate, applied to beers with less than 7 Plato degrees per hectolitre i.e. low or zero alcohol beers, increased consumption of this category of product. Specifically, in recent years there has increasing demand for these beers, as evidenced by the fact that in 2016 their consumption increased by 15%, in 2017 by 24%, and in 2018 by 32%. In 2010, consumption of zero alcohol beers amounted to 125hl, while by 2018 it amounted to 638hl, which represents a percentage increase of more than 500%. Similarly, consumption of low alcohol beers increased from 985hl in 2015 to 1294hl in 2018, that is, an increase of more than 30% (Figure 4.12).

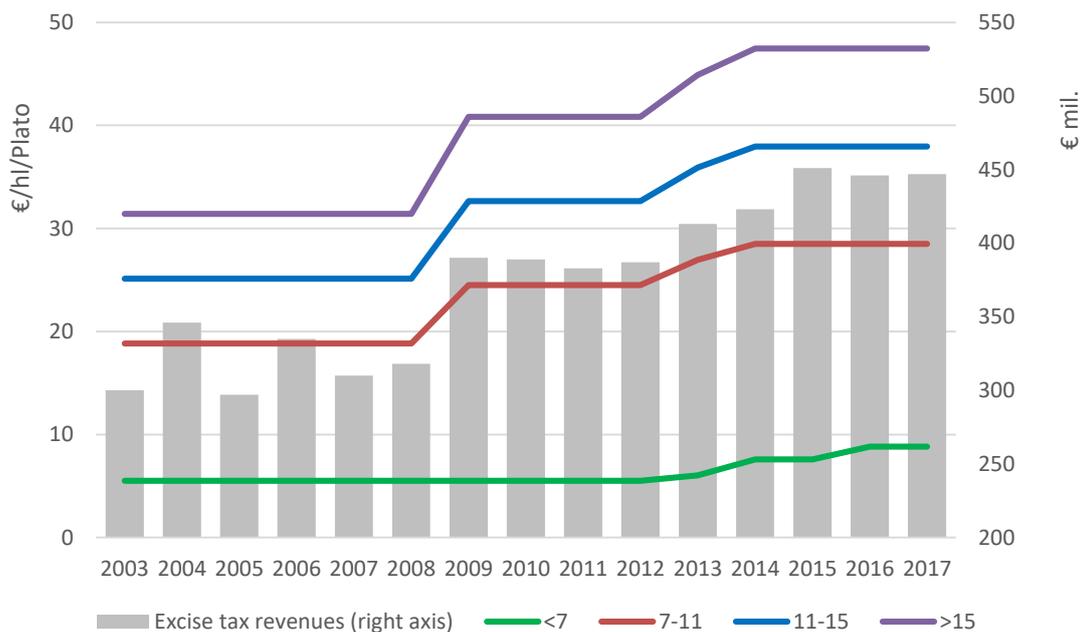
Figure 4.12: Consumption of low or zero alcohol beer in the Netherlands



Source: Nederlandse Brouwers - Bierconsumptiecijfers 2016-2018.

In the Netherlands, the excise duty on beer has increased by more than 50% since 2003. For beers with more than 7 degrees Plato, excise duties were increased in 2009 by 30%, in 2013 by 10% and in 2014 by 5.75%. At the same time, excise duties on beers with low or zero alcohol content, i.e. with less than 7 degrees Plato, saw increases of 10% in 2013, 25.5% in 2014 and 16.4% in 2016. These increases have had a direct impact on excise duty revenues from beer (Figure 4.13), given that from a level of approximately EUR 300 million per year, by 2008 revenues had increased 25% to around EUR 400 million per year, while after the later increases in 2013-2014, they have reached an amount of about EUR 450 million per year over the last 3 years.

Figure 4.13: Excise duty rates per degree Plato and excise duty revenues in the Netherlands, 2003-2017

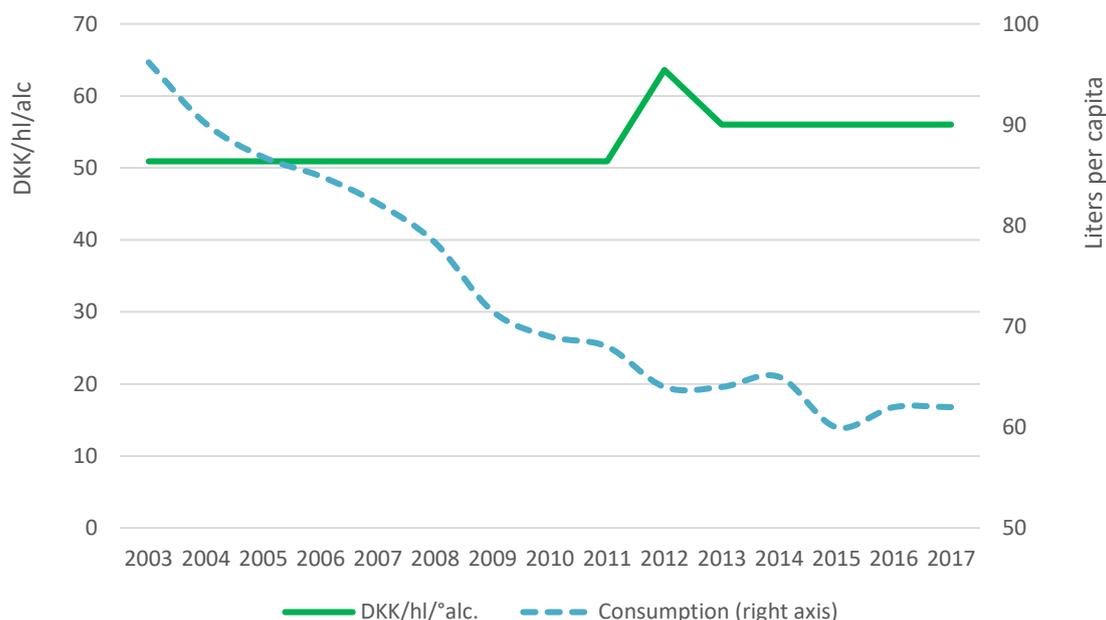


Source: DG Taxation and Customs Union - Data on taxation (2003-2017), Nederlandse Brouwers - Bierconsumptiecijfers 2010-2018.

In another EU-28 Member State, Denmark, which does not apply scaled taxes on beer, the percentage rate of tax on beer has remained relatively stable since 2003, with only one increase⁴⁸ of 10% taking place in 2012. Since then, the excise duty rate remained stable until 2019 when it was cut by 13%, falling to the lowest level in the last 15 years. At the same time, despite the stability of the excise tax rate, per capita beer consumption has been steadily declining, with an overall reduction amounting to more than 30% since 2003 (Figure 4.14).

⁴⁸ In 2012, excise duties were raised by 25%. They were then reduced in the following year by 12%, meaning that in the period 2011 to 2013 the overall increase amounted to 10%.

Figure 4.14: Excise duty rates per percentage alcohol content and per capita beer consumption in the Netherlands, 2003-2017



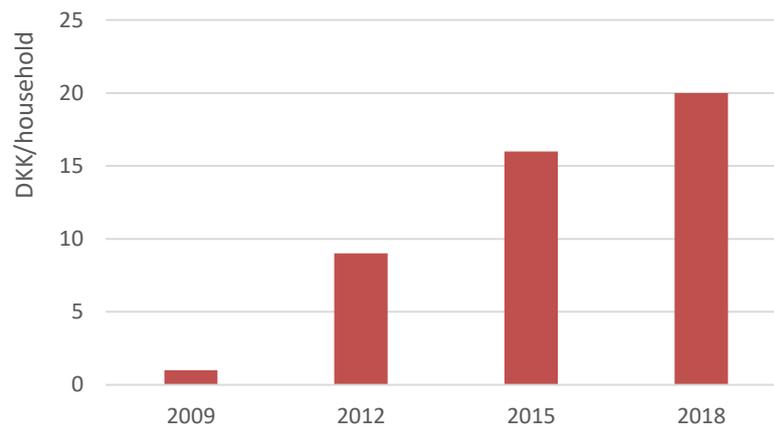
Source: DG Taxation and Customs Union - Data on taxation (2003-2017), The Brewers of Europe - Beer Statistics - 2010, 2012, 2014-18.

Low or zero alcohol beers are exempt from excise duty in Denmark, with the result that their consumption has increased over the last decade (Figure 4.15). Despite the reduction in total beer consumption, the increase in the cost of low or zero alcohol beer indicates an increase in the share of these products in the Danish beer market as a whole.

As the previous examples show, diversifying the taxation of alcoholic products may push consumption in the direction of products with a lower alcohol content. The lower rate of excise duty on low or zero alcohol beers has also helped in the development of new products. According to the two largest breweries in the world, the market share of beer with low or zero alcohol content has steadily increased in recent years. Specifically, Anheuser-Busch InBev has said that, with the addition of 12 new products in 2018, it now offers 76 products with low or zero alcohol content. Indeed, in 2018 beers in this category held an 8% share in overall sales of beer, while it has set a target of increasing this share to 20% by 2025⁴⁹. Heineken, the second largest company in terms of sales of beer in the world, now offers 325 different low or zero alcohol products, for which it has not set specific targets, while it declared a 5.7% share of sales for beers in this category in 2018.

⁴⁹ Anheuser-Busch InBev - 2017 Annual Report.

Figure 4.15: Average household consumption of low or zero alcohol beer in Denmark, per unit price, 2009-2018

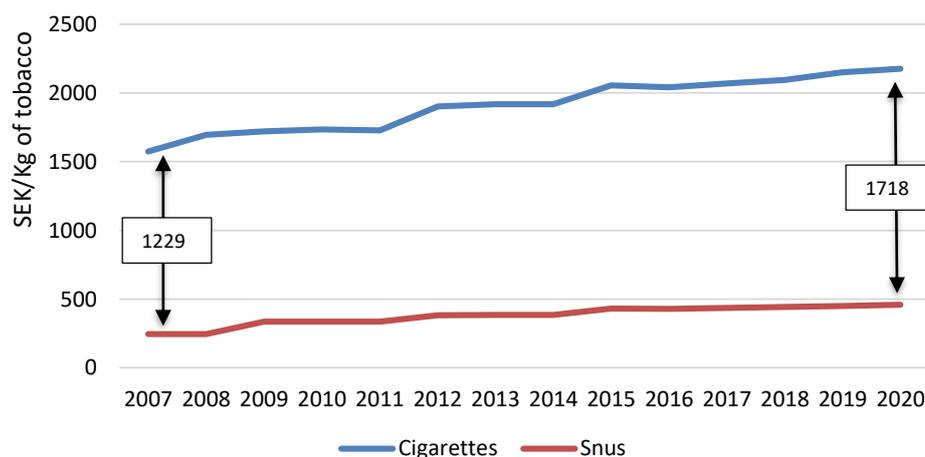


Source: Økonomi- og Indenrigsministeriet - Danmarks Statistik - <http://www.statistikbanken.dk/>

4.6. Tobacco products in Sweden

Cigarettes and snus⁵⁰ have been taxed in Sweden since the early 1970s. In the early 1990s it was decided to apply differential taxation to these products, with the duty on cigarettes being set at a higher level than for snus (Figure 4.16). Since then the increases in excise duty rates have been consistently higher for cigarettes than for snus. As a result in 2020 cigarettes in Sweden were subject to tax rates that were almost 5 times higher than the rates applied to snus (Table 4.6). The goal of the differential tax treatment was to encourage consumers who cannot or do not want to quit smoking to use snus, which is thought to be a less harmful alternative to cigarettes. This tax differential has had a distinct impact on consumer behaviour, given that since 1996, more packs of snus were sold than packs of cigarettes (Figure 4.17).

Figure 4.16: Evolution of tax rates on tobacco products in Sweden (in SEK)



Source : <https://www.skatteverket.se/>

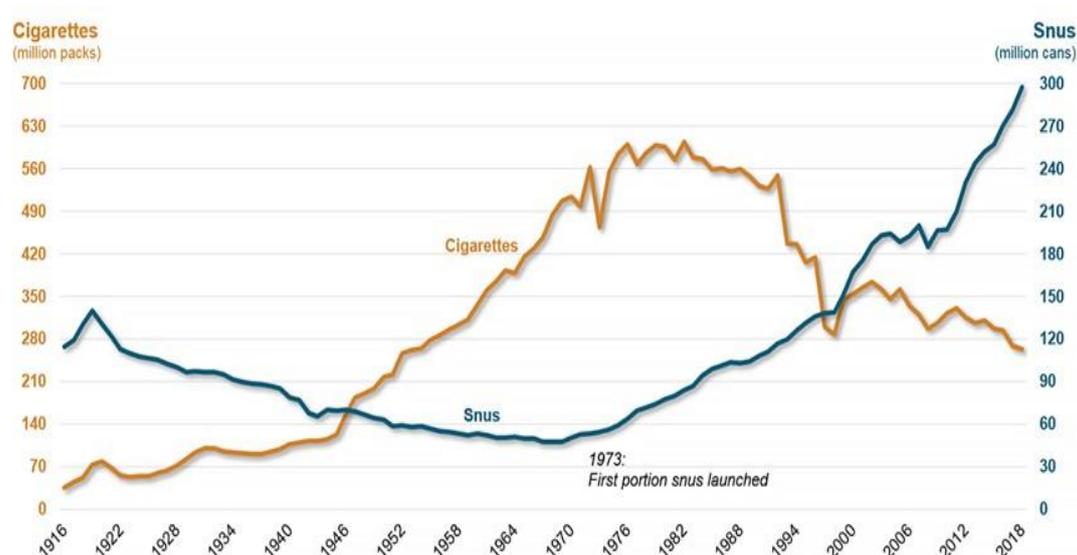
⁵⁰ A type of dry non-smoking tobacco product intended exclusively for chewing, which is prohibited elsewhere in the EU, Sweden being the exception.

Table 4.6: Tax rates on tobacco products in Sweden, 2020 (in SEK)

	Per 1000 units	Per 1000 kg	On the retail sales price.
Cigarettes	1,600		1%
Cigars	1,410		
Fine-cut tobacco		1,957	
Other tobacco products		1,957	
Snus		459	
Chewing tobacco		506	

Source : <https://www.skatteverket.se/>

Figure 4.17: Sales volume of cigarettes and snus in Sweden, 1916-2018



Source : <https://www.swedishmatch.com/Snus-and-health/Tobacco-use/Tobacco-use-in-figures/>

In 1997, Sweden was the first country in the world to meet the World Health Organization's target for the year 2000 of keeping the percentage of adult smokers below 20%⁵¹. Sweden had the lowest rate of smoking-related deaths (10%) in the European Union in 2000,⁵² where the percentage averaged 23%. Most recently, in 2017, Sweden had the lowest percentage of daily smokers⁵³ among the EU-28 countries, with 7%, while the United Kingdom was in second place with 17%. At the same time, it also had the lowest male mortality rate in the EU-28, with 41.4 deaths per 100,000 inhabitants in 2016, compared to the next lowest mortality rate of 60.6 per 100,000 inhabitants in Finland. Without ruling out the influence of other factors among the above effects on the health of the population, there are strong indications that the differential tax treatment of these tobacco products has played an important role.

4.7. Environmental tax on plastic bags

The demand for plastic products is growing worldwide and especially in Europe. Total plastics demand in Europe increased from 46 million tonnes in 2010 to 52 million tonnes in 2017,

⁵¹ Tobacco Statistics 1970-1999. Statistical Report 2000-09-18, VECA HB Statistical Bureau.

⁵² In 2000 the European Union consisted of 25 countries.

⁵³ Eurobarometer 458, May 2017 -Smoking in Europe –Percentage of residents who smoke daily.

representing around 15% of global demand⁵⁴. The use of plastic continues to increase, due to its low price and useful properties which make it an effective material in a wide variety of applications. The packaging sector uses most of the plastic produced, followed by construction, the automotive industry and electronics.

Most plastics are durable with a long useful life. However, this also means that after their use they become a burden on the environment, and a percentage ends up in the sea, where the accumulation of plastic waste is now an issue of global proportions. Plastic waste in the environment is converted over time into microplastics (small pieces of plastic less than 5 mm in size), while the toxins they contain, either as additives in the original plastic (e.g. dyes), or as chemicals that are absorbed and transported by them afterwards (e.g. organic pollutants), eventually entering the food chain. Evidence to date shows that plastic particles can be toxic and more research is needed to assess the potential long-term risks to humans, animals and plants⁵⁵.

Efforts to improve the use of natural resources are a key part of the EU's long-term sustainable development strategy. In this context, in 2014 the European Commission issued a communication entitled "Towards a circular economy: a zero waste programme for Europe" (COM 2014/398), outlining the Commission's initiatives and proposals to facilitate the transition to a circular economy. Among other things, with this programme the Commission announced that it intended to conduct further analysis of the major failures at the level of the market and governance to prevent the creation of waste materials and their reuse. In addition, the Commission proposed specific quantitative targets for the recycling of packaging waste (60% in 2020, 70% in 2025 and 80% in 2030), by reducing the use of lightweight plastic carrier bags and banning their disposal in landfills, as well as replacing them with recyclable plastics and other recyclable and biodegradable materials by 2025.

In Europe, all waste prevention programs include measures that are either directly aimed at preventing plastic waste or are horizontal measures that also address the need for avoidance of plastic waste. In addition, several countries have introduced measures targeting specific plastic products, such as plastic bags, disposable plastics or microplastics. In most cases, these measures do not work in support of specific objectives, but rather set general objectives for the prevention of waste as a whole, i.e. reducing the volume of waste. The resources available to governments can be divided into regulatory, market-based, financial, voluntary and informative.

Regulatory instruments are those that are enacted by law and cover, for example, prohibitions and standards, thus affecting the behaviour of market participants through mandatory regulations. Market-based instruments seek to address environmental issues and achieve environmental goals by encouraging targeted changes in business practices and consumer behaviour. Familiar policy instruments of this type consist not only of taxes, fees, subsidies, and extended liabilities for producers, but also include systems to refund advance payments, and these can make contributions to the prevention of plastic waste. Typically, under national

⁵⁴ European Environmental Agency - Report No 02/2019 - Preventing plastic waste in Europe.

⁵⁵ Auta, H.S., Emenike, C.U., Fauziah, S.H. 2017. Distribution and importance of microplastics in the marine environment: A review of the sources, fate, effects and potential solutions. *Environment International* 102: 165–176.

law, the collection and recovery of packaging waste is financed through fees charged for participation in a collection and recovery system. Participation fees are calculated according to the specific materials used in the packaging and their weight, in order to create incentives for avoidance of unnecessary packaging.

Voluntary agreements are typically agreements that are the result of negotiations between social partners and other stakeholders. Financial instruments relate to public resources that are able to support the implementation of regulatory frameworks, as well as those that rely on market-based measures. Other measures that can help prevent the generation of plastic waste are the development of appropriate infrastructure for the management of plastic waste, the provision of funding for research and development, the strengthening of new businesses, and green public procurement contracts. Furthermore, the media can contribute to the prevention of plastic waste by facilitating the exchange of information within the plastics value chain and influencing the behaviour of stakeholders. Awareness, education and environmental labelling are also recognised tools that public authorities can apply.

In recognition of the particularly substantial environmental impact of lightweight plastic carrier bags, European institutions have approved amendments to the original packaging Directive⁵⁶. Specifically, the Directive⁵⁷ issued in 2015 set standards for lightweight (<50µm) and very lightweight bags (<15µm) and set new obligations for Member States to reduce the use of lightweight bags. It also made provisions for measures to label biodegradable and compostable plastic bags, as well as for the submission of reports to evaluate the effectiveness of the measures introduced by the Directive. In particular, to limit the use of the lightweight bags, Member States were required to implement one or both of the following measures:

- To ensure that the annual consumption level does not exceed 90 lightweight plastic carrier bags per capita by the end of 2019. Furthermore, the target for the end of 2025 was set at 40 plastic bags per capita. Very lightweight plastic carrier bags could be excluded from national consumption objectives.
- To ensure that by the end of 2018 at the latest, lightweight plastic bags are not supplied free of charge at points of sale of goods or products. Very lightweight bags were excluded from this measure.

Directive (EU) 2015/720 amended the original Directive 94/62/EC on packaging and packaging waste with the objective of reducing consumption of lightweight plastic carrier bags. Greek law was harmonised with Directive 2015/720/EU in 2017⁵⁸. Specifically, as of 1 January 2018, consumers in Greece are required to pay an environmental tax for each lightweight plastic carrier bag, with very lightweight plastic carrier bags (with a wall thickness of less than 15 microns (µm)) and biodegradable or compostable plastic bags being exempt. The environmental fee was introduced as of 1 January 2018, set at three (3) cents, and as of 1 January 2019 at seven (7) cents. It has a contributory character, given that it constitutes public revenue attributable to the Hellenic Recycling Organisation. The available data on revenues

⁵⁶ Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste.

⁵⁷ Directive (EU) 2015/720 of the European Parliament and of the Council of 29 April 2015 amending Directive 94/62/EC as regards reducing the consumption of lightweight plastic carrier bags.

⁵⁸ Article 6, Law 4496/2017 (Government Gazette, Series I, No 170/8-11-2017)

from the plastic bag environmental fee indicate that consumption of plastic bags had already fallen in the second quarter after its introduction, while the estimate for 2018 as a whole is on target, at 63.84 units per inhabitant per year (Table 4.7).

Table 4.7: Verified revenues from plastic bag environmental fees in Greece, 2018

Time period	Revenues (EUR million)	Units/inhabitant/m onth	Estimated corrected annual value (units/inhabitant)
January - March	6.10	6.28	63.84
April - June	4.76	4.90	
July - September	4.64	4.78	

Source: Ministry of the Environment and Energy

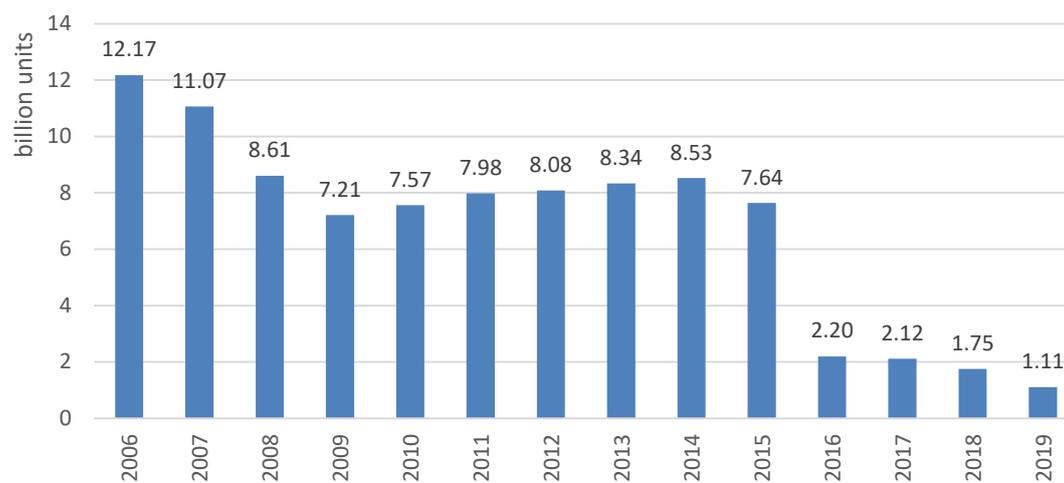
The case of the United Kingdom is also of interest in relation to the policy of restricting the use of plastic bags. The UK Plastics Pact is a policy programme for England, Scotland and Wales. It is a voluntary pact between manufacturing industry, the waste and resources action programme (WRAP⁵⁹), and the Ellen MacArthur Foundation. This Pact was signed by 68 organizations representing 80% of plastic packaging sold through supermarkets in the UK and seeks to create a circular economy for plastics. It brings companies from across the plastics value chain in contact with the British government and non-governmental organisations to address the problem of plastic waste. The targets by 2025 include the complete elimination of unnecessary disposable packaging, 100% of used plastics becoming recyclable, reusable or compostable, 70% of plastic packaging becoming recyclable or compostable, and 30% of plastic packaging being recycled on average. The “Courtauld Commitment” is another voluntary agreement aimed at improving efficient use of resources and reducing waste in the UK food sector. The agreement, funded by the local authorities of England, Scotland, Wales and Northern Ireland, began operating in 2005 and is now in its third phase, which includes a quantitative target to reduce product and packaging waste in grocery stores by 3%. Scotland has also pledged to ban non-recyclable disposable plastics by 2030, while charging for plastic bags has reduced their consumption by 80%. Scotland's strategy for the circular economy⁶⁰ (Making Things Last) has been in effect since 2016 and in terms of investment supports innovative technologies, including plastics recycling.

In the United Kingdom, there is a charge of £ 0.05 per disposable plastic bag. In England, 19 bags per person per year were used in 2019, compared to 140 bags per person per year in 2015, when the government introduced this charge, in other words, there has been an 86% reduction in consumption within a four-year period. In Scotland, the corresponding law came into force in 2014 and consumption has fallen by 80%, while the Scottish Government has pledged to increase the charge to £ 0.10 as soon as feasible. In Wales, where the usage fee of £0.05 was introduced in 2011, there was a fall of 70% by 2014, while in Northern Ireland between 2017-2018 the number of plastic bags saw a reduction of 67.1%. Given that the population of England represents around 80% of the total population in the United Kingdom, the imposition of the £0.05 charge in 2015 had a significant effect, given that the total number of bags used fell by more than 70% in the same year (Figure 4.18).

⁵⁹ The Waste and Resources Action Programme – WRAP.

⁶⁰ <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>

Figure 4.18: Consumption of disposable plastic bags in the United Kingdom, 2006-2019



Source: <https://data.gov.uk/>- <https://www.wrap.org.uk/>

5. CONCLUSIONS

Excise duties are relatively effective **sources of tax revenue**, they help to improve the distribution of resources by **internalising the external costs** associated with product consumption or production, they discourage the consumption of products that are considered harmful, they serve as a **charge for the use of public goods**, such as roads, and can promote progressive taxation (e.g. taxes on luxury goods). The imposition of excise duties can also lead to the development of new substitute products with fewer negative externalities, that is, they act as an incentive which reinforces innovative activity, which is one of the key drivers behind economic growth and the creation of highly skilled, productive and rewarding jobs. If tax policy-makers tax both the original and the innovative substitute product equally so as not to reduce tax revenue due to substitution, they will discourage innovation, which, apart from continuing to maintain negative externalities, may also result in a slowing down of economic growth.

The correction of negative externalities is the primary justification for excise duties, although the need to collect revenues from the taxation of basic goods carried greater weight in the past, even where these goods did not present negative externalities. Excise duties affect the respective production processes or product markets, limiting negative externalities and, at the same time, help to generate tax revenues that can offset the resulting external cost. In addition, if demand for excise goods is inelastic, then according to the Ramsey rule the effects of taxation on social welfare are limited. This results in a dual benefit (revenue plus reduction of negative externalities) that might be used to reduce distortions in other areas of the tax system.

Excise duties should encourage innovative activity aimed at developing substitute products or alternative production processes that present comparatively fewer negative externalities or cause less damage than those that are subject to excise taxation. Differential taxation, or even subsidies for specific products or activities, such that there are appropriate incentives to reduce negative externalities from production or consumption, can contribute to this. In other words, **it is advisable for tax treatment to be differentiated according to the extent of the negative externalities**, or for subsidies to be similarly scaled in accordance with positive externalities.

Tax revenues in Greece depend to a large extent on the special taxation of products and services, which, in addition to the collection of revenues, aims to achieve other public policy objectives, such as the protection of the environment and health. Accordingly, **proper planning of excise duty policy is of great importance in fiscal terms, as well as in terms of correcting negative externalities and improving social welfare**. Fuel, tobacco products, acquisition and use of passenger cars, and alcoholic beverages are the product categories that account for the major part of excise duty revenues in Greece. Apart from the taxation of vehicles, individual energy products and e-cigarette liquids, there are no significant figures for differential tiered taxation in the other categories of taxable products.

In the period of fiscal adjustment in the Greek economy during the decade following 2010, **excise duties were predominantly applied to strengthen tax revenues**, by increasing tax rates and the introduction of new special taxes. At the same time, the use of various tax expenditures to promote public policy objectives was downgraded or abandoned. This policy

did not rely on any analysis of the wider economic consequences, including that of the negative externalities that would likely be curtailed by increased taxation. The results were evident in the respective markets, where demand fell sharply. However, **the application of high rates of tax also had undesirable effects**, such as an increase in the **illicit trade** of products subject to excise duty, while **generated revenues systematically fell short** of the expectations and targets that had been set.

The examples from international practice presented in this study show that a combination of different tools and mechanisms contributed to the achievement of the policy objectives they were intended to serve. In the **Netherlands** with tiered rates and in **Denmark** with a uniform rate, **tax differentiation** has boosted the **consumption of beer with lower alcohol content** and helped to develop new products. Similar results can be seen in **Sweden**, where the aim of tobacco product policy is to **encourage consumers** who cannot or do not want to quit smoking **to use 'snus'**, which is thought to be **a less harmful alternative to cigarettes**.

However, in a more complex market, the benefits of differential taxation are maximised through use of a broader policy framework has the ability to address the particular relationships between different market players. **Italy has implemented a wide range of direct and indirect schemes designed to support power generation from renewable energy sources**, including guaranteed injection prices, Green Certificates and a simplified energy sales and purchase regime. The results of this strategy have been particularly positive, given that **energy dependence has fallen**, while at the same time, **the share of RES in energy production has increased significantly** with support for new renewable energy technologies.

Fiscal instruments, such as carbon tax or emissions trading schemes, **are the most effective policies** to ensure that energy prices cover environmental costs and that **innovative 'clean' technologies are promoted, while they also continue to serve as a revenue source**. The use of one instrument does not negate the application of another, but the right combination can be effectively applied to different factors in the same market. In Sweden, for example, a minimum carbon tax threshold for industry has been determined, while differential tax treatment was applied to sectors of manufacturing industry that fall with the Emissions Trading System as well as to the remaining sectors.

Wherever a broader policy framework is applied, it is important that it is **reviewed regularly to ensure that it adapts to new circumstances** and responds to developments. A important aspect of Sweden's carbon tax reforms was their gradual implementation in combination with overall changes to environmental taxation, as well as the functioning of the EU Emissions Trading System (EU ETS), which was incorporated later. **The combination of gradual reforms with political commitment is an important parameter in the successful implementation of such a framework**, since it provides the necessary time for the sectors affected to adapt and switch to more efficient and less environmentally-harmful energy sources. Similarly, Norway also implements an extensive incentive strategy for low-emission cars. A clear, stable policy framework, combined with the respective political commitment on the part of the government, is crucial to creating credible long-term conditions in the automobile market. The overall message from the majority of Norwegian political parties is that it should always be economically viable to choose cars with zero or low emissions over cars with high emissions, which is achieved by applying 'the polluter pays' principle to vehicle taxation.

Furthermore, **the active engagement and self-commitment of market players contribute positively to the strengthening of efforts to achieve the goals of each strategy.** In the United Kingdom, for example, in addition to waste prevention programmes, a voluntary agreement has been reached between organisations which account for 80% of plastic packaging consumption, bringing together businesses from across the entire plastics value chain with UK government organisations and NGOs to reduce plastic waste.

Lastly, **the choice of where revenues from excise taxation are to be directed is also especially important.** In the broader context of waste prevention programmes, the UK has **invested in research** into microplastics and innovation in the field of plastics, on the condition of equivalent funding from the industry. At the same time, the results of Sweden's approach to environmental taxation have highlighted the importance of shifting the tax burden by **reducing other tax rates**, in order to mitigate the negative effects of excise duties on income distribution and business competitiveness.

6. BIBLIOGRAPHY

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