



ENVIRONMENTAL POLICY TOOLS TO PROTECT ENVIRONMENT

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Abstract

The objective of the contribution is to point out the broad range of environmental policy tools, which can be used to protect environment. These tools include: standards, financial and economic tools having the form of environmental payments, emissions trading and voluntary agreements. Differences in implemented tools generate different economic efficiency and environmental effectiveness.

Environmental taxes stimulate polluters to reduce emissions in cases when costs of their reduction are lower than the environmental tax they are obliged to pay. The stimulation function of environmental taxes needs to be continuously evaluated so that it does not prevent the flexibility of polluters in looking for cost-effective ways of reduction of the burden on environment. The practice of environmental policy tools implementation confirms that environmental protection solely in the form of environmental taxes is rare. Environmental taxes are normally enforced in combination with other environmental policy tools, which include standards, custom duties as well as voluntary tools. Voluntary tools are characterised as voluntary activities of polluters. They include environmental management systems and others.

Keywords: *environment, environmental policy, internalisation of negative externalities, environmental standards, environmental taxes, emissions trading, voluntary agreements*

1 INTRODUCTION

The issue of environmental pollution originates in the occurrence of side effects in the spheres of production and consumption. These side effects are called externalities by economists, and they are considered to be a reason leading to the failure of market's allocation function. It means that due to the existence of negative externalities, product prices do not reflect actual manufacturing costs, which results in excessive production related to environmental damage.

We need to realise that production costs only include one part of costs related to ensuring environmental balance. They are costs incurred by the purchase of ecological components of the manufacturing process. The second and decisive part of costs related to the occurrence of negative externalities in prices is absent.

The implementation of so called common burden principle upon the payment of costs of ensuring environmental balance not only encounters a lack of public resources, but it also leads to inconsiderate usage of environmental resources, their excessive exploitation and damage. Increased costs arise to other users of environment as a result of its damage. Costs of environmental damage are thus borne by

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someone else, not the entity having caused them. In an effort to solve this problem, economic theory applies a number of approaches to the given issue, including: bilateral agreements, environmental standards, environmental taxes, tradable permissions to pollute, and voluntary tools. This article aims at highlighting differences between basic approaches to the solution of internalisation of negative externalities and their different economic and environmental efficiencies.

2 ALTERNATIVE TOOLS OF ENVIRONMENTAL POLICY

The objective of environmental policy tools implementation is to influence the behaviour of economic entities. Following the way behaviour is influenced, we can deal with direct and indirect environmental policy tools.

Direct environmental policy tools have a form of orders, restrictions, standards as well as prohibitions of certain productions. Their application enables to achieve enhanced quality of environment in a short time. A negative feature of their usage is that they are too expensive from the national economic viewpoint, as they must be respected by everybody regardless of the amount of costs necessary for their shaping.

Indirect environmental policy tools are not regulations to protect environment, however they create pressure (stimulus) on polluters towards effective usage of environmental resources.

Further economic environmental policy tools include duties, emissions trades and voluntary tools.

2.1 Environmental Standards

Historically, environmental standards are classic tools originating in civil health legislation. A broader usage of standards as regulation tools started at the end of the 1960s and beginning of the 1970s. Standards of various types, aiming at fulfilling the environmental policy principle "order-check" were applied in this period. In this relation, standards were perceived as orders enforceable by means of respective law (Water Act, Clean Air Act, etc.). Non-fulfilment of standards was considered to be law violation.

Following the environmental protection need, several types of standards have been applied,

including emission standards, technological standards and product standards. It is necessary to emphasize that besides the environmental quality criterion, the establishment of standards is also influenced by technological and economic criteria.

Reflection of the quality of environment in standards presupposes the definition of a maximum allowed level of polluting substances in a selected element of environment, i.e. air, water, soil, aiming at securing zero risk of damage occurrence. Zero risk generally means the level of pollution protecting everybody from possible damage regardless of their sensitivity to it. However, this approach is reasonable to adopt in case of highly toxic substances.

It means that emission standards should be stipulated in so called threshold values. However, toxicological studies show that it is problematic to stipulate threshold values in many pollution cases. One of the reasons is the fact that knowledge on damage origin as well as synergic effects generated by pollution is only collected gradually.

Standards enforcement presupposes considering the latest technical solutions whose implementation helps increase environmental protection. A negative feature of standards implementation is that they are static and little stimulating. It is common that the implementation of technical progress is reflected in standards with time delays. Another disadvantage of standards is that their enforcement does not result in the minimisation of national economic costs of reducing one emission unit. This deficiency can be eliminated by implementing environmental taxes as well as emissions trading.

2.2 Emissions and Environmental Taxation

The reason for toolkit broadening towards the market was the knowledge on welfare economics theory, according to which labour, soil and capital are effectively allocated when commodity prices equal their marginal social costs. One of the conditions for effective resources allocation is the existence of equality between private and social costs.

The welfare economics theory was developed by English economist A. C. Pigou. He claimed that

inefficiency in resources allocation originates in the existence of negative externalities. He perceived negative externalities as costs imposed by one economic entity to another economic entity. He claimed that if costs incurred as a result of environmental pollution are not reflected in prices, external costs and subsequent market inefficiency arise. The elimination of inefficiency was seen in the enforcement of externality tax called the Pigouvian emission tax.

Pigou based its shaping on the assumption that if such tax equalled external costs, private costs of producers would increase at the level of production social costs and would become a tool of effective resources allocation. The amount of emission tax itself was stipulated in the intersection of the cost curve of marginal protection and the cost curve of marginal damage. Thus stipulated amount of emission tax was supposed to stimulate rationally behaving polluters to decrease all emissions whose reduction costs are lower than the tax amount itself (Pigou, 1932).

A restriction and at the same time a limit for the application of Pigouvian tax is the absence of information which the tax office does not have. This information can only be obtained from polluters and the aggrieved themselves. Exact quantification of Pigouvian emission tax is therefore impossible in practice.

Further objections against environmental protection management by means of emission tax also include the dynamics of economic growth itself, as well as the occurrence of deformations in economics, causing private costs to differ from social costs.

In the 1980s, the category of emission tax was reviewed from the viewpoints of its environmental efficiency, economic effectiveness and its fiscal effects. The new category of environmental tax started to be used parallel in this period.

Environmental taxes are taxes with incorporated eco regulator enforced within the taxation system of the given state, as well as emission taxes with different structure and mechanism of action (OECD, 2010).

Taxes with incorporated eco-regulator correspond to excise taxes at most by their character. They restrict production as well as consumption, which are related to negative impact on environment.

Emission tax is used to tax emissions originating as a side product of manufacturing process and deteriorating the quality of air, water and soil. From the viewpoint of economic nature, emission tax expresses the "rarity" of environmental resources expressing the substitution relationship between the quality of environment as a public good and as a medium used to exhaust harmful substances.

The definition of environmental tax category is significantly problematic due to the aforementioned two-dimensional apprehension. We can state that so far generally valid definition of this financial category does not exist anymore. The European Commission also pointed out this fact in its official papers, characterising environmental tax as a tax based on a physical unit or its analogous part having a specific negative impact on environment (OECD, 2007).

Under this definition, tax base can be: exhaust emissions (in the air, water, and soil); energy (fuels, oil, coal, natural gas, and electricity); agricultural inputs (fertilisers, pesticides); selected environmentally harmful products (plastic packages, batteries, tyres, etc.); as well as noise.

Present times are characterised by the condition when individual countries apply various types of environmental charges characterised by differences in their amounts, extent of emissions charges, as well as in types of the burden of environmentally harmful products.

The quantification of an efficient environmental tax presupposes the incorporation of a stimulus for polluters, encouraging them to look for ways of reducing environmental burden and minimising their costs. It means that polluters, aware of their marginal costs of environmental pollution reduction and environmental tax amount, will be encouraged to reduce emissions, if their costs of environmental pollution reduction by one emission unit are lower than the amount of applicable environmental tax on such an emission unit. Environmental tax limitations include an uncertain impact on the quality of environment, as the extent of environmental pollution reduction upon environmental tax enforcement is dependent on polluter's response to its amount itself. It is thus not sure that environmental tax implementation will result in achieving the stipulated objective, as responses of polluters cannot be precisely approximated. Further deficiencies in the

environmental taxation include increased costs of its regulation as well as the possibility of creating non-related decentralised company decisions. In cases when it is necessary to ensure a hundred percent certainty of environmental pollution reduction, it is more appropriate to achieve the stipulated objective by means of other tools. Such tools include the enforcement of standards as well as tradable permissions.

2.3 Standard Price According to W. J. Baumol and W. E. Oates

The awareness of negative features of Pigouvian emission tax led to the proposal of W. J. Baumol and W. E. Oates to enforce standard prices of using environmental resources upon environmental protection. Their amount should be derived from costs necessary for maintaining the quality of a selected element of environment (Baumol & Oates, *The Use of Standards and Prices for the Protection of the Environment*, 1971). They defined environmental quality standard as a maximum allowed amount of imissions. Imissions were considered to be the criterion, as they represent the information on actual local environmental pollution. It was highlighted that emissions are decisive for effective enforcement of environmental quality standard, as costs related to standard fulfilment depend on the extent of reducing harmful substances emissions.

Economic efficiency of the enforced "price" of using environmental resources is determined by possibilities of individual polluters to avoid emissions (Baumol, 1972), which means that it depends on what form of emissions reduction is used by polluters (production volumes reduction, changes to manufacturing programme, substitution of ecologically harmful manufacturing inputs, etc.).

A negative feature of the enforcement of prices derived from environmental quality standards is that stipulating high price can lead to increased costs of environmental protection. High price is a stimulus for polluters to carry out investments in pollution prevention. Price decrease will cause that newly built capacities remain, respectively can remain unused, as their operation would be connected to increased costs compared to the payment of enforced reduced prices.

In the opposite case, i.e. upon stipulating a low price, we can assume that facilities which will be built will not be as environmentally efficient as would be those built in case of higher price. These capacities would need to be modified upon price increase. Additional capacities modification is however connected to higher costs than in case if efficiency parameters were already known at the very beginning of design works.

The given arguments imply that upon the enforcement of "prices" derived from quality standards of a selected environmental element, the economic effectiveness of allocated financial resources is not secured. On the other hand, the enforcement of these prices creates a precondition enabling the quality of a selected environmental element modified by the standard to be achieved. It means that "prices" help ensure environmental efficiency.

2.4 Bilateral Agreements

R. H. Coase tried to refute the neoclassical statement that externalities are a source of market failure and that they result in the need of state interventions. Coase claimed that market optimality is also practicable upon the existence of externalities. According to it, economic entities themselves are able to reach effective solutions by means of bilateral agreements (Coase, 1960).

In an effort to support his claim by an argument, Coase formulated a theorem, according to which externalities should be balanced in the form of compensations for damages. A precondition of the compensation for damages is the existence of clearly defined property rights and a legal framework of the compensation of damages regulated by state.

Suability of a property rights violation enables to initiate a direct negotiation between a polluter and an aggrieved. It results in the optimum internalisation of negative externalities, which is a precondition of optimum environmental resources usage according to Coase.

Coase admits that his theorem is only valid under limited conditions, i.e. when high transaction costs are not incurred in relation to the negotiation. This situation occurs, if the creation of a negative externality has been caused by several polluters. The existence of a balance between the interests

of polluters and the aggrieved itself, which can only rarely be achieved in practice, is also problematic.

2.5 Emissions Trading and Voluntary Tools

The idea characterising the nature of trading with emission rights is an effort to establish markets of environmental resources. Efforts to solve the given problem led to the establishment of property rights on emissions (emission rights). Their establishment runs as follows: regulation centre responsible for the quality of environment stipulates the amount of harmful substances emissions which can be released in the system of environment in a certain time without exceeding an emission standard. Maximum acceptable volume of emissions is divided among individual polluters, who thus acquire the emission right. In case a polluter reduces emissions in their company under the level acquired by means of their emission right, they can emit their right and sell the "increased emissions". On the contrary, if they emit more emissions than the amount corresponding to their allocated emission right, they have to buy their right to emit them. The price of an emission unit is set on the market, where entities with lower costs of reducing one ton of emissions than its price represent the offer side. The demand side is represented by entities whose costs are higher than the market-generated price of emission permission. The enforcement of this mechanism enables pollution reduction at the lowest costs.

The stimulus of the owners of emission permissions to reduce emissions in an extent greater than that for which they acquired the permission will last until their costs of the elimination of one emission unit reach the market price of one unit of emission permission.

It is necessary to realise that the activity of polluters aimed at emissions reduction is concurrently reflected in the increased offer of unused emission permissions, which subsequently results in their market price decrease. Long-term balance occurs following the balancing of costs related to emissions reduction by all polluters, while the equilibrium price of emission permission should equal the marginal costs of emissions reduction.

An advantage of emission permissions enforcement, besides the minimisation of issuers' costs, is also their environmental efficiency. Problems with environmental efficiency upon enforcing this tool can occur when issued emission permissions do not consider the consequences of imissions in the given area. In such cases, the creation of so called "hot spots" cannot be excluded. However, a positive feature of this tool is the fact that the fulfilment of environmental objective will also be achieved without information from individual issuers on the marginal costs of emissions reduction.

The functioning of the market with emission rights is affected by several factors, including:

- issuers' possibility to measure emissions with acceptable preciseness;
- the existence of environmental technologies enabling polluters to reduce emissions;
- market with several buyers and sellers, enabling transparent generating of the price of one unit of emissions;
- the ability of offices responsible for the monitoring of released emissions to monitor emissions, and the ability of offices responsible for the allocation of emission quotas to allocate them properly; and
- the existence of transparent market rules which need to be simple, clear and at low transaction costs.

The aforementioned factors have a significant impact on economic effectiveness as well as environmental efficiency of trades with emission permissions. If factors affecting market functioning have been fulfilled, the usage of trade permissions subsequently enables:

- the balancing of costs of environmental pollution reduction;
- the encouragement of technological changes oriented on environmental pollution reduction;
- the provision of a high level of environmental safety by means of stipulating a maximum limit of environmental pollution; and
- the achievement of flexibility in cases of distribution and redistribution effects.

However, situation when a business entity enters the market with emission permissions and increases their prices can occur upon the emission permissions enforcement. The fact that higher prices of emission permissions are unacceptable

for other interested persons in terms of costs can result in production stoppage or even relocation (Filip, 2011). Emission permissions can thus become a tool of competition elimination, respectively of restricting room for their expansion in the given area in future.

2.6 Voluntary Tools

Voluntary tools of environmental policy can be characterised as voluntary activities of polluters in the form of implemented measures to reduce environmental pollution. These tools are either oriented on products or processes.

Tools oriented on products enable buyers to obtain information on the quality of products and their environmental profile. Such tools include e.g. labelling of environmentally-friendly products, life cycle analysis, integrated manufacturing policy, eco-design and green public procurement (Kovač, 2013).

Tools oriented on processes are focused on process management in companies regarding the adoption of measures to reduce environmental pollution. These tools include the environmental management system, environmental management and audit system, environmental audit, environmental accounting, environmental profile evaluation, cleaner production and voluntary agreements.

Exemptions from environmental tax or its reductions are possible upon voluntary agreements implementation. Advantages resulting from voluntary agreements implementation are significant for business sphere, as room is created for a greater flexibility upon environmental objectives fulfilment

compared to the enforcement of other environmental policy tools.

However, voluntary agreements implementation has a negative impact on revenues resulting from the collection of environmental tax, which private sector thus has at disposal. Public sector thus waives revenues resulting from the environmental tax collection and subsequent possibility of its usage to ensure environmental objectives.

3 CONCLUSION

Enforced environmental policy tools enable to influence the behaviour of economic entities. Following the way the behaviour is influenced, we can deal with direct and indirect environmental policy tools. The most frequent direct tools include norms - standards. Besides environmental problems solution, the issues of economic effectiveness and environmental efficiency of environmental quality standards are important upon their establishment. A negative feature of their enforcement is that they are static and little stimulating. It is common that technical progress implementation in standards is reflected with time delays. Another disadvantage of standards is that their enforcement does not result in the minimisation of national economic costs of reducing one emission unit. This deficiency can be solved by imposing environmental taxes as well as trading with emissions, which will be more and more significant in near future due to the need of minimisation of costs exerted to protect environment.

Enforcing voluntary tools of environmental behaviour, entities observe the intention to increase their environmental profile as well as to generate environmental and economic effects.

WORKS CITED

- Baumol, W. J. (1972). On Taxation and Control of Externalities. *American Economic Review*(62), 307.
- Baumol, W. J., & Oates, W. E. (1971). The Use of Standards and Prices for the Protection of the Environment. *Swedish Journal of Economics*(73).
- Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law and Economics*(3), 1-14.
- Filip, S. (2011). Index of citizen's security - a tool to measure the security level. Chernovtsy, Ukraine: Bukovinian University.

Kovač, M. (2013). Methods and tools of measurement of economic security at the level of territorial units in Slovakia. *Contemporary Research on Organization Management and Administration*(1), 60-71. Retrieved from <http://journal.avada.lt/images/dokumentai/CROMA2013str/6.pdf>

OECD. (2007). *Instrument mixes for environmental policy*. Paris: OECD Publishing.

OECD. (2010). *Taxation, Innovation and the Environment*. Paris: OECD.

Pigou, A. C. (1932). *The Economics of Welfare* (4. vyd.). London: Macmillan.

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