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# **Study on the Economic and Environmental Implications of the Use of Environmental Taxes and Charges in the European Union and its Member States**

**Final Report: Executive Summary**

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**EXECUTIVE SUMMARY**

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## Executive Summary

### *Context, Study Approach and Objectives*

This study was launched in the context of the increasingly strong recognition on the part of policy makers across the EU that economic instruments have real potential to address environmental objectives. At the same time however, concerns were raised in some quarters that such taxes can have a negative impact on employment and economic competitiveness.

This study has explored whether taxes and charges have brought about the environmental benefits that the supporters of such taxes have claimed and whether the concerns raised regarding their impact on employment and competition are real. The study therefore fulfils one of the Commission's stated aims to launch a detailed study in this area, as noted in the 1997 Communication on Environmental Taxes and Charges. Box 1 below lists the main conclusions from this study.

### *Summary of Key Conclusions*

#### *Box 1: Key Conclusions*

- **The use of environmental levies is widespread throughout the EU, and the use is increasing**, though with more levies in place in “northern” EU Member States. This reflects the long held belief that such levies are an important policy measure. There continues to be a steady flow of ideas for new levies, driven partly by EC and OECD calls for their greater use, especially in the context of encouraging a broader change in taxation policy to increase taxation on ‘bad things’ e.g. pollution, and to reduce it on ‘good things’ e.g. employment.
- This study demonstrates that the current levies were **often designed and implemented on a case by case basis** and at low rates. They generally do not appear to be part of a broader strategy of an **environmental tax reform (ETR)**, where the instrument of taxes and charges is a preferential option. However, some countries have started to move towards an ETR: the UK has a soft ETR strategy while the Netherlands and Germany are starting the process.
- **Levies are introduced at a national level** (even if there are regional elements). There are no internationally agreed levies. This fact has important implications for the subsequent design and introduction of levies, since the potential effect on international competition is frequently a major factor in design. Levies have been introduced in relation to products (e.g. pesticides), services (e.g. landfill), emissions (e.g. NOx) and resource use (e.g. water abstractions), that cause environmental concerns. Consequently, the range of economic sectors affected by levies is broad.

#### **Design of Levies**

- In assessing the impacts of selected levies, there are two key issues that affect the outcome: firstly, the level of the levy, and secondly, exemptions from the levy.
- **In both cases the design of levies has tended to be very conservative**, with low introductory

levels and a significant range of exemptions to protect those most affected.

- There is rarely any systematic parallel empirical review of impacts introduced with the levy; nor any attempt to define the environmental impacts in the absence of the levy (the counterfactual). This renders ex-post assessment of levies more difficult.
- The design of levies is frequently focused on raising revenues, and **not explicitly directed to introducing a new incentive** for changes in environmentally harmful behaviour. However, in many cases the revenue is earmarked for specific environmental policy measures, and through this helps address environmentally harmful behaviour. However, there is no consistent **choice in whether to earmark revenues or not**, given different fiscal policies.

### Environmental Impacts

- **The environmental impacts of levies are positive**, but in most cases small relative to the problem being addressed.
- The effects of the levy are often limited because of the conservative nature of design.
- In cases where, over time, the scale of the levy has been increased, then the environmental effects also increase.
- The positive effect of levies on behavioural change is not always reflected in physical changes to the state of the environment.
- The case studies show that **even quite small changes in price/cost can send strong signals as to the desired behaviour**. This suggests that the environmental benefits are greater than would be estimated based on simple concerns on price impacts, given the levy's additional role of raising awareness and offering a "moral" signal.

### Impacts on Costs and Prices

- There are two effects that need to be considered. In the case where levies increase the cost of products, services or resources, the impact depends on the significance of the good in the overall cost base. In the large majority of cases the good represents only a small fraction of total production costs.
- Thus whilst **the levy has sometimes led to significant price increases, the effect on costs to consumers has been small**. In the case of emissions, the impact of the levy will depend on the relative size of the levy to the cost base, and in particular to the costs of pollution abatement as a means to avoid the levy.
- The case studies suggest that **emission charges have encouraged increase in environmental expenditure by polluters**.

### Impacts on Competition and Trade

- Whilst the objectives of the levy can be understood and accepted, they tend to be promoted by environment ministries. The **major concern expressed in the design of levies is their effect on the competitive position** of affected sectors, especially in international markets.
- This concern has resulted in the conservative designs noted above. In particular, the concern has led to a plethora of exemptions of polluters from the levy because of the perceived danger to the competitive position. As a result, **the impact of levies on competition and trade is generally**

**negligible since the potential for such impacts is eliminated in the design.**

### **Impacts on Employment**

- There was no evidence of significant negative impacts on employment from the existing taxes and charges, contrary to some arguments presented;
- The lack of negative impact reflects, in part, the extensive list of exemptions; one would otherwise expect some significant structural change to employment, with a move of employment from polluting to less polluting industries and activities (especially important when considering the multiplier effects in the economy);
- There was, however, some evidence that employment gains could be made – both net and gross. The sectors that benefit from the tax signal and also often from the revenue expenditure tend to be more labour intensive (e.g. recycling), though the net employment effects are likely to be more visible in the long term;
- The incentive effect will lead to more employment in “clean technologies and process” activities. Even where there is no net gain, given losses of employment in “old” technologies, it is valuable to labour market analysis to appreciate the winners and losers.

### **Key Lessons for Future Environmental Levies**

- **Exemptions to affected sectors have been granted too regularly**, often based on a static cost assessment and without reference to the potential dynamic efficiency effects
- The levies that have combined a direct incentive effect supported by hypothecated spending have been more successful in both generating environmental benefits and avoiding adverse economic impacts, not least because they support the dynamic adjustment process
- The competition concerns argues for a pan European perspective to the continued drive to introduce more effective and efficient levies. Exchanging information on intentions and designs might help address certain competition fears and ensure compatibility. It would also help to encourage the design of broader strategies within which levies would be just a part.

These outputs have been achieved through a detailed methodological framework which has encompassed both a synthesis of existing information on European taxes and charges as well as primary research in a number of key areas.

This study has focussed particularly on 9 tax/charge types, with their application assessed in several countries to allow in-depth and comparative insights to be obtained (see Table E1). This complements a general overview of taxes and charges. Furthermore, three taxes have been explored to an even greater level, where these offer particularly interesting insights – the UK Landfill tax, the Danish pesticides tax, and the German waste water charge. Given existing research and analysis into energy, carbon, and sulphur taxes and charges, these levies are not the subject of this study.

**Box 2: Definitions of Environmental Taxes and Charges**

Taxes and charges are different instruments, though differentiating between them is still somewhat blurred by the fact that different countries use the two terms to describe otherwise similar instruments as well as inter-changeably.

In this report we have used the term “taxes” where the revenues go to the general budget, and “charges” where they raise revenues that are earmarked for a particular use, used for specific service provision, or for other activities when the revenue is not intended to reach the general budget.

For ease of presentation, we also use the term ‘levy’ to refer to both taxes and charges.

**Table E1: Selection of Taxes and Charges, and Countries for In-depth Analysis (Tier 2):**

1) <i>NO<sub>x</sub></i>	<i>Sweden (S)</i>	<i>Spain (E): Region of Galicia</i>	<i>France (F)</i>
2) <i>Abstraction*</i>	<i>The Netherlands (NL)</i>	<i>Denmark (DK)</i>	
3) <i>Waste Water</i>	<i>Denmark (DK)</i>	<i>The Netherlands (NL)</i>	<i>Germany (D)</i>
4) <i>Pesticides</i>	<i>Sweden (S)</i>	<i>Denmark (DK)</i>	<i>Belgium (B)</i>
5) <i>Fertiliser</i>	<i>The Netherlands (NL)</i>	<i>Finland (FIN)</i>	<i>Sweden (S) and Austria (A)</i>
6) <i>Landfill</i>	<i>France (F)</i>	<i>Britain (UK)</i>	<i>Austria (A)</i>
7) <i>Aggregates</i>	<i>Denmark (DK)</i>	<i>Belgium: Flanders</i>	<i>Britain (UK)</i>
8) <i>Disposable Containers</i>	<i>Finland (Fin)</i>	<i>Denmark (Dk)</i>	<i>Sweden (S)</i>
9) <i>Batteries</i>	<i>Italy (I)</i>	<i>Belgium (B)</i>	<i>Hungary (HU)</i>

*\*A Spanish regional abstraction charge case was also explored during the study, but the investigations proved that the charge was not in line with the definition of an environmental levy and hence was not included in the final report.*

This study is intended to complement existing work of the OECD, and that ongoing in the EU and its Member States on taxes and charges. The study sought to obtain as up to date information as possible, rather than searching for a common year across all taxes and charges as this would have led to some loss of information. Given the timescale of the project, no data or events after mid 2000 are included in the report.

**Overview of Use of Taxes in the EU**

Environmental taxes and charges are increasingly being adopted in the EU as key instruments of environmental policy. If one takes only the taxes considered in this study, it appears that Northern European countries have more of these taxes in place than those of the South

(hence, the apparent ‘Northern bias’ in Table E1 above). A number of Central and Eastern European countries (CEECs) also have such instruments in place. Frequently in the past, the objectives in CEECs have been to ensure compliance with standards through the use of non-compliance fees or to raise revenue for Environmental Funds.

Certain taxes are more widespread than others. Different kinds of levies for water and waste are prevalent across the EU (and some CEECs). However, levies on agricultural pollutants are not as widespread, and the same applies to aggregates and, somewhat surprisingly, NOx emissions.

Tax rates vary considerably across countries that have applied the taxes, and the approach has generally been for countries to adopt levies unilaterally rather than implementing taxes in coordination with other countries. This has implications for the level at which the tax is set, the coverage of the tax (to what extent are exemptions specified?), and ultimately, its effectiveness.

Environmental taxes and charges affect most sectors of the economy either directly or indirectly. Table E2 summarises which are the sectors affected by the taxes reviewed. However, the low level of most of these taxes means that the overall impact at the macroeconomic level is relatively small. The impact of such taxes on the economy depends critically upon how revenue is used, arguably a separate issue from the effect of tax in itself. It is worth pointing out that all revenue is ‘used’ in some way, and that therefore, the overall economic impact (on jobs, sectoral competitiveness) depends upon the effects of the revenue so generated relative to the direct impact on the sectors targeted by the levy.

**Table E2: Direct Sectors Affected by the Levies**

	MS	Sector (in order of priority) And extent of burden *	MS	Sector (in order of priority) and extent of burden *	MS	Sector (in order of priority) and extent of burden *
1) NO <sub>x</sub> tax / charge	S	All large power plants emitting NO <sub>x</sub> – pulp- and paper sector faces largest net cost of the refunded tax, with incineration and chemicals sector Energy producers and food sector are net winners.	E: Galicia	Not known	F	Heat and power sector (power station and waste incineration plants) and some production plants, with higher levels of emissions
2) Abstraction Charges	NL	Water companies, industry and agriculture	DK	Households and selected businesses		
3) Waste Water Charges	DK	Sewage treatment plants, Industry and dwellings not connected to sewer	NK	Sewage treatment plants, municipal treatment, industry	D	Sewage treatment plants Industry
4) Pesticides tax charge	S	Agriculture and pesticide manufacturers and importers	DK	Agriculture and pesticide manufacturers and importers	B	Eco-tax: Wood Industry; Households  Pesticides charge: Agriculture only
5) Mineral Surpluses and Fertiliser tax charge	NL	Agricultural sector: until 2001 pig and poultry farms and dairy farms with > 2.5 cow equivalent units per ha. From 2001 on: all agricultural farms	FIN	Agricultural sector and fertiliser industry	S	Agricultural sector and fertiliser industry
	A	Agricultural sector and fertiliser industry				
6) Landfill tax	F	Municipalities (householders) and some industrial waste producers (though see exemptions)	UK	All sectors (including households) producing waste	A	All sectors (including households) producing waste
7) Aggregates tax	DK	Construction / road building / glass industry.	S	Construction / road building / glass industries	UK	Construction / road building
8) Disposable Containers	FIN	Soft and Alcoholic Drink producers and importers	DK	Fillers and importers of containers	S	All drink producers and importers, except milk.
9) Batteries	I	Consumers, battery industry	B	Consumers, battery industry	HU	Consumers, battery industry

## Environmental Effects

On the basis of our review of environmental taxes, the following comments seem pertinent in respect of their environmental effect:

- Design is crucial. Furthermore, design has to be seen in the context of the particular purposes for which the instrument is to be used. The design of levies shows signs of becoming more imaginative and ambitious over time. The use of a levy on nutrient surpluses in the Netherlands is a good example, as is the Swedish refunded NOx charge and the Danish packaging tax based on life-cycle impacts. Norway (not included in this study) has recently introduced a tax on pesticides which is banded to reflect environmental harm. Other countries looking at pesticides taxes are investigating similar approaches;
- The level of the levy is also important. For obvious reasons, small levies may not have a great effect. On the other hand, the term ‘small’ needs to be seen in context. Levies that are small in the macroeconomic sense may imply significant changes in the price of a specific good or service being subjected to the levy. This can prompt significant behavioural changes (as in the case of landfill taxes on construction wastes – see below). Furthermore, the introduction of a new tax and / or the increase in the tax rates could valuably be announced as early as possible so that companies / households can immediately adjust to this new situation – it will give some ‘certainty for the planning process’.
- The environmental effects of levies are compromised, almost universally (the only exception appears to be some fertiliser and pesticide taxes, and to some extent, the waste taxes) by the existence of exemptions. These exemptions are typically specified on the basis of anticipated competitiveness effects. The effect of broad exemptions is to render the tax less significant both in terms of environmental effects and in terms of promoting structural change in the economy. The fact that it is frequently those who are the largest producers / consumers of the product / service subject to the levy who are exempt obviously has severe consequences for the levy’s claim to be environmentally effective;
- The use of revenues can play an important role in reinforcing the incentive signals which the levy is intended to convey. The use of revenues to support action programmes in the case of fertiliser and pesticide taxes are potentially just as important as the price incentive itself. In the case of the UK landfill tax, some environmental projects have been supported by tax credits. In the Swedish NOx charge, revenues are refunded in such a way as the instrument promotes investments which improve efficiency of energy production per unit of NOx emitted.

Table E3 below records the effect of the taxes we have looked at (see the Tier 2 taxes chapters – 5 to 13 – for more detail).

**Table E3: Effect on Pollution Emissions / Polluting Product Use: Key Points**

	MS	Nature/extent of impact, poss. linkage to tax/charge	MS	Nature/extent of impact, poss. Linkage to tax/charge	MS	Nature/extent of impact, poss. linkage to tax/charge
1) NO <sub>x</sub>	S	40% reduction in NO <sub>x</sub> emissions per unit of energy (on average) (1992 – 1998); estimated reduction in emissions was 25% between 1992 and 1995.	E: Galicia	No direct reduction effect but an estimated incentive effect	F	No effect attributable to price incentive – ADEME estimates reduction by approximately 56,000 tonnes per year by 1997, due to the use of revenues.
2) Abstraction Charges	NL	Estimated reduction in line with elasticity –0.1 – earlier evaluation estimated decline in consumption of 2-12%	DK	13 % reduction in water consumption since introduction of tax and reduction of water leakage by about 23 %.		
3) Waste Water Charges	DK	The discharges from sewage treatment plants have declined by 20-25 % from 1996 to 1998	NL	Discharges of COD reduced by about 90 %, mainly the result of tax and the revenue use	D	31 % decline in industrial wastewater since 1981. Improved compliance with the standards linked to the tax
4) Pesticides	S	Pesticide use has been reduced in the period of the charge / tax. By 1994, use was 35% of 1982-5 levels. However, much of this may be due to advice funded by revenue	Dk	Treatment frequency has been reduced by the tax – has fallen by 11% since 1994-1996.	B	Not available Evidence suggests that diuron consumption by national railways fell by 25% in 1996 (target of 50%)
5) Mineral Surpluses and Fertiliser	NL	Not yet empirical data available. Research estimates: surplus –15% to –75%. Reduction in fertiliser use: 20 to 30%	FIN	11-22% decrease in fertiliser use between the 1980s and the 1990s, due to the increase in the tax at the beginning of the 1990s.	S	The tax probably reduced the use of fertiliser-N by 15 to 20% in 1991/'92. Nitrate use continues to fall as a consequence of the environmental tax on N (N tax tripled at end 1994)
	A	1986: use of fertiliser-Nitrogen decreased by 15% (without an increase in the price of fertilisers!). 1987 – 1994: fertiliser use annually decreased by -0.8%				

	MS	Nature/extent of impact, poss. linkage to tax/charge	MS	Nature/extent of impact, poss. Linkage to tax/charge	MS	Nature/extent of impact, poss. linkage to tax/charge
6) Landfill tax	F	No existing monitoring of environmental impact of the tax.	UK	Waste data available is of very poor quality so it is difficult to assess impact of the tax. (Introduction of tax has improved data availability)	A	Waste data only available up to 1996 and there is no obvious impact on total masses of primary waste. The share of household waste whose final deposit was landfill fell from 75 to 45% 1988-96
7) Aggregates tax	DK	90% of all demolition materials are now recycled (this equals 1 million m <sup>3</sup> and is the maximum realistic amount).	S	Some effect (possibly) – though this seems to be in line with pre-established trend	UK	Slight reduction in demand estimated – also increase in recycling
8) Disposable Containers	FIN	Tax has encouraged the establishment of a deposit system for cans which has resulted in much higher levels of recycling of cans than prior to the introduction of the tax. It has also helped support the existing refill system by making other kinds of packaging systems more expensive.	DK	Not clear yet, tax has only been in place for 1 year.	S	Difficult to assess the impact of the tax in absence of the deposit refund system.
9) Batteries	I	+24% in batteries collection rate: between 1991 and 1998. In 1991, 134,000 tonnes of batteries collected by battery recycling consortium COBAT, while in 1998, 166,500 tonnes were collected	B	The 1996 to 1998 collection targets were met: about 60% of used batteries were collected and recycled in 1998 by the battery industry (BEBAT non-profit organisation)	HU	No data available on whether the introduction of the charge initiated any changes in the level of pollution.

The most significant gains have been with:

- The refunded NO<sub>x</sub> charge in Sweden;
- Both Danish and Dutch water abstraction levies;
- The Dutch and German waste water levies, though in the former, use of revenue has played a role, and in the latter, the link between the tax and standards has played a role in reducing emissions;
- Both the Swedish and Danish pesticides taxes have seen reductions in use (and treatment frequency in Denmark). Revenues have probably played a role in Sweden and Denmark. The effect of reducing quantities of active ingredient has to be considered carefully since this may imply switch to low dose products which may be equally / more damaging (though advice prevents such switching where it is harmful);
- The fertiliser levies have all had some effect though the impact of the levy package is difficult to pin down. The reduction in Austria was probably assisted by extension services (supported by revenue). The Swedish tax on nitrogen (N) continues to produce reductions in use. The Dutch levy on surpluses is expected to have a significant effect on pollution;
- The most significant effects for landfill taxes are on construction wastes in the UK (see below). However, there are some concerns related to so-called ‘sham recovery’;
- As regards aggregates, the positive effect in Denmark is probably related to the tax on landfill as much as the tax on raw materials – these have worked in tandem to increase recycling;
- It is difficult to assess the significance of packaging charges on their own, given the inter-linkage with other complementary instruments within the portfolio mix, such as deposit and recycling systems.
- Finally, in the case of used batteries, the proposed Belgian 1993 ecotax was considered as instrumental in leading to the implementation of a voluntary scheme (BEBAT) involving the battery industry and supported by a charge on batteries similar to the ecotax. This scheme is regarded as working well, and collection targets have been met for all years where data was available.

It should be stated that ex post assessments continue to face the difficulty of the lack of really good data and monitoring available on the response of targeted actors to the instrument. Where one relies on time series data for the provision of ‘evidence’ of an effect and its magnitude, the length of the time series required to enable strong conclusions to be drawn makes it increasingly likely that other factors will complicate the picture. This is the case in almost every single levy that has been investigated and suggests the need for much more systematic evaluation of policy if we are to understand the full effects of policy. This does not mean that environmental levies have not been effective, merely that the degree to which one can attribute an effect to the levy (as opposed to other instruments) is difficult to resolve. Indeed, some would argue that it is almost impossible to fully disentangle the effect of a levy from the effects of other sectoral and wider economic and political measures and developments.

Whilst the above picture deals with ‘positive’ aspects on the environmental side, some consideration of the potential negative consequences is warranted:

- In the case of landfill taxes, we understand that in Denmark, as well as Austria and the UK, the effect on the construction and demolition industry has been to divert some materials to uses which may not be especially positive. The general point is worth making that when incentive structures change, the potential for avoiding the levy’s effects will be explored. This may require that additional regulatory resources are employed to ensure the tax has no negative effects. It might also highlight the need for environmental taxes to be introduced in the context of more comprehensive policy framework;
- Where levies cannot properly target the cause / all causes of pollution, the risk remains that responses to the tax are not necessarily environmentally beneficial. Per kg taxes on pesticides may simply promote switching to low dose products which could be less benign environmentally. A tax on NO<sub>x</sub> emissions in the absence of taxes on other associated emissions may lead to investments in NO<sub>x</sub> abatement equipment that produce more emissions of other pollutants which are not subjected to the levy. Again, taxes on fertiliser may not necessarily reduce nitrate leaching if what is taxed is only what is sold. If manure and compost is stored / applied inappropriately, the problems of nitrate pollution may not necessarily be solved by a tax on fertiliser at the point of sale.

### **Impacts on Price and Costs**

The environmental taxes and charges function, *inter alia*, through the impact that they have on price, if what is subject to the levy is a product or service, or costs, if what is subject to the levy is an input to, or emission from, a process. For most taxes / charges, the impact on the cost base is relatively small, even though the impact on prices paid for products and services can be relatively large in percentage terms (and clearly, for previously untaxed emissions, the increase is infinite).

Possible exceptions are the cases of the Danish pesticides and the Swedish fertilisers taxes where what are significant price increases are affecting a significant share of the cost base. The refunding mechanism used in the case of the Swedish NO<sub>x</sub> charge makes such a high price increase possible and this has been important in driving forward the dynamic innovation that followed. However, more generally, the ‘low impact on cost / high impact on prices’ characteristic suggests that prior to the introduction of levies, ‘the environment’ is under-priced (the market does not internalise damages). In some cases, especially levies on emissions, the tax may be insufficient to incentivise emissions abatement in itself (e.g. French NO<sub>x</sub> tax).

**Table E4: What are the Effects of the Tax/Charge on (Input) Price**

	MS	Effect	MS	Effect	MS	Effect
1) NO <sub>x</sub>	S	Abatement cost plus refunded charge (positive or negative) is less than 1% of total production value of each respective sector.	E (Gal)	Minimal	F	Minimal (Industry bears some small abatement costs, which will not have any measurable effect at the macro level of prices.)
2) Abstraction Charges	NL	For SMEs and industries, price increase of about 40 %. For Dutch industry as a whole, the revenue collected by the groundwater tax amounts to 0.03 (0.08) % of turnover (value added) For households the groundwater tax results in a 27 % price increase, measured against average water tariffs excl. sewage costs.	DK	From 1989 to 2000 the water bill doubled, from an average about 12 DKK/m <sup>3</sup> to about 25 DKK/m <sup>3</sup> . The water tax is responsible for about half of this increase, while the other half is due to increased water supply tariffs, increased sewage costs and the waste water tax.		
3) Waste Water Charges	DK	For the connected industrial enterprises cost increase is less than 0.01 % of the wage sum. Among the direct dischargers with 70 % reduction, the tax amounts to an additional cost of about 0.2 % of turnover.	NL	The cost of the levies amounted to 0.3 % of sales value, 1 % of total value added and 3.9 % of net profits in NL in 1996.	D	For indirect dischargers tax is about 2 % of sewage bill For public sewage treatment plants which do not comply with the BAT standard, the effect of the tax is to increase costs by up to 10 % of total operating costs. For plants that comply the cost share of the tax is only about 2 %
4) Pesticides	S	5-8% of price	DK	Insecticides: 48% of retail price Herbicides/Fungicides: 13-14% of retail price Tax amounts to approx 2% of value of crop production	B <sup>1</sup>	Not known for the specific active ingredients targeted by the tax

<sup>1</sup> Based on estimates - not very reliable.

	MS	Effect	MS	Effect	MS	Effect
5) Mineral Surpluses and Fertiliser	NL	Not applicable: the tax is on nitrate surpluses, not on a product	FIN	Price of fertiliser +72% (1992-1994)	S	1984: about 10% of the fertiliser price 2000: about 20% of the fertiliser price In 1994 fertiliser expenditure accounted for 14% of farm income (Gross Added Value)
	A	1987-1989: 10 to 12% increase fertiliser price Fertiliser expenditure is about 8% of the farmers income (Gross Added Value)				
6) Landfill tax	F	Landfilling of: (% of gate fees) Municipal Waste: 6% to 15% Industrial Mixed Waste: 6% to 15%; Toxic Municipal Waste: 0.2%	UK	Landfilling of: Inert Waste only: 66 to 200% gate fee increase. (accepting also active waste: +36 to 88% gate fee increase) Active Waste only: 35 to 200% gate fee increase	A	Landfilling of: Demolition waste: 3-15% of gate fee Other waste at Best technology landfill: 6 to 12% of gate fee Average: around 5-15% of total disposal costs
7) Aggregates tax	DK	Aggregates sales price varies with the type of raw materials. Ranges from approx. 15 DKK to approx. 150 DKK per cubic meter. The percentage the tax represents therefore varies between 3% - 33 %.	S	About 4-12% price increase	UK	Varies, though a typical increase might be 30%
8) Disposable Containers	FIN	Not known	DK	Not known	S	Maximum of 3%
9) Batteries	I	1.7% price increase	B	5% price increase	HU	Difficult to estimate. E.g. in the case of car batteries, the product charge is approximately 7-8% of the consumer price.

## Impacts on Competitiveness

The study has found that the competitiveness effects of the environmental levies are minimal. This runs counter the expectations raised by the repeated industry statement on negative impacts of levies on their industry. There are a number of reasons for fact that the impacts on competitiveness are minimal:

- Most significantly, exemptions were in place for virtually all the sectors that would in principle have been adversely affected by a levy. A glance at the OECD database on environmental taxes reveals an enormous range of exemptions specified for the levies included therein;
- The exemptions specified presumably reflect real concerns that certain industrial sectors may be harmed. However, it is the case than many industrial sectors can be encouraged to improve the efficiency of production in the presence of a tax, with the result that the tax actually makes them more efficient and hence more profitable and competitive. These benefits are likely to be greatest where industry perceives a tax not as a static cost, but as a valuable signal suggesting dynamic efficiency improvements. The current study shows that win-win effects are being sought in Denmark, where the pesticide tax is part of a package of policies aimed at optimising use. Win-win effects are also reported in response to the UK landfill tax;
- Some of the levies affect goods and services which are not widely traded. Landfill is a good example. The ability to market landfill services is unlikely to be affected, therefore, other than ‘within country’ where alternative treatments may become price competitive due to the levy. In these circumstances, the competitiveness effects are reduced to those enterprises which are most affected by the cost increases implied. Presumably, a switch to alternative treatments / techniques is one of the changes sought by the instrument;
- At the macroeconomic level, the levies we are examining are insignificant. The competitiveness of ‘a nation’ is therefore nowhere an issue, the effects being restricted to the microeconomic level;
- Some of the levies are used in the context of more or less specific tax shifts. These tend to produce ‘winners’ and ‘losers’. In this way, they engender greater political support as well as minimising ‘country’ competitiveness. They become means of influencing structural change though altering relative factor prices (albeit, owing to the size of revenues, only at the margin).

Quite apart from the competitiveness issues at the sectoral level, there seem to be no concerns regarding competitiveness between the EU and trading partners for the taxes/charges levied. Part of this is due to the focused and restricted nature of the taxes/charges, partly due to the industry structure, and the exemptions discussed above. In the Dutch waste water case, exempted industries were effectively assisted in making adjustments through revenue-supported advice. Frequently, what is being taxed is a production input (water) or a service (landfill) that is not widely traded so that the only competitiveness effects would occur through the effect on end-product prices. One can speculate that inducement effects may reduce any (small) negative impacts on producers competing in international markets. In

addition, it should be recognised that foreign producers may be subject to taxes / regulations of their own.

Virtually all countries seek to exempt exports from taxation, and effectively tax imports at the same time where it is possible to do so. There are now ‘border tax adjustment’ mechanisms for embodied content of the emission / input subject to tax domestically. To our knowledge, the taxes are not applied in any discriminatory manner, but only on the same objective basis as that which is used to assess domestic products for taxation.

### **Implications for Internal Market and Trade**

Taxes can be expected to alter trade flows in some way. This is not our concern here unless these changes result from the imposition of levies in such a way as the run counter to principles of the Internal Market. In this context, we perceive that the following issues are important:

- The freedom of movement of goods;
- The equality of treatment of domestic and foreign products / services;
- Potentially, the degree to which the tax affects only foreign products (though the objective basis for the levy is an equally important consideration);
- The degree to which domestic industries are exempted;
- The manner in which revenues are refunded;
- The imposition of disproportionate administrative burdens related to the administration of a tax; and
- Relatedly, the use of standards linked to levies which may discriminate themselves against foreign production, or be deemed disproportionate in the light of their effect on specific traded goods / services.

Few of the levies studies here appear to have given rise to major concerns. The Danish pesticides tax was formally examined since it implied that revenues from a levy imposed upon both domestic and foreign products would be used domestically . However, the Commission ruled that this was acceptable owing to the fact that the revenue was used to support the objectives that the levy sought to achieve (and was not being used to support domestic producers of pesticides). The new Danish packaging tax appears to be a response to the concerns raised regarding its ban on the use of one-trip beverage containers.

Arguably, one would expect far greater concerns to arise in the context of product taxes than in any other type of levy. It is products that are widely traded and where levies are established, they may be set on the basis of characteristics of products which are not generally required to be known by exporters in other Member States. Issues of proportionality then arise. It should come as no surprise that packaging taxes are the ones that are most often cited in respect to Internal Market effects. This is true in the cases we have looked at, and this is leading to movements, exemplified by the Danish case, to a more ‘objective’ basis for the environmental levy. Ironically, life-cycle approaches are rarely regarded as entirely

‘objective’ and it seems unlikely that this attempt will stop the flow of complaints being faced by those with packaging taxes in place.

### **Impacts on Employment**

An increasing amount of modelling of the macroeconomic consequences of environmental taxes has been undertaken but this usually concentrates on the taxes – energy and fuel - which are not the subject of this study. An exception is work carried out ex ante by Cambridge Econometrics on the UK landfill tax. The lessons of these studies for the taxes considered in this report are:

- The (net) employment impacts of these taxes and charges can be expected to be small, as a direct consequence of the tax, given that the taxes are generally small and on a focused group.
- In addition, there is a potential employment impact from the use of the revenue, and for this the nature and extent of the impact on employment depends on the manner in which the revenues are used.
- Note, however, that it is entirely reasonable that a tax where revenue accrues to the general budget may have a net positive employment effect. This will be true if a relatively low labour intensity sectors is being taxed, and the revenue is either used to support higher labour intensity public services, or effectively offsets requirements to generate revenue from elsewhere, which also have greater employment intensity. In other words, taxes, in promoting structural adjustments in response to changing prices, can increase employment;

For the taxes covered by the study, none of the 9 taxes present any evidence that there are significant negative impacts on employment due to the taxes being levied. Equally, although we suspect that there are reasons to believe that the taxes may have had net positive effects, partly through the effects discussed above and partly through the nature of the adaptations fostered, there is no firm quantitative evidence to support this. While not important on a macro level, changes to labour markets - creating new winners and losers - through taxes/levies are important. For example, under a landfill, or waste tax, employment and recycling will rise, while employment in landfill management will fall.

### **Key Lessons For Future Environmental Tax Policy**

There are a number of lessons which appear to follow from our review:

- Design of the levy is important for obvious reasons. The more careful the design, the more likely it becomes that the effects will be positive. Design of the levy should consider use of revenues. It is clear that in some of the most successful schemes, notably the Swedish NOx charge, it is the link between the levy and the refunding mechanism that makes the instrument so effective. Unfortunately, arguments concerning revenue still occur between the Treasuries and environment ministries in Member States. If the goal is to improve the environment, Treasuries should take a more pragmatic approach to the use

of these revenues since European Community law provides guidance as to the circumstances where such revenues can be used.

- Exemptions from levies are being granted too freely. This compromises environmental effectiveness and the structural changes in the economy that are being sought. It appears to be too easy for industry to argue in favour of exemptions given the fact that in the absence of knowledge concerning the dynamic response of firms, the assessment of levies' impact on industry frequently is often restricted to a static imposition of the tax burden on the affected sectors. Dynamic adjustments which minimise exposure to the tax are usually possible, and these have environmental benefits. Arguably, the rationale for exemptions would be reduced where all or part of the revenues generated by a levy were earmarked for the provision of information to support the environmental objectives of the levy. Interestingly, this could encourage development of a more competitive industry;
- The taxes we have examined, though small in macroeconomic terms (and therefore of limited impact on the economy as a whole), can affect the goods, services and emissions subject to the tax in significant ways. This can produce quite surprising effects. Equally, it may lead to perverse effects as actors seek to reduce exposure to the tax. There is an argument for ensuring adequate regulatory capacity exists to ensure these 'outlets' are not abused;
- The exemptions argument suggests the need for rather better co-ordination by countries within the EU (and OECD). Whilst not arguing for complete harmonisation, which past experience suggests would be extremely problematic, countries could benefit from co-ordination of their efforts and interests in implementing new environmental taxes and charges, not least since this may improve the design of instruments and enable countries to understand each other's concerns in this evolving field. This co-ordination (and learning) might also reduce the chance that unnecessary exemptions will end up being agreed with industry, that taxes and charges rates are set at levels that do reflect environmental concerns, and in keeping with the polluter pays principle, and that significant and still needed environmental improvements are achieved.
- Alternatively, greater consideration should be given to measures which enable adjustment under a levy. Time-limited exemptions are hinted at in the Commission's Communication. These would enable sectors where competitiveness concerns were greatest to adjust to the instrument over time. In the case of more severe impacts, offsetting employment generating projects may be required where the impact has a more concentrated regional dimension.

In essence, environmental taxes have to grasp the nettle of structural adjustment rather than pretending that environmental improvements can be attained without friction.

## Study on the Economic and Environmental Implications of the use of Environmental Taxes and Charges in the European Union

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