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SUBSIDIES REMOVAL AND FISCAL REFORM *

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SUBSIDIES REMOVAL AND FISCAL REFORM

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EXECUTIVE SUMMARY

Political relevance

Research on strategies to abate greenhouse emissions, notably by World Bank and OECD, has indicated the potential of killing two birds -- reducing budget deficits and improving the environment --, with one stone -- the removal of subsidies and tax incentives with an adverse impact on the environment. No wonder G-7 and later, OECD Environment Ministers requested the OECD to conduct a wide-ranging study to look into the costs and benefits of the elimination or reform of these kinds of subsidies and tax incentives, to explore more in depth the possibilities of win-win situations for government finance and the environment. This paper outlines the main features of this new wide-ranging study.

Which subsidies and tax incentives must be prioritized for removal or reform?

The existence of a win-win strategy depends on the actual linkages between subsidies and tax incentives and their environmental outcomes. Unfortunately, this is not a simple and straightforward relationship and to establish it requires rather detailed analysis. In some cases, reducing these subsidies and tax incentives may have a significant positive effect on the environment, in other cases, this is very much less likely. One of the main objectives of the present study is therefore to identify characteristics of subsidies and tax incentives that are reliable indicators for them to have a strong effect on the environment. Past research already provides us with some important clues, notably:

- the effects of the subsidies and tax incentives on marginal cost (and therefore on production and consumption decisions),
- the linkage between the subsidy and tax incentive and the intake of materials and energy (which themselves are highly correlated, since materials use and materials prices are strongly dependent on energy use and energy prices) and
- the importance of the differences in leverage of various points of incidence of the subsidies and tax incentives. These leverages vary widely because subsidies and tax incentives given to a certain group of recipients may leak away to other sectors in the economy. These leakages therefore may result in strong differences of "effective" support (of the same amount of subsidy or tax incentive).

If we could derive a list of characteristics that are reliable indicators for significance impacts of subsidies and tax incentives on the environment, these characteristics combined with data on their budgetary consequences and policy conclusions regarding implementation strategies, would possibly allow us to construct a list of criteria for prioritizing subsidies and tax incentives to be removed or reformed.

The Marginal Effective Tax Rate (METR) approach

Based on these preliminary conclusions, the study is set out to add a limited number of new case studies, following a methodology that seems appropriate to quantify the importance of the previously mentioned "clues" as much as possible. This methodology is an adaptation of the "Marginal Effective Tax Rate (METR) approach", to make it suitable to analyze production decisions. A METR (in our analysis) is an indicator of the combined effect of taxes and subsidies on various (multiple inputs) on marginal cost of the product or service under consideration. It is primarily dependent on input structure, elasticities of demand and supply, the openness of the economy (both factors determining the so-called "tax shifting factors") and of course the combined level of subsidization and taxation. This methodology makes it possible to look at the three previously mentioned "clues" within one consistent analytical framework.

Combining METR calculations with environmental analysis

Comparing METR on an "environmentally sound practice" with the METR on a lesser sound one, is an indicator of a possible discrimination of the overall tax and subsidy regime against, or in favour of the environment. But knowing the METR difference between two alternatives is one thing, knowing what will happen if the METR difference were to be changed, is quite another. To estimate that, one must establish the degree in which a change in the METR difference would stimulate a change in production and consumption decisions and secondly what the environmental effects of such a shift would be.

The Scope of the Study

We plan to make the most of past research (notably on subsidies to agriculture, energy and transport), meaning that we plan to analyze these results carefully against the hypothesis that the above mentioned "clues" really matter. Secondly, case studies are prepared, applying the METR/environment analysis in the fields of:

- input intensive as against input extensive agriculture. Do MET's discriminate against extensive agriculture?,
- materials/energy combinations, in view of possible discrimination against recycling,
- freight transport. Are METRs reliable indicators of distortions and what effect would changes in METRs bring about in the social costs of transport.

The study will draw heavily on extensive work by OECD, IEA and ECMT in the field of identifying and quantifying subsidies and social costs in agriculture, energy and transport.

Subsidies Removal and Fiscal Reform

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1. INTRODUCTION.

1.1 Political interest in subsidies, taxation and the environment

Governments nowadays seem to compete with each other in reducing deficits, taxes and administrative burdens. In the meantime environmental pressures remain high. There are successes in many areas, but increasing problems concerning notably the fields of climate change (greenhouse gases, ozone depletion), air quality in cities (ozone, particulates), water management (e.g. desiccation, desertification, salinisation, producing drinking water), and (more generally) managing non-point sources. Studies by the World Bank and OECD from 1992 on, indicated large energy subsidies. Abolishing these subsidies would yield significant reductions in CO₂-emissions. No wonder investigating the possible "win-win" strategy of reducing subsidies, increasing the efficiency of resource use and reducing environmental pressures became a high priority. In this context, the OECD Environment Ministers requested: "A wide-ranging analysis of subsidies and tax disincentives to sound environmental practices in various economic sectors, and the costs and benefits of their elimination or reform, as proposed by the G-7 Environment Ministers in May 1995". In May 1996 the OECD Council requested OECD to submit an analysis of the elimination or reform of environmentally harmful subsidies in 1998. The remainder of this paper describes the background and outline of this project that aims at presenting a Report to Ministers in May 1998. In the meantime several countries embarked on projects to "green taxation". Because reforming subsidies out of government budgets clearly are part of 'greening taxation', both types of activities are closely related. The OECD Council requested therefor also an examination of the potential for environmental or "green tax reform" in 1997.

1.2 Government spending, subsidies and environment: the linkages

The existence of a win-win strategy, "reducing or abolishing subsidies and improving the environment at the same time" depends on three basic factors:

Reducing subsidies decrease government spending. This is not always true. Large amounts of subsidies are subsidies from consumers to producers (for example price regulations in agriculture and energy), not directly affecting government budgets.

Reducing subsidies increase the efficiency of resource allocation and therefore is beneficial for the economy (and public finance) This is not always true either. Decreasing subsidy to public transport for example *may* induce more congestion. A decrease in agricultural subsidies *may* induce erosion.

Subsidies to economic activities do increase the level of these activities and that is invariably bad for the environment. Although this is generally the case, the linkages between subsidies and environmental effects is complex and may in some cases point at the opposite direction. The environmental effects of subsidies (the magnitude of the linkages) depend on:

- *the subsidy-activity linkage* (how strongly does the subsidy induce an environmentally damaging activity?). For example, an income subsidy is very *likely* to invoke less damaging activities than a subsidy to irrigation water. Here, two factors are important:

- what we are interested in is the degree to which behaviour changes per amount of subsidy removed. This depends on the effects of the change in subsidy on the marginal costs of production.
- accompanying measures, for example production limitations, or special requirements that must be met in order to be eligible .
- *the pollution-damage linkage*. The damage a certain amount of pollution does depends on circumstances, like the condition of the receiving environmental medium.

In order to make an assessment of the environmental benefits of subsidy reform one must understand these linkages and know their magnitude. Past work has revealed that these linkages vary widely. The OECD-project aims inter alia at identifying circumstances and characteristics that determine the extend of the linkages.

1.3 Taxation as a source of price distortions

Subsidies externalise costs of production and consumption, that is to say that they pass costs on to others that do not cause these costs. But subsidies are not the only distorting factor stemming from public finance. Therefore *OECD Environment Ministers included tax incentives* (and disincentives) in their request to OECD to undertake a wide-ranging analysis. Actually we are looking for price distortions with a negative impact on the environment. Close relatives to subsidies are tax expenditures. They are that close that often they are included in the definition of subsidies. Distant relatives are “normal” tax rates which discriminate against “sound environmental practices”.

1.4 The scope of the study

Basically there are two elements; we want to draw policy lessons from the numerous studies already available, which link subsidies to environmental pressures, with a view to selecting good candidates (subsidies) to be reformed or eliminated. Secondly we would like to broaden our horizon and include tax measures (including tax expenditures), so that a type of comprehensive effective can be used in deciding where reforms is most necessary.

2. WHAT IS A SUBSIDY:

Before quantifying the relationship between subsidies and the environment, one must define subsidies. Past analyses differ considerably in the definition of a subsidy. We would like to adopt the following definition: **A subsidy occurs when costs are externalised.** After all that means that some costs associated with the production of a certain good or service are not paid for by those who buy the good or service, but by others. So there is no full cost pricing. *This definition includes external (environmental) effects.* Measured against the yardstick of optimal resource allocation, there is no difference between the externalisation of say labour costs because of a subsidy to employers who hire labour at the expense of the taxpayers, or the externalisation of environmental damages at the expense of those who suffer from it. Analytically this is the only tenable view, especially since these external effects are often quite large in comparison with internalised pollution abatement costs. There are case studies that include external effects in the definition of subsidies.

For two reasons however one might prefer to exclude external (environmental) effects from the definition of subsidies.

- External effects are difficult to measure in monetary terms. Therefore monetary values of environmental damages often have large margins of uncertainty, much larger than the numbers concerning the amounts of taxes and monetary income transfers. It is sound practice not to mingle figures with considerable differences in uncertainty (arbitrariness).

- Secondly, the passive not externalisation of external costs does not have the same political “feel” as actively handing out subsidies¹. This matters a lot to politicians.

A working definition of subsidies then becomes: **Forms of economic support by means of cash payments, tax expenditures, price regulations and trade restrictions**. Of course this definition is no more than an enumeration of elements, it doesn't say a thing about “why something must be seen as a subsidy”. It contains no real criterion, except that subsidies are meant to provide economic support. It has also measurement problems, for example because in practice tax expenditures are measured against different yardsticks (“normal rates”) in various countries. However, these difficulties are not as large as those involved in monetising environmental effects. So on the balance, this seems a reasonable definition to start working with.

Although difficult to measure in monetary terms, external (negative environmental) effects, must play an important role in our analysis, since the purpose of our effort is to analyse the cost and benefits of subsidy reform or removal. Since the environmental benefits are an important part of the equation, they must be analysed and somehow related to other costs and benefits, for example using cost effectiveness analysis. The more environmental effects can be analysed in monetary terms the better.

3. WHAT DO WE KNOW?

3.1 There are good subsidies and bad ones

First of all, we know that there are good and bad subsidies. Bad subsidies are those that increase the volume of environmentally-damaging economic activities, of which the external effects are not internalised in the costs. Because we are interested in win-win outcomes of subsidy reform, we are interested in these bad subsidies. There are of course also “good” subsidies. These produce positive externalities like cleaner production methods and cleaner products, or stimulate environmentally benign behaviour. They are not our primary concern. Sometimes, bad subsidies also contain elements of good subsidies, for example if a subsidy scheme also incorporates subsidies to cleaner production. Moreover, the damage caused by bad subsidies may vary according to the characteristics of the local environment, or the alternatives which the subsidy recipient faces. Therefore: “**details matter**”.

3.2 The leverage of various points of incidence

Basically we distinguish between subsidies to inputs, market support and direct income support. *Subsidies to inputs* include for example supplies of energy or irrigation water, at prices below “market values”, subsidies to agro-chemicals, subsidies to labour or capital, etc. *Subsidies in the form of market support* include for example price regulations. Minimum prices above the “market level”, generate subsidies from consumers to producers. *Direct income support* may also take various forms, like cash payments to specific individuals or special rates of taxation. The effects of the same amount of subsidy, or tax incentive for that matter, may vary strongly according to the point of incidence. Preliminary results of research are summarised in table 1. They indicate that subsidies not related to production (decoupled subsidies) in general score the best on economic as well as on environmental criteria.

The reasons behind this are that subsidies related to production “leak” probably much more to other groups in the economy, according to demand and supply elasticities than direct income support does. Subsidies to inputs for example will in the end accrue, to a significant extent, to the suppliers of these inputs. It requires at least partial and preferably general equilibrium models to figure this out.

Table 1: Differences in effects of subsidies on various points of incidence.

TYPE OF SUBSIDY: POINTS OF INCIDENCE	EFFECTS ON			
	EMPLOYMENT RECIPIENT SECTOR	TRADE DIVERSION	INCOME RECIPIENT SECTOR	ENVIRONMENT (POLLUTION)
SUBSIDY TO INPUTS	o	ooo	o	ooo
MARKET SUPPORT	oo	ooo	oo	oo
DIRECT INCOME SUPPORT	ooo	o	ooo	

Of course "ooo" means large effect; "o" means small effect.

Following this table, subsidies should be given in the form of direct income support. These subsidies favour the recipient sector most and minimise at least two important negative effects of subsidies: trade diversion and environmental damage. This leaves us with a tantalising question: Why are most subsidies given in the form of input subsidies and market support, and so little in direct income support? As for now, we can only guess. My guess would be that many subsidies (for example to transport, energy, mining) are given because it is argued that cheap energy, transport and materials are good for economic growth. This might very well be a fallacy. Subsidies must be paid for, meaning that other sectors of the economy must foot the bill. In consequence, their profitability and growth are hampered by giving these subsidies. If one realises that many subsidised sectors are relatively labour extensive, this policy may very well add to unemployment. The disquieting thing is that this fallacy is often not acknowledged in politics, perhaps because the subsidies are in of direct interest to the recipient sector, which will be keen to get the subsidy and may yield much political influence, whereas those who have to pay the bill are dispersed and politically lukewarm about conferring subsidies on another group. Direct income support has a very strong negative aspect for the recipients, because it says basically: "we don't want your products but we don't want you to starve either". These subsidies of course will be cut as soon as governments budgets come under pressure. So every interest group will try to hide its subsidies as being some kind of payment for a positive externality. Subsidy reform is therefore a giant "hide and seek" game.

3.3 Subsidies are not the only source of "market distortions"

Subsidies may create market distortions², but so may taxes and price regulations, or other regulations. Therefore there is much to be said for analysing subsidies in conjunction with these other forms of distortion. In fact subsidies may be the financial counterpart of other market regulations. It may be that many market regulations are needed in order to uphold subsidies, and vice versa. Some research seems to indicate that when there are serious market distortions due to market regulations, subsidy removal would create significant effects on pollution reduction, whereas where markets operate relatively efficiently, subsidy removal would have rather slight effects³.

3.4 The pervasiveness of prices (and subsidies and tax incentives for that matter)

Once a price decreases due to a subsidy, this mutation will pervade through the economy, affecting other prices or incomes. This gives rise to cross subsidies. This is particularly important in the case of products and services used in many sectors of the economy, like energy, materials, and transport. It seems therefore necessary to study subsidies to these products and services in conjunction with the products that are made, using (large amounts) of these energy, materials and transport service inputs.

BOX 1

SOME PHYSICS BEHIND ECONOMICS: THE CASE OF MATERIALS AND ENERGY

There is no product (including services) produced without energy. In consequence, subsidies to energy production (in the form of: tax expenditures, depletion allowances, capital subsidies etc.) accrue to all products, according to their - large differences in - energy intensity. In particular energy intensive products, such as: metal products, fertiliser, fresh sea fish, paper, to name only a few, benefit from energy subsidies. Low energy products pay the subsidy.

The prices of materials depend on their energy intensity, the price of energy, the recycling rate and GDP. The price of ore is of no significance (Mannaert 1993).

Primary (virgin) materials require typically twice as much energy as secondary (recycled) materials, although materials differ strongly in this respect (Ross and Steinmeyer, Scientific American, 1991). Recycling tends to be more labour intensive than the production of virgin materials. So energy subsidies reduce the marginal costs of primary materials more than those of secondary materials, thus impeding recycling. The same holds true for high taxes on labour.

Materials substitution (including recycling) matters⁴. By shifting from high energy intensive materials to low energy intensive materials, we can save huge quantities of energy and at the same time save a lot of other pollution and waste as well. Reducing subsidies to energy would therefore have a very significant effect on pollution and waste (definitely not only CO₂-emissions and other forms of air pollution). Unfortunately the vast majority of studies on the environmental effects of energy subsidies start from looking at specific forms of pollution (CO₂), and fail to include the effects of materials substitution.

Transport requires enormous quantities of energy and materials. Energy subsidies to transport (lower fuels prices), combined with subsidies to energy production mean subsidising transport twice (also subsidised are primary materials)!

Some research⁵ indicates that relatively large amounts of subsidies and tax incentives accrue to activities related to the intake of matter and energy into the economic system. Since man cannot destroy matter or energy, that intake inevitably becomes waste or pollution at some point in time. When it reaches the state of pollution or waste we try to curb these streams inter alia with taxes, charges and levies. The efficiency of this is not immediately obvious, to say the least.

4. A COMPREHENSIVE APPROACH

4.1 Ministers of Finance in the drivers seat

Since the Ministers of Finance are the main actors when it comes to taxes and subsidies, it pays to frame the question of subsidy reform in terms of fiscal analysis, taking into account the total of potential distorting effects of both, taxes and subsidies. Quite a few subsidy analysis have been framed within the realm of environmental policy. Their results have been that it could be beneficial for the environment to reform a certain subsidy. This is in many cases a difficult message to get across. Subsidies are there for some (political) reason and tend to be difficult to remove in isolation from other policy measures. For ministers of Finance, it may make sense to see whether they can construct a "package

deal”, one that safeguards some of the income transfers involved in the subsidy, and at the same time reduces the negative impacts of the subsidies and tax incentives on the environment. So the starting point is to relate subsidy reform to other elements of taxation (and incomes) policy.

4.2 Costs and benefits from subsidy and tax incentive reform or elimination

OECD Environment Ministers requested a cost-benefit analysis of subsidy and tax incentive reform or elimination. This calls for a very comprehensive approach indeed. Not only are there environmental factors in play, but also the incomes of the recipients, market efficiency and the like as well as the question who actually pays for the subsidies and tax incentives. This concerns also the macro economic effects of income transfers from “paying” sectors to “receiving” sectors on growth, employment and the income distribution.

4.2.1 *Do subsidies live up to their expectations? (economic analysis)*

As stated above, different kinds of subsidies vary widely in their ultimate effect on the income of subsidy recipients. Probably only direct income support is efficient in this respect and deters trade the least. The remaining questions are how they effect overall economic growth and overall employment.

Quite often subsidies, notably to transport, mining, agriculture and energy are motivated by their alleged positive effects on growth. Since all these branches of industry produce vital inputs to the economy it is argued that low prices and or secured supply benefit growth. This however is probably not true. Subsidisation must be paid for. Others have to put up with the bill, reducing their own ability to realise growth. It requires at least partial equilibrium models and preferably *general equilibrium analysis* to determine whether the overall effects of the subsidy and tax incentive will be positive. Probably they are not.

The overall effects on employment are quite uncertain and might very well be negative. In this respect, it is important to note that many subsidies stimulate labour extensive activities, meaning that labour intensive activities are paying the bill. This sword cuts at both edges! There must be quite substantial benefits in terms of increased competitiveness associated with the subsidies, only to compensate for these initial negative effects. Unfortunately subsidies have a rather poor record when it comes to modernising production techniques, if they are not explicitly made dependent on innovation in the first place.

Are there no subsidies which are good for the economy? This depends largely on the definition. If one excludes payments for positive externalities from the concept of subsidy (because they do not constitute the externalisation of costs), there are at best only a very few “good” subsidies. If one however includes payments for technical change, or for the preservation of landscapes and soil and the like, simply because they happen to be labelled “subsidies”, yes, there are important “good” subsidies. This boils down to the question of the public good character of private goods. This distinction is often difficult to make, because we are faced with joint production of the public and the private character of the same product.

4.2.2 *Environmental effects of subsidies*

In most analysis of the environmental effects of subsidies, one analyses how a subsidy influences a predetermined set of environmental effects. And one stops if that relationship is established. This kind of analysis has basically two shortcomings. The subsidy may influence the volumes of economic activities upstream and downstream, which are left out of the analysis, without really knowing whether they are important (structural effects). Secondly, environmental effect may rebound on the economy (rebound effects).

4.2.2.1 The structural effects

Take the example of most energy - environment subsidy studies, most of which analyse the CO₂-effect. In itself this is a limitation, there are of course many more emissions and waste streams involved in energy production and use. Moreover, a relative rise in energy prices also affects the economics of materials use. Typically it induces materials users to use fewer inputs of material. A more efficient use of materials decreases the pollution and waste generated in their mining, transportation and handling, and as a secondary effect, reduces the size of the streams of the required energy carriers. It is my belief therefore that most traditional analysis of the effect of reforming subsidies underestimates the beneficial effects on the environment to a significant degree⁶.

4.2.2.2 Subsidies rebound on the economy because of their environmental effects

Subsidies can stimulate behaviour that has adverse effects on the environment. These environmental effects may rebound on the economy with serious economic consequences. Especially suspect are subsidies that stimulate economic activities with a high demand of depletable resources and or relative high emissions of damaging pollutants. Depletion of resources means less economic viable opportunities in the future and high emissions means either more environmental damages which eventually will end up in a rise of production costs or in higher abatement costs, or both. Just an example:

In many countries subsidies, running at a total of some \$ 50 billion a year, have been and are given to stimulate the modernisation of the fisheries [Safina, "The World's Imperilled Fish", in Scientific American, November 1995]. This led to increased catches in the beginning, but in the beginning only. Later on, when fish stocks decreased, catches in all the oceans, except for the Indian Ocean (as yet) decreased. This process has not helped the fisherman; on the contrary. The subsidies have mostly benefited the banks and suppliers of high tech equipment, and many fisherman are nowadays jobless, because of the lower total catches and higher catch per fisherman. Did society as a whole benefit? Probably not, since the subsidies were paid by others, who have been stopped from investing the money in other businesses. *The bottom line is that we actually have been subsidising unemployment, because we did not take the environment into account.* There are equally telling examples in the field of *ground water use for irrigation*. It should be noted that a part from this rebound effect also stemmed from the increase in capital intensity. Unfortunately this is a rather common feature of present day subsidy schemes.

4.3 A comprehensive economic and fiscal analysis; the marginal effective tax rate analysis

4.3.1 Concept

What counts is the total effect of taxes and subsidies on the decision to expand or contract production and consumption levels. These effects are therefore dependent on the extra amount of taxes minus subsidies on the last unit produced (or consumed). This is referred to as the marginal tax (minus subsidy). Of course this marginal tax must be calculated and summed up over all the relevant stages of production and then related to marginal costs. Taxes and subsidies may not end up being fully incorporated in the prices of goods and services. Some of the effect is not shifted to the next stage of production. Therefore we are interested in the "effective" tax, meaning the tax that really becomes a part of prices of goods and services.

It is convenient to express the marginal effective tax as a proportion of marginal costs, indicating how much the marginal costs are influenced by the effective tax. This brings us to the Marginal Effective Tax Rate (METR) on products (cumulative over all relevant stages of production), indicating the total of taxes (including subsidies as "negative" taxes) at the margin, expressed as a proportion of marginal production costs. In other words, how much tax is paid on the last unit produced (marginal tax), expressed in a percentage of the production costs of this last unit (marginal costs).

4.3.2 The calculation of the METR

The METR is complex to calculate. It depends on a number of factors including:

- input shares (Capital, labour, energy (various sources), various materials), to be derived from input-output analysis;
- the marginal tax rates (normal rates, thresholds, ceilings, tax expenditures) on the various inputs and one's own production process;
- (other) subsidies for example from consumers to producers because of price regulations;
- the marginal production costs, since the METR is expressed in terms of marginal costs.
- the tax shifting factors (can one shift a tax increase to one's sellers or buyers, or must it be absorbed at the expense of one's profit), depending on:
 - demand and supply elasticities on the relevant factor markets;
 - openness and size of the domestic market.

4.4 Combining the METR calculations with environmental analysis

The starting point is to define alternative ways of producing a certain good or service (or close substitutes) that vary in their environmental effects. Rank them according to the severity of these effects and see whether the overall tax and subsidies regime favours (lower METR) or penalises (higher METR) the environmentally benign alternative(s). Or to put it more generally: compare the environmental differences between the alternatives and see whether this justifies the differences in METR's

The second step is to simulate what will happen if the METR-difference is changed in an environmentally benign direction. What shift will occur towards the environmentally benign alternative? Estimate the environmental effects of a change in the METR-difference. Calculate the environmental cost savings (opportunity costs) and the effects on employment, growth and possibly trade⁷.

Examples, suitable for the comprehensive approach are:

- the use of primary (virgin) materials versus secondary (recycled) materials, or better still reused products;
- the use of energy from renewable sources versus energy from fossil fuels;
- the use of food and other biomass, produced in an intensive way (high capital, fertiliser and pesticides use) versus those produced in an extensive way;
- modal choices in transport (i.e. shipping goods by ship, rail, road or plane).

5. ELEMENTS OF THE OECD PROJECT ON A "WIDE-RANGING STUDY"

5.1 Making the most of past case studies

An attempt will be made to draw general conclusions from past case studies. Most of these studies do not really allow for a comparison of costs and benefits of subsidy and tax incentive reform or elimination (as requested by OECD Environment Ministers). The gaps lay mainly in too narrow an analysis of the environmental effects, as well of the wider economic consequences. The aim of this work will be to draw up a checklist of criteria to prioritise subsidies and tax incentives to be reduced or removed.

Special attention will be given to the different leverages of the various points of incidence, the thesis being that much of the present subsidies and tax incentives accrue to the intake of materials and energy into the economic system and the importance of structural effects on the economy for pollution and waste.

5.2 Carry out some METR-environment analysis

5.2.1 *Materials and energy*

Studies are being prepared on the effects of energy subsidies and tax incentives and other tax elements on the marginal costs of primary and secondary materials, in relation to the differences in pollution burdens of both types of materials. Results of past research indicate that the tax system (including energy subsidies) indeed may discriminate against at least some secondary materials.

5.2.2 *Extensive and intensive agriculture*

Several case studies are in preparation to investigate whether tax and subsidy regimes favour or penalise extensive agriculture.

5.2.3 *Modes of transport*

It seems that all modes of transport are subsidised. The first question of course is: do we really want that? The second question is whether the differences between the METR's on modes of transport reflect the differences in social costs of transport. Here we can draw on extensive work on the social costs of transport carried out by the ECMT.

5.2.4 *Objectives of the METR-analysis*

The objective of METR analysis is first of all to illustrate that subsidies are not the only source of distortions and in conjunction the need to analyse subsidies and tax incentives in a broader perspective. This type of analysis may also highlight whether there are more systemic factors in play than isolated subsidies. (For example: how pervasive are energy subsidies or relatively high taxes on labour in actual fact?)

In line with the objectives for analysing past studies on subsidies and the environment, attention will be given to the possibility to construct something like an overall indicator for distortions stemming from "public finance".

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¹ On the other hand, the general public does accept external costs as a legitimate reason for taxation, often even without bothering to demand precise calculations on the size of these external effects. The simple fact that there are external costs often suffices. See for example the acceptance of excise duties on tobacco, alcohol and fuels. This suggests that abolishing subsidies (to be seen as "negative taxes") for their environmental effects, could very well meet with widespread public support.

² Of course the difficult point here is to define market distortions, because markets left to themselves will not always produce optimal results either. Our stating point is that financial and market regulations that impede technical change to lower private + social costs, are distortive.

³ Compare for example the striking differences between the outcomes of calculations, using roughly the same methodology, of: "The Climate Change Implications of Eliminating U.S. Energy (and related) Subsidies", by Michael Shelby et al, indicating relatively small effects, and "Impact of Russian energy Subsidies on Green-House Gas Emissions", by E. Gurvichet al, indicating large effects of reforming energy subsidies on CO₂-emissions, in: "*Environmental Implications of Energy And Transport Subsidies*", OECD, forthcoming.

⁴ An illustration of the importance of the significance of materials substitution is given by Okken and Gielen (1994). The costs of CO₂-reduction (in the long run) will be cut into half, if one allows materials substitution to play its role. Wooden structures require less energy than concrete and steel ones, a car of recycled aluminium requires far less energy to construct and uses less energy during its use than a steel one (up till now). Materials substitution to lower energy intensive ones will be greatly speeded up, if energy prices would rise. Regulatory approaches, including voluntary agreements can play a role here, but are clearly less efficient than price instruments.

⁵ Doris Gerking (1995)

⁶ This may be a reason why the effects in the study by Gurvitch et al shows greater effects than the study by Shelby et al. In the former study, the effects on industrial structure play an important role. This is not extensively analysed in the latter one.

⁷ If it were only possible to calculate the marginal social damage of pollution, one could theoretically arrive at an welfare theoretical optimal METR-difference. This difference would internalise the marginal social damage cost in the total private costs.

