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Reducing Resource Consumption.
A Proposal for Global Environmental Policy.

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1 INTRODUCTION

The world has just recognized that market failures of the global financial system have the power to destroy the entire economy. Short term profit maximization and wrong prices of the products are the problematic factors. Even the CEO`s of leading financial institutions demand a framework of rules that is able to avoid for the future what just has happened. The same reasons are responsible for the destruction of nature as a result of the economic process and insofar there is a window of opportunity for a general structural change in global policy. But the analogy is not perfect because the environmental problem is a long run problem and the coming catastrophe is not seen by everyone. Further many of those who are convinced that we have to act now see several distinct problems that are identified as externalities of the economic process and do not accept that we have a systematic problem. The paper at hand addresses this conflict and asks for a pragmatic policy proposal that will be able to induce a more sustainable economic development.

2 THE THEORETICAL BASIS.

Neoclassical environmental economics focuses on the mitigation of emissions of residuals of the economic process into the nature. With a microeconomic partial analysis approach the different emission problems are analyzed and policy recommendations are given. The emissions are identified as technological external diseconomies and treated as "freakish anomalies in the process of production and consumption" (Ayres and Knees, 1969, p. 287). The policy recommendation is the internalization of the externalities by market oriented instruments like subsidies, taxes and pollution rights, the latter having the best acceptance (Baumol and Oates 1998, pp. 177). The approach tends to interpret the different emission problems as separate and practical policy based. It formulates programmes for CO2, dust, NOx, sulphur etc, and other emissions into air, water and soil. The problem is that the emissions are an inherent and normal part of the economic process, that they appear at many locations and that the emissions are not independent from each other (Ayres and Knees, 1969, p. 287). Since this independency is not given in reality, in a total analysis the pollution rights may not necessarily be the most efficient instrument to avoid emissions. Further the mitigation of emissions does not necessarily reduce extractions, which also violates nature, as the following examples show:

The mitigation of CO2 emissions by pollution rights will favour the new technique of carbon capture and storage (CCS), which in the case of coal power stations captures the carbon after burning the coal and stores the carbon under the earth, where it shall stay till the end of all times. This would even raise extractions and the transport of coal would induce new emissions. A world wide policy that focuses on CO2 emissions based on pollution rights will in many countries raise the number of nuclear power stations, which induces more material extractions and radiation and other emissions. The policy focus on CO2 emissions has already induced growing demand for bio fuels which reduces the available land for the cultivation of food and thus raises its prices and produces hunger in the third world.

An alternative approach as the basis for global environmental policy is available, which looks in a more systematic way at the interdependencies between the environment and the economy in a macroeconomic total analysis and therefore avoids the mentioned problems: The principles of Ecological Economics as have been formulated by Ayres and Knees (1969), Daly (1991) and others should be the basis for a policy proposal: The economy is embedded in the nature and receives extractions of resources and gives emissions into the nature. There is a material flow from extractions to emissions, and the total amount of emissions in physical units differs from the extractions only in the amount of material inputs that get part of the capital stock during the period. In terms of physical material flows there is no final use of products, but the economy is only using services from the material flow by production and consumption activities, which changes the physical structure of the material flow. Further the throughput of materials over the different stages of production and consumption needs energy, which itself induces material extractions. Both activities emissions and extractions violate the nature and it will be necessary to reduce the throughput of materials of the economy.

This view recommends targeting environmental policy on extractions and not on emissions. The emissions will then follow the extractions, but it is not possible to reach the opposite. Sub- targets for this policy will be rising resource productivity on all stages of production (efficiency) and a reduction of resource use in consumption (sufficiency).

An international commitment is needed that defines time paths of targets for resource consumption per capita in tons for the member countries of the agreement.

3 The Choice of Instruments

The establishment of a global system of extraction rights seems to be unrealistic. It would mean that the OPEC, Russia, Iran, South Africa, Brazil, Chile and the other resource owning countries would lose their control over the supply of the different resources. A tax on resource extractions combined with an import tax for resources from countries which do not tax the extractions is the alternative.

It is plausible that the damage of nature is strongly correlated with the weight of materials and independent of its kind. For all materials it is true that the extraction, the transport and disposal have severe consequences for energy consumption, dust, and noise and bio diversity. Therefore a material input tax has to be based on physical terms like tons, and the tax rate should be the same for all materials. Taxing the extraction and imports of materials with a certain amount of currency unit per ton, the costs spread over all stages of production so that prices of all products rise due to the direct and indirect materials which are part of the products. This will induce material saving technical progress on all stages of production and create new less material intensive products for final consumption.

In the ideal case all industrialized countries and the emerging countries introduce a material tax system that includes taxes on the extraction of fossil fuels. These countries would tax the domestic extraction and the import of all materials of countries that do not belong to the community. The administrative costs would be relatively low because the number of agents is small and the activities in question are visible.

To avoid disadvantages for the manufacturing industries of the countries of the community, goods imports from the other countries have to be taxed too (Stern 2008, p. 25). The tax rates have to be different for the product groups due to their "rucksacks" of materials they are bringing with them. Calculations for the "rucksacks" are available in deep disaggregation following the MIPS concept (Schmidt- Bleek 2007). Alternatively the tax rates could be calculated using the input- output approach based on the assumption that domestic and imported products of the same kind should bear the same tax. Another option is to resign on an import taxation of goods with the following argument: Non-metallic minerals and ores are part of the product. A reduction of these inputs will change the products properties, so that new products will be on the markets which have advantages against the old ones. A higher price will not necessarily reduce their demand. In the opposite it can be expected that these high quality products will defeat the old ones.

The tax revenue has to be recycled to the economy (Binswanger 1980). One purpose is to avoid negative income effects that arise from higher goods prices especially for lower income groups. A second is to push resource saving technical progress by subsidies.

A rise of the tax free amount in the tax tariff guarantees that all employed persons have the same absolute advantage, but lower income groups will be compensated relatively better. The same compensation has to be installed for pensioners and non employed people. The reduction of the income tax will reduce the pressure on wage bargaining because net income will rise. The reduction of labour costs will reduce the growth of labour productivity and thus raise employment. Further there will be a cost reduction for those goods that directly and indirectly have high labour inputs.

Similar effects can be achieved by a reduction of social security payments, if the country has a system, where the employed people and the firms pay and pensioners and old people receive payments. But here the problem occurs that the payment of the government changes the character of the system, which may not be wanted by the society.

A reduction of labour costs could also be achieved directly by subsidizing labour inputs. This would also reduce labour costs and goods prices.

A smaller amount of the tax revenue could be used for subsidizing the development of material saving new technologies. Because of the uncertainties in the process of structural change and the necessary big innovation push it can be expected that private activities alone fail to solve the problems (Stern 2008, p. 26). Further a program for communication and information has to be financed that helps especially smaller firms to dematerialize their production (Stern 2008, p.23). Well known consulting firms have found out that 20% of material inputs in manufacturing could be saved only by communication and information. The harvest of this "low hanging fruit" would help to start the decoupling of economic growth and material consumption in spite of the rebound effect, as modelling results show (Meyer et al. 2007).

4 Arguments for a Global Hybrid Approach

The European ETS is a market for CO2 emission rights for primary industries. The system controls the inputs of fossil fuels in the production process of the most energy intensive industries. Many discussants assume that the European ETS might be a nucleus

for a world wide carbon cap system. But it seems to be unrealistic to expect a world system with a unique carbon price, as would be ideal from the partial theoretical point of view of environmental economics (Stern 2008, p. 23). We have already argued that this does not hold in a total analysis.

Further practical arguments should be mentioned: The ETS produces huge administration costs: In Europe over 20,000 installations have to be observed. In a global scale this might be impossible especially because in the emerging countries the administrative structures may not be sufficient to do the work. Another argument denies the political acceptance of the instrument: For many countries such a cap would be too narrow and they would fear negative incalculable economic consequences. It seems to be more realistic that a hybrid system will emerge with isolated systems of pollution rights and tax regimes (Olmstead and Stavins 2006). Politicians are less interested in ecological efficiency of an instrument, but they want to know the total economic effects before the instrument is in action. So it can be assumed that in the international discussion there will be a bias for taxes. Further the tax revenue offers more policy options especially for emerging countries which have huge development problems but small tax income.

On the other side it does not make sense to cancel an established instrument, which is favoured by an influential group of actors in science and politics. This would mean to accept for those countries who have already introduced a carbon trading system or are willing to do this that fossil fuels are excluded from resource taxation for those parts of the economy where the trading system exists. The argument is valid also for other existing instruments that are targeted on emissions like energy taxes.

5 The Default Case: No International Agreement

If an international agreement with a necessary number of relevant countries will not be possible, a policy mix for Europe has to be found that avoids a discrimination of the European manufacturing industries. The following proposal could even be realized by a single country. The idea is to give the revenue of a material tax directly back to the paying industry, but using a different key for the allocation of the compensation. This key could be production or sales of the firms. The effect of this benchmarking would be that those firms with a bad technology are net payers and the efficient firms are winners. So the incentive to improve the technology would be there, but the industry as a whole would not be hurt. The variant with the lowest costs of administration would be a value tax on material inputs.

Further technical standards for imported and domestically produced final products that are sold on European markets would not discriminate European manufacturers. The top-runner concept, which has been introduced in Japan with great success, avoids policy failures: The government observes the market in question and chooses the technology of the most efficient firm as the standard that has to be realized after a couple of years by all firms. After that period the procedure starts again.

6 CONCLUSIONS

The proposal for a consequent use of economic instruments in environmental policy tries to reduce the inputs of all non-renewable resources. In the case of Europe the CO2 trading system ETS controls the inputs of fossil fuels in the energy intensive industries, the inputs of ores and non metallic minerals should be covered by a material input tax. For an international system the paper formulates a preference to introduce a material input tax for all resources including the fossil fuels, because it is an efficient instrument with very low administrative costs. In contrast the experience with the ETS is not encouraging, because the costs in practice have been much higher than theoretically was expected. The revenue of taxation has to be recycled to the economy and it should also be used to subsidize investment in resource saving technologies and programmes for information and communication.

An international commitment is needed that defines time paths of targets for resource consumption per capita in tons for the member countries of the agreement. The goods imports of all other countries have to taxed at the border.

How such a global policy might affect economic growth can not generally be answered. Of course in the very long run there will be a restriction for growth because the production and consumption of goods seems not to be thinkable without the use of non renewable resources. But there is a high potential for decoupling resource consumption in tons and economic growth measured in currency units by raising resource productivity as the results of model simulations show (Distelkamp et al. 2006). It seems to be possible that even an increase in economic growth measured in currency units in constant prices could happen because of the rising investment in new technologies. Further research will be necessary to clarify these questions.

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