London group country update: SWEDEN

NATIONAL INSTITUTE OF ECONOMIC RESEARCH (NIER) (see also separate report for the physical environmental accounts of Statistics Sweden)

The Environmental Economic Research Division at NIER produces analyses for Swedish environmental policy. Our work can be divided into three areas:

- Methods for developing environmental accounts in monetary terms
- Impact analyses of instruments of environmental policy
- Theoretical and empirical analyses of efficient environmental policies

CURRENT PROJECTS

MONETARY ENVIRONMENTAL ACCOUNTS

Monetary green accounting and ecosystem services

During 2003 a theoretical method for monetary environmental accounts was created (Gren, 2003). The method is used to calculate the value of changes in natural capital and sustainable use of natural capital. The starting point for estimation is the natural capitals production of ecosystem services. Given that monetary estimates are available for these services, it is possible to calculate the value of changes in ecosystem service provision. This is calculated as the discounted value of changes in future ecosystem services from the capital stock. The calculated value takes into account the ecosystems impact on the welfare of future generations and is defined as a natural capital accounting price. Empirically, the method has been applied to four kinds of natural capital; forest, agricultural landscape, wetlands and urban environment. The analysis has been extended to a ten year period (Gren and Svensson, 2004).

Health and air pollution

A theoretical model for including health problems from air pollution in environmental accounts has been developed (Huhtala and Samakovlis, 2003). The model includes a production externality in the form of air pollution, which causes both direct discomfort and indirect health effects through its impact on the productivity of the labour force. The results show that the valuation of discomfort should be included in the environmental accounts. Further, data from a National Environmental Health Survey have been linked with municipal data on air quality. Concentration-response functions have then been estimated to analyse the relationship between nitrogen dioxide and respiratory restricted activity days (Samakovlis et al., 2004). The aim is for the estimates to form the basis for valuation of the health effects. To be able to value the discomfort deriving from the problems, a contingent valuation (CV) study has been conducted. The results are now being compiled.

ENVIRONMENTAL ECONOMIC IMPACT ANALYSIS

Economic effects for Sweden of limited carbon dioxide emission trade within EU

NIER has previously developed an applied general equilibrium model, EMEC, for analysis of the interaction between the economy and the environment. Recently, EMEC was used to analyse the economic impacts for Sweden of restricted carbon dioxide emissions when we have international emission trade. The study shows that Sweden will have significant welfare gains from participating in international emission trade within the EU. Sweden's national emission target could, however, be attained at significant lower costs if all production sectors as well as households could participate in the emission trade (Östblom, 2003a and 2003b).

Costs of climate policy when pollution affects health and labour productivity

Much of the debate over global climate change involves estimates of the direct costs of global climate change mitigation. Recently this debate has included the issue of ancillary

benefits. These benefits consist mainly of health improvements, since reducing greenhouse gases has the effect of also reducing other pollutants affecting human health and labour productivity. This analysis incorporates a linkage between air pollution and health effects into a general equilibrium model. Results from recent concentration-response and contingent valuation studies are used to model direct disutility and indirect welfare effects that negatively affects the productivity of labour. Three different scenarios for attaining the Swedish CO_2-target are compared with and without feed back effects on health and productivity. The results show that not including these feed back effects means overstating the costs of climate policy.

Evaluation of the Swedish climate policy 2004
The government has given the Environmental Protection Agency and the Swedish Energy Agency the task of producing material for evaluation of the Swedish climate policy in 2004. In this work, NIER has been given the roll of presenting the economic outcome of various scenarios. The model EMEC is used in constructing these outcomes, as well as for sensitivity analysis of alternative policy measures for attaining the goals of the Swedish climate policy.

Transport services in the EMEC model
As was claimed in the report "Economy of Natural Resources" by the Committee of Efficient Resource Use: “one of the most difficult problems to solve, when it comes to reducing pollutions harmful to the environment, is the energy use of the transport sector". A significant share of total fossil fuel consumption is taken by car fuels in Sweden today, but in contrast to the situation in many other sectors, the energy productivity of transportation by private cars has not increased in recent decades. Energy use and thereby also carbon emissions will continue to increase, should there be no important innovations in transport techniques. This project develops the households’ choice of transport services in the EMEC model to present a more detailed picture of the demand and supply for transport (Nilsson, 2004a).

A global CO2 market: efficiency and regional well fare
The question of how to distribute carbon dioxide emission permits is of debate in international negotiations on the issue of climate change. There are many principles discussed for distributing the permits. A few of the principles are founded on economic welfare theory and are both fair and consistent from an economic point of view, in contrast to ad hoc rules such as distribution of permits according historical emissions. The global model, GTAP-EG, was used to calculate the economic effects of fair distributions for various regions of the world but with a special focus on the effects for Sweden (Nilsson 2004b).

ANALYSIS OF ECONOMIC INSTRUMENTS IN ENVIRONMENTAL POLICY

Cost-effectiveness in Swedish policy for the Baltic Sea – an evaluation
This project evaluates the cost-effectiveness in Swedish policies to reduce nitrogen emissions to the Baltic Sea. Since the end of the 1980s, reduction in nitrogen loads to the coast is one of the environmental targets in Sweden. To reach this target, different regulations have been introduced for the sectors that contribute to emissions. In this project, measures for abatement of over-enrichment in the Baltic Sea were analyzed. The results show that the Swedish policy has been inefficient and a number of proposals for increased cost-effectiveness are presented (Elofsson and Gren, 2004a). In Elofsson and Gren (2004b), it is shown how the impact of measures in different drainage basins on Baltic Proper, can be calculated with the help of input-output analysis. The results show there is significant interdependence between different basins, implying that measures in all drainage basins must be compared with regard to their costs and effects if policy-makers want to develop cost-effective policies.

What is driving the EU burden-sharing agreement: Efficiency or Equity?

In accordance with the Kyoto protocol, the EU agreed to reduce its emissions of greenhouse gases by 8 percent compared to emissions in 1990. The Burden Sharing Agreement defined how the emission reductions are to be distributed among the EU Member States. This project investigated the factors that determined this distribution (Marklund and Samakovlis, 2004). The results indicate that both cost-efficiency and equity were important aspects when Member countries' abatement burdens were agreed.

Efficient water management on local and national level

The EU Water Framework Directive (WFD) is currently implemented. The Swedish Commission on Water Administration (SOU 2002:105) suggests a re-organization of water management through the establishment of five water districts, where borders are defined by natural water drainage basins. These water districts are intended to manage all types of waters (groundwater, surface and coastal waters). The purpose of the project is to analyze economic effects of delegation of responsibilities for water management to regional governments. "Responsibilities" can, according to the WFD, imply authority to define environmental targets as well as policy instruments. One factor of importance is that local, national and international water quality may be affected by a single measure. The project will extend existing economic models for the Baltic Sea to include the impact on local water quality (Svensson, 2004).

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