

## *Data and method: Good examples 2/2013*

### *Use of micro- and macro- economic models*

#### What is it?

Finding and choosing good methods for the audits is often a challenge. This example focuses on the use of several different micro- and macroeconomic models to provide data in the field of climate-related taxes.

#### When?

- the audit focuses on effects of a tax restructuring.
- the audit focuses on distribution effects (whether there are differences in how much different polluters have to pay) both between households and trade and industry, between different types of households, between the trading and the non-trading sectors and between various trade and industry sectors.
- the audit involves several policy instruments, for example climate-related taxes and the European Trading System (ETS).

#### How? Audit example

Example: Climate-related taxes – Who pays?, RiR 2012:1, the Swedish National Audit Office

Climate-related taxes are important policy instruments for achieving the climate objectives set by the Swedish Parliament. Climate-related taxes shall be cost-effective and be based on the polluter pays principle. The audit covers the coordination of Swedish climate-related taxes with the EU Emissions Trading System (EU ETS) and the combined effects of these policy instruments. The effects of the tax restructuring (2010–2015), are also audited.

The audit focuses on whether the Government and agency reporting of trade and industry and household expenditures for and effects of climate related taxes is clear and surveyable as well as whether there are great differences in how much different polluters have to pay.

As the system is complex, four different micro- and macro-economic models were used in order to obtain audit evidence. The models used were:

1. The Swedish National Institute of Economic Research's computable general equilibrium (CGE) model for environmental analyses
2. Statistics Sweden's distributional analysis system for income and transfers
3. Statistics Sweden's Firm Register and Individual Database

#### 4. Simulation model for the Firm Register and Individual Database

The models are based on quantitative data, mainly from Statistics Sweden.

*The first model* displays adjustments throughout the economy with a 10–15 year perspective from an "original situation", which is altered through, for example by tax changes, to a situation where the economy has once again reached equilibrium. The model was used to show the long term effects and impacts on the entire Swedish economy due to the tax restructuring.

*The second model* used is the distributional analysis system for income and transfers, with the module for indirect taxation. This model shows distribution of climate-related taxes and emissions among six different household types.

*The third model* used is based on the Firm Register and Individual Database. The model was developed by close cooperation between the Swedish NAO and Statistics Sweden. This model calculated industrial energy consumption and estimated the expenditure for energy and CO<sub>2</sub> taxes in various trade and industry sectors.

*The fourth model* is a newly developed simulation model to the Firm Register and Individual Database. The model shows the inflow of tax revenues for energy and CO<sub>2</sub> to the central government. In the audit the Swedish NAO used the model to show the differences in expenditures between the non-trading sector and the trading sector before and after the tax restructuring.

The use of the different micro- and macro- economic models, made it possible to audit the whole system.

#### General advice

- The solution is not always to use one model. Consider to use and combine data from several, different, models instead.
- When ordering data from, for example, statistics agencies prepare and send examples of tables in which the results are intended to be presented. This is one good way to avoid misunderstandings.
- When planning the audit, be prepared to extend the expected timetable for the data collection, in particular when new methods are used.

## Sources

Swedish National Audit Office (2012) Climate-related taxes – Who pays? RiR 2012:1 (The audit is available in English at the EUROSAI WGEA website.)