

Research Unit for Economic Growth and Environmental Economics

The Research Unit for Economic Growth and Environmental Economics at Statistics Norway aims to provide the government with state-of-the-art, long term, economic forecasting models for the Norwegian economy. Moreover, we seek to publish research at the frontier of economics on some chosen topics within the natural resource economics, environmental economics and the economics of economic growth. For the upcoming years we will in particular focus on:

- *The economics of climate change*, in which we especially study the functioning of emission permit markets and the relationship between climate policy and technological change.
- *Further development of our long term general equilibrium model of the Norwegian economy*, for which we in particular will include a diversity of carbon abatement technology options.
- *The international markets for oil and gas*, in particular analysing market structure at the supply side of the markets and developing price predictions in the markets.
- *Sustainable development*, for which we focus on how to include the precautionary principle in sustainable development indicators and our calculation of national wealth

The numerical general equilibrium model (MSG-6) is our most applied tool. The recent version has endogenous labour supply, intertemporal consumer and producer behaviour based on perfect foresight, an integrated emissions-to-air module linked to the economic activities, and a detailed description of the electricity market. The latest version is calibrated to the 2004 National Accounts. Studies of climate policy have been performed by means of MSG-6 in 2008, and in particular, we have looked at scenarios in which Norway employs a higher carbon tax than other countries. In these studies we have combined the MSG-6 model with a bottom-up model of the Norwegian energy markets.

Main findings

A CGE model with induced technological change is developed and has been applied in studies of innovation-promoting policy alternatives. Among others, we have utilized the model to analyse the effects of innovation policies. Research and development (R&D) play a pivotal role for firm productivity, not only through developing new and better products and processes, but also through increasing the firms' capacity to learn. Accounting for the firms' capacity to absorb knowledge from abroad reinforces the welfare arguments for public support to R&D.

Our simulation model for the international energy markets, with special attention to the supply side of the oil market, has been further developed to include gas- and coal supply and an electricity sector in each region. The model has been used to analyse the future development of natural gas trade, and the effects of carbon capture and storage technologies (CCS). By the means of the same model we have also conducted a study of taxation of oil companies at the Norwegian continental shelf, and looked at different scenarios for oil and gas production in the Arctic.

Sustainable development with emphasis on natural resources management has also been analysed with point of departure in the development of Norwegian national wealth. Here we have focused on developing better methods for estimating the human capital component. Based on the Jorgenson and Fraumeni approach we provided new estimates of the value of Norwegian human capital in 2006. These studies will be extended to provide figures for the period from year 2000 until 2007.

The Kyoto Protocol and international climate policy are also examined within a game theoretic model for CO₂ abatement in different regions. The research question has been to what extent rich developed countries should over-invest in technological development given that they can direct development to either suit developed countries or developing countries. Moreover, we have had studies of the allocation rules in the European quota market, the effect on policy when governments cannot commit to future carbon taxes and an optimal subsidy policy under various assumptions about technological change.

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