



NORTH-HOLLAND

Environmental Policy Analysis: An Environmental Computable General-Equilibrium Approach for Developing Countries

Jian Xie and Sidney Saltzman, *Department of City and
Regional Planning, Cornell University*

Environmental pollution is now a serious problem in many developing countries. One approach to combat the problem is to implement various pollution control policies. However, due to a lack of adequate quantitative models, the economic impacts and effectiveness of many pollution control policies are still unknown.

This article uses the computable general-equilibrium (CGE) approach to develop an integrated economic and environmental model for environmental policy analysis for developing countries. The model presented here incorporates various environmental components, including pollution taxes, subsidies, and cleaning activities, into a standard CGE framework. The study also presents an environmentally extended social accounting matrix (ESAM), which serves as a consistent data set for calibrating the model.

The model is applied to China, the largest developing country in the world, for evaluating the effectiveness of Chinese environmental policies on pollution control and their impacts on the Chinese economy. The environmental policies under scrutiny include pollution emission taxes and pollution abatement subsidies. The economic impacts of the waste water treatment plan in China's recently launched five-year environmental protection

Address correspondence to Jian Xie, The World Bank, Rm. J4-010, 1818 H Street, N.W., Washington, DC 20433.

Prepared for presentations at the Sixth International CGE Modeling Conference, October 1995, University of Waterloo, Ontario, Canada, and at the 42nd North American Meetings of the Regional Science Association International, November 1995, Cincinnati, Ohio, USA.

The authors would like to thank Professors Iwan Azis, Walter Isard, and Erik Thorbecke at Cornell University for their suggestions and comments. In addition, the first author is grateful to Keith Florig, Raymond Kopp, and Walter Spofford at Resources for the Future; Shantayanan Devarajan, Jeffrey Lewis, John O'Connor, and Zhi Wang at the World Bank; Richard Garbaccio at the East-West Center; Theodore Panayotou at the Harvard Institute for International Development; Christian Dufournaud at Waterloo University; and Dianqing Xu at the University of Western Ontario; for their interests and helps in the research and helpful discussions on this topic. The views expressed are solely those of the authors.

Received March 1996; final draft accepted November 1996.

program are also examined. © 2000 Society for Policy Modeling. Published by Elsevier Science Inc.

1. INTRODUCTION

Environmental problems are serious and pervasive in today's world. In many developing countries, industrial pollution emissions continue to increase and, as a result, environmental problems, such as deforestation, soil erosion, and the expansion of desert areas, are aggravated. These problems have severely threatened the sustainable development of these countries and have caused great concern at all levels, from the general public to national governments and international agencies.

Because they face serious environmental degradation, the governments of many developing countries have begun to introduce environmental policies and regulations to combat environmental problems. The most popular environmental policies include pollution taxes, environmental impact assessments, pollution subsidies, and pollution emission permits. However, due to a lack of adequate quantitative models for environmental policy analysis, the effectiveness of pollution controls and the economic impacts of these policies are still unknown. Therefore, there is a strong need for analytical models for environmental policy analysis.

The computable general-equilibrium (CGE) approach is adopted for environmental policy modeling in this research. Compared with other modeling techniques, such as the input-output approach and linear programming, the CGE approach has appealing features for modeling environmental policy analysis. The four major features of a typical CGE model are listed as follows. First, prices are endogenous to the model and are determined by the "market." Second, the model focuses on an economy where supply and demand for either goods or production factors are equated by adjusting prices based on Walrasian general-equilibrium theory. Third, supply and demand functions in the model are derived from the behavior of profit-maximizing producers and utility-maximizing consumers. Finally, a CGE model is usually multi-sectoral and non-linear, and contains resource constraint. In the late 1980s, the CGE approach began to be applied to environmental issues. Even though many of these applications still are in experimental stages, they show that the CGE approach has advantages for environmental policy modeling.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات