NORTH-HOLLAND

Journal of Policy Modeling
23 (2001) 217–234

Journal of Policy Modeling

# The world economy to 2015 Policy simulations on sustainable development

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Received 1 October 1998; accepted 1 October 1999

**Abstract**

The new frontiers of science and technology in the 21st century will appear in the fields of space, environment, biotechnology, new energy, new materials and information high-technology and is expected to induce tremendous impacts on development of the world economy and global environment. The Futures of Global Interdependence (FUGI) global model has been developed as a media of providing global information to the human society and finding out possibilities of policy coordination among countries in order to achieve sustainable development of the world economy under the constraints of changing global environment. The FUGI model 9.0 M200/80 classifies the world into 200/80 countries and regional groupings where each national/regional model is globally interdependent through international trade, financial flows and information flows. The purpose of this paper is twofold: one is to present the baseline projection of the world economy to the year 2015 using FUGI global model 9.0 M80 and the other is to show alternative simulation of the world economy under the policy assumption on sustainable development strengthening technological advancement for environment protection. © 2001 Society for Policy Modeling. Published by Elsevier Science Inc.

*Keywords:* FUGI global model; Long-term projections of the world economy; Sustainable development

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0161-8938/01/$ – see front matter 
PII: S0161-8938(00)00039-9

## 1. Introduction

In the 21st century, it is expected that integrated progress of technology, culture and development will be seen in the global human society, which is a dynamic organic system, made up of constituent parts or "members" that are globally interdependent. The information technology innovation will give tremendous impacts on human life, culture and economic development. Historically speaking, human behaviors, under the global cultural changes imposed by the increasingly interdependent global human society, are a rather new experience and challenge for the human society.

Under these circumstances, the Futures of Global Interdependence (FUGI) global model seems likely to play a significant role in efforts to envisage the future of global interdependence and to provide global information on the development and environmental changes under alternative policy scenarios for the sustainable development.

Project FUGI was started in 1976 with the cooperation of three Japanese institutions, namely, the University of Tokyo, Osaka University and Soka University, under the sponsorship of the National Institute for Research Advancement in Tokyo. The original FUGI model consisted of three parts: a Global Input–Output Model (GIOM), a Global Resources Model (GRM), and a Global Economic Model (GEM), Types I, M15. Yoichi Kaya, Faculty of Engineering, the University of Tokyo, Yutaka Suzuki, Faculty of Engineering, Osaka University, and the author, respectively (Onishi, 1977), coordinated the development of these models. Work in progress was reported at the IIASA global modeling meetings in 1977 and the years following (Onishi, 1980). The first generation FUGI global economic model (Type I, M15) designed by the author was the development of the Multi-Nation Economic Model which was originally designed by the author in 1965 and applied to 15 countries in Asia for the purpose of projections of the Asian economy (Onishi, 1965). Drawing on experiences with global modeling in the 1970s, the author developed a fourth-generation FUGI global economic model (Type IV, M62), which divided the world into 62 countries/regions and consisted of approximately 30,000 equations. It was first made public at a seminar on comparative simulations of global economic models held at Stanford University, June 25–26, 1981 and hosted by Bert Hickman (Onishi, 1981). The United Nations Secretariat, Department of International Economic and Social Affairs, Projections and Perspective Studies Branch for the purpose of long-term projections and policy simulations of the world economy soon afterward adopted this model for use. It was used from 1981 to 1991, when it was replaced by the new generation FUGI global model 7.0 (Type VII) (Onishi, 1986a, 1986b, 1986c, 1991a, 1991b). For the period 1985–1986, a new generation of the FUGI global model was designed as an *early warning system for displaced persons* (Onishi, 1986d, 1987, 1990). During the period 1990–1995, the FUGI model 7.0 M80 was designed as an integrated global model (Onishi 1993, 1994a, 1994b, 1995).