

Management and Impacts of Climate Change Programme GICC CRP 1999

Project 1/99 – Agriculture-oriented macroeconomic model for analysing the impact of climate change and the effects of policies in terms of efficiency and equity

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The names of the team members who implemented this project appear on the cover. They developed what was essentially planned from the beginning, i.e. a model including 12 countries and 14 sectors, which is functioning satisfactorily; its listing is annexed to the main report. Public data from the GTAP database was used to construct the model, after applying an innovative data processing procedure. A dummy prototype was set up beforehand, which provided a micro-model based on dummy data, with no geographical details but able to run fast and thus potentially highly valuable as teaching material.

As anticipated, the model takes reasonably into account interactions between sectors, is of reduced dimensions (although we were forced to develop several versions of the model to meet this particular requirement, since the truly 'small' models turned out to be unable to provide answers to the questions, whereas 'large' versions spent too much time on calculations), takes into account risk and transport costs, is dynamic, discriminates between 'rich' and 'poor' households and is low-priced. Disappointingly, it does not include water information, but time was spent on locating the appropriate data and this particular aspect should soon be taken into account as well. Some "fresh" data were processed especially for this project, in particular household data, which were classified into 'rich' and 'poor' for each country – an operation not undertaken in the GTAP database. We hoped thereby to highlight the consequences for income distribution of measures to alleviate the greenhouse effect. Similarly, we broke down – in conformity with GTAP standards - available data concerning emissions. This represented a substantial amount of work but should make it possible to check the validity of other analyses carried out simultaneously by American researchers using this same database.

Comparing the results obtained with what actually happened during the last decade gives baseline credibility to the 'typified events' extracted from this model. It is important to underline that this model, due to its dynamic characteristics, is one of the rare examples of its kind that can be tested

using figures from statistics yearbooks. Systematic comparisons were made between the outputs of the model and the oscillations of real economic variables between 1995 and 2000. Although the model does not claim to 'predict' these variables in detail, the order of magnitude of the 'predicted' oscillations is satisfactory.

The outputs from this model were then compared to those of 'standard' models. Like the latter, it effectively predicts that imposing global limits on greenhouse gas emissions would weigh mainly upon 'rich American households'. However, results diverge when it comes to considering trade liberalization scenarios. Whereas standard models predict gigantic benefits to all, and in particular to 'rich households of developing countries', our model is much less optimistic, predicting severe losses for 'poor households of developing countries' and very moderate benefits to Europeans, depending on the years.

This model in its present form is not yet fit for use by the general public, or for dissemination on the Web as a video-game – its original intended destination. Indeed, much work remains to reach this ultimate objective. Nor has a training programme in its use been developed. Nonetheless, public promotion is under way, as a handbook and newspaper articles are currently being prepared.