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Agricultural Trade Modeling – The State of Practice and Research Issues

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A USER'S PERSPECTIVE ON THE MODEL IMPACT ANALYSES

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The objective of this first half day of the program on modeling agricultural trade (to inventory, compare, and assess the principal agricultural trade models) was certainly ambitious. The approach of having each model owner attempt to simulate the impact of two identical shocks as a basis for comparison and assessment of alternative models would seem to be very appropriate. For a person who was not already reasonably familiar with the structure of the alternative models and given the complexity of most of the models combined with the limited time available for description of model structure, however, it is very difficult to conclude much more than that the models differ in numerous ways and that they provide different results. As a research manager in an organization that has devoted significant resources to model development both internally and through collaborative research arrangements with other institutions, I still do not know which of the models I should buy or attempt to sell.

As I listened to the presentations and discussions on the various models and to the modelers attempt at simulating impacts of the designated shocks, I made two or three observations that are indicative of some of the conflicts and difficulties the profession faces in its attempts to model international agricultural trade. First, I noted the tendency that the longer the discussion, the simpler the model being discussed. This tendency probably results from the greater ease of understanding the simpler model, being able to see why the simpler model gave the kind of results it did, and then to comment on the "goodness" or "badness" of the performance of the model. This greater degree of transparency is one of the advantages of simpler models, but the tradeoff is the simpler model's sacrifice of greater detail and realism we often desire.

The second observation was the tendency of each model owner to redefine, to varying degrees, the assigned problem to fit the characteristics and capabilities of the model. This tendency indicates one of the frustrations that we researchers, especially in a response-mode organization like the Economic Research Service (ERS), constantly feel: the models we have on the shelf are never exactly the ones we need to deal with the latest high-priority issue. The third observation was the frequency with which model owners made such comments as, "the model couldn't handle the problem as specified," or "the model is still in the developmental stage but in the future it will be able to do a more complete job of simulating the specified shock," or "the model is currently being revised or modified and when this is completed it will be able to handle this type of problem." Models never seem to be quite finished, and when they are, they almost immediately become obsolete and require updating and modification.

I would like to make a few comments about my perception of the need for and use of models in the ERS, especially trade models in the International Economics Division (IED). We basically have three different model needs. First, we need models that can be used for short-turnaround, issue-specific policy analysis. This model (or models) needs to be flexible, since we never know in advance what the particular policy, commodity, or country focus of the

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next problem to be analyzed will be. The model also needs to be user friendly so its use is not restricted to one or two people. And it needs to be simple enough that necessary modifications can be made and a solution obtained within a relatively short period of time--say, not more than 2 days.

The second use we make of models and for which we need better modeling capability is trade forecasting. In this area, quick turnaround and user friendliness is less important than forecasting ability. It would also be extremely useful to have a multicountry trade forecasting model that could forecast trade flows (that is, a spatial model).

The third use made of models is for longer term policy analysis. These types of analyses are in the traditional vein of trade policy research and possibly longer term staff analysis for which we have a 2-6 month response time. For these kinds of uses, the profession and we in ERS have tended to build a new model for each research activity, and the models tend to die a rather rapid death after the particular study is completed.

In ERS, we have tended to approach this multiplicity of model needs in two ways. We have attempted to develop large complex general purpose models that could, it was hoped, serve multiple purposes. Our involvement in development of the IIASA model and our GOL modeling efforts are examples of this approach. The other approach is to develop many simple, partial, special-purpose models. The models described by Sharples and Dixit are examples of this type. Many of our country and regional analysts have developed simple spreadsheet models to be used in their periodic updating of production and trade forecast.

It is probably fair to say that we in ERS have had a tendency to strive for one grand model that would serve all our purposes. The ideal model for us has sometimes been described as being a global, general equilibrium model disaggregated by commodity and country that was also a spatial model. Of course this model should be simple and user friendly, provide quick turnaround, run on a microcomputer, and be economical in terms of its demands for data. We know that we cannot have all of that, but we probably do tend to have those kinds of expectations. To carry out our mission and especially to have the ability to respond adequately to short turnaround policy analysis requests, we very much need most, if not all, of those characteristics in our model tool kit.

It may be that a more realistic approach to meeting our needs than either the large complex model that will be all things to all problems or a large stable of small simple models is instead the development of a combination of a comprehensive, easily accessible data base and a computerized model-building capability. That is, a computerized data base that includes the data and parameters needed to specify a model and a general model framework with a set of computer programs that will draw from the data base the information necessary to specify and initialize a model of specified country and commodity disaggregation. On two very different scales, the small model described by Sharples and Dixit and the GOL described by Roningen are attempts to move in this direction (in the intervening period since this conference was held, Roningen and his colleagues have moved another step in this direction by developing a trade policy modeling framework referred to as SWOPSIM).

In conclusion, I would like to raise two issues that I believe we as a profession and members of this Consortium need to give much more attention to.

The first is our ability to model the policy response behavior of countries. Most of our models treat policy as exogenous and model the behavior of traditional economic entities (individuals or firms). Most of the really important policy issues confronting us at this time, however, are of such nature that a policy change on the part of one country is likely to be significant enough to elicit a policy reaction on the part of competitors or trading partners. We need to move as rapidly as possible to improve our knowledge of and ability to model this kind of policy behavior endogenously.

The second is a question of whether, given the limited resources devoted to agricultural trade research and associated modeling, we as economists should not organize ourselves so as to take advantage of the potential gains from specialization and trade among ourselves as individuals and institutions. That is, can we agree among ourselves on some specialization in types of modeling activities to be pursued and then in some way share these models as we approach the multitude of research problems we face.