

2. Forecasting and Models

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Forecasting consists of determining the levels of key variables at different future times over varied geographic spaces. The aim is to anticipate future events to facilitate adaptations (policy, behaviors, etc.) and lower certain negative impacts. Unlike predictions focusing on a single future that one seeks to know with precision, forecasting examines the consequences of more or less probable scenarios.

Forecasting as Applied to the Economy and the Difficulties Involved

Forecasts are based:

- either on the collection of experts' opinions, using more or less formal methods, so as to compare and harmonize them, but without any assurances as to the overall coherence of the scenarios envisaged;
- or on quantitative models. In this case, the model's equations provide this coherence.

A typology of the multiple econometric models elaborated over the past twenty years can be proposed based on the question examined, the scale of analysis and the methods employed. For forecasts of world agricultural trade, the questions focus on the system's capacity to meet solvent demand and future changes in this demand, the environmental consequences, probable prices, and the major export and import zones for each product. One can distinguish between sectoral (e.g. agriculture) and general (i.e. the economy as a whole) equilibrium models and accounting models based on "physical" equilibrium and containing no (or few) economic behavior equations. The models propose analysis at varied scales (global, regional, national). They are based on determining and formulating in equation form the primary relations at work and estimating, based on past data or experts' opinions, function parameters; and on extrapolating future trends by modifying some of the entry parameters, or assuming the continuation of trends, or even adapting the system to a supposedly driving variable such as rising demand.

This type of work has multiplied thanks to the advances in computer calculation capacities and the awareness that current decisions influence the future and considerable time may be needed for certain modifications because of the inertia of the economic system and the cumulative processes at work in its relations with social and environmental systems.

As the 2006-2008 food crisis illustrates, which few experts had predicted, models do not generally make it possible to provide scenarios that turn out to be true or even clarify the future. Indeed:

a) The questions asked and relations chosen are the subject of choices that are rarely explicit and even less often discussed. And yet, when the question is well posed and the principal relations are well identified, models provide relatively relevant results and are useful because they make it possible to synthesize the multiple effects linked to the relations between variables.

b) Most models favor the perpetuation of past trends, whereas crises are breaks with trends. Dynamic simulation models could determine the probability of crisis but they are chaotic and because of this difficult to elaborate and utilize (high degree of sensitivity to initial conditions). They are little appreciated by experts because they yield a wide range of possible impacts that depend on parameters that we cannot calculate with sufficient precision. The search for consensus does not favor innovative analyses.

c) Numerous elements that are not easily quantifiable are missing in models even though they play a major role in the evolution of economic variables: social phenomena, cultural phenomena, institutional phenomena, balances of power, etc.

d) The goal of “global coverage” of phenomena leads to the simplification of local specificities so as to limit the number of variables. The “heavy” trends revealed do not allow these specificities to be depicted.

Useful Tools for Reflection... whose Assumptions Must Be Made Explicit

Forecasting obliges one to simplify things considerably, and differences with reality are explained by the multiple elements seen as “exogenous” (weather events, the state of social relations, technical advances, etc.). Economic forecasting tools then become quite unverifiable. This is the major stumbling block that stands in the way of the discipline’s progress and makes it vulnerable to exploitation.

In this way, the results of models cannot be seen as depicting an overall reality. Choices are made on the primary relations to take into account. Some aspects are pushed aside to limit the number of variables to analyze and stick to easily quantifiable phenomena. It is therefore necessary to make explicit which relations were chosen as essential and which were left out because of their negligible nature. Faced with complex phenomena, models are nevertheless useful to depict the relations between variables and synthesize their impacts for the various types of actors. By revealing unsupportable outcomes if current trends continue, they can suggest necessary reforms and, by emphasizing possible blockages, suggest appropriate strategies.

They must not, however, be confused with reality. To improve models and their use and avoid their exploitation for ideological purposes, the results must systematically be

accompanied by a notice specifying the main assumptions, key relations used or excluded, and the probable consequences of these choices...

Trade Liberalization and Global Models

Let us look at the example of the research on trade liberalization that has been at the forefront for thirty years in regard to development policies. Trade liberalization is justified on the basis of quantified assessments drawn from general equilibrium models (often based on the same data: the GTAP database) or partial equilibrium models. These models, cast from the “same mold” based on the Walrasian theory of a certain future, are all in favor of trade liberalization and the disappearance of agricultural policies. Indeed, by construction, they believe that:

- * markets exploit all comparative advantages and are balanced at all times, because economic agents know prices in advance and can therefore effectively and with certainty predict production, regardless of the necessary lapse of time;
- * prices are consequently established at a level such that supply harmoniously equals demand; and
- * free markets are therefore the most efficient means to allocate rare resources (automatic regulation by the market) and economic policies are always constraints that lower the efficiency of actors’ behaviors.

In addition, the arguments for trade liberalization insist on the potential gains for developing countries due to:

- price stabilization thanks to the dilution of shocks over a wider market,
- the dissemination of technical innovations and improvements, thanks to the intensification of trade, and
- a dynamic of growth and formal and informal job creation in rural areas, benefiting all of the population and notably the poorest.

This discourse is given excessive media coverage but ignores the real content of studies (produced, for example, by the World Bank) that indicate the complexity of the phenomena and the difficulties portraying them, or even the recommendations of the models’ authors, who emphasize the caution that should be taken when using their results.

Despite their complexity, global models seem extremely simplified in relation to the global economic system. This is notably the case when modeling producers’ and consumers’ behaviors:

- capital markets are assumed to be perfect, and all profitable activities are therefore financed without delay, and
- prices allow for the immediate equalization of supply and demand, with agents having all the information necessary for their decisions, without any uncertainty.

In fact, these models do not evolve in “real time” even when they are dynamic. Finally, only inappropriate government intervention opposes agents’ optimal decisions. What is more, the government’s role is limited to redistributing income and consumption. This omits the economy’s role in public goods and currency, as it does the role of monopolies

or the power of certain actors in markets (the assumption of “pure and perfect” competition).

Furthermore, despite being cast from the same mold, the results vary considerably from one model to the next because a few key assumptions have a non-negligible impact on the results (elasticities, shift of factors from one sector to another, real levels of customs duties).

Also, the estimates of global gains from liberalization have fallen over time and have always shown a lack of positive impacts—and sometimes even negative impacts—for the poorest. Despite this, discourse is evolving very slowly and development policy design even more slowly: belief in trade liberalization and its beneficial role for development seems to persist in many publications and at the center of the discourse on development.

One must therefore question the use of the results of models. By refusing to discuss their assumptions and know their limits, and by using them for ideological purposes rather than as tools for dialogue or to align phenomena, we are not preparing correctly for events that are, however, probable, as the recent crisis in agricultural markets shows. The lack of consideration of uncertainty—which plays an important role in how markets operate and makes up the fundamental justification for regulation policies—does not allow one to test the costs and advantages of agricultural policies.

It is appropriate to discuss the assumptions in the models and see their results as more or less probable possible futures. They could be improved by iterative correction processes, by comparing results to reality. This implies forecasts that first verify that they can reproduce the past and that examine objects that can be observed in reality.

4- The Tricky Question of Food Insecurity and its Persistence

In poor countries, because of socioeconomic conditions and the complexity of mechanisms, models can contribute to the study of food security, help evaluate alternative policies, and help organize negotiations among actors—a crucial element in policy legitimacy and credibility.

As for projects, the success of economic policies probably depends on the possibility of redefining them during their roll out, which implies having both the necessary information and expertise capacities. Models are in this case effective tools to align data and collect statistics, and therefore to multiply analysis capacities and serve as training and negotiation tools. Indeed, they offer elements to support policy reflection by making explicit the expected consequences of various measures on each type of actor and their costs.

For this, models must:

- be able to reproduce the main dynamics at work (in particular the cumulative phenomena that are decisive in household trajectories and thereby movement into and out of poverty),
- be based on relatively detailed empirical foundations,
- take into account the diversity of contexts,
- submit their assumptions and the consequences of these assumptions to various actors for opinions, and
- take into account the environmental dimension.

Several recent works show the salutary impacts on food security of policies that make it possible to increase capital in rural areas. These analyses use empirical models to reproduce theoretical approaches in terms of “poverty traps.” Indeed, food insecurity is here considered to come from low incomes, which are themselves generated by poor labor productivity linked to the absence of savings and therefore investments. Producers minimize their relations with the market to the exchanges necessary to cover incompressible monetary needs and favor self-consumption. The low use of inputs then lowers monetary needs.

Liberalization does not make it possible to break this vicious circle. Market regulation policies then have a key role because they make it possible to make investment profitability more secure. They must be accompanied by measures addressing access to capital (credit) and public investment in infrastructures. They can only be assessed correctly using models if the models are dynamic and take into account uncertainty.

Even though one must also examine the institutional and financial “feasibility” of policies, modeling can make it possible to designate the most effective levers. For this, one must:

- have access to models with solid empirical foundations and relatively detailed depictions of specific situations,
- clearly explain the assumptions and their consequences on the results,
- discuss assumptions and results with the various actors concerned,
- consequentially use models in an iterative process involving the actors concerned and policy designers so as to improve both the tools and the negotiation process,
- integrate uncertainty in models of agricultural market operations,
- depict the environmental impacts that result from actors’ decisions and the policies conducted, and
- use dynamic models to depict cumulative processes.

Such models would be useful as support tools to meet the 21st century’s food security challenges.

It is easier to comply with these requirements for national questions than for questions addressing the global level. The larger and more complex the object depicted, the more simplifications will be necessary. Thus, global forecasting models addressing humanity’s capacity to feed itself neglect, because of the complexity of real relations and the need to quantify them easily, financial phenomena. Yet, current events remind us of their

importance. At the same time, it is not possible to depict the detailed situation of each household in the framework of a national study. The question of which scale is most efficient has not been resolved and depends on the question asked. National models are a compromise: they authorize the depiction of a certain degree of detail without requiring an excessive number of variables. They correspond to easily accessible statistics, which facilitates validation.