

**ERS 2001 EU Modeling Workshop**  
**New Challenges in Modeling EU Agriculture and Agricultural Policy**

**Session 2--EU Enlargement**  
**Thursday, November 15, 2001**  
**2:00 PM –4:30 PM**

The second session dealt with some of the thornier issues connected with modeling EU enlargement. Because of time constraints discussion focused on just two of the topics listed under the agenda:

1. Impacts on commodity markets (grain, oilseeds, and livestock): the impact of narrowing price gaps, the falling value of the Euro, and the realignment of CEE policies; the appropriate treatment of quality differences between EU and CEE products; and assumptions about the costs of meeting EU regulations.
2. The direct payments question: what assumptions should we make regarding the phase in of these payments; how do we model the impact of direct payments; are these truly decoupled payments, or do they in some way influence production decisions?

Nancy Cochrane moderated the session and gave some opening remarks to frame the questions. Presenters addressing question were Philip Paarlberg of Purdue University, Martin Banse of Gottingen University, and Sylvia Weyerbrock of Princeton University. Banse led the discussion on direct payments.

### **Topic 1—Impacts on Commodity Markets**

**Nancy Cochrane** opened the session with a brief summary of results obtained by ERS in 1999 using the ESIM model and then raising a number of questions that could not be answered using that framework. ESIM is a partial equilibrium model that incorporated detailed policy information and the interactions of the feed-livestock complex. ERS analyzed the impacts of enlargement, using stand-alone country models for three East European countries—Poland, Hungary, and the Czech Republic—and one for the EU-15. The results of these models were entered into a global linker program equilibrating world supply and demand, thus capturing the effects of enlargement on world agricultural markets.

The principal results obtained by ERS were the following:

- ◆ The CEEs become net importers of wheat, but larger exporters of corn, barley and other feed grains. Wheat prices in both Poland and the Czech Republic were above the EU wheat price as laid out in Agenda 2000, so that wheat prices decline in these two countries after accession. Feed grain prices in all three countries were substantially below the EU price, so their production rises significantly after accession.

- ◆ The CEEs become large net exporters of beef and pork. Producers experience price rises of 40 to 60 percent and output, particularly of pork, expands accordingly. The rise in beef output is constrained by the EU dairy quota, as more than half of CEE beef production is a product of the dairy herd. But higher prices cause consumption to decline sharply, leading to large surpluses.

However, a number of factors could significantly alter those results:

- ◆ Price gaps between the EU and the CEEs have narrowed considerably, such that in some cases CEE prices are actually higher than the EU intervention price. This has come about partially as a result of the appreciation of CEE currencies relative to the Euro, but it is also the case that the CEEs have been gradually realigning their policies to conform to the CAP.
- ◆ ERS results suggest significant increases in livestock output and exports. The driving force behind these results is the large gap between EU and CEE livestock prices. However, part of this price gap is the result of quality differences, which ESIM does not take into account. In addition, the need to comply with EU regulations regarding animal welfare and sanitary standards will raise production costs and wipe out some of the benefits of the higher CAP prices.
- ◆ The ERS ESIM model, being partial equilibrium, cannot be used to project the impact of enlargement on land, labor and capital markets and possible changes in the structure of CEE agriculture.

The other speakers in the session had used various types of CGE models, and much of the ensuing discussion centered on the relative merits of CGE versus partial equilibrium models such as ESIM. CGE models can explicitly model the intersectoral linkages and can answer some of the questions raised by Cochrane regarding land and labor markets. But that ability comes at a cost of the rich policy detail that can be captured by ESIM.

**Banse** used a combination of partial and general equilibrium models in his analysis. He used a version of ESIM to model the policy detail and a CGE model to analyze the impact of enlargement on macroeconomic variables, such as primary factor prices, consumer income, exchange rate, and prices of intermediate goods.

The version of the ESIM model used by Banse is a comparative static, multi-commodity agricultural world model. It includes ten CEEs (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia) and the EU-15. All other countries are aggregated into the “rest of world”. The agricultural sector includes 27 products. Net trade is modelled as the residual of supply and domestic use.

CGE models were developed for the Czech Republic, Hungary, Poland and Slovenia. The models depict a single composite agricultural good and a food processing good. They include two types of labour (low and high skill workers) which are perfectly mobile across all sectors. Land is modelled as a specific primary factor in agricultural production. The models specify the behaviour of consumers in two different types of households (urban and rural). Aggregate

domestic demand in the model has four components: private consumption, intermediate demand, government, and investment. The CGE models include the major macro-balances: savings, investment, government deficit, and the balance of trade. In the balance of trade equation, the value of imports at world prices must equal the value of exports at world prices plus exogenously set foreign savings and net foreign borrowing by the CEE governments, and the real exchange rate adjusts to achieve equilibrium.

Banse analysed three scenarios: accession without implementation of the CAP, accession under Agenda 2000 but without direct payments, and accession with direct payments. Partial equilibrium results show significant increases in net exports of feed grains, sugar and butter, products that enjoy the highest levels of protection in the EU-15. Production increases are greatest in Hungary: Hungarian producers currently receive the lowest levels of protection in the region, and commodities receiving the highest levels of protection under the CAP make up a large share of Hungarian production. At the opposite extreme, Slovenia, which currently provides higher levels of support to its producers than the EU-15, sees a decline in production and a rise in imports.

The CGE model allows projections of total GDP, exchanges rates, total value added in agriculture, and net welfare gains or losses. According to this analysis, the impact on GDP is influenced by the initial net trade position of the CEEs. Under the scenario with Agenda 2000 but no direct payments, Poland and Slovenia, currently net importers, see a slight decline in GDP, while Hungary and the Czech Republic see increases. Without direct payments rural households in Poland and Hungary see small welfare gains, while urban households lose. With direct payments all households in Poland and Hungary gain, but welfare gains are still greater in rural households. In Slovenia, gains are greater for urban households.

**Philip Paarlberg** of Purdue University presented a model developed under a cooperative agreement with ERS for an analysis of East European and Russian livestock sectors in transition and adapted to answer questions regarding EU enlargement. This model is a CGE model specifically designed to analyze the animal and meat production sectors. The model separates animal breeding from meat processing and provides detailed linkages between feed crop production and livestock.

The model depicts both agricultural and nonagricultural sectors. Primary factor markets--land, labor, and capital--are included, with linkages between sectors and aggregate resource constraints explicitly recognized. The agricultural sector is desegregated into livestock/poultry and crop production. Crops provide feed for livestock/poultry production. Animals are traded, retained in breeding herds, or slaughtered and processed into consumer goods. Processed consumer goods (meat and dairy products) are retailed domestically or exported.

Primary factors of production consist of labor, land, and sector-specific capital. Pure final goods are beef, pork, poultry meat, fluid milk, butter, cheese, and sugar. Goods used only in the production of other goods (pure intermediates) are oilseeds and meal, cattle, hogs, poultry, sugarbeets, roughage, pasture, and farm milk. The remaining goods are used both as intermediates and as final goods. These include grains, potatoes, roots/pulses, and a composite nonagricultural good.

The nonagricultural sector is represented by a composite traded good and a composite nontraded good. The composite traded good includes all nonagricultural goods used to produce or process agricultural goods, which are able to be transported across international borders--inputs such as fertilizer, pesticides, herbicides, petroleum goods, etc. The nontraded good includes such items as bank credit, veterinary services, storage, transportation, electricity, etc., which by their nature are unable to be transported across international borders.

Primary factors are combined with nonagricultural goods to produce crops, roughage, and pasture. These inputs together provide feed necessary to produce livestock and poultry for slaughter or trade. Animal production relies on feeds as well as labor, nonagricultural goods, and sector-specific capital. Animals are slaughtered or provide farm milk. Farm milk is processed into a price-determined combination of fluid (retail) milk, butter, or cheese, using labor, capital, and nonagricultural goods. Slaughtered livestock and poultry become final goods -- beef, pork, poultry meat.

The modeling framework allows simulation of exogenous changes in policies, resource endowments, factor prices, etc. Its advantages are that it can capture intersectoral linkages and model the impact of enlargement on markets for agricultural land, labor, and capital. In an analysis of EU enlargement this model does a good job in projecting the impacts on the acceding countries of alternative price and income policies, labor market adjustments, impacts on land markets, and impacts of the structural funds. It is not well suited to deal with quality issues or the issue of foreign ownership of land.

**Sylvia Weyerbrock** used a 13-region, 20-sector CGE model with a 1995 base year. With this she was able to desegregate to capture the most important commodities affected by the CAP. She modeled EU price, income and trade policies as endogenous or exogenous price wedges. Her major contribution was to point out the advantages and disadvantages of CGE models. The advantages were that they capture the intersectoral, factor-market, budgetary and macroeconomic effects of policy changes and external shocks and are useful for examining long-run effects or policy change. The disadvantages are:

- ◆ The appearance of being a “black box”
- ◆ They need a huge amount of data—not much of a problem for EU but significant for the CEEs
- ◆ Most such models use parameter estimates from literature
- ◆ They are not good at examining short-run effects and transitional issues

She also pointed out that this type of model simulates the workings of a market economy in which prices or quantities adjust to clear markets. This is no problem for analyzing the EU, but could be for the CEEs, where markets are not yet functioning smoothly.

## **Topic 2—the Direct Payments Issue**

The second half of the session dealt with the question of direct payments. An increasingly contentious issue in the negotiations is whether or not CEE producers will be immediately

eligible for the full range of direct payments that EU-15 producers are now entitled to. These are per ton “compensation payments” intended to compensate EU producers for the cuts in support prices that came with the 1992 CAP reform. They are paid on a per ton basis but are tied to historical average area and yields, so that in theory they do not influence current production decisions.

There are two issues under negotiation. First, EU negotiators are insisting on a transition period before CEE producers are eligible. The CEEs are insisting that their producers receive the full range of CAP subsidies immediately on accession. The second issue concerns which historical period will be used as a base, once CEE producers are eligible for the payments. The EU is proposing the 1995-99 average area, yields, and herd levels be used as the base. CEE negotiators are insisting on higher base levels.

One question of interest in this workshop was the impacts that the levels of direct payments will have on output. There was a general consensus that these payments will have some influence on production decisions, that is they are not totally *decoupled*. But there was considerable discussion as to exactly how they influence production.

Martin Banse gave the only formal presentation on this question. For crops, his model incorporates direct payments into the yield function, and for animals, direct payments are part of the herd equation. His findings showed that providing the full range of direct payments to CEE producers would result in just small increases in output, but would result in substantial increases in net value added for CEE agriculture, as well as overall welfare. Direct payments increase the welfare of rural households in Poland, for example, by 21 percent. Without direct payments, welfare of rural households in Poland hardly changes, while welfare of urban households declines.

However, the impacts on the EU budget are equally large. Banse estimates that providing direct payments to CEE producers would increase budget outlays by as much as 6.5 billion Euros. This is the principal reason why EU negotiators are so eager to restrict direct payments to the CEEs. If CEE negotiators prevail and gain eligibility for direct payments, the result will be serious pressure for CAP reform.

## **Conclusions**

There was not time for discussion of primary factor markets (land, labor, or capital), although Banse’s CGE model was able to generate results for labor and capital markets. We also did not touch on the question of structural funds. In part this was because from the point of view of the European participants, the most urgent question connected with enlargement is the issue of direct payments.

But an important conclusion was that the best approach for studying enlargement was to use a combination of partial equilibrium models, such as ESIM, and CGE models. The partial equilibrium models provide the commodity detail, while the CGE models provide the intersectoral linkages and impacts on factor markets. The results of one can be fed into the other.

However, as was pointed out by David Abler at the conclusion of the workshop, the analyst needs to be careful to check the final results for consistency.

In the end, there were four major unresolved issues relating to the modeling of enlargement.

- ◆ There has been no rigorous analysis of the impact of direct payments on producers. Everyone who has attempted to model this has simply made assumptions about the impacts, but no one has tested these assumptions empirically.
- ◆ In most of the models discussed parameter estimates are taken from the literature or estimated in some way, rather than econometrically estimated. In the case of the CEEs it is still too early to obtain a long enough time series. But more generally, there has not been much effort to estimate parameters for any region since the 1970s.
- ◆ There was no resolution of the issue of quality differences between EU and CEE products. Every model assumed homogeneous products, when the reality is that quality differences are becoming more and more important in determining consumers' choices.
- ◆ There has not been sufficient work in estimating the costs of compliance with EU animal welfare, sanitary and phytosanitary regulations.