PolicyPennings by Dr. Daryll E. Ray

Errors in methodology can affect policy conclusions

On December 5, 2005, the CATO Institute released a paper, "Boxed in: Conflicts between U.S. farm policies and WTO obligations," authored by Daniel A. Sumner, professor of agricultural and resource economics at the University of California, Davis. Sumner was also an economic expert for Brazil in the WTO cotton case. The paper can be accessed on the internet at: http://www.cato.org/new/12-05/12-05-05r.html.

The paper is a combination of a critique of current US farm policy, an examination of the impact of current policy on agricultural prices and trade, an outline of possible agricultural trade disputes that could be brought against the US, and a justification of his activity in providing expert testimony in the cotton case that Brazil brought against US cotton policy.

Sumner's basic argument depends on a simulation model he developed to show that when subsides are eliminated crop prices will increase significantly. The direction of the price change is not in question. It's the magnitude that is important.

The magnitude of the price change is basically determined by the modeler's assumptions concerning how the agricultural economy works. And we do have problems with Sumner's analysis in that regard.

First, Sumner assumes that farmers react to a price reduction by reducing supply by the same percentage as price declined. You read that right. He assumes that a 20 percent reduction in price would cause farmers to reduce supply by 20 percent. Second, any acreage that is taken out of production in his analysis falls off the face of the earth - so to speak.

Let us begin by looking at corn. Sumner computes a "price" that farmers are assumed to react to in determining how much corn to produce. The "price" is actually the sum of the market price and 75 percent of corn's per bushel government subsidy. He assumes - as we have already indicated - that, for each one percent decline in this combination-price-and-per-unit-payment, the supply of corn declines by that same one percent. To use the parlance of economists, Sumner uses an own-price elasticity of corn supply of 1.0.

Notice that farmers are assumed not to respond to prices of other crops in this model. Also, as we will see, there is no way for other analysis crops to use acreage that has been taken out of corn production in response to low prices.

To complete the analysis framework, Sumner specifies other equations and their parameters, including a US corn demand, and corn supply and demand for the rest-of-world. The parameters assumed for these relationships reflect much less price responsiveness than the US supply relationship, but they are also suspect.

For example, the price elasticity of US corn demand is assumed by Sumner to be -0.5. It is doubtful that even corn export demand is that price responsive and feed and food demand which make up about 60 percent of corn demand are usually reported closer to-0.25 than -0.50.

The bottom line is that after all these assumed highly price-responsive reactions work through his system of equations, Sumner squeezes out a 10 percent corn price increase when corn subsidies are eliminated.

OK, next crop. It is the same story for wheat. Wheat production reacts only to changes in wheat revenue per unit (combination of market price and wheat per-bushel subsidy, except this time he considers 65 percent of government payments).

An own-price elasticity of supply of 1.0 is used, just like for corn. Again, note that the analysis framework does not allow movement of acreage from wheat to corn (or corn to wheat, etc.).

So what happens to wheat price when Sumner takes away the wheat subsidy? Wheat prices go up by 8 percent. A similar approach for rice results in an estimated 6 percent increase in rice price. Even with unrealistically optimistic analysis parameters, eliminating subsides generates very modest price increases compared to the subsidies foregone.

He does not analyze cotton because that case has already been decided against the US by the WTO. Soybeans are not considered because subsidies are small relative to market revenue and cost of production. Soybeans should be part of the analysis however, because - even though it is not allowed in his models – much of the acreage that comes out of corn, cotton and wheat in his analysis would not remain idle but would be put into soybeans.

So in brief what does all this economist talk really mean? It boils down to this: According to Sumner's analysis, a crop's supply responds proportionately to the crop's per-bushel-gross returns. Since the returns for other crops are assumed to not be considered in farmers' decisions when deciding how much to produce of given a crop, any reduction in acreage for one major crop is not available for use in another. All this seems contrary to what is know about the nature of agricultural markets and the way farmers make decisions.

This type of partial equilibrium analysis may be defensible for analyzing the elimination of a subsidy that only applies to one crop (say the Step 2 payment in cotton) and there is no interest on how the policy change impacts other crops or the impact on other crops is negligible. Partial equilibrium analysis assumes that everything else is held constant – that of course is not the case in the present analysis situation.

The use of this partial equilibrium analysis framework also would be defensible if it were applied to aggregate agriculture, that is, the market for all agricultural products. But the parameters would be much different.

For example, the aggregate US supply elasticity would be close to 0.10, not 1.0. The demand elasticity would be closer to -0.20 than -0.50. The measure of price for aggregate crop agriculture would no doubt be positive as a result of eliminating subsides, but a fraction of the magnitude of the crop price increases reported by Sumner.

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