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The Economic Contribution of Agriculture in Delaware: Comment

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In the April issue of this journal, Tanjuakio, Hastings, and Tytus (1996) assessed the economic contribution of Delaware's agriculture using IMPLAN, an input-output modeling software. The authors used an expanded definition of agriculture to include production agriculture, agricultural inputs, and food and fiber processing industries. While the authors recognized that analysis using output as the impact variable inherently suffers from double counting, setting the RPCs (regional purchase coefficients) of the agricultural industries to zero will reduce but not overcome the double-counting problem for the following reason.

The authors defined the direct, indirect, and induced effects as changes in output, employment, income, and value-added per million dollars change in output (in table 2). However, the correct definitions, as published in the Micro IMPLAN User's Guide (see Olson and Lindall's 1994 modification of Taylor et al. 1993, p. C-36), are in terms of per million dollars change in final demand and *not* output. While it would not make a difference if one is to assess marginal effects assuming the entire change in output is attributed to final demand change, using the same methodology to assess the contribution of a sector or group of sectors would not be appropriate. Imagine a hypothetical economy with three sectors whose outputs are $100, $200, and $300 million, with a total output of $600 million. If their output multipliers are respectively, 1.3, 1.2, and 1.1, then their respective contributions are $130, $240, and $330 million, with a total contribution of $700 million, which is more than the actual total output of $600 million. This adding-up problem is inherent in all methods utilizing output as the starting point in assessing the economic contribution of sectors in input-output analysis and is well documented in Groenewold, Haggar, and Madden (1987). Setting agricultural RPCs to zero will no doubt decrease the size of the agricultural multipliers. However, it is obvious that in no way will it alleviate the adding-up problem entirely unless all the multipliers are one or some multipliers are less than one. Neither is possible.

This clearly points to the inappropriate use of input-output multipliers in assessing the economic contribution of agriculture or any other sector. We suggest that the final demand approach would be more appropriate in assessing agricultural industries as a collective unit. First, it will not have the adding-up problem. Second, the problem of using the final demand approach when a sector's final demand is small relative to intermediate demand vanishes as we are dealing with a collective unit. For example, the field sugar sector may have no final demand and hence no economic contribution will be recorded using the final demand approach. However, when we combine the sugar processing sector with the field sugar sector, then the collective contributions will be correctly recorded as the sugar processing sector purchases raw sugar from the field sugar sector. By carefully defining agriculture, such as the U.S. Department of Agriculture's Economic Research Service's food and fiber sector (FFS), we would be able to assess the economic contribution of agriculture in a theoretically correct manner using the final demand approach.

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