

DISCUSSION: REGIONAL MARKETS FOR FOOD AND INTERREGIONAL COMPETITION: IMPLICATION FOR SOUTHERN AGRICULTURE

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A comprehensive discussion of research and interregional competition logically includes three major components: (1) a review of the overall need for the research results and a clear delineation of the differences in information requirements across types of clientele; (2) a description of the characteristics of the needed research methodology, as related to the specific clientele needs; and (3) the resulting data requirements, consistent with both the methodology and with the research objectives. Furthermore, in addressing a research-oriented audience, there should be emphasis on identifying "bottlenecks" that currently exist either in developed methodology or data bases, or both. Of course, the idealistic objectives are to stimulate the assembled audience, first, to return home with an enthusiasm for developing new and more appropriate analytical methods; and, second, to begin lobbying for better and more extensive public data resources.

In their respective papers, Professors Blakley and Johnson each recognize and address the factors just mentioned. It is hoped that these additional comments will serve to reinforce the link between the research need and the appropriate methodology and data required.

Professor Blakley spends considerable time discussing the factors affecting consumer demand and reaches the conclusion that tastes and preferences, relative prices, and food budgets have become more homogeneous across geographic areas; hence, demand relationships are not inherently different because of the location of consumers, but because of the socioeconomic characteristics of the consuming families. While one cannot really argue with this conclusion, the analysis presented to justify the conclusion does get a bit confusing. In particular, the section on income response needs some comment.

The first statement in the income section of his paper focuses on the problem. He says, "Regional demands for goods have been different in the past because of differences in levels of income." If we accept that (a) demand relationships are multivariate functions which include income, and (b) that the response parameters are homogeneous for all consuming segments, then his statement reflects a movement along a single demand surface from region to region, as opposed to differences in demand functions across

regions. Again, if we accept this, then his subsequent analysis, which purports to show little food expenditure variability across income groups, actually argues against including income, at least as a continuous variable, in the consumer demand function.

A problem exists in that the analysis only casually addresses two fundamental questions. First, What is the food consumption response to various income levels? and, second, How does this response coefficient vary across geographic regions? Blakley presents and addresses the first question on a national basis for fairly aggregate food groups. It is doubtful that the data given are appropriate to formulate any useful hypotheses regarding regional income parameter variations. Even his tentative conclusion that only two income groups are needed in demand equations is tenuous because of the aggregation involved in the food groups. For example, the observation that total expenditures for meat, poultry, and fish are relatively insensitive to changes in income across the four income groups presented does not necessarily imply that the demand for any given component of that group, for example, beef, pork, and so forth, is insensitive to income levels.

If, through empirical analysis, it is determined that traditional price and income parameters differ geographically, the question concerning why the differences exist remains unanswered. Of course, this leads us to the "taste and preference" issue, and that leads us to the particular population characteristics of a given locality. Blakley argues, on the one hand, that population mobility, nationwide advertising and marketing programs, and homogeneity of income distribution are factors leading to uniform tastes and preferences across regions. He then goes on to argue for better identification of socioeconomic variables, implying that demand will be influenced by these variables. An obvious conclusion is that we should at the very least include socioeconomic (ethnic, education, age, employment, family size, urbanization,) variables as demand shifters. However, a similarly logical hypothesis is that the price and income response coefficients are also related to socioeconomic variables—thus, an argument for estimating unique demand functions for each group.

While this argument is intellectually appealing, its practicality is suspect for several reasons:

1. The various "socioeconomic" variables tend to be highly correlated.
2. Data are difficult and expensive to obtain.
3. Even if it is possible to estimate unique demand relationships by socioeconomic group, for spatial equilibrium or regional research it is necessary at some time to aggregate across functions to obtain a regional demand. Aggregation problems are not trivial when the parameters differ across groups.

Furthermore, geographic differences in demand are also likely to result from regional differences in firm marketing activities, the location of commodity production, and other unexplained factors. This becomes more evident when one deals with more detailed product characteristics: for example, apples and oranges versus fruit; chilled and frozen orange juice versus orange juice; beef and pork versus meat; hamburger and steak versus beef, and so on.

In summary, the above comments suggest a stronger position for regional demand analysis than was apparent to me in Blakley's paper. Of course, this leads to the very tough problem of data collection. In my opinion, consumer panel data, despite many and well publicized shortcomings, is the best alternative. Perhaps the technical capability will soon be available to have electronically generated panel surveys as opposed to diaries, which are highly dependent on consumer recall. This suggests that, as a profession, we should exert more pressure on the USDA and other public agencies to develop and fund a more extensive public data-collecting procedure for retail level transactions. Despite the wide acceptance of systems analysis and the undisputed link between the consuming and producing sectors, government spending on agricultural data is still very weighted on the side of the producing and first-handler level in the marketing chain.

Obviously, it is easier to recognize the importance of regional differences when considering the supply side of the market. Professor Blakley handles this discussion well, and I offer only several additional thoughts. First, it is important to emphasize the need for disaggregating total crop supply response relationships to the acreage, yield, and production components. Private sector clientele of our research have a particularly acute need for this breakout. While many of these firms are serviced by proprietary economic consulting firms, such as the one I represent, public research agencies have a vital role to play in the continued development of methodology and data generation.

For example, we recently found that in Canada there is very significant yield response to current and recent-past economic conditions for all the major crops. Also, the yield response to economic conditions differs between western and eastern Canada. Thus the conclusion that expectations for crop prices relative to input costs not only affect the allocation of land among crops, but also the way farmers care for the crop at and after the planting period.

Another argument for regional analysis is illustrated by the winter-wheat-planted acreage increases in the U.S. this past fall. Responding to short grain supplies and a strong price outlook, U.S. farmers increased winter wheat acreage by about 6 million acres. The significant thing about this is that the largest percentage increases occurred primarily in the Southeast, where winter wheat is normally not a major crop. This suggests the possibility of double cropping with soybeans, and it very vividly illustrates the regional production adjustments that are stimulated by relative price fluctuations.

The current interest in developing new fuel-ethanol production capacity using grain feedstock could have significant regional impact on agricultural activity. Archer Daniel Midland Company is planning an anhydrous alcohol plant that will use a reported 85 to 90 million tons of corn a year and produce the protein equivalent of more than 500 thousand tons of soybean meal in the form of corn gluten feed and corn gluten meal. The regional impact for crop production and livestock feeding from this magnitude and type of activity can be tremendous. As a profession, we had better be in a position to evaluate the impacts.

Professor Johnson's paper represents a thorough review of the methodology applied to inter-regional and transportation problems. His concern over model and parameter validation problems associated with normative spatial models is shared by many in the profession.

I was intrigued by the statement that "model validation converts competitive equilibrium models from normative to positive estimator models." Unfortunately, I did not have access to the Wallace reference given to support the statement. If I have interpreted correctly, Johnson's criteria for model validation rests strongly on the ability of programming model solutions to track actual market observations. In my view, this does not *convert* a model from being normative to positive in character. All it really says is that the "normative" results produced by the model happen to coincide with the "positive" data generated by real world activity.

If we are conscious about fitting our methodology to the needs of the users of our research, it may be found that the amount of interest in knowing what regional adjustments are "likely to occur" (in the context of positive economics) far

exceeds the interest in knowing what adjustments "should occur," to be consistent with the particular objective function chosen in a normative model.

A final comment relates to Johnson's plea for the "internalization of closely related commodities" in spatial equilibrium models. One cannot help but agree, and conceptual models such as those developed by Judge and Takayama and others can handle substitution relationships. However, on a practical level, my experience has been that econometrically estimated coefficients very rarely fulfill the necessary and sufficient Kuhn-Tucker conditions for a unique solution to the programming problem. For example, in a spatial equilibrium model using demand functions with own-price and cross-price coefficients, there is no guarantee that the estimated coefficients will have the proper relationship to each

other to produce a positive definite quadratic matrix in the programming model objective function.¹

One possible way of assuring that the estimated demand price and cross-price slopes will be consistent with the conditions required for a unique optimum solution is to develop the demand coefficients by estimating complete demand systems that incorporate the parameter restrictions implied by the maximization of utility subject to budget constraints.

If one argues for regional demand differences and for spatial equilibrium analysis with internalization of closely related commodities, then there would appear to be a strong argument for estimating complete demand systems on a regional basis. Of course, that raises a whole new set of data problems.

¹ For example, consider the quadratic programming problem:

Find a vector $\bar{x} \geq 0$, which maximizes the quadratic function:

$$f(x) = c'x - \frac{1}{2}x'Qx$$

subject to:

$$\begin{aligned} Ax &\leq b \\ x &\geq 0. \end{aligned}$$

A unique solution requires the $n \times n$ quadratic matrix Q to be positive definite, that is, the objective function is strictly concave. This discussion relates to the situation where Q represents own-price and cross-price slopes from consumer demand functions.

