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PROCEEDINGS

of the

WESTERN FARM ECONOMICS ASSOCIATION

THIRTY-SIXTH ANNUAL MEETING

JULY 24, 25, 26, 1963

UNIVERSITY OF WYOMING
LARAMIE, WYOMING

separate transportation model to determine product flows, and hence product prices for the following year.

Because each region can be treated as an independent programming problem in each year, the recursive inter-regional analysis may offer a distinct computational advantage. Restrictions imposed by computer capacity are not likely to be as critical in this approach as they are for the spatial equilibrium-type of model treated as a single problem.[8/] Nevertheless, we should recognize that the equilibiium and RP approaches have different objectives. The former builds the time dimension directly into an iterative sequence in an attempt to describe the actual adjustment path. The spatial equilibrium model may also involve an iterative procedure but not with reference to time. Its purpose is to draw a comparative-static picture of the more normative adjustments.

Conclusions

Recursive programming could easily become a "plaything" if we cannot graduate from the security of "pilot" studies to practical application. Three pertinent questions are: (1) How do we know when a technique passes the test of reliability? (2) What are the stumbling blocks to its practical use? and (3) Can these be lessened?

Because no one technique is perfect for all problems, probably the most meaningful test is one that compares the manageability and results of different approaches to the same research problem so as to identify their relative advantages and limitations. Our tendency to use one model for one problem, or region, and another model elsewhere is seldom a sufficient test. Data are the inevitable barriers to practical use of any programming model. The related problem of aggregation bias requires urgent attention if we are to determine whether gains in predictive accuracy are worth additional refinements, one of which is deaggregation.

DISCUSSION: REGIONAL MODELS AND AGRICULTURAL ADJUSTMENTS

Odell L. Walker
Oklahoma State University

The specific problem of this session apparently is "what models shall we employ in estimating regional agricultural adjustments to selected economic or other stimuli?" The objective of the proposed research is to provide information to decision makers of private firms and institutions which will help them make adjustments in private and public affairs consistent with present and/or prospective economic and technological conditions and private and public objectives. Hopefully, an attempt will be made to maximize the utility of such information to managers of nonfarm firms and institutions serving the agricultural sector, as well as to managers of farm firms.

8/ For example, see Egbert, Alvin C., and Earl O. Heady, Regional Adjustments in Grain Production--A Linear Programming Analysis, USDA Technical Bulletin No. 1241, June 1961.

While rather general agreement probably exists on objectives of the research, important preliminary steps such as planning effective organization for regional research and selecting models or analytive techniques remain. The technique problem is emphasized today. However, effective inter and intra agency or department organization for regional research undoubtedly is an important contributor to success in regional ventures. Thus, a few comments on organization are offered prior to discussion of the papers.

Organization for Regional Research

Concepts useful for planning regional research naturally would stress the geographical breadth of the effort. However, the problems, resources, training, and interests of researchers, and technical and economic data involved have similar impressive dimensions of depth, breadth, quantity, and detail. For example, a majority of our research resources would be required. Similarly, most components of managerial activity, market performance, consumer demand, factor supply, and foreign trade are of interest. The following planning concepts, emphasizing a need for spanning one or more of the relevant dimensions, appear essential for success of the regional research proposed.

1. The concept of minimum participation by states and agencies cooperating must be specified and accepted. That is, once decisions are made regarding procedures and work, cooperators would be expected to provide minimum data or analyses required. Of course, extensions of the research or work on other related problems of interest beyond that agreed on by regional group would be welcomed but not required.

2. Close ties with agencies having regional and national orientation appear particularly essential. Complementarity of efforts, long term continuity of work, and more adequate research resources are some of the benefits derived from such ties.

3. Coordination of production economics specialists (in this case) with other subject matter specialists (e.g., marketing, policy and credit specialists, and resource and general economists) must be increased. In fact, the scope of regional research suggests need for quite formal ties between specialists.

4. Evaluation of production and marketing practices and alternatives must proceed at an accelerated rate. In some areas, substantial work must be completed before regional analysis can be conducted, regardless of the model used. The basic concept is that traditional farm management and marketing work is not to be discontinued but vertically extended.

Regardless of the techniques used in regional research, these concepts should be useful. Clearly, the list is not exhausted and additions are needed and welcomed. The concepts emphasize coordination within and between agencies. Unless such coordination is achieved, we are likely to reach familiar and monotonous dead ends.

Techniques for Regional Adjustments Research

If, as Andersen reports, " 'Supply Response Study' has come to mean a study in which budgeted or programmed responses of production to price fluctuations on individual farms are summed to develop regional supply functions," we have narrowed our thinking in an unfortunate way. It is to be hoped that present students and future workers are not endowed with such ideas. The emphasis, of course, is needed on the phenomenon to be investigated rather than the research package.

The above quotation quite adequately characterizes the technique discussed by Andersen. However, the more humble term "piled up" might be substituted for "summed." Three steps in the technique deserve more elaboration than Andersen was allowed by limited time. The steps with brief additional comments are:

1. Selection or construction of resource situations (representative farms) requires:
   a. Careful analysis of possible economies of scale.
   b. Specification of adjustment periods of interest in the study (e.g., short, intermediate, or long term), and
   c. Projection of farm size distributions for the period of interest.

2. Input-output data must be consistent between areas with respect to technology levels and cost items included. Researchers conducting studies similar to the Lake States Dairy Study have made significant advances in delineating soil resource relationships which appear to allow more accurate depiction of supply responses and increase the usefulness of the farm management results obtained.1/

3. Specification of prices or other stimuli or conditions to be varied in the study is a critical step. Our marketing and policy colleagues can be of great assistance in this step and considerable complementarity of research effort may result.

A wide range of modifications or additions to the study described by Andersen can be envisioned. For example, a number of objective functions could be tried and/or restraints added to reflect differences in objectives between farmers. An attempt might even be made to stratify the farmer population by decision criteria used. Some segments of the population (farm or farmer) might be assumed not to respond to environmental or economic change. As will be noted later, the technique of adding restraints can give results similar to those from recursive programming. Finally, factor prices might be varied in addition to product prices.

More useful aggregates for some variables may be obtained from model modifications such as the minimum resource programming technique. For example, results from some Oklahoma areas indicate that about the same quantities of products would be estimated for a given price level by the profit maximizing model and the minimum resource model. However, estimates of population adjustments, hired or custom labor and machinery inventories would differ substantially

1/ Connor, Larry J., W. F. Lagrone and J. S. Plaxico, Resource Requirements Costs and Expected Returns; Alternative Crop and Livestock Enterprises; Loam Soils of the Rolling Plains of Southwestern Oklahoma, Processed Series P-368, Oklahoma Agricultural Experiment Station and F.E.D., A.R.S., U.S.D.A.

for common formulations of these models. In this case, the theoretical tenets for the minimum resource model appear to provide a superior basis for estimation.

As Schaller indicates, the recursive model, described simply, is a constrained profit maximization model. As discussed here, it is for a region. We can't argue with the concept of utilizing restraints to tailor a problem to the relevant managerial environment. Building and machinery limits, maximum and minimum levels of various enterprises, feeding activities limited to available feed, etc., are examples of such restraints used in past studies.

In the absence of models which directly recognize relationships leading to adjustment lags, the recursive procedure is most welcome. The effectiveness of restraints utilized in Schaller's work is impressive. This success, like a large R^2 in regression analysis, provides motivation to isolate the structural relationships underlying the results. Therein lies the avenue to real understanding of firms' or regions' economic behavior. Some refinement of flexibility coefficients might be obtained by removing direct or lagged effects of price variation and changes in price ratios on flexibility coefficients estimated directly from time series data. Changes of flexibility coefficients over time might also be studied.

We can cite a number of important restraints for which coefficients cannot be estimated from time series data. For example, coefficients projecting disposition of Soil Bank land eligible for release cannot be estimated at present. Similarly, data from the past provide little basis for guessing whether farmers will maintain wheat allotment histories under new programs. Thus, the researcher may be forced to rely on objective functions and restraints suggested by theory to estimate adjustments. These procedures are the same as modifications suggested for the Andersen model.

Schaller appears to give too much away (by implication) in saying that the recursive model approaches the equilibrium solution if the R.P. iterations are repeated long enough. The statement may not be correct if flexibility coefficients are made variable to reflect biases of managers against certain organizations or products. However, the important point is that equilibrium studies, such as the Lakes States Dairy Study, cannot easily be associated with a calendar period. Thus, if adjustment estimates for a specific time are desired, equilibrium solutions do not fit the research objective as well as R.P. estimates.