

DISCUSSION: ASSESSING STRUCTURAL CHANGE IN THE DEMAND FOR FOOD COMMODITIES

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The topic of structural change in demand for food is so broad that it is not surprising that Haidacher chose to focus on the conceptual basis of structural change rather than specific causes of structural change in demand for food. Haidacher first defines what he means by demand structure. Second, he gives two examples on how to implement this framework empirically. Third, he discusses problems of assessing changes in demand structure, emphasizing the intractability of obtaining direct evidence on structural change. Finally, he proposes and illustrates what he calls an "indirect" approach to assessment of structural change. I will first present a brief overview of the concepts of demand structure and structural change, derived from Haidacher's paper and my own assessment. Then I will comment on specific points raised in the paper relating to the assessment of structural change. Finally, I will conclude with some remarks on the usefulness of household production theory as a framework for assessing structural change in demand for food.

A BRIEF REVIEW

Haidacher defines the demand structure as the set of parameters and the form of the functions that are uniquely specified by the utility function. I would add to this determining factor the factors of the nature of the opportunity sets facing consumers and the composition of the population of consumers. The reason for including opportunity sets in this definition is that in some instances the budget constraint may not be linear. A situation in which this occurs is when the household is both a producer and consumer of the commodities, producing basic goods (the direct objects of consumer choice) with market goods and other inputs (such as household time) through household-production functions. These production functions need not exhibit constant returns to scale. This means the budget constraint for the outputs of household production may be nonlinear and concave to the origin. This is the so-called household production model. Other situations that can give rise to nonlinearities and kinks in the budget constraint are discussed by Deaton and Muellbauer (chapter 1). Whatever the source of the nonlinearity, the nature of the opportunity set and

budget constraint—and factors affecting them—are part of the demand structure.

Composition of the population can also be an important dimension of the structure. Haidacher only mentions this aggregation problem in passing. When working with aggregate data, we should not forget that the general restrictions of consumer behavior—homogeneity, symmetry, and adding-up, only hold strictly for individuals, and that market demand—even when formulated in terms of a "representative" consumer—still depends on the income distribution and other characteristics of the consuming population.

In light of the above definition of structure, one view of structural change might be any change in the utility function, opportunity set, or composition of the consuming population. To the extent that these changes are not accounted for by theory—through relative price and income changes—this definition seems logical. However, as pointed out by Haidacher, this definition is really intractable. This is because if our maintained hypothesis (MH) is no structural change, and we reject MH, this does not necessarily mean we accept the hypothesis of structural change. This is because our alternative hypothesis (AH) is unspecified. It may be structural change or it may be specification bias of one variety or another. Since we have no objective criteria upon which to make a selection, the choice is arbitrary. Thus, he concludes that direct evidence of structural change is intractable and that we should seek other alternatives. Haidacher then proposes an indirect approach to assessment of structural change that includes using the conceptual framework of a complete demand system to estimate the demand parameters, validating the estimated structure, and indirectly assessing the results and performance of the model for possible structural change. Finally, Haidacher suggests for practical solutions to the problem of structural change: (1) including trend variables in the demand equations (intercepts in log differential equations), (2) extending the validation phase to sample observations outside the period of estimate the structure, (3) incorporating dynamic aspects in the basic demand structure, and (4) using econometric methods that take account of contemporary developments on time-variant parameters, that is, varying parameter estimation procedures.

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AN ALTERNATIVE

While I am in general agreement with Haidacher's recommendations, I do not think he goes far enough. Use of time trends and varying parameter methods merely treat the symptoms, not the cause. The same could be said about including lagged variables in the model if these variables are included in an ad hoc fashion.

In contrast to Haidacher, I would recommend modifying the existing theory or model to account for the hypothesized structural shift or misspecification. In this way, the MH includes the source of the hypothesized misspecification, and when nested within the AH, it becomes an hypothesis which can in principle be refuted by the data. This suggestion is not new, but can be traced back at least two decades to Frederick Waugh when he wrote,

It is high time we develop new theories and concepts of value that are testable by statistical analyses. If statistical findings fail to confirm the theories inherited from our predecessors, should we struggle to invent elaborate methods to reconcile the facts with the theory? Rather like the physical scientists, we should modify theoretical concepts to make them fit the observed facts in the actual marketplace. (p. 7)

This, of course, does not mean we should necessarily throw out the neoclassical paradigm. What it means to me is that we should not stop once we have obtained a set of demand parameter estimates. We should follow the diagnostic procedures outlined by Haidacher and then, if necessary, respecify and reestimate the model.

A case where this procedure has proven useful is in testing the general restrictions of consumer behavior. These tests have consistently led to rejection of the homogeneity restriction and, in some cases, the symmetry restriction (Deaton and Muellbauer, chapter 3). What are we to conclude from these tests? That utility maximization is incompatible with consumer behavior? That taste changes make the restrictions incompatible with the data? Not necessarily. Most analysts have focused on possible causes of the misspecification including functional form misspecification (Gallant), dynamic misspecification (Deaton and Muellbauer), joint allocation of labor supply and goods expenditure (Barnett), and aggregation over consumers (Sexauer).

With respect to functional form misspecification, Gallant estimates an essentially unbiased functional form based on a multivariate fourier series expansion. He then uses this to test for functional form misspecification in the translog specification. He rejects the translog relative to the fourier form and concludes that tests based on the translog bias the results toward rejection of the general restrictions. Deaton and Muellbauer, in testing the general restrictions with the Almost Ideal Demand System, found that when they first-differenced their equations and included intercepts in the equations, the incidence of serial correlation and rejection of homogeneity went down. Since the intercepts were significant in most instances (suggesting

trend effects), they concluded that this was strong evidence of dynamic misspecification. Further work by Blanciforti and Green tends to confirm this finding.

In contrast to these studies, Barnett argues that leisure is the shift variable causing the apparent taste change found in aggregate-goods demand estimates. When goods expenditure and labor supply are estimated jointly, he finds the price of leisure is a significant variable in these equations, and the shift variables become insignificant.

Sexauer, in exploring the effects of demographic shifts and income distributional changes on food-away-from-home expenditures, concludes that

... some of the behavior which economists normally attribute to taste changes [on food-away-from-home expenditures] can actually be quantified as being a result of compositional shifts. (p. 1055)

While all these studies differ somewhat in methodology and data sources, they have one thing in common: they attempt to isolate the source of the misspecification and then modify the existing theory to account for this misspecification.

By way of summary, I would like to return to the fundamental question of whether we should entertain the possibility that taste changes are a cause of structural shifts in demand equations. In this context, a well-known paper by Stigler and Becker makes some relevant points. Their maintained hypothesis (p. 76) is "that tastes neither change capriciously nor differ importantly between people." This interpretation is important, they argue, because

an explanation of economic phenomena that reaches a difference in tastes between people or times is the terminus of the argument: the problem is abandoned *at this point* to whoever studies and explains tastes (psychologists? anthropologists? phrenologists? sociologists?). On our preferred interpretation, one never reaches this impasse: the economist continues to search for differences in prices or incomes to explain any differences or changes in behavior. (p. 76)

Stigler and Becker then go on to argue that such phenomena as addiction, custom and tradition, advertising, and fashions and fads can be explained by relative prices and income with stable tastes. What is important here, they argue, is definition of the direct objects of choice to the consumer (i.e., what he is deriving satisfaction from) and the form of the household production functions relating the market goods to these commodities. While some of the examples they present may seem trivial or appear unimportant to agricultural economists, the possibilities for household production theory in explaining demand behavior for food and agricultural commodities seem endless. More importantly, their basic message has important implications for how we assess structural change in demand for food. That is, we should not abandon our search for economic explanations in favor of interpretations of taste changes until we are satisfied that we have explored the numerous subtle forms that prices and income can take in explaining demand behavior.

REFERENCES

- Barnett, W. A. "The Joint Allocation of Leisure and Goods Expenditure." *Econometrica* 47(1979):539-63.
- Blanciforti, L., and R. Green. "An Almost Ideal Demand System Incorporating Habits: An Analysis of Expenditures on Food and Aggregate Commodity Groups." *Rev. Econ. Stat.*, forthcoming.
- Deaton A., and J. Muellbauer. *Economics and Consumer Behavior*. Cambridge: Cambridge University Press, 1980.
- Gallant, A. R. "On the Bias in Flexible Functional Forms and an Essentially Unbiased Form: The Fourier Flexible Form." *J. Econometrics* 15(1981):211-245.
- Sexauer, B. "The Effect of Demographic Shifts and Changes in the Income Distribution on Food-Away-From-Home Expenditure." *Amer. J. Agr. Econ.* 61(1979):1046-1057.
- Strigler, G. J., and G. S. Becker. "De Gustibus Non Est. Disputandum." *Amer. Econ. Rev.* 67(1977):76-90.
- Waugh, F. V. *Demand and Price Analysis: Some Examples from Agriculture*. U.S.D.A. Tech. Bull. No. 1316, Wash. D.C., 1964.

