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## The History of the Profession in the History of a Man—Karl Fox

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*Demand Analysis, Econometrics, and Policy Models: Selected Writings by Karl A. Fox.* Edited by S R Johnson, J K Sengupta, and E Thorbecke Ames Iowa State University Press, 1992

*Reviewed by Henry W. Kinnucan.*

This 345-page hardcover, indexed volume is the first of a planned 2-book set on the writings and professional life of a man who was at the center, if not the leading edge, of major advances in quantitative policy analysis. The volume contains 16 selected writings covering roughly the first quarter-century of Fox's career (through 1969). As such, we get only a partial glimpse of the man's contributions and the book must be judged from that perspective. The book differs from similar works (for example, Houck and Abel's selected writings of F V Waugh) in that Fox himself provides retrospective commentary on each selection. This adds a nice personal and historical dimension to what might otherwise be a heavy academic tome.

Although the selections are divided into five parts (Demand Analysis for Farm and Food Products, Spatial Equilibrium Models, Studies of Interaction Between Agriculture and the Nonfarm Economy, Econometric Models and Policy for Stabilization and Growth, and the Theory of Economic Policy), a chronological order is maintained so that the reader gets a sense of Fox's intellectual growth as his career unfolds. The "scientific autobiography" and section introductions written by the editors create a well-rounded finished product.

The reader is immediately struck by the importance of the simultaneous equation problem in Fox's early career. Because the problem was to occupy him for nearly three decades and to permeate his writings, a short historical overview might be in order. Beginning in about the 1920's, a number of pioneering economists, most notably Henry Schultz of the University of Chicago, began applying regression procedures to the estimation of demand functions. The best available data at the time were those maintained by the U S Department of Agriculture.

By the beginning of World War II, through the diligent efforts of a number of econometricians, Fox among them, a rather impressive set of results had been amassed on demand elasticities for the major food and fiber commodities. A euphoria of sorts was beginning to set in, it would only be a matter of time before a complete "econometric road map" of the agricultural sector could be made available for policy analysis. Then came Haavelmo's 1943 *Econometrica* article, "The Statistical Implications of a System of Simultaneous Equations." As Fox describes it (p 38) "From 1944 to 1953, news about Haavelmo's approach, commonly referred to as the 'simultaneous equation approach,' or 'Cowles Commission Technique,' spread rapidly among econometricians by word of mouth, through journal articles, and finally through two Cowles Commission monographs published in 1950 and 1953. Econometricians who had done serious empirical work were not impressed, but the new approach became gospel among graduate students with strong mathematical backgrounds and with a predilection for teaching rather than research."

Not surprisingly, Fox was among—perhaps the leading spokesman for—those who were not impressed with Haavelmo's critique. But it would be a mistake to interpret this as a defensive reaction to protect his own work (Fox at the time had recently completed extensive work in the estimation of price-dependent demand equations using ordinary least squares (OLS)). In vintage style, Fox advanced a carefully reasoned argument to show why not all economic relationships estimated by OLS suffer from simultaneous-equation bias. Arrow diagrams, a Fox trademark, were used to illustrate hypotheses about the direction of influences among variables and to demonstrate why and under what conditions supply, demand, and certain other relationships within a model could be estimated appropriately by least squares. (The diagrams were used to such effect that Thorbecke was later to comment (p 252), "I remember how impressed I had been at Fox's arrow diagrams and his emphasis on causal chain models. This was the reason why I painstakingly worked out the complete causal ordering among endogenous variables of the model used by the Dutch Central Planning Bureau.")

The battle lines were drawn. Despite the clarity and common sense of his early arguments, Fox found it necessary to revisit the issue in virtually

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all of his econometric writings over the next 25 years. One particularly poignant observation appeared in his 1956 review of Klein and Goldberger's econometric model, when he states (p 173), "Some younger economists have come to believe that a coefficient derived by [the limited-information maximum-likelihood method] is 'right,' while a coefficient derived by any other method is 'wrong.' Actually, the general theory that underlies the limited-information method often leads one to single-equation, least squares estimation as a special case." Fox then went on to show that the coefficients estimated in the Klein and Goldberger model were at least as sensitive to the sample period as to the estimating technique (Adding just two observations to the 1929-50 estimation period caused as many differences in the coefficients as changing the estimation technique!)

Fox was convinced that relative to other problems such as measurement error and specification error (he was particularly impressed by a lemon demand study that included temperature as an explanatory variable), the simultaneous-equation problem was a red herring. The sensitivity to potential data errors led Fox in his early demand studies to use novel procedures to assess the reliability of the estimated parameters that are worth restudying even today. His meticulousness with data, one of his many admirable qualities as a scientist and researcher, is apparent in the following passage (p 237) " while I was estimating statistical demand functions for a wide range of agricultural commodities and food, I tried to arrive at judgment estimates of the level of *ex post* measurement error in the time series I was using. My procedure was to interview the persons responsible for estimating each of the published series on commodity prices and production." He had little time for "academic economists, who were mainly interested in 'testing' theories or techniques" and whose "ignorance or disregard of data limitations often vitiated [their] empirical work." Who would claim that this problem is any less severe today than when Fox expressed his views in the *International Encyclopedia of the Social Sciences* over 20 years ago?

The rectitude of Fox's position with respect to the simultaneous-equation "problem" is buttressed (if not vindicated) by Tomek's remarks some 30 years later to the American Agricultural Economics Association (p 18) "In the 1950's simultaneity was seen as a relatively important problem, and errors in variables were barely mentioned. Now, it seems clear that biases related to specification error and errors in variables are often more important than those related to simultaneity." And I am sure that Fox would endorse, indeed applaud,

Tomek's further comment (p 18) that "The approbation given econometric methods by price analysts, however, sometimes limits progress in price analysis by shifting incentives away from improving models and data. For example, a paper applying a novel econometric procedure to mediocre data may be judged to be a more meritorious contribution than a paper applying a conventional econometric method to novel data or to an improved model." Other leading price analysts (see Gardner, p 887) have expressed similar reservations. In short, Fox was right.

The second major theme of Fox's professional life during the early postwar years is his steadfast belief in the value of econometric models for policy evaluation and rational decisionmaking. Thorbecke describes how Fox at economic workshops at Iowa State University was fond of saying, "The alternative to a model is a muddle" (p 251). This belief stemmed in good measure from Fox's keen awareness of the interrelatedness of different sectors of the economy. Planned decreases in defense spending after World War II, for example, could adversely affect the agricultural sector by reducing personal income and therefore the domestic demand for agricultural commodities. The ensuing reduction in farm income, in turn, would likely have a "back effect" on the nonfarm economy by reducing cash outlays for inputs, such as farm buildings and equipment. Fox foresaw that properly constructed econometric models could be of immense help to policymakers in understanding the nature, timing, and magnitude of proposed policy actions.

It helps to remember that Fox was articulating these views at a time when rigorous quantitative analysis of policy proposals was anything but routine. There was considerable skepticism that anything of value could come from econometric models, even among professional economists. In the early 1950's, the conventional wisdom, according to Fox, was that "all economic relationships should be dealt with on an intuitive level—that no tangible mechanism should intervene between the raw material (individual time series) and the finished product (policy recommendations)." The problem with this approach, Fox argued, was that it " requires an act of faith on the part of both the giver and the receiver of economic advice." At this point he asserts his belief in clear and forceful terms, " the policy implications of a host of raw time series can be made clear if they are organized into an econometric model—a system of equations which translates the concept of interrelatedness into an explicit, quantitative, reproducible form" (p 171).

A curious aspect of Fox's work is that it failed to incorporate the downside of farm policy. Surely with his active interaction with macroeconomic modelers of the time (Klein, Goldberger, Tinbergen, among others) and his sensitivity to sector interrelatedness, Fox must have known that the tax increases (or deficit financing) needed to fund farm policies could have potentially damaging "back effects" on the general economy. And his keen economic intuition should have tipped him off to the long-run consequences of price-support programs in terms of inflated asset values and erosive cropping practices. Yet we never see mention of second- and third-order effects of this type. Why the blind spot? The tenor of the times? Or is it a product of Fox's self-described position as a "policy liberal"?

For those who like to study a subject area (as I do) through the prism of the "Greats" who have gone before, the book will provide many hours of engaging reading. The history of the profession in no small measure is written in the history of this man. The collection of writings will be especially useful to students of agricultural price analysis, in that it focuses on issues of enduring interest (such as model specification, simultaneity, measurement error) with a grace and clarity that is at once refreshing and enlightening. (It's no small matter, I believe, that Fox's undergraduate degree was in English.) The arrow charts describing the structure of specific industries (such as beef, pork, chicken, and dairy) could be profitably incorporated into lecture material to explain some of the

more thorny questions about endogeneity and simulation. Finally, the historical perspectives gained from reading this volume provide a catharsis of sorts in that the book deepens one's understanding of and appreciation for the antecedents of present-day disciplinary knowledge. Taken together with the quality of the editors' commentary, the volume sets a high standard for the sequel.

## References

Gardner, Bruce 1983 "Fact and Fiction in the Public Data Budget Crunch," *American Journal of Agricultural Economics* Volume 65, pages 882-88

Houck, J P, and M E Abel (eds) 1984 *Selected Writing on Agricultural Policy and Economic Analysis Frederick V Waugh* Minneapolis University of Minnesota Press

Tomek, W G 1985 *Limits on Price Analysis* Cornell University Staff Paper No 85-21, Department of Agricultural Economics

## Correction

An incorrect price was listed on a book reviewed in the previous issue of JAER. The book is *Market Demand for Dairy Products*, edited by S R Johnson, D Peter Stonehouse, and Zuhair Hassan, and published by Iowa State University Press. The correct price is \$55.95.

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