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Karl Fox: A Retrospective

Economic Models, Estimation, and Socioeconomic Systems: Essays in Honor of Karl Fox. Edited by T J Kaul and J K Sengupta. Amsterdam North-Holland, 1991, 645 pages, \$89.50

Reviewed by Richard J. Foote

Editor's Note Gene Wunderlich, former economics editor of *The Journal of Agricultural Economics Research*, once lauded Karl Fox's stature as an agricultural economist by writing "The life and times of Karl Fox is a classic case for broad, varied training and experience. His personal story is a metaphor for a substantial portion of the profession. For Fox, doing agricultural economics meant continuing education, writing in theory, and analyzing a wide spectrum of applied economic problems."

A year or two after I returned to USDA from private industry in 1950, Karl Fox introduced me to econometric systems of simultaneous equations. For several fruitful years, he was my immediate supervisor. In 1952-53, I converted his award-winning Ph.D. thesis into a USDA technical bulletin and later administered a program inaugurated by him under which promising young university scholars researched new agricultural economics methodologies. This program yielded the application of expectational theory, like distributed lags, to the supply response of farmers (Marc Nerlove) and to new storage rules (Robert L. Gustafson).

This volume opens with "A Scientific Autobiography" (1986) which begins with Fox's career in college and charts developments that led to the relatively modern field of econometrics and to the new discipline of eco-behavioral science. A series of essays written by internationally known economists follows.

The first essay, by Gordon C. Rausser and David Zilberman of the University of California at Berkeley, presents a controversial conclusion. They predict that "conflicting interests can be expected to result in declining support for public research in agriculture" (p. 36). They suggest that the present system be replaced by research initiators who would submit proposals to research administrators at the Federal or State level. Failing this, the proposal would be submitted to the Public Research Commission made up of members appointed by elected State or Federal officials. Policies and decisions of

the Commission should reflect "societal value judgments on equity across groups affected by the proposed research. The Commission would determine whether the program should be supported by the public sector and, if it should, to impose the final incidence of burden to support the research program" (p. 41). Each interest group would manage a reserve fund composed of dues to finance projects that benefit members and compensation payments for projects that harm members. Government agencies would represent diffuse interest groups such as consumers. The authors conclude "The cost of implementing the above three-stage research evaluation design certainly compares favorably with the current use of the court system to resolve *ex post* conflict" (p. 45). They note that this "design keeps intact the superb land grant system of research and extension" (p. 46).

Glenn L. Johnson, Michigan State University, addresses not so much accounting but accountability by production economists. He questions their ability to research normative values in an objective, descriptive manner. The meaning attached to such terms as "product," "production," "input," and "efficiency" are examined within the context of theoretical and empirical work and applied to the evaluation of market adjustments when knowledge is imperfect or the government intervenes. Johnson then summarizes ideas published elsewhere on how work with normative dimensions can be done objectively.

James L. Seale, Jr., and Henri Theil of the University of Florida discuss demand analysis, and note that in the past several decades, consumer demand analysis has steadily moved toward a systemwide approach. In a number of algebraic specifications of demand systems, the authors consider first the income sensitivity and then the price sensitivity of demand. They emphasize matters of empirical validity rather than mathematical details. Since income elasticities vary over time, the authors strongly recommend that they be shown over time. For example, based on a translog model, Japanese income elasticities for food *increased* from 0.42 in 1951 to 0.75 in 1972. Based on Working's model, they *decreased* from 0.72 to 0.54 over the same period. For 1961, they are 0.61 and 0.64 for the respective models.

A rational expectations equilibrium model is put forth by E. Kwan Choi and Stanley R. Johnson of Iowa State University. This model shows how parameters of a price stabilization program affect

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producer participation and factor intensity Risk premiums and factor use levels are aggregated and used to investigate the effects of changes in the policy parameters on market supply response and producer income The authors maintain that an efficient stabilization program can be designed to maximize producer income for a given expected government cost If the government has a fixed budget for stabilization, an efficiency analysis can determine commodity markets for government intervention

An essay by Carl F Christ from Johns Hopkins University details helpful steps to avoid pitfalls in macroeconomic model building He states, "Many and varied are the inconsistent, incomplete, or inappropriate economic models I have encoun-

tered " (p 257) I heartily agree, based on my own experience His paper should be read by anyone working in this area

The papers summarized above illustrate the variety of material within this volume Several of the papers under the heading "Socioeconomic Accounts, Models, and Systems" would be of interest to *JAER* readers as will Fox's autobiography and Harold F Breimyer's "Transcendental Allegory" The book should be purchased by all libraries that serve economists, econometricians, mathematical statisticians, or sociologists I recommend borrowing a copy from the library, reading material of interest, and then deciding whether to purchase a copy for more permanent use

Use of bST in Dairy: Public Perception and Projected Response

Bovine Somatotropin and Emerging Issues.
Edited by Milton C Hallberg Boulder, CO Westview Press, 1992, 324 pages, \$44 50

Reviewed by W. Burt Sundquist

Much has been written on the topic of agricultural biotechnologies and, especially, bovine somatotropin (bST) This book is the best integrated treatment of bST anywhere Along with a substantive foreword, the book contains 14 chapters authored or coauthored by 21 experts This large gathering did produce some unevenness in exposition and some minor, but not particularly bothersome, duplication of subject matter Moreover, a set of common assumptions greatly enhances the value of the information generated on the following topics economic evaluation of bST for onfarm use, bST effects on aggregate and regional resource needs and on beef and veal output, and bST and the price of milk and dairy products

The foreword and first part of the book "Biotechnology and Society," present a good review of biotechnology since the first successful directed insertion of foreign DNA into a host organism less than 20 years ago Realized and expected applications of biotechnology for animals, plants, and food processing are described in some detail and potential scenarios are developed for science, for farmers and rural communities, for consumers, for agribusiness, and for international trade and development In the process, the authors find a number of potential problems (unwanted effects of biotechnol-

ogy) and plead for effective *ex ante* evaluations of each of the significant emerging technologies They conclude that, "Biotechnology now permits the design of future agricultural systems without providing any guidance for the directions of technology development and the assessment of embedded social choices" Among the ethical questions identified is how to "deal effectively with technical questions of responsibility social justice, and human (and animal) well being?" A simple solution might be to build a higher wall between public science (public research institutions), which is generally held in a position of public trust, and private science (private corporations), which develops technologies that may produce unwanted consequences But this solution is thought unworkable because of the extensive interdependence of public and private institutions in financing and conducting research Also, public confidence in the credibility of public research has declined, further complicating the situation In the meantime, uncertainty persists among dairy farmers and consumers about the expected benefits (and possible unwanted consequences) of bST

In the chapters on performance and management of bST-supplemented cows, extensive experimental evidence supports the conclusions that (1) a 10-20 percent boost in milk yields is achieved with 5-10 percent less feed per unit of milk, (2) the milk increase is greater for multiparous cows than for heifers, (3) high environmental temperatures and relative humidity can reduce yield response, and (4) progressive farmers employing best-management practices (including balanced rations, effective health program management, high-quality forages, advanced production-monitoring, and farm-cost ac-

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counting records) appear to have the greatest potential to optimize profits from bST use

In the chapter on economic evaluation of bST for onfarm use, effective illustrative procedures are presented that can be used to examine the farm-level net revenue associated with use of bST. Net revenues are calculated for cows with differing genetic capabilities and response rates and with alternative price levels for bST and milk. These are all key variables in determining the profitability of bST use for the individual dairy farmer.

Milk market implications of bST adoption are based on a set of economic models that utilize a milk supply and consumption data base for each of 16 US subregions and 8 regions. Milk supply elasticities differ between most subregions, whereas a common set of demand elasticities is assumed for all subregions. A spatial equilibrium model is then used to determine producer milk prices, regional milk supply/marketings, consumer expenditures, producer revenues, and cow number requirements under a set of scenarios which, in addition to the base run (no bST), include (1) bST adopted everywhere, (2) bST banned in the Midwest, (3) bST banned in the Northeast, and (4) bST adoption with reduced milk consumption (in response to negative consumer reaction to bST). Estimates of feed and labor requirements and veal and cull cow production are generated using a separate (per cow) cost-and-return, budget-based set of computations.

At the risk of oversimplification, one can summarize the national-level results of full bST adoption with baseline milk consumption requirements as follows:

- (1) Producer milk prices, -8 percent,
- (2) Dairy cow numbers, -7 percent,
- (3) Milk marketings, +2 percent,
- (4) Labor hours required for milk production, -2 percent, and
- (5) Hay and silage requirements, -6 to -7 percent

Under the assumption of reduced milk consumption, milk prices would decline an additional 4 percent. Under scenarios where the use of bST was banned in one region but not in others, the banning region would suffer a decline in shares of milk production and marketings. Although the above model results are probably best used only as a broad gauge of the

expected market, their directions and general magnitudes appear both consistent and reasonable.

A chapter on consumer responses to milk from bST-supplemented cows evaluates 11 separate studies on consumer perceptions. The results are not easily summarized but are consistent in that most consumers are concerned about bST. Eight studies indicated that, on average, about 60 percent of respondents would not change consumption if milk were produced with bST. The other 40 percent believed they would respond by decreasing or ceasing milk consumption.

The book also contains substantive chapters on bST and animal health, potential adoption and diffusion of bST, effects on small versus large dairy farms, food safety and product quality, bST and international trade and policy, and a final summary of issues, facts, and controversies. A very brief perspective of expected bST impacts gained from these chapters is that (1) animal health problems can generally be handled with good management practices, (2) bST adoption will be lowest on smaller dairy farms and among younger and older farmers, (3) milk from bST-treated cows is a safe food product no different from milk cows not receiving bST, and (4) a growing demand for food quality in developed countries will likely result in a proliferation of differing food quality standards, which will create significant barriers to trade.

A number of countries have already approved the use of bST, although a moratorium on its use is still in effect in the European Community. And, with or without bST, US milk production per cow will continue to increase. What then should be the public policy response to bST? Hallberg suggests developing policies aimed specifically at easing the adjustment process. This would contribute to general economic growth and progress while lessening the imperative to provide specific protection from a given technology.

The book is very well organized and well written, identifying and discussing the major issues voiced about bST. It does not provide a quantitative aggregation of potential benefits or unwanted consequences of bST, but it couldn't. The book is a very useful prototype for the broad-based technology assessment studies that public research institutions should undertake.