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Research Review

Prospects for Soviet Agriculture in the 1980's

D. Gale Johnson and Karen McConnell Brooks. Bloomington: Indiana University Press, 1983, 214 pp., \$17.50 (cloth), \$8.95 (paper).

Reviewed by Jim Cole*

Prospects for Soviet Agriculture in the 1980's is a concise and thorough study of the agricultural sector in the USSR, a sector whose growth has tapered in the past decade and has thereby strained development in other sectors of the economy by channeling investment rubles and hard-currency reserves to agriculture. As the authors point out, total investment in the agro-industrial complex represents about a third of all investment in the Soviet economy. Johnson and Brooks conclude, however, that these resources are poorly spent because of the high degree of centralized planning and management, the lack of effective incentives, and pricing policies that fail to guide resources into productive spheres. They do not, however, provide supporting evidence for their views on the last point

Johnson and Brooks present no new Soviet data. Instead, they analyze existing data through the seventies, and they trace Soviet agricultural performance from the early fifties and sixties, when growth was almost 4 percent per year, into the seventies, when growth slowed to just over 1 percent per year. The lack of new information is disappointing.

What makes the book interesting and worthwhile is its treatment of climatically similar areas of the USSR, the United States, and Canada. In part I of this two-part book, Johnson concludes that grain yields in the Soviet Union have been increasing over the past 30 years at "essentially the same rate" as in areas of the world that are climatically similar. To illustrate his point, Johnson divides the USSR into 24 crop regions, using data from 1955 to 1979¹ and production and area estimates at oblast levels,² he concludes that annual yield increases for the USSR amount to 0.3 centners (66 pounds) per hectare per year. According to Johnson, this annual increase in yields is the same as in analogous areas of

Canada and the United States, after fallow area and some data inconsistencies have been taken into account.³

Johnson concludes that agricultural problems in the USSR will continue into the next decade and will burden the economy. The Soviet Union will probably continue to have a high degree of centralized planning and poor price and incentive policies. While noting that climate plays a twofold role in determining agricultural production (through long-term trend and short-term variability), he predicts that grain production could reach 226 million tons in 1985 and 245 million tons in 1990. Keeping meat production goals would force the Soviet Union to import as much as 40 million tons of grain annually through the end of the eighties. If meat production targets are relaxed somewhat, Johnson still envisions grain imports of 25-30 million tons in 1986-90.

Compared with the research of the Economic Research Service (see "U S -USSR Grain Trade" in the U S Congress, Joint Economic Committee compendium, *Soviet Economy in the 1980s Problems and Prospects*, Dec 31, 1982), Johnson's production projections seem reasonable, but are high for imports. His high import figure seems to be based on a continuation of Soviet feeding inefficiencies, an assumption that may produce unrealistic grain-for-feed requirements. The Soviet Union is certainly aware that it is an inefficient feeder of grain and is taking steps to correct this problem.

Brooks compares productivity in the Soviet Union with that in the United States and Canada in part 2. Because agricultural input and output data were available only at the State level for the United States, the Province level for Canada, and the Republic level for the USSR, the detail Johnson used earlier had to be abandoned. Brooks concludes that agriculture in similar areas of the United States

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¹ The Soviet Union has failed to publish yield or production data for grains for 1981 and 1982.

² An oblast is the political subdivision of a Soviet Republic.

³ For example, the Soviet Union reports grain production in terms of "bunker weight." Therefore, one must deduct 10-15 percent (to remove excess moisture and nongrain material), thus leaving usable grain supplies as a residual.

and Canada is twice as productive as it is in the Soviet Union. Most differences, as she points out, lie in the productivity of labor. Output-to-land ratios, about 10 times greater in Canada and the United States, were generally inconclusive. Horsepower-per-cultivated-hectare ratios were about 2-3 times higher in the non-Soviet areas. Brooks discusses the histori-

cal difficulties associated with Soviet labor productivity, including wages and tariffs on collective and state farms (with interesting, but not new, information on the labor organization on both collective and state farms), problems of wages versus productivity growth differentials, and the movement of labor out of agriculture into other economic sectors

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Farms in Transition

David E. Brewster, Wayne D. Rasmussen,
and Garth Youngberg (eds.). Ames:
Iowa State University Press, 1983, 169 pp. \$9.75.

Reviewed by Kenneth R. Farrell*

Farms in Transition is an interdisciplinary potpourri of 11 papers originally presented at a symposium on farm structure and rural policy in late 1980 at Iowa State University. As is frequently the case with conference proceedings, the papers reprinted in this volume are largely stand-alone contributions with little integration of subject matter by either authors or editors. If there is a unifying theme, it is that "big is bad" and that "small," if not "beautiful," is to be preferred for numerous reasons, ranging from less environmental degradation to more vigorous rural communities.

Still the book succeeds in making some useful, if conventional, points. Farm and rural policy has become increasingly pluralistic and complex (Guither). Past policies have been anything but neutral in effect regarding farm structure (Heady, Soth). There are important, possibly growing, social class divisions among farmers over issues such as farm structure (Coughenour and Christenson). Agricultural groups need allies in the policy process more than ever, but potential allies are fewer than ever (Meier and Browne). The policy instruments which might be employed to modify current farm and rural community structures are not likely to be politically acceptable in the eighties (Buttel).

The book has the familiar ring of themes popular in the late seventies. Lee proclaims the imminence of a new era for agriculture—a transition from conditions of excess resources and chronic surpluses to one of limits. Heady believes that "The agricultural public and society at large must decide soon whether to let the trend to super farms continue, or whether to introduce measures to limit farms to an efficient and modest size." In what is easily the most lucid of the 11 papers, Berry calls for a holistic, "organic" solution to agriculture's problems—one which will be "ecologically, agriculturally, and culturally healthful."

Soth is not optimistic that political action will slow down the "cannibalization" of farms, but sees the possibility that two economic forces could have restraining effects: (1) rising energy costs and pressures on the natural resources base and (2) deterioration of environmental quality from overcropping and excessive use of chemicals. Benbrook, Fulton, Korsching, and Nowak generally agree with Soth's hypotheses.

The book and, I suspect, the symposium could have been made more appealing by the inclusion of contrary viewpoints on the structure issue. There is a strong flavor of populist agricultural fundamentalism and, occasionally, euphoric recollection of small-town, small-farm America. Editors Brewster, Rasmussen, and Youngberg contend that the book focuses on subject matter not usually emphasized in discussions of farm structure. But no author makes the case for concentration and large farms, although some must surely believe in such market phenomena, given the trends of recent years. Nor does the book provide a rigorous examination of the tradeoffs, economic or political, which an explicit farm structure policy would require. To its credit, it does raise classical issues of efficiency versus equity and illustrates the many, frequently conflicting, dimensions of contemporary agricultural and rural policy. However, more definitive evidence of the "PERTs" and "PESTs" are needed to advance the structural issue from its recent rhetorical plane.¹

The structure issue is by no means a new element in agricultural policy, it was evident in much of the New Deal legislation. Nor is the quiescent nature of the issue in late 1983 evidence of its demise in future public policy debate. *Farms in Transition* will be a useful, if not seminal, reference.

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¹ Gordon C. Rausser, "Political Economic Markets: PERTs and PESTs in Food and Agriculture," *American Journal of Agricultural Economics*, Vol. 64, No. 5, 1982, pp. 821-33.

New Directions in Econometric Modeling and Forecasting in U.S. Agriculture

Gordon C. Rausser, ed. New York: Elsevier Science Publishing Co., Inc., 1982, 830 pp., \$85.

Reviewed by David Torgerson*

This collection of 22 papers is a selection presented at four conferences sponsored by ERS from 1976 to 1980 to acquaint U S Department of Agriculture (USDA) modelers with promising state-of-the art techniques and concepts in econometric modeling. The usefulness of this collection goes far beyond the original target audience. To paraphrase Samuelson, "quantitative economics is too good to be left for quantitative economists." The Rausser collection contains some good, a few excellent, expositions of economic ideas that had been fermenting in the late sixties to the late seventies. A few important topics, however, were absent or not covered in depth. But this book does introduce the reader to tools required for understanding the current literature and to associated debates on econometric modeling issues.

Despite the wide set of topics covered, the articles implicitly address five questions: (1) What is the nature of dynamic economic decisionmaking? (2) What are the appropriate variables from outside agriculture which are needed for a credible model of U S agriculture? (3) How do policy interventions affect individual behavior and market outcomes? (4) What is (are) the appropriate or convenient representation(s) of producer and consumer resource allocation decisions? (5) What should the role of econometric modeling in policy formation and analysis be, and how should it be implemented? The chief strengths of this collection comes from its attempt to deal with such a broad range of concerns. Its chief weakness stems from its failure to provide a clear presentation of the connections among economic ideas.

This collection deserves better editing and organization and needs an index. The table in the next column may partly fill this gap.

The articles are divided into six parts and consider developments in (1) supply and demand analysis, (2) expectation formation, (3) qualitative analysis

applied to markets, (4) agricultural trade analysis, (5) Government policy analysis, and (6) forecasting techniques, evaluation, and model management. Part 1 is the deepest and clearest. In fact, it could have been a useful monograph applying modern producer and consumer theory. It sets a high standard that the rest of the book rarely meets. The first three chapters of part 5 serve as a useful primer on techniques of grain reserve modeling. For those without first-hand knowledge of large-scale model-building efforts, the final chapter of the book (which examines the institutionalization of a large-scale econometric model in *Agriculture Canada*), provides a sense of the political econometric realities of modeling.

Aggregate index

Topic	Chapters
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Varying parameter estimation	20
Welfare economics (consumer surplus, Government behavior)	3, 11, 14, 15, 16, 17, 18, 19, 22, 23

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Ladd (part 3, ch 2) reviews several generalizations of Lancaster's economics of product characteristics that treat product characteristics, and not products, as the objects of consumer choice. Such useful topics as constant quality indexes and behavioral price functions are examined from this framework (There is an obvious typographical error in formula (15)). Other applications and potential extensions are listed. After an article by USDA's Waugh in 1928, the approach was virtually dormant until the late sixties, when the work reviewed here emerged.

Hanemann (ch 3) formally develops characteristic demand theory by using tools of modern demand analysis such as duality and Cournot aggregation. He compares and contrasts the generalized Lancaster (GL) and Houthakker-Theil (HT) models of choice of product qualities. The HT model assumes continuous choice of one quality for each good. By contrast, the GL model assumes discrete choice with the possibility of more than one quality for each good. The HT model precludes consideration of the set of quality levels offered, whereas the GL model always assumes an interior solution to the optimization problem—that is, the consumer buys some of each product. A stochastic generalization of the GL model is developed to deal with corner solutions. The presentation shows the merger of qualitative economics in Lancaster's style with the qualitative econometrics associated with McFadden (probit, tobit, and logit). For an alternative view that bases qualitative demand on the theory of household production, see (6).¹

Berek and Rausser (ch 4) neatly bridge demand and supply. The demand for product characteristics by consumers is the wedge for the exercise of monopoly power by monopolistically competitive firms. As reflected by the new literature, monopolistic competition is seen as Pareto optimal (or a Pareto improvement over perfect competition). Consumers value diversity, monopolistically competitive firms supply it. Unfortunately, demand uncertainty and myopic price search behavior make a firm's market share indeterminate. Although conceptually and analytically interesting, this article will not stimulate much change in the way empirical margin research is carried out.

¹ Italicized numbers in parentheses refer to items in the References at the end of this article.

Using duality theory, Weaver (ch 5) cogently develops a multiple output-input production system for estimation. The empirical part was published in (13). One should not take the empirical results presented in this version seriously because of the large size of estimated fertilizer and capital service price elasticities. Clearly, these problems arise from identification bias. Nevertheless, the presentation of duality is excellent. Hallam, Just, and Pope (part I, ch 6) use duality theory to extract some empirically testable propositions from the expected utility maximization hypothesis. They present a reasonable motivation for this attempt and the limitation of current approaches. They derive the effect of output on price risk. The analysis explicitly ignores output uncertainty, a major concern of farmers.

It is disappointing that the authors of part 2 did not do a better job of presenting rational expectations. This failure is especially ironic because the path-breaking article in rational expectations was an agricultural commodity model developed by Muth (9). Readers seeking an overview of rational expectations ideas can consult (5) or (11) or more technical treatments in (2) or (7). A reasonable example of empirical rational expectations modeling appears in (8).

Part 3 on market analysis and qualitative econometrics begins with a good overview by Chambers and Just titled "Qualitative Econometric Analysis in Agriculture." The major point is that the techniques of qualitative econometrics (logit, probit, and switching regression) are useful in modeling market disequilibrium. To pursue these techniques further, the reader should consult the excellent review of qualitative econometrics in (1). Much of the early market disequilibrium literature was characterized as *ad hoc* and unmotivated. Chambers and Just's article and those it reviews attempt to motivate price rigidity reasonably and to formulate estimable models of this type.

Further refinement of the dynamics in these models will likely lead to richer empirical estimation. Rausser and Riboud (ch 11) and Chambers, Just, Moffitt, and Schmitz (part 4, ch 13) are interesting empirical applications of those techniques when market clearance is lacking because of Government intervention. The market for junk feed (corn gluten feed

and dried distillers grains) in the European Community is a nearly perfect case for applying these methods. This set of approaches shows how policy interventions affect market behavior both in terms of the outcomes and the final societal benefits and costs (measured as consumer or producer surplus).

Thompson and Abbott (part 4, ch 12) and Freebairn, Rauser, and de Gorter (part 5, ch 17) together do a reasonable job of presenting the major trade and macroeconomic agricultural linkages in models of the late seventies. Events both in the profession and in the world have largely overtaken their views.

One promising approach that uses the market non-clearance hypothesis was begun by neo-Keynesians such as Okun (10). Perhaps blending qualitative econometrics with this approach will yield fruitful modeling that links open macroeconomies to U.S. agriculture.

The first three articles in part 5 on Government policy analysis address the desirability of Government intervention in agriculture. Burt, Koo, and Dudley present a dynamic programming model showing that wheat farmers are the gainers and consumers are the losers from a Government wheat storage program. These authors provide a fairly clear exposition on the use of dynamic programming and sensitivity analysis. Further extensions of this work would involve a sensitivity analysis based on alternative objective functions. For a reasonable technical treatment of dynamic programming from an economist's perspective, see (3) and (4).

Gardner (ch 15) examines the change in private and foreign government behavior induced by a government's holding grain stocks. In Gardner's model, the net cost (based on market value of carryover stock) of price stabilization rises if some interactions of private stock behavior are taken into account. Once other countries are brought in, the possibilities of free riders and strategic interaction abound. The point that private and other country stockholding behavior should be considered in modeling public stockholding mechanisms is well taken both in theory and in practice.

Just and Hollam (ch 16) examine price-stabilizing and destabilizing policies from several theoretical and technical perspectives. A producer surplus concept based on a mean-variance expected utility objective function is developed as a function of expected quasi-rents per acre. An empirical model of the U.S. wheat economy is used to carry out the calculations of surplus. Domestic producers are large gainers and foreign consumers are losers from price stabilization, assuming producers are not taxed for storage and administrative costs. Domestic producers and consumers gain if the source of instability is domestic supply. This is a good example of modern applied welfare economics incorporating risk.

Rauser, Lichtenberg, and Latimore (ch 18) review some of the literature in endogenous government behavior. Although interesting (but perhaps redundant) to political scientists, this article has little operational significance. Policymakers make too few key decisions during their term in office to allow an econometrician to estimate an objective function representing those decisions.

Part 6 contains the pearl of this collection, Zellner's article on what he calls SEMTSA (structural-econometric model time series analysis). It is an original, insightful, and provocative article. Economists became interested in time series analysis when univariate time series models outforecasted large econometric models for a large number of important variables. Some suggest this situation arose from specification errors, inappropriate structures, inflexible functional forms, and incorrect assumptions about error structure and exogeneity of variables. Therefore, Zellner presents SEMTSA. From this synthesis he clarifies the logic of some empirical Bayesian results and clarifies the interconnections of forecasting, structural estimators, and control within the Bayesian framework. He outlines the type of problems this approach revealed about SEM (structural-econometric models) and sketches some areas for future research. His article presents a model which unites time series and econometric modeling.

Rauser, Mundalk, and Johnson (ch 20) present a strategy, one of many recently developed, for estimating parameters which vary over time. Unfortunately, the increased complexity of this approach

will likely make system estimation difficult, impossible, or meaningless. However, this article's significance lies in its focusing on a key issue—namely, that behavioral parameters, even in a reasonably specified model, are likely to shift over time. For example, no one really believes that the underlying relationships behind money demand (and the Fed's reaction function) are invariant with respect to changes in the Fed's operating rules, depository deregulation, the wide availability of computer technology, and very high nominal and real interest rates. For a presentation of a widely used alternative developed by Swamy, see (12).

Having read reviews of the major pieces in this collection, the reader may inquire about the book as a whole. First, in terms of the five main questions the book addresses, it gets 1 A, 3 B's, and 1 C from the viewpoint of the late seventies (recall that in graduate school, only B and better pass). Second, despite the collection's spotty performance, it has no serious competitors. This book would be useful for a seminar in policy or applied econometric methods with additional assigned readings. Practitioners catching up on new developments will also find it useful. A paperback edition would promote its sale to both these audiences.

The collection falls far short in its treatment of dynamics. The treatment of rational expectations is very weak. Third-generation investment models are not discussed. A true economics of information is at best suggested. But the reasonable quality of chapter 20 and the good presentations of disequilibrium models mitigate the book's general lack of dynamics.

The papers on policy intervention, international trade and macro linkages, and the role of econometric models in policy formation topics are adequate. Nevertheless, the collection lacks appropriate synthesis and contains severe gaffes (some of which have been alluded to), typographical errors, conjectures which have proved false, and other major limitations.

As already mentioned, the discussion of supply and demand in part 1 is excellent. The central importance of these topics in agricultural models combined with these excellent presentations raise this book to the recommended level.

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