BOOK REVIEWS

Soybeans and Their Products: Markets, Models, and Policy

By James P. Houck, Mary E. Ryan, and Abraham Subotnik. University of Minnesota Press, Minneapolis 55455. 284 pages. 1972. $10.

The seemingly insatiable demand for soybeans has stimulated much interest in analyzing this demand. This book reports on three research projects dealing with the economic aspects of all parts of the soybean industry. In part I the authors describe the world market for food oils and high protein meals. In part II they develop a dynamic supply and demand model and use it to measure the effect of alternative Government policies on the supply and demand for soybeans and their products. In part III the authors develop a framework for analyzing foreign demand for U.S. soybeans.

Because of the magnitude of the analytical model, it was inevitable that considerable time would elapse between completion of the analysis and publication of the results. All of the data in the book end with the 1967-68 marketing year—a year when it appeared that supply had about overrun demand. The expansion of supply and the even more rapidly developing demand since 1967 could have been anticipated had the results of this research been available.

The major expansion in U.S. soybean production has occurred since World War II. With the loss of much of the capacity to produce food oils in other parts of the world as a result of destruction during the war, the demand for soybeans derived mostly from the demand for oil. But as other areas returned to production the demand for soybean oil slackened. As food oil production recovered, so did the economies of many other countries, particularly in Europe, and Japan. As per capita incomes rose, so did the demand for protein foods, and the strong demand for soybean oil was replaced by a strong demand for soybean meal.

In satisfying the demand for protein meal, soybeans have a distinct advantage over other oilbearing crops in that soybeans yield a higher proportion of meal (80 percent) than any other oilbearing products. Furthermore, soybeans are edible for human use whereas some other oilbearing crops are not.

Even some far-ranging political events have stimulated the demand for U.S. soybeans. The closing of the Suez Canal in 1956-57 and again beginning in 1967 also raised the cost of delivering Chinese soybeans and Indian and east African groundnuts to the European markets. An offset was the decision by the European Community nations to support the incomes of domestic producers of edible fats such as butter, olives, and rapeseed.

The analytical model described in part II provides a reliable indicator of the effects of Government policies on the supply and price of U.S. soybeans. Two kinds of policies are considered. First are those that apply directly to soybeans such as the level of price supports for soybeans, the price at which Commodity Credit Corporation soybean stocks will be sold, and the extent of concessionary sales of soybean oil under Public Law 480. Other policies and programs that affect soybean production are those relating to supply control and price supports for feed grains, particularly corn, and for cotton and wheat.

Because of the competition for resources between soybeans and other crops, particular attention was given to the effects of these programs on soybean production. Despite the wide assortment of methods used by the Government to limit production of major crops (excluding soybeans) and to support prices and incomes from them, the authors are to be congratulated for developing a system for reducing all variations and combinations to only two components for each crop—an "effective support rate" and a payment for acreage diversion. The model provides a useful tool for analysis, and could have predicted the effects of alternative policies throughout the 1960's on year-to-year changes in production of other major crops as well as soybeans. Whether the model could encompass the vagaries of the set-aside program remains problematical.

The analysis in part III looks at foreign demand for U.S. soybeans by regions, with countries grouped according to a combination of geographical proximity, their stage of economic development, and the nature of their demand for soybeans, soybean oil, or soybean meal. Thus the Mediterranean Region is treated as a unit, but Denmark and Canada are considered as a unit in analyzing demand for soybean meal, and Israel and Taiwan are presumed to have similar demands for U.S. soybeans. Because the United States supplies such a large part of the world trade in soybeans and their

products, the demand for these products within the importing countries was assumed to be a demand for U.S. soybeans.

The apparent success of this research to analyze demands for soybeans, and the effects of Government programs on the supply, suggests that similar analysis might be appropriate for other major commodities.

James Vermeer

Mathematical Methods and Models in Economic Dynamics

By Giancarlo Gandolfo. American Elsevier Publishing Company, Inc., 52 Vanderbilt Avenue, New York, N.Y. 10017. 511 pages. $27.50.

This book is intended to be used as an introductory text for difference and differential equation models at the advanced undergraduate and beginning graduate levels. The book is divided into two parts: Part I deals with linear difference equations with constant coefficients while part II treats linear differential equations with constant coefficients. Each of these parts is approximately 160 pages. In addition, there are four appendixes covering a total of 120 pages which deal with more advanced topics.

Chapter 1 deals with general terminology such as differences, notation, etc. Chapter 2 discusses the mathematics of first-order difference equations while chapter 3 gives examples of first-order models such as the cobweb theorem and Harrod's growth model. Chapter 4 goes into second-order equations, which are illustrated in chapter 5 with examples such as Samuelson's "interactions" and Hicks' trade cycle models. Chapter 6 goes into higher order equations, with distributed lags and inventory cycles used as examples in chapter 7. Simultaneous difference equations are presented in chapter 8 and illustrated in chapter 9.

No knowledge of mathematics (beyond high school algebra) is required of the reader for part I. The choice of illustrative examples is quite balanced and covers the important theoretical contributions in the area. Part II covers differential equation models and follows exactly the same format as part I. Examples range from stability conditions for market equilibrium (first order) to stability of the Walrasian system and the dynamic Leontief model (simultaneous systems). Part II requires at least an elementary knowledge of differential and integral calculus. The four appendixes cover such advanced topics as stability of general equilibrium systems, nonlinear differential and difference equations, growth models of Uzawa, and discussion of Hahn's work with multisector growth models.

The book is extremely well written, with a clarity which is reserved for those who must write in what is for them a foreign language. There are references at the end of each chapter and appendix so that the interested reader may pursue the subject further. Included also in the example chapter are various problems and exercises for students to work. The material covered is in no sense exhaustive, nor was any attempt made to survey completely the various areas of application of difference and differential equations. However, the ardent student can come away with a thorough understanding of introductory difference and differential equations and a good coverage of the major applications of these tools.

Dale M. Heien

Quantitative Economic Research: Trends and Problems

By Simon Kuznets. National Bureau of Economic Research, 216 Madison Avenue, New York, N.Y. 10016. 93 pages. 1972. $1.50.

John Dewey, the noted educator, once said that there is nothing more practical than theory. With respect to economics, quantitative research is important in giving economic theory practicality because it makes theory withstand the test of experience and experiment. Only tested theory can provide a practical foundation for sound policy.

Simon Kuznets, the author of this book, is well qualified to write on this subject. He was the 1971 Nobel Prize winner in economic science and is admired in economic circles for his contributions to theories of business cycles, national income and its distribution, and economic growth.

The major characteristic of quantitative economic research is that it views the economy as a unified system of interdependent units, with each component being capable of responding to market stimuli in a predictive way. That is to say, an aggregative statistical framework of necessity must view the economy as a whole; within the framework, no one current problem is emphasized in isolation from the rest of the economy. Furthermore, this approach discovers any gaps in the data and thus is a guide for the improvement in data supply.

The author takes pains to point out a limitation in the current situation of quantitative economic research. It is a fact that little quantitative economic research is

done utilizing comparisons of the growth experiences of several countries; almost exclusively, the concentration of the economic research is restricted to the scholar's country. This is a shortcoming that must be corrected since a more systematic study on a comparative basis is required to devise general laws about economic growth. No doubt some of the current problems of our economy are attributable to our inadequate understanding of other economics.

Quantitative research will always be under pressure to answer questions raised by the dynamism of changing economics and to resolve the complex questions that have been with us for such a long time.

Jack Ben-Rubin

Economic Analysis of Agricultural Projects

By J. Price Gittinger. Published for The Economic Development Institute, International Bank for Reconstruction and Development by the Johns Hopkins Press, Baltimore, Md. 21218. 221 pages. 1972. $10.

The fact that this book is the first of a series by the Economic Development Institute may be somewhat misleading. Rather than being an economic treatise, it is a "how to do it" book for those entrusted with selecting agricultural development projects. The foreword notes parenthetically, "It is surprising how many people with very good economic educations have never had an opportunity to become familiar with applied project analysis methodologies." There is no longer a legitimate excuse for this. Gittinger illustrates the advantages and disadvantages of several measures of project worth, including benefit-cost ratios, and discounted cash flow measures from which may be derived net present worth and internal rate of return. Unfortunately there is no formula for calculating the exact internal rate of return. It may be approximated and interpolated rather simply by trial and error. Neither the benefit-cost ratio nor the net present worth criterion can be relied upon to rank alternative project investment possibilities. Even the internal rate of return, which the World Bank uses for economic and financial analyses of practically all of its projects, can lead to an erroneous choice, if not carefully used, in dealing with mutually exclusive projects. For this reason, the World Bank uses several different analyses. Gittinger contrasts the use of "most probable outcome analysis," including sensitivity analysis discussed in this book, with "probability analysis" also used by the Bank, which requires the use of a computer.

This book is clearly written for the noneconomist. Its simple language will be a help to those of its prime customers less fluent in English. It still demands of the reader a high desire to know. The economist who is a project planner will not find this book beneath him. It is written by an economist who has grappled with the theoretical and practical concepts of choosing among competing demands for the development dollar. He is ready to reference theoretical discussions for those who desire further conceptual refinements. The distinction between economic analysis to judge the effects of a project on the economy as a whole and the financial analysis necessary to judge the project's ability to meet its financial obligations is clearly presented.

The focus is almost completely on selection of agricultural projects in developing countries. Those familiar with the current arguments regarding project interest rates in the 5 to 7 percent range may be surprised at the opportunity cost of capital in the 14 to 18 percent range common in developing countries.

This book is undoubtedly a must for those who have to prepare and select among project plans for developing countries. It is also a must for those economists who want to sharpen their intuition by studying the actual and hypothetical examples and comparisons selected by Gittinger from his experience with the World Bank.

Howard A. Osborn

The Green Revolution in West Pakistan

By Leslie Nulty. Praeger Publishers, Inc., 111 Fourth Avenue, New York, N.Y. 10003. 150 pages. 1972. $12.50.

"The Green Revolution in West Pakistan" certainly is a book that needs to be written, but this volume by Leslie Nulty is not that book. Such a book would encompass new developments in water, seeds, fertilizers, pesticides, mechanization, agricultural education, watershed management, and credit availability, to name a few. This book unfortunately lacks such a panoramic view. It covers mostly aspects of water development, especially in tubewells, with a brief pass at such things as cropping patterns, land tenure, and farm income, mostly in relationship to tubewells. The conclusion, which deals with the widening disparity between poor and rich farmers, is interesting. The subject best covered is, of course, tubewells.

Even in coverage of water development, there is a lack of historical perspective. Pakistan may be a new country, but the region is a very old one, parts of it

having been occupied by man for thousands of years and irrigated for more than three centuries. The original system, with many modern additions, is still in use today. Miss Nulty seems to be unaware of this fact.

In the entire 150 pages of this book there is only one map, on page 20, of the Indus drainage basin only. The map is interesting, maybe even adequate, but it is hard to tell since the print is so small as to be almost unreadable. There is no map of all West Pakistan, showing provinces, elevations, rainfall, etc. If there were such a map, it would make the text more comprehensible. To show the importance of precipitation, for example, the 1970-71 wheat crop was down from 1969-70 entirely due to deficit of rainfall. Rainfall not only benefits the crops but also helps irrigation water levels in rivers and canals.

The economics of inadequate water use by the farmer is well covered. There should be more indepth information about soil salinity, probably the most serious problem faced by West Pakistan in its agricultural development. Salinity is a very old problem in that region. There is another serious difficulty not even mentioned in this book—that of watershed management. The life expectancy of some of the new dams may be considerably shortened by excess erosion of the watersheds.

Even though tubewells are important, the green revolution is not tubewells alone as it would appear from reading this book. As of 1970, tubewells provided water for less than 10 percent of the total irrigated lands. The West Pakistan Government had been laying the groundwork for the green revolution as early as 1960. The green revolution takeoff started when West Pakistan imported about 42,000 tons of semidwarf wheat seed from Mexico in 1967. In 1968, about 16 percent of wheat acreages were planted to Mexican high-yield varieties (HYV), afterward renamed Mexipak. This acreage yielded 35 percent of the total wheat crop of 1968, the largest wheat crop in the history of West Pakistan. I am not downgrading the importance of water in the agricultural development of West Pakistan, but I am not going to say that water is the only factor responsible for the green revolution in West Pakistan.

The new, imported HYV seeds had higher water requirements than the native varieties and were also fertilizer responsive. This is what spurred water development and chemical fertilizer use. Inadequate pest and disease control, which is not covered by Miss Nulty, may be a major problem in the future. When climate, weather, temperature, humidity, host plant conditions, and other factors are right, the crop plant pest and disease problem will be out of control.

The tables in this book deal mostly with subjects relating to tubewell development and are helpful in that limited area. There is a lack of tables on total crop production. The table on landownership patterns (p. 34), an extremely important subject, apparently dates from the 1950's and is so old as to be almost useless. Several of the other tables are also old.

This book would have been more aptly named "Tubewell Development in West Pakistan." Leslie Nulty has done a beautiful job of covering that segment of the green revolution. Unfortunately, other aspects were either absent or insufficiently covered. However, if you want to know about tubewell development in West Pakistan you simply must read this book.

Amjad H. Gill