AGRICULTURAL PRICES AND COMMODITY MARKET ANALYSIS

FERRIS

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ABOUT THE AUTHOR

John N. (Jake) Ferris is a professor in the Department of Agricultural Economics at Michigan State University. His MSU responsibilities have blended extension, teaching, and research, including international assignments and two with the federal government in Washington, D.C. His professional focus has been on price analysis, outlook, and marketing strategies. Dr. Ferris has authored over a thousand articles, bulletins and staff papers, contributing regular outlook articles to a national livestock publication and the *Michigan Farmer.* He directed several multidisciplinary futuring projects on the long-range prospects and potential for Michigan agriculture, natural resources and the food industry. Professor Ferris developed AGMOD, an innovative econometric model of U.S. and world agriculture which generates year-to-year projections on major commodities. He developed commodity marketing courses for both graduate and undergraduate students that emphasized the application of forecasting tools. He has received a number of recognitions, including a "Distinguished Extension Program Award" and several "Premiere Forecasting Awards" from the American Agricultural Economics Association and the "1996 Distinguished Service to Agriculture Award" from the Michigan Farm Bureau.

PREFACE

This book is about the "nitty-gritty" of commodity analysis and forecasting. While the focus is on agricultural commodities and food, the principles apply to other commodities as well. The forecast horizon ranges from the intra-day activity of scalpers on futures markets to monthly and quarterly time frames, to the year-by-year projections of econometric/simulation models, and to the very long-range concerns about world food supply-demand balances. The book also extends forecasting into decision making and policy analysis.

The emphasis is on applied econometrics. The reader would be best prepared having completed courses in intermediate economic theory and introduction to econometrics. Most essential is an understanding of college algebra and multiple regression, and familiarity with microcomputer software programs in statistics. References in the text are to MicroTSP from Quantitative Micro Software. However, readers without formal courses in econometrics should be able to comprehend most of the material with extra reading on linear regression in introductory econometric texts.

This book evolved from lecture notes in a graduate course in agricultural economics, designed to prepare students for some of the more common tasks in market analysis as undertaken by professionals in industry, government and academic institutions. Each student has been required to estimate the structural parameters of an econometric/simulation model, evaluate it and solve the model for a 10-year projection period. With this term problem as a focus, students have the incentive to test the procedures suggested in the text.

While the emphasis is on agriculture and the food system in the United States, increased globalization of markets dictated that the subjects be applicable throughout the world. Even futures markets, which have been a major institution in U.S. agriculture, are expanding globally. The rationale and role of these markets are treated in some detail.

While the book is organized in a logical sequence, the reader could enter at any point to explore particular subjects of interest. In a sense, the book is intended to cover the salient aspects of modeling and forecasting, and to provide readers with a conceptual idea on topics deserving closer inspection. Hopefully, the book will encourage readers to pursue such subjects more intensively.

The book reflects 40 years of experience of the author as an on-campus teacher of graduates and undergraduates, as an extension specialist and as a researcher. The research in recent years has focused on the development and application of large econometric/simulation

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models. Having forecasts published regularly forces analysts to sharpen their tools and sort out the important from the unimportant. This book contains what this author believes is particularly relevant in forecasting and where additional refinement in these procedures is needed.

ACKNOWLEDGMENTS

This book is dedicated to my wife, Maxine, who supported me in this endeavor as well as my entire professional career. This she did while handling family obligations and launching her own career in academia.

Special credits go to a superb secretary, Nancy Creed, who saw this manuscript through class notes stages and countless revisions as a textbook. Graduate students provided valuable feedback on what to include and how to present the material. Reviewers of early drafts quickly revealed to me that I had not written the "perfect text." I am indebted to those persons and have kept their comments and suggestions in mind as the manuscript was revised and restructured. As noted in Chapter 18, my colleague, Robert Myers, was particularly helpful in a review of that chapter.

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As usual, I assume responsibility for errors of omission and commission.

John N. (Jake) Ferris

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1

INTRODUCTION

The extensive public and private resources devoted to measuring, monitoring, analyzing, and forecasting commodity supplies, demands, and prices attest to the importance of these activities to the world economy. Food, being an especially precious commodity, draws extra attention. Impending food shortages and high prices make headlines. Also, food surpluses and low prices, creating stress on the farm, garner action through government programs.

Decision-making at many levels depends on reasonably accurate assessments of future developments in the commodity scene. In the agriculture and food sector, this ranges over inventory decisions of farm equipment manufacturers, farmers' allocation of land in spring planting, developing marketing programs by producer associations, positioning rail cars at harvest, designing special promotions at the retail store, forward contracting wheat for export, designing the next farm bill, etc.

The U.S. Department of Agriculture (USDA), in cooperation with state departments of agriculture, sets the pace by generating crop and livestock estimates and monitoring market prices. So important is this task that the private sector is also involved. These organizations not only gather such information, but also have extensive programs in disseminating commodity news.

Analysis and forecasting are major functions of the Economic Research Service of the USDA and an inter-agency unit known as the World Agricultural Outlook Board. Land Grant Universities and many private firms also devote considerable resources to this activity.

Citations could be made of similar programs in other nations and particularly international organizations such as the Food and Agriculture Organization (FAO) of the United Nations, the Organization for Economic Cooperation and Development (OECD), and the World Bank.

Data valuable for commodity analysis extend well beyond the standard production, stocks, use, and price statistics. Household consumption surveys, cost of production studies, financial statistics such as interest rates, descriptive studies of industries, and technical conversion rates all contribute to comprehensive commodity market research. The *Census of Agriculture* of the U.S. Department of Commerce provides key benchmark data to identify structural changes on the farm.

While market analysts often feel constrained by voids in the data base, agriculture is blessed with a vast statistical resource compared to many other industries. This rich database may reflect the long-term traditional role of the public sector in agricultural data collection and dissemination beginning in the mid 1800s at the federal level in the U.S.

In the 1950s, when the field of econometrics was in its infancy, market analysts were restricted to electro-mechanical desk calculators and large, slow main-frame computers. These large computers speeded up in the 1960s and, at that time, the smaller desktop and then the hand-held electronic calculators appeared on the scene. The expansion in availability and use of the microcomputer, which began in the 1970s, accelerated in the 1980s. The capacity of these machines was enlarged in the 1990s as they dominated hardware for econometricians and others.

Also, during the 1980s and early 1990s, evolution in software programs allowed market analysts to pursue more ambitious and comprehensive projects. Possibly one of the most valuable contributions of these programs was to provide faster feedback to the analyst as econometric/simulation models were being developed. The process of exploring alternative formulations became more efficient.

Improved computer hardware and software may shorten the distance between the decision maker and the modeler. Some decision makers may become modelers, or will have personnel closeby who can tap computer models for answers to questions requiring a quick response.

Moreover, the process of modeling is a rich learning experience. One might say, "Modeling is too important to leave to specialized modelers." The point is that analytic activity can become more decentralized with a role for those who, in the past, have applied the output of large econometric models, but have not plugged directly into the operation and development of the model itself. At the same time, economists specializing in modeling continue to improve the capability of these analytical tools.

Considering (1) the extensive agricultural database, (2) an expanding analytic capacity with new computer hardware and software programs, and (3) the importance of food in world economic development, agricultural economists can demonstrate how to transform agricultural statistics into useable information for decision makers. As nation after nation shifts from centrally directed economies to a market orientation, commodity market analysis will become more relevant. Agricultural products and other raw materials are important to the economies of these nations. Also, the poorer countries are heavily dependent on products of farms, forestries, and mines for foreign exchange to initiate economic development.

Implementation of the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) will also challenge commodity analysts and political scientists to evaluate the consequences for the producer, consumer, and government expenditure sectors. In many nations, highly structured price-setting mechanisms will give way to volatile markets, upon which the commodity futures industry thrives.

This book is divided into four sections. Chapters 2 through 6 in Section One extend theoretical concepts of demand and supply to agriculture and the food system and prescribe empirical procedures for analysis. In Section Two, chapters 7 through 10 integrate demand-and-supply relationships in constructing and evaluating econometric/simulation models designed to generate dynamic forecasts of agricultural variables. How to deal with uncertainty such as the weather effect on crop yields is also covered.

While Section Two concentrates on methodology relevant for intermediate-term forecasting, say the next one to five years, Section Three (chapters 11 through 13) addresses the challenge of projecting ahead beyond five years when structural change and new technology must be taken into account. A perspective on interregional adjustments, international trade, and plant location is included in this section. Application of these projections for decision making and policy making is also presented.

Finally, Section Four relates more to short-term forecasting, that is, less than a year into the future. This includes seasonals, technical analysis, time series models, and descriptions of futures and options markets and their functions. These institutions are important elements in U.S. and world commodity markets. Sources of agricultural data and market analysis are enumerated in the concluding chapter.

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