Forecasting Consumer Price Indexes for Food

A Demand Model Approach

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Introduction

Forecasting food prices is an important component of the U.S. Department of Agriculture's short-term outlook and long-term baseline forecasting activities. A food price-forecasting model is needed to provide information for use by agricultural policy decision-makers to evaluate the effects of changes in farm products due to farm programs, economic conditions, and weather on food prices. The objective of this report is to develop a price-forecasting model that can be easily implemented for timely outlook and situation analyses.

Some food price-forecasting models use a time series approach such as the Autoregressive Integrated Moving-Average (ARIMA) model in Box and Jenkins (1970). The time series model, which depicts the historical movement of time series data observations, is a convenient approach because it uses mainly its own price variable to predict food prices. Because none of the time series models incorporates economic rationale, however, the models' forecasts may be unreliable when there is a change in economic conditions.

To include economic reasoning in the food price forecasts, this study applies an inverse demand system, in which prices are functions of quantities and income.

As indicated by Hicks (1956), the Marshallian demands have two functions: one shows the amounts consumers will take at given prices, and the other shows the prices at which consumers will buy at given quantities. The latter function, "quantity into price," is essentially what the inverse demand system expresses.

The inverse demand system is theoretically sound and has considerable appeal as applied to food price forecasting. It has been long recognized that lags between farmers' decisions on production and commodities marketed may predetermine quantities, with price adjustments providing the market-clearing mechanism. Therefore, quantities of food production and use are likely appropriate variables to use in food price forecasts. Hence, an inverse demand system for food price forecasts is capable of capturing the economic demand-pull factors, such as food use and income in the food-price movements.

The materials of this report are presented in two parts. At the beginning, the specification of a price-forecasting model is discussed. The major focus is on how to apply an inverse demand system for forecasting food prices. Then the empirical results of an estimated inverse demand system are presented.