

Abstract

With the market-oriented changes in U.S. agricultural policy, farmers are exposed to more price risk. Despite a sizeable literature on marketing strategies and the existence of commercial advisory services, seemingly simple questions--for example, how spreading cash sales across the marketing season compares with selling all at harvest--are yet unanswered. This study applies the rational expectations competitive storage framework to the U.S. corn market, and examines the impact of various marketing practices on distributions of returns.

In the monthly model, production, consumption, and storage decisions are based on the state of the world, defined by the month of the year, available supply, the realization of demand and supply shocks, expected crop size, and expected harvest-timing. Agents adjust rational expectations of future states according to available information. Equilibrium consists of state-dependent price and planting functions, which are solved numerically by the collocation method using cubic spline functions. Analogous functions for futures prices are derived.

By drawing random disturbances consistent with the model, equilibria are sequentially generated. The simulated long-run distributions of monthly endogenous variables are comparable to those estimated from observations in the period 1989/90-1997/98. Consistent with this sample, the season-high price occurs in May and the season-low in November, on average, although unlikely seasonal patterns are also possible. Price variability is smallest in November and highest in the growing season. Simulated futures price distributions exhibit a time-to-maturity effect similar to those estimated from the sample.

The model implies a range of possible price behavior and can be used to evaluate numerous alternative marketing strategies. Based on a 10,000-year simulation, spreading cash sales across post-harvest months generally lowered the mean return, with little reduction in variability, relative to the base strategy of selling all at harvest. These strategies, however, were not unambiguously inferior in all years. All hedging strategies reduced variability, but post-harvest hedges that are conditioned on expected basis convergence also improved the mean return. Risk-averse producers are likely to select these strategies over the other strategies analyzed. Alternative measures of price risk, such as semi-variance, can be calculated from simulations and provide more relevant information than variance alone.