Abstract

Scope and Method of Study. This study contains two essays. The first essay is preharvest pricing decision making and the second essay is postharvest decision making. The purpose of the first essay was to determine producer's utility function and price processes where profit margin hedging is optimal. A statistical test of mean reversion in agricultural futures prices is conducted. The simulations were also conducted to compare the expected utility of profit margin hedging strategy with the expected utility of other strategies such as always hedging and selling at harvest. The purpose of the second essay was to determine whether real option values can explain why producers appear to store too long. To determine the real option value, we modeled and estimated a seasonal mean reversion price process which allowed price to be a random walk within a season, but mean reverting across crop years. After estimation of the price process, a universal lattice model was used to determine cutoff price. This study conducted simulations using cash prices of crops to determine differences of net returns of optimal strategy under two different price processes, which are a simple mean reversion price process and a new seasonal mean reversion price process.

Findings and Conclusions. Theoretical results from the first essay showed that profit margin hedging is an optimal strategy under a highly restricted target utility function even in an efficient market. Profit margin hedging is profitable if prices are mean reverting. Simulation results showed that profit margin hedging gives the highest expected utility to producers under the highly restricted target utility function. With the variance ratio test, there is little evidence that futures prices of crops follows a mean reverting process. In the second essay, the estimated nonparametric bootstrap parameters of the seasonal mean reversion process show the seasonal function turns negative before mean reversion begins, which suggests that real option values are relatively unimportant in determining when producers sell their grain. The graphs of cutoff price when assuming a seasonal mean reversion price process show that producers sell before mean reversion begins except when prices are extremely low. Therefore, Fackler and Livingston's (2002) finding of a large real option value that can explain why producers store too long is

not supported. The simulation results show that there is little evidence that the net returns between the mean reversion model and the seasonal mean reversion model are different.