A RISK-RETURN SIMULATION MODEL OF COMMODITY MARKET HEDGING STRATEGIES

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The American food processing industry is characterized by a vast array of products, which are produced in large quantities at relatively low unit costs. The pincipal component of the unit cost for these food products is their raw material (usually a basic grain commodity) constituent. Consequently, most food processing companies are greatly concerned with the prices they pay for their raw materials, and as the prices of these raw materials change, the typical food processing company's profits may be greatly affected. Since most companies prefer a steady growth rate, these raw material price fluctuations must be counter-balanced by other strategic or operating decisions. One basic set of decisions which is utilized to overcome raw materials price fluctuations involves the established commodity trading markets.

The operation of the commodity futures markets allows food processors to determine what prices they will pay for their raw materials over the production horizon. However, since a number of futures options may exist for each commodity, the inherent risk of price fluctuation remains with the processor, as some manufacturers may buy their supply of the commodity at significantly lower prices than others and reflect this difference in the price of the finished product.

The research described in this paper was conducted within the commodity market trading environment of a major American agri-business firm. The objective of the study was the development of a risk-return simulation model which could be used for testing commodity market hedging strategies in both cash and futures markets. The model was developed under general assumptions for the basic commodity, corn, and included a market price change simulation subsystem, a hedging

strategy testing subsystem, and a risk-return measurement subsystem. The simulation model was tested over a multi-period time horizon for a series of commodity market hedging strategies, and extensive test results are presented.

USING THE COMPUTER TO PLAN PRODUCTION IN A FLOW SHOP

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Management of one of the Company's product lines must submit contract bids during one year for manufacture, with start and due dates, any time in the next five years. In the past, management had insufficient information as to the effects a new contract would have on their manpower requirements, resource utilization, and present contracts. The solution was to simulate production. The results of the simulation was a general schedule for production along with manpower utilization under given capacity constraints. This general schedule is not used for day-to-day scheduling of operations. Rather, it is used for "middle range planning", three months to a couple of years, where manpower levels and equipment are variables instead of constraints. Management reviews the output and makes any desired capacity and/or contract changes. A new simulation is made and the process repeats itself until management has determined what contracts to bid on and what their manpower and equipment needs will be during the "middle range".