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Development of a CRUSH Margin Calculator for Beef and Pork Markets

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Summary and Implications

A convenient, web-based application was developed that utilizes Chicago Mercantile Exchange (CME) futures settlement price data to generate an expected margin. Futures price data is available for live cattle, feeder cattle, lean hogs, soybean meal, and corn. The prices of these commodities on the futures market can be hedged in advance of cash purchases or sales to reduce price risk or used to estimate potential margins when producing and selling fed cattle or market hogs.

Introduction

The volatility of beef and pork markets present an urgent need to provide a means of monitoring future margins due to the lag time between placing livestock on feed and marketing these finished animals. The use of futures and options are tools for securing a buying and selling price as well as probing into a possible market outcomes. The CME provides price data on daily trades for the primary inputs used in both beef and pork markets including feeder cattle, corn grain and soybean meal. Likewise, price data on fed cattle and lean hogs, the outputs, are also provided. These data can be accessed at the CME website and obtained through a subscription for a current data stream or by viewing if daily settlement prices are adequate. With this in mind, along with the constant demand for convenience and the availability of technology such as smart phones, the objective was to build a crush margin application available to the public to monitor these markets and provide a forecast tool. The forecast information establishes the potential price margin remaining after the feeder calf or pig was placed on feed and when they are sold taking out the corn, and in the case of pigs corn and soybean meal, input provisions.

Material and Methods

Due to the many variations in technology platforms, a web-based application was developed on the Iowa Beef Center server that could be accessed by anyone with internet connectivity. The web application was developed in Java programming language, and the data are stored in the MySQL database. Two different data tables are used to save

the data. One is for the settlement prices and the other for the calculated crush margin value.

Crush Margin Calculations

Prices are scraped from the previous day's CME settlement price listing. All the settlement prices are saved in a database along with the date. Saving everything in the database allows users to use past and future dates to calculate crush margins for alternative placement, feeding, and marketing periods.

Hogs

Default—Uses a 275 pound market hog (200 pound carcass), 10 bushels of corn, and 0.075 tons (150 pounds) of soybean meal. The weaned pig value is calculated as ½ of finished hog price, e.g., a \$70/cwt market hog price equates to a \$35/head weaned pig value. The market hog price is the 5-months-out from placement CME lean hog futures price. Placement month CME prices are used for corn and soybean meal prices.

Formula:

Crush Margin = 2 x CME lean hog futures price (5 months from placement) – 0.5 x CME lean hog futures price (5 months from placement) – 10 x CME corn futures price (at placement) – 0.075 x CME soybean meal futures price (at placement)

Cattle

Default—Uses 800 pound feeder fed to 1,400 pounds in 6 months using 64 bushels of corn. Placement month CME prices are used for feeder cattle and corn prices.

Formula:

Crush Margin = 14 x CME live cattle futures price – 8 x CME feeder cattle futures price – 64 x CME corn futures price

For 600 pound feeder fed to 1,400 pounds in 8 months using 85 bushels of corn.

Crush Margin = 14 x CME live cattle futures price – 6 x CME feeder cattle futures price – 85 x CME corn futures price

For 1,000 pound feeder fed to 1,400 pounds in 4 months using 42 bushels of corn.

Crush Margin = 14 x CME live cattle futures price – 10 x CME feeder cattle futures price – 42 x CME corn futures price

**Note that historical basis values available from the Ag Decision Maker website, <https://www.extension.iastate.edu/agdm/ldmarkets.html>, are added to the CME values prior to the calculation.*

Results and Discussion

This app is a complement to the ISU livestock crush margins website, <http://www2.econ.iastate.edu/margins/>. The crush margin website has crush margins calculated every Wednesday based on futures settlement prices that day. It also has historical data on how the crush margin has changed over time. This app will allow users to quickly see daily crush margin calculations and tailor the calculations to more precisely fit individual situations. The finished application is available to the public and is accessible by going to <http://cowweb.exnet.iastate.edu/CowWeb/faces/> and selecting the “Beef and Pork Crush Margin” icon. Upon opening the app, select the “Cattle” or “Hogs” followed by “Get Crush Data”. The CME previous day’s

settlement prices are loaded for the commodities involved. Using these settlement prices, the program automatically calculates the crush margin and displays it to the user along with the market period of the commodities. A reference sheet showing Iowa basis values is linked to the app and care used as defaults.

Although the current calendar date appears when opening the app, the user can choose any future date of placement, select the “Update Futures and Basis” button and see what this placement date means in terms of future margins. If the user wants to override CME settlement prices and default basis values they can enter the desired prices and then “Recalculate” the margin. The margin is not an indicator of profit or loss. There are additional costs associated with producing fed cattle or market hogs that will vary by operation and would need to be subtracted from the calculated crush margin.