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Ames, Iowa

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Hog: Corn Ratio

What can we learn from the “old school”?

Economists have studied the hog to corn ratio for over 100 years. This ratio is simply the live hog price per 100 pounds divided by the price of corn per bushel. Prior to the increase in specialized farming, diversified farms often viewed hogs as an alternative strategy for marketing corn. If corn prices were low the farmers would “walk the corn off the farm” by feeding hogs. If corn was more expensive or livestock too cheap farmers would sell corn and reduce livestock numbers. The old rule of thumb was that if the hog:corn ratio was above 18 or 20 the associated profitability would lead to expansion of hog inventories and lower hog prices in the future. The opposite was said to be true for values below 18 or 20.

Today’s production practices are more complicated and fewer farmers are willing to switch into and out of a commodity enterprise. Increased specialization in grain and hogs, and the higher capital requirements of each, make such diversification more of a challenge.

So do the old price relationships still hold? To address this question and identify potential indicators of future market direction, we evaluated the quarterly average hog:corn ratios during the period between July 1989 and July 2006. While there is a lot of variation in the values, there are some generalities to consider.

Figure 1 shows the relationship between the hog:corn ratio and live hog prices two quarters later. Notice there is a slightly positive relationship; however, plenty of variation surrounds this trend line. For example, when considering a hog:corn ratio of 20, hog prices two quarters in the future ranged from \$30 to \$55. This difference in hog prices may be due to reduced gilt slaughter at the start of the expansion phase of the hog cycle.

Figure 1. Hog: Corn Ratio and Quarterly Live Hog Price Lagged Two Quarters

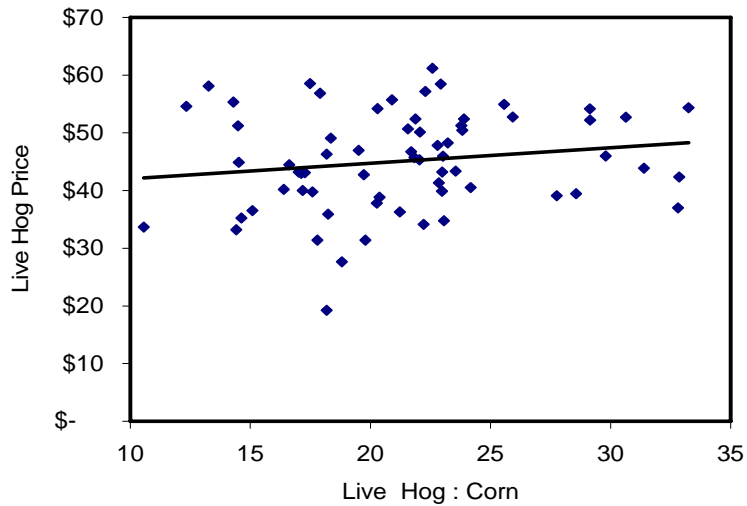


Figure 2 shows a the relationship between the hog:corn ratio and live hog prices four quarters out. Note that the line is nearly flat suggesting very little relationship between the ratio and prices a year later. There is still plenty of variation around the trend line.

Figure 2. Hog: Corn Ratio and Quarterly Live Hog Price Lagged Four Quarters

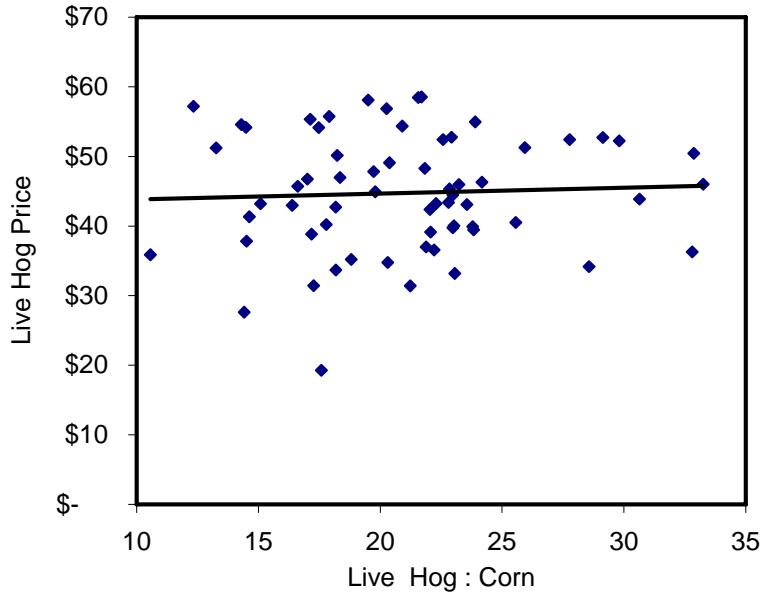
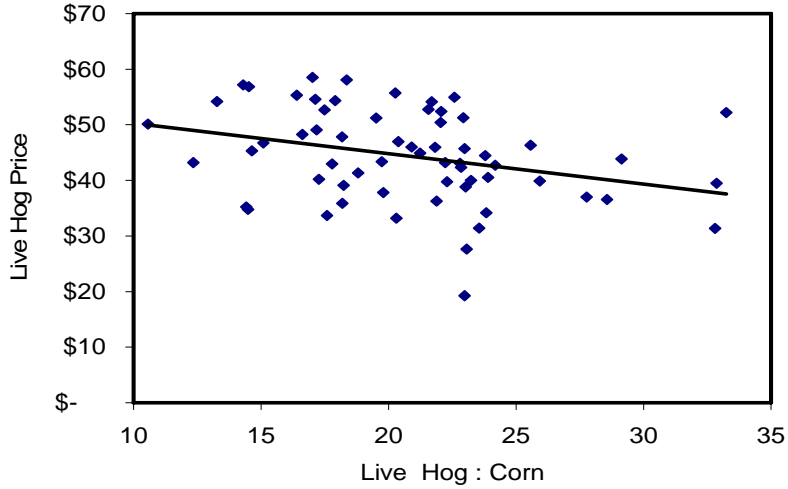


Figure 3 is the hog:corn ratio and live hog prices six quarters later. Now the trend line slopes downward suggesting that higher ratios lead to lower hog prices six quarters in the future. This relationship is consistent with the idea that profits reflected in a high ratio (higher hog prices and/or lower corn prices) result in an expansion of hog production and pressure on prices at a future date. Again, there is significant variation around the trend line and it is difficult if not impossible to predict hog prices into the future from this method, but the odds of getting the direction correct have improved.

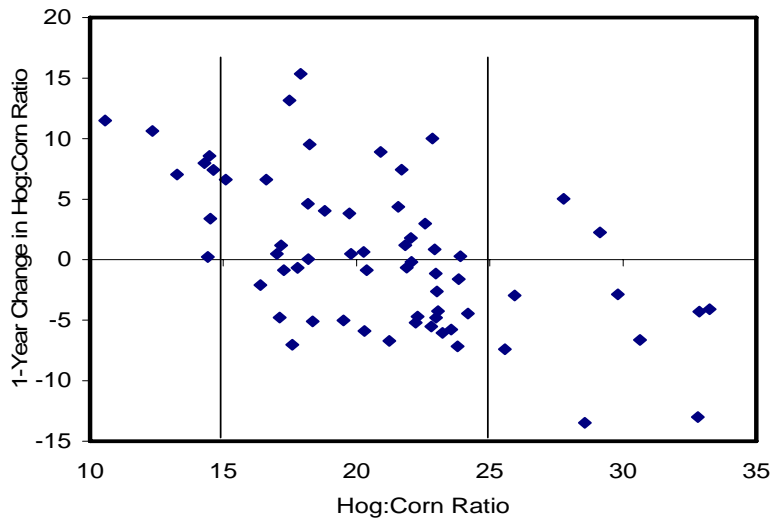
Figure 3. Hog:Corn Ratio and Quarterly Live Hog Price Lagged Six Quarters



Figures 1, 2, and 3 show the general relationship between the hog:corn ratio and hog prices at a later date. Figure 4 shows the change in the hog:corn ratio over the next four quarters, sorted by beginning ratio. We can now begin to see more indicative predictability in this relationship. While there is still a lot of noise in the middle of the spectrum, there is a stronger message on the outer ends of the range. During this time period, the hog:corn ratio increased a year after a quarter when the ratio was below 15 in nine out of the nine occurrences. In eight of the ten times the ratio was above 25, the ratio was lower a year later. When the beginning ratio was between 15 and 25 the ratio increased 21 times and decreased 25 times.

For the past year the ratio was 31.4, 29.1, 24.0, and 26.9 in Q305, Q405, Q106, and Q206, respectively. While past performance is not a guarantee of the future, this analysis points to a smaller hog:corn ratio and narrower margins in the year ahead. Current forecasts of higher corn prices and lower hog prices concur.

Figure 4. Change in Hog:Corn Ratio from Four Quarters Previous



October Crop Report Puts Corn Crop a Billion Bushels below Demand Soybeans: Ample for Now but Tighter Next Season

USDA's October 12 crop report indicated the nation's corn production will be about 240 million bushels less than the grain trade had anticipated. At the same time, worsening drought in Australia sharply reduced its expected wheat crop, tightening world supplies of feed wheat and creating the potential to boost U.S. corn export prospects. Normally, about 4.0 to 4.5 billion bushels (corn equivalent) of wheat are fed annually in international markets.

The U.S. corn crop, with the second highest yield on record, is now estimated by USDA to fall a billion bushels short of expected market demand. This news, combined with a projected 34% increase in the amount of corn processed into ethanol this marketing year and an even larger potential increase next season, is likely to keep corn prices quite volatile from now through spring. Further increases in corn cash and futures prices appear likely at times this fall, winter and early next spring as the market attempts to encourage farmers to plant at least 9 to 11 percent more corn acres than in 2006 and also responds to uneasiness about U.S. and foreign weather prospects..

The U.S. soybean crop estimate was increased 96 million bushels or 3% from last month, but was about 25 million bushels less than the average of grain trade expectations. With a modest increase (66 million bushels) projected by USDA in South American soybean production, the record U.S. soybean crop is expected to cause a moderate increase in U.S. August 31, 2007 soybean carryover stocks. *Stocks at the projected level, in the past would have been very negative to soybean prices. However, a sharp increase in corn plantings next spring is likely to reduce soybeans acres, and that may set the stage for reduced soybean carryover stocks in 2006-07. These prospects and uncertainty about the South American crop prospects this winter and next spring appear likely to strengthen soybean prices in the months ahead.* The large bean carryover stocks will probably temper the price strength some, but bean prices will still have the potential to respond strongly to any serious crop concerns in Brazil or Argentina.

The October 12, U.S. crop estimates are shown below in Table 1. The estimate of corn production was lowered 209 million bushels from the September estimate, along with a

Table 1. USDA October 12 Crop Estimates & Compared with September 12, 2006

	Corn, 10/12	Corn 9/12	Grain Sorghum 10/12	Soybeans 10/12	Soybeans 9/12
Mil. Harv. A., 2006	71.05	71.84	5.3	74.51	73.94
Bu./A., 2006	153.5	154.7	56.6	42.8	41.8
Mil. Bu. Production-2006	10,905	11,114	301	3,189	3,093
2005 Production	11,112		394	3,063	
Mil. Harv. A. 2005	75.1		5.7	71.3	
Bu./A., 2005	147.9		68.7	43.0	

4 million bushel decline in grain sorghum production. ***The entire decline in U.S. corn production from last year was a result of a 5% decline in planted acreage – a response to high fertilizer and fuel prices.*** The estimated Iowa corn yield declined 6 bushels per acre from last month, along with a decrease of 3 bushels in Illinois and 2 bushels in Indiana. Corn yield estimates were increased 2 bushels per acre from last month in Minnesota, 4 bushels in Nebraska, and 1 bushel in Ohio. Soybean yield estimates were unchanged or increased in all major producing states except South Dakota. The South Dakota yield was down one bushel per acre from last month.

How Many Corn Acres will be Needed in 2007?

The corn market for this winter will be focused on a production short-fall from demand of a billion bushels – even with very good yields nationally, and a virtually certain large increase in demand for corn to be processed into fuel ethanol next season. This year's production short-fall can be met by drawing down the large carryover stocks that were built-up in the 2004-05 marketing year. However, USDA currently projects August 31, 2007 U.S. corn carryover stocks at 996 million bushels. That is only a 4.4 week supply available a little more than a month before the main Corn Belt harvest season gets into full swing. Reducing the carryover stocks by another 200 million bushels next season, with prospects for total use in the 12.5 to 12.6 billion bushel range would put the carryover at a 3.3 weeks' supply. That would be a very tight old-crop situation.

Actual corn use in 2007-08 will depend on (1) the number of new ethanol plants coming on line, (2) domestic corn feeding, and (3) U.S. corn exports. At this writing the Renewable Fuels Association (RFA) web site <http://www.ethanol.org/productionlist.htm> shows about 1.35 billion bushels of new corn processing capacity under construction if 2.75 gallons of ethanol per bushel of corn conversion rate is used. Other sources including news releases and *Ethanol Producer* magazine show other plants under construction but not listed by the RFA that would put the total under construction at approximately 1.6 billion bushels. It may be realistic or even conservative to use 50% of this under-construction capacity as the likely increase in corn processor demand in 2007-08. That would increase demand by a range of 675 to 800 million bushels and would boost corn processing for ethanol by 31 to 37 percent. ***At the top end of the range, nearly one out of every four bushels of corn produced would be processed into ethanol.***

For these projections, we are using currently recommended distillers grain (DDGS) feeding rates and figuring the increased DDGS use will be spread across all species of livestock and poultry. We would expect the increased DDGS production to replace 120 to 150 million bushels of corn and the soybean meal from 50 to 60 million bushels of soybeans. The corn replacement would about equal the long-term annual growth rate in domestic corn feeding, and could bring a leveling off of domestic corn feeding next season. Exports are more uncertain and will depend on the size of next year's foreign crops. Production of corn in Argentina and South Africa, and wheat in Australia, the U.S., parts of Europe and the former Soviet Union has been reduced this year by adverse weather. Better overseas crops might reduce U.S. corn exports somewhat, although

world stocks are low and many of these countries may want to use some of the possible increased production to increase stocks. For now, our calculations assume corn exports, feed use and non-ethanol corn processing will remain about constant in 2007-08.

With the assumptions and calculations outlined above, and corn needed to fill this year's billion bushel production-use gap, the U.S. would need at least 6.5 to 7.5 million more corn acres harvested for grain next year. That is based on a U.S. average corn yield of 160 bushels per acre on all acres. The record U.S. corn yield was 160.4 bushels per acre in 2004 with very good weather conditions across the Corn Belt. These increases in plantings would be 9 to 11 percent increases in U.S. corn acres. ***Even with the increases, corn supplies would be expected to be very tight.*** A new record U.S. yield of 165 bushels per acre would offer the potential for a small increase in carryover stocks. University research on yields of corn following corn typically show a yield reduction vs. corn planted after soybeans, so the increased acres may have a lower yield than the U.S. average.

A big question mark in the price outlook is “How high will corn prices have to be to bring the needed increase in corn acres in 2007 and later years?” There are no clear answers to this question. The price needed will depend on the size of the South American soybean crop next spring, soybean prices, and fertilizer prices. The downtrend in natural gas prices in the last several months suggests that nitrogen fertilizer prices may be lower than last spring. High prices last spring for nitrogen and the other two major plant food ingredients were major reasons behind the 5 percent decline in 2006 U.S. corn plantings.

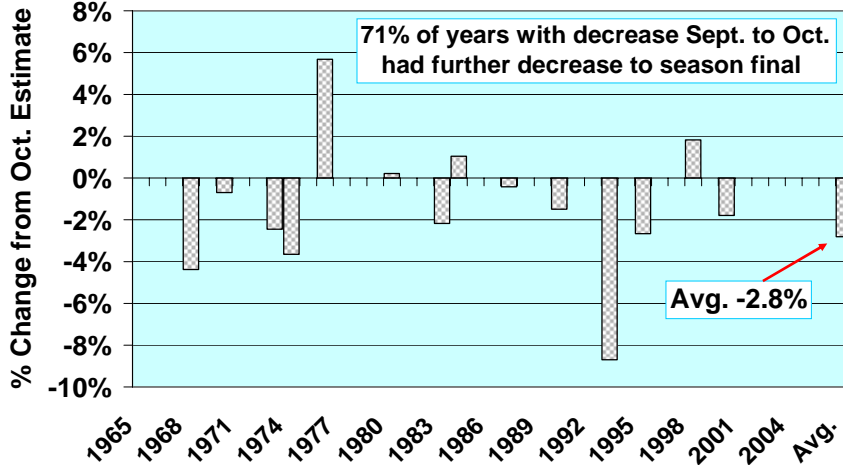
For the longer-term (2 to 3 years or more out), the downtrend in crude oil and ethanol prices, if it continues, along with higher corn prices might slow the expansion in ethanol processing some. Spot wholesale (rack) ethanol prices peaked in Iowa at a high of about \$3.89 per gallon in late June as the industry scrambled to get supplies to fill the void left by a halt in MTBE production. A few weeks ago, Iowa ethanol prices reached a low in the range of \$1.60 per gallon. At this writing, Iowa spot ethanol prices are reported at \$1.87 per gallon. Near-by wholesale gasoline prices on the New York futures market (New York Harbor location) are \$1.48 per gallon as of October 16.

Will 2006 Corn Crop Estimates Decrease Again?

USDA will issue two more crop estimates this season. The first will be on November 9 and the second will be in early January. Figure 1 shows changes in the U.S. corn yield estimates from October to the season final yield (usually released in January) ***for just those years when the estimate declined from September to October.*** There were 14 such years from 1965 through 2005. ***Seventy one percent of those 14 years had a further decline in the season final estimate. The average 2.8 percent decrease, if it occurred this year, would lower the U.S. corn crop by another 310 million bushels and would create a 1.3 billion bushel production-use deficit unless prices rise enough to ration use. That would bring August 31, 2007 U.S. corn carryover stocks down to about a 3.2 week supply. In 1995-96, the year when central Iowa cash corn prices were above \$5 per bushel for 6 months, U.S. corn carryover stocks were a 2.6 week supply.***

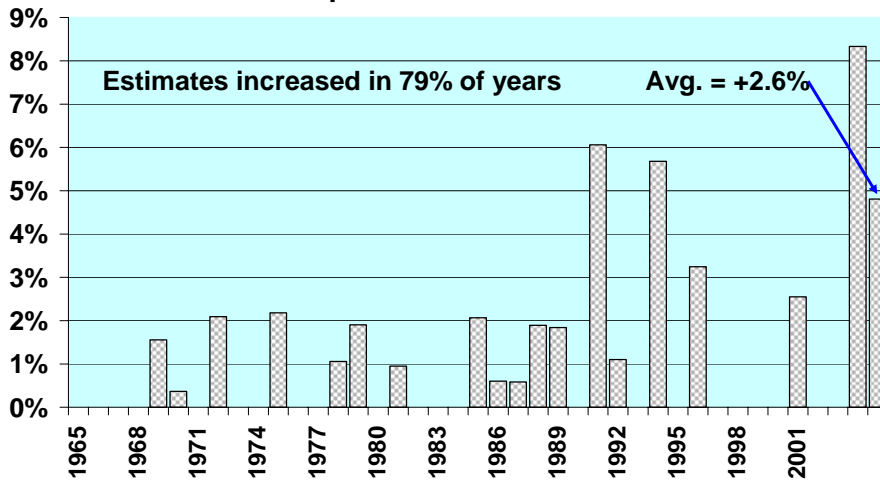
Figure 1. Corn Yield Change from October to Season Final in Years When Estimate Decreased from September to October

Data are from USDA, NASS



was higher than the October estimate. The average increase over all years of increase from September to October was 2.6%. This percentage increase, if it occurs in the 2006

Figure 2. USDA Soybean Yield Change, October to Season Final, in Years with Increase from September to October



strengthen more than futures into mid-winter.

Will Soybean Crop Estimates Increase?

Figure 2 shows changes in U.S. soybean yield estimates from October to the season final estimate in years since 1965 when the estimates increased from September to October. In 79% of such years, the season final estimate

was higher than the October estimate. The average increase over all years of increase from September to October was 2.6%. This percentage increase, if it occurs in the 2006 crop, would increase U.S. production by another 80 million bushels. That, in turn, would somewhat temper the upside potential in soybean futures prices into the winter and early spring. However, the soybean basis is very weak, and cash prices may

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