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Has Corn Gone High Enough?

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In response to the drought of 2012 and the lowest projected corn yield in 17 years, the price of corn has risen to all time record highs. Given that the economic role of high prices is to ration demand, the question facing stakeholders in the grain industry (speculators and commercial interests) is whether the current price of corn is high enough to have accomplished that task? That is, has the recent escalation of corn prices been adequate to curb the quantity demanded down to match expected levels of supply? Or can we expect prices to go even higher because use has not been reduced enough? This paper examines the supply/demand balance of the U.S. corn crop in in light of the 2012 drought and a look at each of USDA's major corn use categories.

Drought

Since the beginning of May, as drought conditions have worsened across the Corn Belt, USDA's estimate of 2012 corn production has fallen from 14.790 billion bushels to 10.779 billion, the smallest crop since 2006. The national average corn yield has fallen from a projected 166.0 bushels per acre in May to 123.4 bushels per acre (see Figure 1). The last time corn yields were this low was the 113.5 bushel per acre average in 1995. In response, the monthly average of the nearby futures price for corn has risen from $6.01 per bushel in May to $8.02 thus far in August, a 33 percent increase (see Figure 2).

Exports

The projected corn use cuts USDA made in each of the categories it uses to monitor corn consumption vary. The category with the greatest elasticity of demand is exports. The own price elasticity of demand measures the quantity response for a given price change. More elastic demand means that quantity changes more for a given price change. Typically, the quantity exported is more responsive to price than other uses of corn. While the United States is the largest exporter of corn in the world at about 45 percent, its market share of the world corn market is on the decline, down from over 80 percent in the mid-1990s. USDA has lowered its estimate of U.S. corn exports from 1.9 billion bushels in May down to 1.3 billion bushels, a 33 percent decrease. In response to the high U.S. price of corn, foreign corn users will certainly see lower corn use estimates of their own, seek corn supplies from other exporters, and substitute other grains for corn where possible. Another important factor in export projections is the exchange rate of the dollar in world currency markets. A stronger dollar makes our export products more expensive in world markets while a weaker dollar makes U.S. exports more affordable. With the financial and economic instability in Europe, the dollar has, of late, been relatively strong. In addition to the effect of the drought on yields, quality may have also been affected. That may leave even smaller supplies of export quality corn.

In This Issue. . . .
Has the recent escalation of corn prices been adequate to curb the quantity demanded down to match expected levels of supply? Or can we expect prices to go even higher because use has not been reduced enough?

Feed Use and Residual[1]

USDA has cut estimated feed use for 2012/2013 from 5.450 billion bushels in May to 4.075 billion bushels, a 25 percent reduction. Since the biofuel era began in 2007, the United States has seen a contraction of its livestock

[1] The Feed and Residual Use category is not a survey based use estimate but is calculated as total corn supply minus all other uses (food, seed, and industrial plus exports) minus ending stocks. The residual allows the balance sheet to "add up."

sector. As measured by grain consuming animal units, this number peaked in 2007 at 95.118 million head (see Figure 4). The estimate for 2012 is 92.931 million, down 2.3 percent from 2007. Perhaps more importantly and with longer range implications, the amount of energy feed consumed per grain consuming animal unit is on the decline. As the livestock industry has increased efficiency and made feed substitutions where it can, energy feed per grain consuming animal unit is down from 1.84 metric tons in 2007 to 1.67 metric tons in 2012, down 9 percent. This number includes distillers grains added back to feed use. Given that the 1.67 metric ton estimate for 2012 is above 2011 use of 1.61 metric ton per grain consuming animal unit, feed use in 2012 may still be overestimated.

Short term livestock adjustments triggered by high feed costs and reduced profitability have taken several forms over the last few weeks. Dairy cow slaughter has increased sharply over the last month, with weekly slaughter 13 percent over the same period last year. Weekly dairy cow slaughter is the largest for late July-early August since 1996. Sow slaughter has increased 6 percent from year ago levels over the last month. Adjustment in livestock markets also takes the form of lower prices for feeder weight animals. Feeder pig prices have declined 60 percent in over the last 2 months, while feeder and stocker calves are down more than 20 percent in the Southern Plains.

Food, Seed, and Industrial Use (Ethanol)

Corn for fuel use is now projected at 4.5 billion bushels in 2012/2013, down from 5.0 billion bushels in May (-10 percent). High corn prices have forced the closure of several corn ethanol plants around the country and ethanol blenders can use credits from ethanol use in previous years to offset some of the current blending requirements. A study by the University of Illinois estimates that for 2012, 20 percent of the ethanol mandate could be satisfied by the application of these credits[2]. In addition, ethanol use in 2012 is running below that of 2010 and 2011 and ethanol stocks above those same time periods. The 2012 monthly ethanol stocks to use ratio is above last year by about 6 percent (see Figure 5).

Food use is the smallest and most price inelastic of all corn consumption categories. For the last five years food use has ranged from a high of 1.407 billion bushels to a low of 1.276 billion bushels, a range of 131 million bushels. For 2012/2013, USDA cut food use from 1.425 billion bushels in May to 1.350 billion bushels, a 75 million bushel, or 5 percent, decrease

Constraints to Adjustment

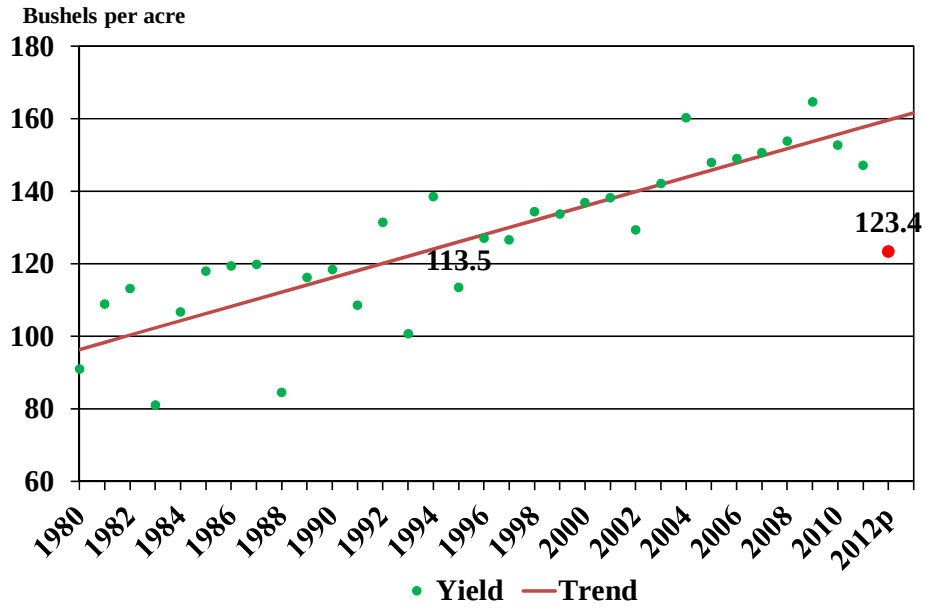
The ability of businesses and people to adjust and the speed of adjustment to higher prices are larger in the longer run. In economic terms, the short run (a few months) is more price inelastic than the longer run that allows people more time to adjust. Given more time, greater adjustments to high prices can be made. Some constraints that slow the short run adjustment in corn use include the industry structure of corn users, the financial capacity of the industry players, the ability to adjust refinery gasoline blends, the ability to reduce animal breeding schedules and finished weights, contracts for production delivery that are already in place running well into next year, and the reaction of consumers to higher prices for finished products made with corn.

Summary

While this paper has focused on quantity demand adjustments by users, the other market role of high prices is to increase production. It is likely that the December 2013 futures corn price of $6.55 per bushel (as of this writing) will cause more acres to be planted in 2013 than the 96.4 million estimated planted acres in 2012. It will encourage more corn acres to be planted in South America, as well. And it might buy more acres into other feed grains. Combined with changes in corn use and efficiencies forced on users by high prices that are slow to change back, increased future production is very likely to have a larger negative effect on corn prices in the future. Based on USDA's current use projections, it appears high corn prices have adequately reduced corn use to match current supply estimates. If production declines further, there appears to be some slack in the consumption categories to allow for further tightening. Of course, a significant revision downward in production (below 10 billion bushels) or quality concerns that limit use (i.e. aflatoxin, low test weights) could provide the impetus for another leg up in prices.

[2] Paulson, Nick and Seth Meyer. "An Update on RIN Stocks and Implications for Meeting the RFS2 Mandates with Corn Ethanol", Farmdoc daily, August 1, 2012, available online at www.farmdocdaily.illinois.edu/.

Figure 1. U.S. Corn Yields



WASDE, 8/10/2012

Figure 2. Index of Corn Use and Price Changes, May to August 2012

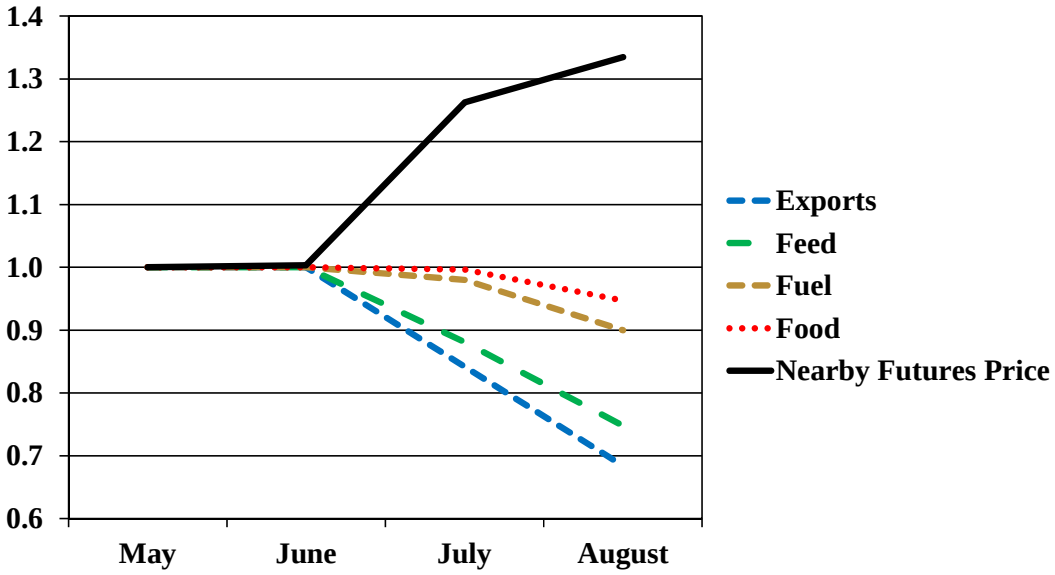
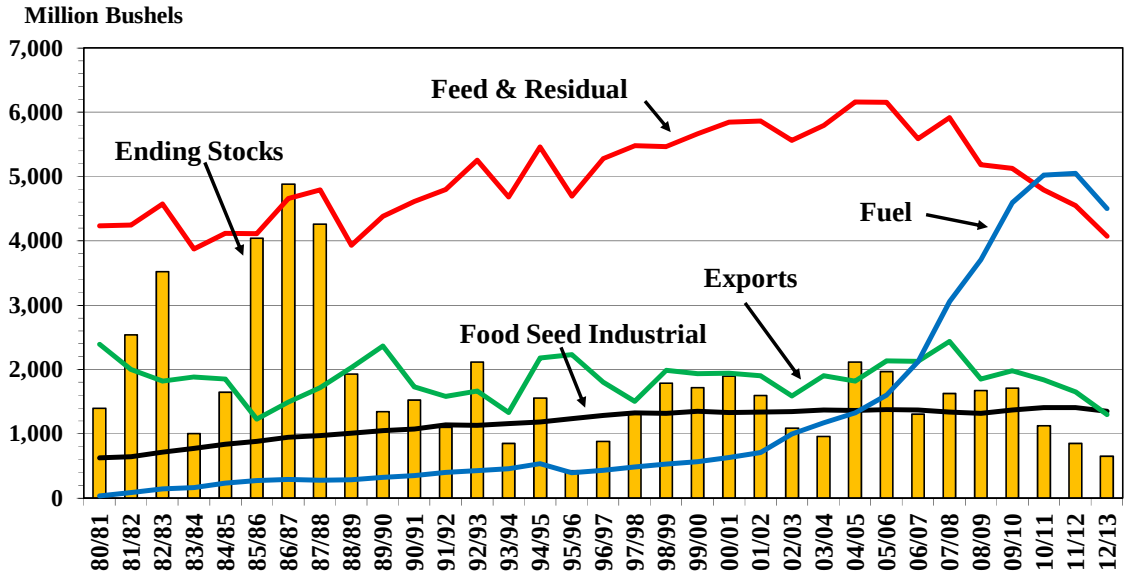
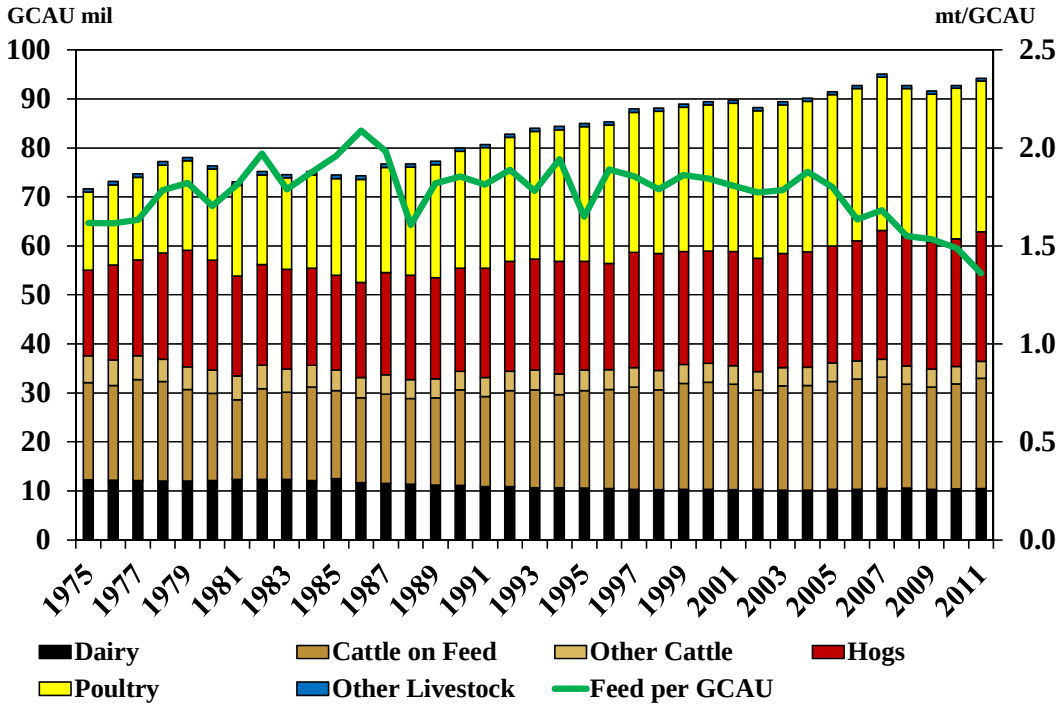


Figure 3. U.S. Corn Disappearance



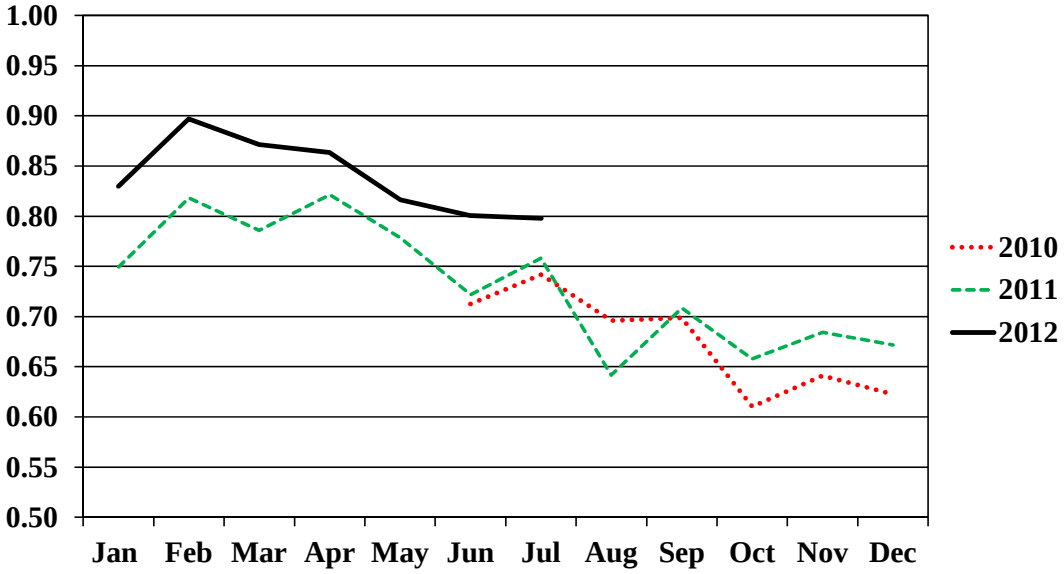
Source: USDA WASDE

Figure 4. Feed Use per Grain Consuming Animal Unit



USDA, Feed Grains Database and Agricultural Marketing Resource Center, August 14, 2012

Figure 5. U.S. Monthly Ethanol Stocks-to-Use Ratio



Energy Information Agency, Petroleum and Other Liquids, Weekly Supply Estimates; http://www.eia.gov/