

# The Main Street Economist

Regional and rural analysis



2008

FEDERAL RESERVE BANK of KANSAS CITY

## ARE ENERGY PRICES THREATENING THE FARM BOOM?

By JASON HENDERSON, VICE PRESIDENT AND OMAHA BRANCH EXECUTIVE

This year's farm incomes are expected to reach their highest levels in over three decades. Profits have soared with record crop prices, strong export demand, the booming ethanol industry, and tightening global supplies. The robust profit opportunities for crop producers have more than offset losses for livestock producers.

Energy prices, meanwhile, continue to march higher. While slackening from the record highs posted in July, they still threaten profit margins for crop producers—despite the record crop prices.

This article examines the links between today's high energy prices, crop profits, and farm credit conditions. After tracking rising energy prices and farm input costs, the article explores how the unexpected surge in farm input costs has eroded crop profits, dampened farm income expectations, and softened farm credit conditions. Ultimately, soaring energy prices threaten to slow the booming farm economy.

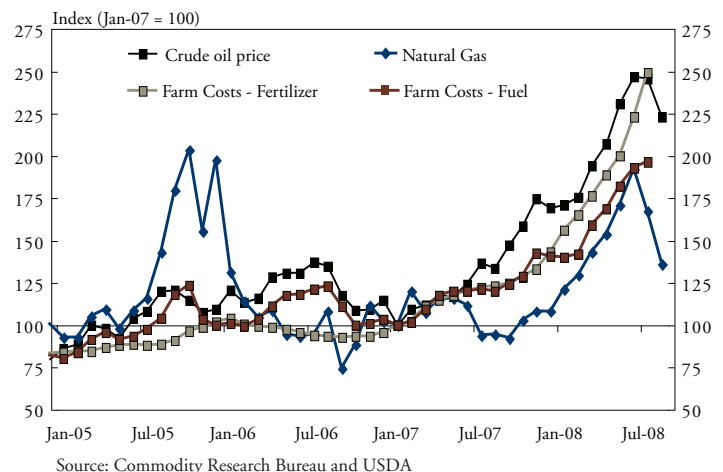
### ENERGY AND FARM INPUT COSTS SURGE

World energy prices began their recent surge in 2007 amid robust global demand and limited supply gains. While developed countries have curbed their crude oil consumption since 2005, developing countries have sharply increased their consumption. According to the Energy

Information Administration, China's appetite for crude oil has grown roughly 50 percent since 2001, accounting for about a third of the world's increase in oil consumption.

At the same time, the world's crude oil production has lagged expectations. With OPEC countries operating at extremely high capacity levels, much of the world's oil reserves are located in non-OPEC countries, which have not met crude oil production expectations. In fact, world crude oil production was flat in 2007, falling behind world consumption. As a result, both crude oil and natural gas prices have set record highs (Chart 1).

**CHART 1**  
ENERGY PRICES AND FARM INPUT COSTS



The soaring energy prices have led to an unexpected surge in farm input costs, especially energy-based inputs. At the beginning of the year, record high, double-digit price gains were expected for fuel and fertilizer.<sup>1</sup> By July, U.S. farm input costs had surpassed expectations, rising 20 percent above year-ago levels. The largest price increases were for fertilizer (derived from natural gas), which more than doubled year-ago levels (Chart 1). Fuel prices also nearly doubled. Seed prices rose 30 percent. And chemical prices went up 12 percent.

### **RIISING INPUT COSTS TRIM PROFITS**

Rising farm input costs have trimmed expectations for crop returns. Since June, the U.S. Department of Agriculture (USDA) has raised its crop production cost forecasts, and farm commodity prices have eased. And, bankers' farm income expectations have retreated from record highs recorded at the beginning of the year.

In general, the high fertilizer, seed, and fuel prices have led to sharp increases in operating costs (Table 1). Total corn, wheat, and soybean production costs rose by 25, 20, and 15 percent, respectively, above 2007 levels.

Fortunately for crop producers, the surging input costs have coincided with record crop price increases. In fact, USDA raised its annual farm level corn price estimate from \$3.50 per bushel in November 2007 to \$6.00 per bushel by June 2008, before declining to \$5.40 per bushel in August 2008. Soybean and wheat prices followed similar paths. As a result, total gross market revenues are expected to rise well above 2007 levels, boosting net returns to production.

Despite higher returns in 2008, the timing of crop price increases and farm input cost gains is reshaping farm income expectations. In the fourth quarter of 2007, crop production costs were expected to rise modestly in the year ahead, and crop prices were expected to retreat from 2007 highs. For example, in November 2007, corn prices were expected to average \$3.50 per bushel in 2008, down from 2007 levels. As a result, at the end of 2007, crop returns were expected to decline. Agricultural bankers responding to Federal Reserve agricultural credit surveys reported expectations of farm incomes softening in 2008.<sup>2</sup>

However, an unexpected surge in crop prices during the first quarter of 2008 boosted crop revenue expectations. In turn, agricultural bankers reported that farm incomes exceeded expectations during the first quarter of 2008. Moreover, they expected farm incomes to remain strong going forward.

But by the end of the second quarter of 2008, energy prices and farm input costs had painted a different picture. Farm income expectations dropped below the historical highs posted in the previous quarter, and high input prices cut income expectations going forward.<sup>3</sup> While revenue forecasts remain well above year-ago levels, they have declined from spring 2008 expectations. For example, assuming November 2007 production costs and spring price expectations held true, 2008 net revenues for corn were projected to reach \$475 per acre (excluding land costs). However, with the higher June 2008 production costs and current price expectations, net corn revenues are expected to dip to \$375 per acre, or 21 percent below prior projections. Similar patterns hold for both soybean and wheat production.

Going forward, USDA expects more modest production cost gains, although the gains are still historically high. Corn, soybean, and wheat production costs are expected to rise between 4.5 and 5.0 percent in 2009, well above their historical average. For example, from 1975 to 2005 corn, soybean, and wheat production costs rose 2.5, 2.7, and 3.0 percent per year, respectively. The biggest gains are expected to emerge in seed, fuel, fertilizer, and chemicals. Using USDA trend yield forecasts and production costs, breakeven costs for corn, soybeans, and wheat are expected to edge up in 2009 (Chart 2).

Crop production costs, however, have been rising at a much faster clip. For example, if input costs held steady through the rest of the year, by January 2009 they would remain 15 percent above January 2008 levels. In September, the Food and Agricultural Policy Research Institute (FAPRI) projected that variable costs of production would rise roughly 15 percent in 2009. Assuming 15 percent increases in production costs, breakeven costs for corn, soybeans, and wheat would increase sharply from 2008 levels (Chart 2).

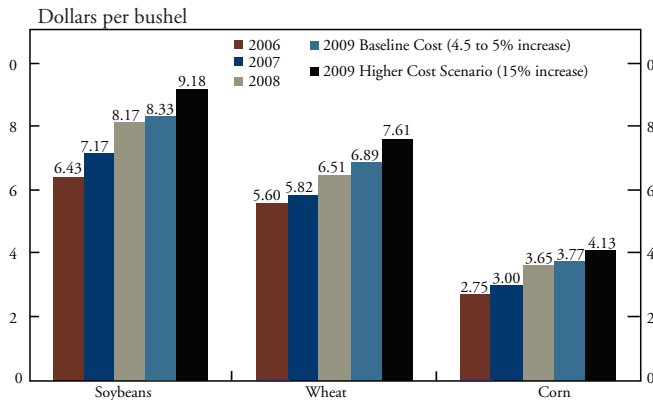
**TABLE 1**  
**U.S. CROP PRODUCTION FORECASTS AND NET RETURNS (DOLLARS PER ACRE)**

	Corn Production			Soybean Production			Wheat Production			
	2006 Actual	2007 Forecast	2008 Forecast	2006 Actual	2007 Forecast	2008 Forecast	2006 Actual	2007 Forecast	2008 Forecast	
Total Costs	409.7	450.5	459.5	274.6	295.4	300.8	216.8	235.7	239.5	283.1
Total Operating (Variable) Costs	206.0	237.7	240.2	96.9	107.0	109.5	85.0	96.6	97.9	133.5
<i>Fertilizer</i>	80.2	101.5	100.0	11.9	15.1	14.8	28.4	36.0	35.5	59.2
<i>Seed</i>	43.6	48.9	50.0	34.1	38.3	39.1	8.5	9.5	9.7	12.0
<i>Fuel, lube, and electricity</i>	28.7	31.8	33.0	15.8	17.5	18.1	17.8	19.7	20.5	29.2
<i>Chemicals</i>	23.6	24.1	25.6	14.2	14.4	15.4	8.8	9.0	9.6	9.6
Repairs	14.5	14.9	15.2	11.6	12.0	12.2	12.4	12.8	13.1	13.1
Custom operations	10.6	11.0	11.3	7.0	7.3	7.5	6.7	7.0	7.2	7.2
Interest on operating capital	4.8	5.4	4.9	2.2	2.4	2.2	2.0	2.2	2.1	2.8
Other variable expenses	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
Total Allocated (Fixed) Costs	203.8	212.7	219.3	177.8	188.4	191.3	131.8	139.1	141.7	149.6
Land Costs	90.8	95.4	97.8	88.3	92.7	95.0	40.9	42.9	44.0	47.2
Total Gross Market Returns	453.3	657.3	535.5	274.6	418.2	371.7	164.9	262.4	247.1	315.4
Price (dollars per bushel)	3.04	4.35	3.50	6.43	10.15	9.00	4.26	6.48	6.10	7.25
Yield (bushels per acre)	149.1	151.1	153.0	42.7	41.2	41.3	38.7	40.5	40.5	43.5
Net Market Returns to Production	43.5	206.8	76.1	-0.1	122.8	70.9	-51.9	26.7	7.5	32.3
Assuming Nov. 2007 costs			377.6			195.5				75.8
Net market returns to land	134.4	302.3	173.8	88.2	215.5	165.9	-11.1	69.6	51.5	79.5
Assuming Nov. 2007 costs			475.3			290.3				119.8

Note: Production cost data obtained from USDA cost and returns forecasts [www.ers.usda.gov/Data/CostsAndReturns/](http://www.ers.usda.gov/Data/CostsAndReturns/)

Price and yield data obtained from USDA, World Agricultural Outlook Board, World Agricultural Supply and Demand Estimates, August 2008

## CHART 2 CORN, SOYBEAN, AND WHEAT BREAK-EVEN COSTS



Source: Calculations based on USDA cost of production forecasts

### RISING COSTS BOOST FARM DEBT

Rising production costs and shrinking profit margins could pose a tough challenge to U.S. farmers: Farm debt could rise as the capital required to grow a crop increases.

At the beginning of a planting season, many farmers take out a farm operating loan to cover the costs of planting and harvesting a crop. The loan is then paid off at the end of harvest season or rolled over into another loan for the next harvesting year. As a result, rising production costs increase the lines of credit that farmers request from farm lenders for operating loans.

In the first half of 2008, the number of farm operating loans made increased sharply. The total volume of non-real estate loans to farmers jumped more than 20 percent above year-ago levels, with both the number of loans and the loan amounts rising sharply.<sup>4</sup> According to Federal Reserve surveys, loan demand was expected to rise sharply in the third quarter as farmers, concerned about rising farm input costs, prepaid costs for fertilizer and other inputs for the 2009 crop (Chart 3). Still, USDA trimmed their interest costs projections, partly reflecting lower farm interest rates.

Such increases in operating loans could boost overall debt levels going forward. At the end of the first quarter, the total number of farm loans outstanding at commercial banks rose 5.2 percent. In the second quarter, the Farm Credit System also reported that production and intermediate-term loans outstanding increased 9.0 percent over December 2007.<sup>5</sup> In addition to larger operating loans, increased capital spending on tractors and

other farm equipment underpinned the rise in farm loan originations. In the second quarter, the volume of non-real estate loans made to farmers for machinery purchases by commercial banks increased 7.4 above 2007 levels.

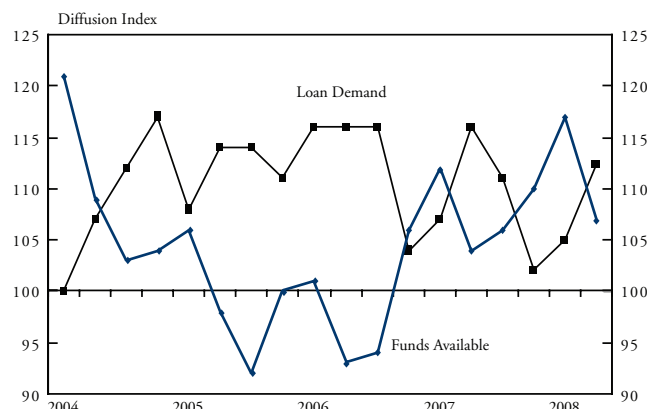
Rising production costs have led to some deterioration in farm credit conditions in the second quarter. After improving over the past two years, farm loan repayment rates dropped sharply in the second quarter, according to the Federal Reserve Bank of Kansas City's agricultural credit survey. Moreover, agricultural bankers also reported the number of loan renewals or extensions on operating loans increased modestly in the second quarter. Agricultural bankers expect loan repayment rates and the number of renewals and extensions to hold steady in the third quarter.

Increased credit demand will boost farm lending opportunities and also increase the funding requirements of farm-related lenders. Agricultural bankers indicated that farm loan demand increased sharply in the second quarter with further increases expected in coming months. As the demand for farm loans increased, agricultural bankers also reported a decline in funds available for farm loans. If loan demand increases further, as expected, agricultural banks may turn increasingly to funding sources beyond bank deposits to meet credit demand.

### THINNER PROFITS SLOW FARMLAND VALUE GAINS

Higher production costs and thinner profit margins could also slow farmland value gains. Farmland values

## CHART 3 FARM LOAN DEMAND AND FUNDS AVAILABLE FOR FARM LOANS



Source: Federal Reserve Bank of Kansas City

are based on the capitalization of expected returns to production. Weaker profit expectations for crop production should slow the rapid acceleration in farmland value gains.

Heading into 2008, farmland values soared with crop prices and farm income expectations. At the end of 2007, U.S. farmland values jumped 8.8 percent nationally, led by robust gains in Midwestern states with large concentrations of crop production.<sup>6</sup> For example, in the Corn Belt, farmland values rose 14.8 percent with 18.8 percent gains reported in the Northern Great Plains. And, Federal Reserve surveys reported that strong farmland values gains persisted through the first quarter of 2008.

In the second quarter of 2008, however, farmland value gains slowed more dramatically than traditional seasonal trends. With reduced profit expectations, farmland price appreciation paused. According to the Federal Reserve Bank of Kansas City, nonirrigated cropland values rose 0.6 percent in the second quarter, well below the 6.9 percent pace of the previous quarter. Irrigated cropland and pastureland gains also slowed dramatically during the second quarter.

The future path of returns to land and farmland values depends on production costs and crop prices. For example, FAPRI projects annual farm corn prices to be roughly \$5.25 per bushel from 2009 through 2013. At this price level, capitalized returns to land from corn production could range from \$6,000 per acre (if production costs excluding land rise 5.5 percent in 2009) to \$3,800 per acre (if production costs rise 30 percent as they did in 2008) (Table 2). Similarly, assuming USDA's baseline production cost increase of 5.5 percent, capitalized returns to land could vary from \$2,300

per acre (if corn prices are \$4.00 per bushel) to \$11,000 per acre (if corn prices are \$7.00 per bushel) (Table 2). Similar patterns emerged when varying production costs and prices for soybean and wheat production.

Has the farm boom reached its peak? Despite record crop prices, rising input costs associated with fertilizer, fuel, seed, and chemicals have trimmed farm income expectations below spring highs. Surging production costs have boosted the capital needs for farmers and raised operating loan demand. The sustainability of the farm boom will depend on future production costs and crop prices. While higher crop prices could sustain record profits, the combination of high input costs and weaker crop prices are a risk to the booming farm economy.

#### ENDNOTES

<sup>1</sup>Food and Agricultural Policy Research Institute's (FAPRI) 2008 agricultural outlook is available at [www.fapri.missouri.edu/outreach/publications/2008/OutlookPub2008.pdf](http://www.fapri.missouri.edu/outreach/publications/2008/OutlookPub2008.pdf).

<sup>2</sup>Federal Reserve agricultural credit surveys are available at [www.kansascityfed.org/agcrsurv/agcrmain.htm](http://www.kansascityfed.org/agcrsurv/agcrmain.htm).

<sup>3</sup>Lower income expectations were also fueled by weakness in the livestock sector. Analysis of farm income expectations by the share of income derived from crop or livestock production revealed that farm income expectations declined in regions with large concentrations of livestock production.

<sup>4</sup>Data on farm loans at commercial banks are reported by the Federal Reserve Board of Governors "Agricultural Finance Databook" Second Quarter 2008. Obtained August 1, 2008, at [www.federalreserve.gov/releases/e15/current/SectionA.htm](http://www.federalreserve.gov/releases/e15/current/SectionA.htm).

<sup>5</sup>Data on farm loans at Farm Credit banks are reported by the Federal Farm Credit Banks Funding Corporation "Quarterly Information Statement – Second Quarter 2008". Obtained August 29, 2008, at [www.farmcredit-ffcb.com/farmcredit/financials/quarterly.jsp](http://www.farmcredit-ffcb.com/farmcredit/financials/quarterly.jsp).

<sup>6</sup>National farmland values were obtained from USDA at [www.ers.usda.gov/Briefing/LandUse/aglandvaluechapter.htm](http://www.ers.usda.gov/Briefing/LandUse/aglandvaluechapter.htm).

**TABLE 2**  
**CAPITALIZED NET RETURNS TO LAND FROM**  
**U.S. CORN PRODUCTION**  
**(DOLLARS PER ACRE-AVERAGE 2009 TO 2013)**

2009 Production Cost Excluding Land Increase (Percent)	Corn Price (Dollars per bushel)		
	\$4.00	\$5.25	\$7.00
5.5% (USDA baseline)	\$2,341	\$5,986	\$11,089
15%	\$1,501	\$5,146	\$10,249
30% (Actual 2008 increase)	\$175	\$3,820	\$8,923

Calculations based on USDA cost of production forecasts for 2007 through 2009 and FAPRI yield projections and production cost gains through 2013. Returns exclude government payments. Returns are capitalized at 5.5 percent rate.