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What are the Risks in Today's Farmland Market?

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Farmland is a bellwether to the financial health of the U.S. farm sector, accounting for 85 percent of U.S. farm assets. Its value is typically based on the expected revenues from agricultural production. Sparked by surging grain prices, U.S. farmland values soared to record highs at the end of 2010. However, the double-digit gains in cropland values outpaced the rise in cash rents. Thus, many observers question the sustainability of such high land values and suggest that other factors, such as low interest rates, are driving current farmland values.

Farmland values often rise with persistently low interest rates and strong crop prices. Low interest rates lift farmland values by reducing the discount on the future income stream produced by the land. In addition, low interest rates depress the value of the dollar, which in turn boosts agricultural exports, raises commodity prices and enhances farm revenues.

Conversely, rising interest rates can reduce farmland values by widening the discount on the value of future income streams. In addition, research has shown that higher interest rates can depress commodity prices, farm revenues and farmland values. Higher interest rates in a strong economy increase the risks of falling farmland values—which in turn could cut farm assets, boost leverage ratios and impair farm balance sheets.

This article takes a closer look at risk in today's farm real estate market. After describing current trends, the article analyzes whether the recent surge in farmland values to record levels is sustainable. The article finds that if interest rates rise to more-normal levels and crop prices swoon, land values could fall, suggesting that farmers could experience a deterioration in their balance sheets.

…"if interest rates rise to more-normal levels and crop prices swoon, land values could fall"…

Farmland Value Trends

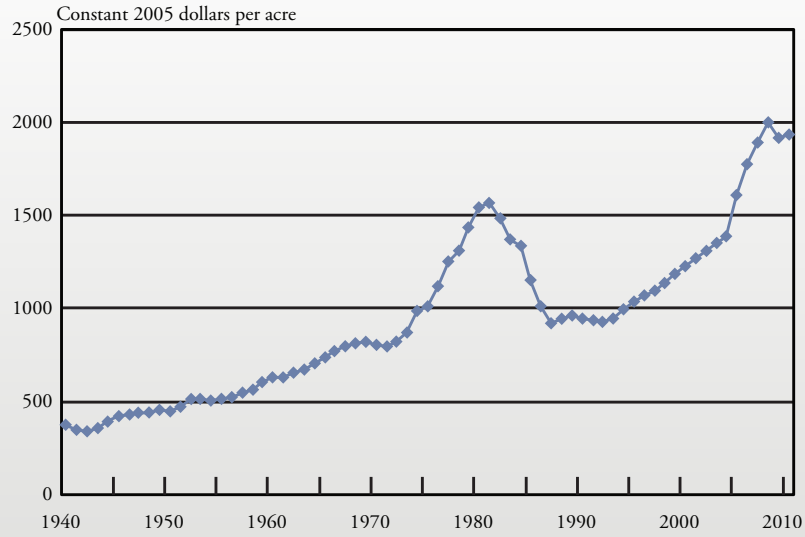
After softening in the recent recession, surging farm revenues fueled a sharp rebound in U.S. farmland values. Since June 2010, U.S. corn and wheat prices have doubled due to strong export demand and tight crop inventories. In response, crop profits have soared to record highs, lifting Midwestern cropland values.

Prior to the recession, farmland values were rising at the fastest clip since the 1970s. After jumping 20 percent in 2005, U.S. farmland values grew 7.5 percent annually from 2005 to 2008 (Chart 1). The recession reversed this trend. Heading into 2009, residential demand for farmland fell, global food demand plunged and crop prices suffered. Although U.S. housing markets remained weak in early 2010, the global economic recovery led to a modest rebound in agricultural commodity prices and land values at the beginning of the year.

In the second half of 2010, crop prices rose unexpectedly with burgeoning exports and tighter crop inventories. Stronger economic activity in emerging countries, especially China, led to stronger-than-expected export activity in 2010, with U.S. grain exports rising roughly 13 percent. At the same time, drought conditions in Russia and wet weather in the United States cut world grain inventories. Consequently, 2010 ended with the combination of strong demand and tight supplies—U.S. grain prices doubled, and crop profits soared.

In response to surging crop prices and profits, gains in Midwestern cropland values quickly accelerated. In the fourth quarter of 2010, Federal Reserve surveys reported that Midwestern cropland values jumped almost 20 percent above year-ago levels (Map 1). The strongest gains emerged in the western Corn Belt, where cropland values rose 18 percent. Other surveys of farmland values reported similar increases, and expectations for further gains continued to build.

Chart 1
Real U.S. Farm Real Estate Values



Source: USDA

With farmland values rising faster than cash rents or revenues from crop production, questions naturally arise about the sustainability of current land prices. According to the U.S. Department of Agriculture (USDA), U.S. cropland values have soared more than 40 percent since 2004, outstripping the 17 percent gains in cash rents. The Federal Reserve Bank of Kansas City reported near the end of 2010 that land values were rising at twice the rate of cash rents.[1] This apparent decoupling of land values and cash rents suggests that other market factors, such as low interest rates, are driving farmland values.

Interest Rates, Farm Revenues and Capitalization Rates

Concerns about the sustainability of farmland prices tend to surface in periods of low interest rates. Farmland values are based on the capitalized value of expected economic returns to farm production, which are shaped by demand and supply forces in the market. Low interest rates boost the capitalized value of farmland in two

ways. First, low interest rates push down the capitalization rate.[2] Second, farm revenues are often higher when interest rates are low.

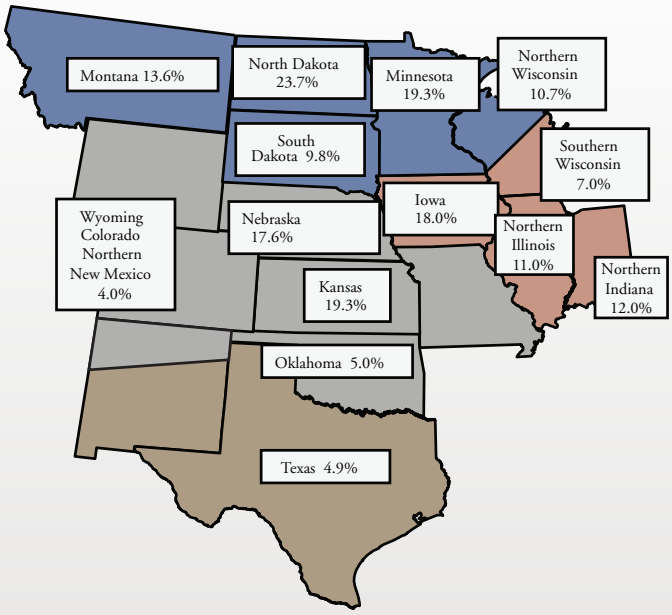
Low interest rates lead to higher farmland values by lowering the discount or capitalization rate. In general, people prefer to have a dollar today over the promise of earning a dollar tomorrow. When compared to the value of current income, future income streams are valued at a discount. The size of the discount depends on interest rates—the investor's required rate of return. Low interest rates shrink the discount on the current value of future income streams. As a result, farmers and other nonfarm investors will bid against one another in agricultural real estate markets for ownership of these future revenue streams, thus capitalizing these future revenues into current farmland values. As interest rates fall, the investor's required rate of return declines, pushing down the discount and capitalization rate, in turn lifting farmland values.

Historically, low long-term interest rates have spurred rising farmland values by lowering the capitalization rate. Since the mid-1990s, after adjusting for inflation, yields on the 10–year U.S. Treasury security, which is a risk-free rate, and the interest rate on farm real estate loans have both trended downward. In fact, since 2000, these interest rates have averaged their lowest level since the 1970s. These lower long-term interest rates have coincided with a decline in the cash rent-to-land value ratio, a proxy for the capitalization rate (Chart 2).

In addition, low interest rates lift farmland values by strengthening farm revenues. Low interest rates place downward pressure on the value of the dollar and make U.S. agricultural products more affordable to foreign consumers, thus boosting the demand for U.S. exports, raising agricultural commodity prices, and lifting farm revenues (Chambers and Just). More recently, research has shown that commodity price inflation responds much more quickly to shifts in monetary policy (Saghaian, et al.).

When short-term interest rates fall, commodity prices rise, in turn boosting farm incomes. Since 1970, real net farm incomes were higher during times of low short-term interest rates, measured by the inflation-adjusted yield on the one-year Treasury security

Map 1
Non-irrigated Cropland Values
(Percent change 2009:Q4 to 2010:Q4)



Source: Federal Reserve District Surveys (Chicago, Minneapolis, Kansas City, Dallas)

(Chart 3). Conversely, real net farm incomes were lower with higher interest rates.[3] The combination of stronger farm revenues and lower capitalization rates sparked the sharp farmland value gains at the end of 2010.

Capitalizing Future Revenues

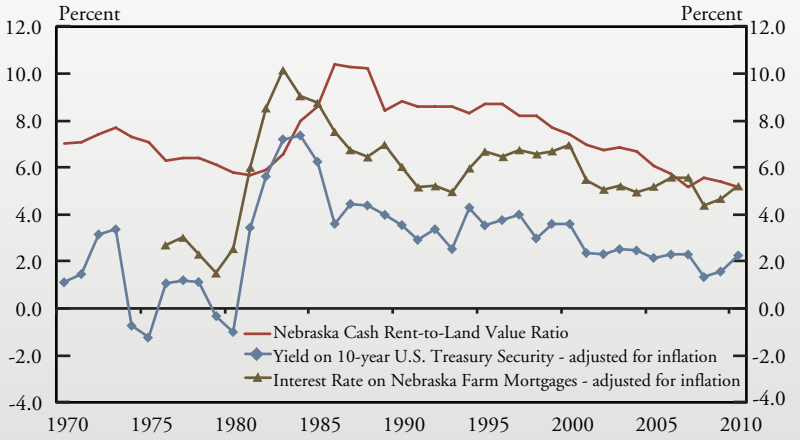
If historical relationships hold true, Midwestern cropland values hinge on farm revenues, interest rates and their relationship with the capitalization rate. Assuming average Midwestern crop yields, various combinations of corn prices and capitalization rates can rationalize current cropland values. However, all of these combinations assume historically high crop prices or historically low capitalization rates, which raise the risk in land markets. With economic models suggesting that today's historically high farm revenues have been capitalized at historically low rates of return, agricultural real estate values could fall sharply if crop prices sag or future interest rates rise.

To illustrate the risk facing farmland values, a straightforward net present value model is used to determine the capitalized value of future crop revenues (Lamb and Henderson). Assuming constant revenues in the future and a constant capitalization rate, cropland values can be determined by:

Cropland values = Future revenues ÷ Capitalization rate. (1)

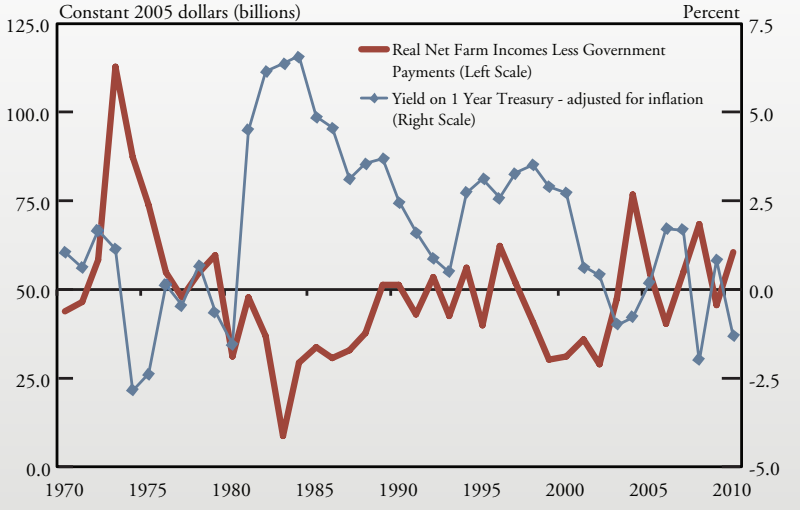
In this model, future revenues are limited to the returns that are

Chart 2
Real Interest Rates and Capitalization Rates



Sources: USDA , Federal Reserve, BLS

Chart 3
Real Interest Rates and Net Farm Incomes

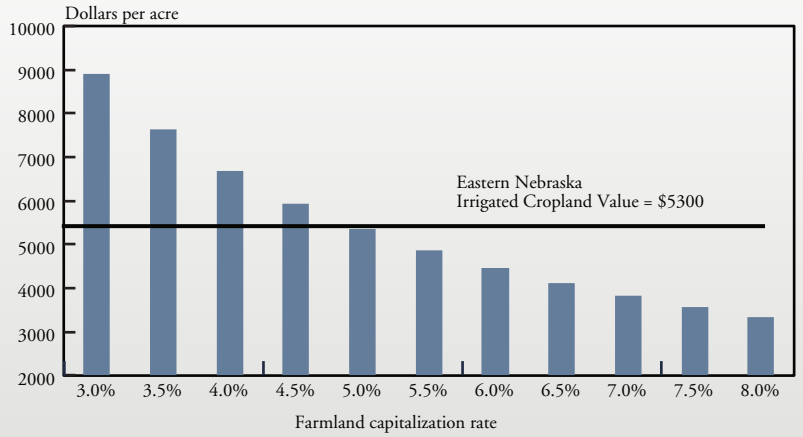


Sources: USDA , Federal Reserve, BLS

reinvested into the land or the amount received by the landowner. While the returns to land vary with farm profitability, the portion of gross revenues allocated to land owners has remained fairly constant over time. Over the past three decades, USDA costs of production data indicate that land owners receive about 25 percent of all gross revenues generated from cropland.[4] Therefore, future revenues can be estimated as a quarter of expected farm revenues, based on expected crop prices and yields. As discussed earlier, capitalization rates can be proxied with historical cash rent-to-land value ratios.

Using equation (1), current farmland values appear to reflect current market conditions. For example, the current average market price for irrigated cropland in eastern Nebraska is estimated to be roughly $5,300 per acre.[5] Assuming an average corn yield of 200 bushels per acre, an average 2010 farm-level corn price of $5.35 per bushel and Nebraska's average 2010 capitalization rate of 5.1 percent, the capitalized cropland value is estimated at roughly $5,300 per acre ($5.35 *200 *0.25 ÷ 0.051 = $5,245).[6] Analyses of farmland values in other regions of the nation produced similar results, also suggesting that current farmland values reflect high farm revenues and low capitalization rates.

Chart 4
Capitalized Revenues on Nebraska Irrigated Cropland at Various Capitalization Rates



Authors' calculations assuming 200 bushels per acre, a corn price of $5.35 per bushel and 25% of gross revenues capitalized into land.

Nevertheless, farmland values face significant risk. If returns on alternative investments rebound, capitalization rates could increase and cut farmland values. For example, with prices remaining constant and capitalization rates rising to their historical average of 7.5 percent, eastern Nebraska's irrigated cropland values could drop by almost a third (Chart 4).

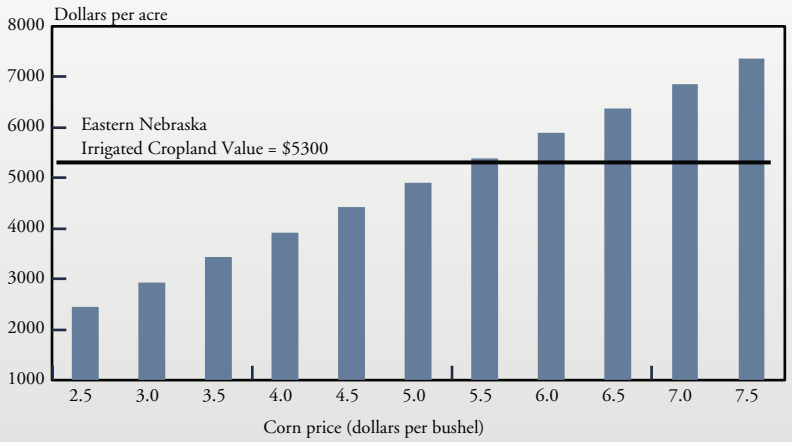
Farmland values could also fall if farm revenues decline. In response to today's current high commodity prices, U.S. farmers are expected to expand their crop production.[7] With larger production, crop inventories are projected to rise, placing downward pressure on crop prices. In fact, by 2013, USDA projects U.S. corn prices to fall to $4.10 per bushel with larger inventories. If these expectations are realized and corn prices fall to $4 per bushel, irrigated cropland values in eastern Nebraska could fall more than 20 percent, even if capitalization rates remain at today's historically low levels (Chart 5).

The worst-case scenario is a combination of higher capitalization rates and falling farm revenues. In 1981, the spike in real interest rates pushed capitalization rates to historic highs. At the same time, high interest rates contributed to higher exchange

rates, lower agricultural exports, falling commodity prices, and cuts in farm revenues. From 1981 to 1987, the combination of higher capitalization rates and falling revenues contributed to a 40 percent decline in real U.S. farmland values, with even larger declines in nominal farmland values.

If similar events occur in today's environment, farmland values could plummet. For example, in eastern Nebraska, if capitalization rates return to their historic average of 7.5 percent and corn prices fall to $4 per bushel, then irrigated cropland values could fall nearly 50 percent to about $2,600 per acre. Other regions face similar risks.

Chart 5
Capitalized Revenues on Eastern Nebraska Irrigated Cropland at Various Corn Prices



Authors' calculations assuming 200 bushels per acre, a 5.1% capitalization rate and 25% of gross revenues capitalized into land.

Summary

Farmland values soared at the end of 2010. Strong demand and tight supplies fueled a spike in U.S. crop prices, while low interest rates contributed to both lower capitalization rates and higher commodity prices. Across much of the Midwest, rising farmland values have outstripped the increases in cash rents, raising questions about the sustainability of current values.

In the long-term, future farm revenue expectations and interest rates should determine farmland values. Today, the interest rate risk to farmland values is high. Record high farmland values are based on expectations of interest rates remaining low for an extended period. As the economy strengthens, however, interest rates could rise, which may lift capitalization rates and lower farm revenues. Events such as these could become a recipe for falling land values and the erosion of farm wealth.

"In the long-term, future farm revenue expectations and interest rates should determine farmland values."

Endnotes

[1]Brian Briggeman and Maria Akers. 2010. "Farmland Values Climb and Credit Conditions Improve" Survey of Tenth District Agricultural Credit Conditions, Federal Reserve Bank of Kansas City, Third Quarter, *http://www.kansascityfed.org/publicat/research/indicatorsdata/agcredit/AGCR3Q10.pdf*

[2]For more information on capitalization rates and farmland values see Jason Henderson. 2009. "Will High Farmland Values Hold?" Main Street Economist. Federal Reserve Bank of Kansas City, Issue VI, *http://www.kansascityfed.org/publicat/mse/MSE_0609.pdf*

[3]In a regression of current and lagged values, 1-year treasury yields adjusted for inflation were found to be negatively and significantly correlated with contemporaneous real net farm incomes.

[4]In the costs of production data, cash rent is the amount of revenues returned to the land owner.

[5]In February 2010, irrigated cropland values in eastern Nebraska were reported to be almost $4900 per acre. Assuming 10 percent gains in land values as reported by Federal Reserve Bank surveys, irrigated cropland values would be $5380 per acre.

[6]Nebraska corn yields from irrigated production were obtained from the USDA. Farm level corn prices were the average 2010 U.S. price obtained from USDA World Agricultural Supply and Demand Estimate (WASDE).

[7]Crop production and price information obtained from USDA's Agricultural Projections to 2020 *www.ers.usda.gov/Briefing/Baseline/*

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