The Feed

Farmer Mac's Quarterly Perspective on Agriculture

Summer | Fall 2017



FINANCING RURAL AMERICA

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ABOUT THE FEED

The Feed is a quarterly economic outlook for current events and market conditions within agriculture. The report is broad-based, covers multiple regions and commodities and incorporates data and analysis from numerous sources to present a mosaic of the leading industry information, with a focus on the latest information from the United States Department of Agriculture and their Economic Research Service. There are several regularly included sections like weather and major industry segments, but the authors rotate through other industries and topics as they become relevant in the seasonal agricultural cycle. Where the report adds value to readers is through its unique synthesis of these multiple sources into a single succinct report. Please enjoy.

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A MESSAGE FROM CURT COVINGTON

Across the Midwest, the corn and soybean harvest will soon be in full swing. The season brings with it another year of uncertainty and stress. Will it be another better than average production year for farmers? How will the markets react to more grain on the market? How will a lender take the news? Can a farm absorb another year of losses?

Uncertainty can cause that voice in everyone's head to say some crazy things, and it breeds different reactions, different strategies, and different results in all of us. The problem is that uncertainty is often viewed in a binary fashion—known versus the unknown, good or bad, right or wrong, left or right. There seems to be nothing in between. Even the best farm managers can become paralyzed in the face of uncertainty, choosing to do nothing because they cannot see the curves in the risky road ahead. Yet, experience tells us that there are almost always "degrees" of the unknown.

When the 2017 harvest is over and all the beans are counted, it will be time, once again, to take a full review of the crop year just completed. It might also be a good time for a producer to inventory the strengths, weaknesses, opportunities, and threats to the operation through a SWOT analysis, considering the degrees of uncertainty that lie ahead.

A SWOT analysis allows a business to take a holistic look at its internal strengths and weaknesses measured against external opportunities and threats. It also takes the focus off the problems and instead allows producers to compartmentalize those things that can be controlled (organizational strengths and weaknesses) in defense of the things that cannot (market place opportunities and threats). For example, a producer may view his financial position, crop marketing strategy, or cost efficiency as a strength that combats the threat of continued lower crop prices in the future. Likewise, those same strengths may provide an attractive opportunity to grow the business in the face of tough times while others cannot. In the same context, identifying weaknesses in the business, such as poor logistics management, low levels of liquidity, or aging equipment may be uncomfortable, but it is core to fending off threats. Ignoring weaknesses in business is not uncommon. After all, who wants to admit they have problems in the organization other than the <u>BEST</u> managers?

In the end, uncertainty does not have to paralyze a farmer or his business. Business planning tools like SWOT analyses give managers a playbook in the face of ever-changing market forces. And as Dwight D. Eisenhower famously put it, "Plans are worthless, but planning is everything."





SPECIAL REPORT: AGRICULTURE IS THE THIRD A IN 'NAFTA' (resource 1, 2, 3, 4, 5, 6)

By Jackson Takach and Ryan Kuhns (Farmer Mac)

Key Highlights

Agricultural trade between the U.S., Canada, and Mexico has tripled since NAFTA went into effect in 1994.

Farmers, ranchers, and processors in most major ag-producing regions have seen growth in market access because of NAFTA.

Renegotiations and any subsequent changes won't take effect until at least mid-2018, but most industry groups are promoting a "do no harm" agenda.

BACKGROUND. Seeking to extend the trade-liberalizing Canada-United States Trade Agreement (CUSTA) to Mexico, the North American Free Trade Agreement (NAFTA) establishes an enhanced trading relationship between the United States, Canada, and Mexico. NAFTA contains many agricultural provisions, including trading rules such as tariff and quota elimination, specific disciplines for the adoption of scientifically-based sanitary and phytosanitary measures, origin rules prohibiting the pass-through of goods from non-participating countries, prohibition of export subsidies in Canada-U.S. trade, and standards for grade and quality of certain agricultural products. Following NAFTA's January 1, 1994 implementation, U.S. farmers and ranchers have benefited from the growth in markets that NAFTA has provided, and U.S. consumers have benefited from a greater and cheaper year-round selection at the grocery store.

As Figure 1 details, inflation-adjusted total ag trade between the U.S. and its NAFTA partners has more than tripled between 1993 and 2016, while ag exports increased 177 percent during that same period. Nearly 30 percent of all U.S. ag exports are destined for markets in Mexico and Canada, up from 20 percent in the early 1990s. The U.S. also represents a significant market for Canada and Mexico, with 50 and 78 percent of their respective ag exports bound for the United States. Increased trade has typically allowed the U.S. to run a positive ag trade surplus within the trade block. The recent U.S. ag trade deficit within the group is largely the result of lower commodity prices affecting export value – on a weight basis, growth in exports in recent years has far outpaced growth in imports.

Throughout the 2016 presidential cycle, candidates from both political parties adopted isolationist tones and took negative stances on the fairness of trade agreements like NAFTA and the Trans-Pacific Partnership (TPP). On May 18, 2017, U.S. Trade Representative Robert Lighthizer announced the Trump administration's intent to renegotiate NAFTA, starting the clock on a 90-day window for consultation with lawmakers. Beginning August 16, 2017, the U.S. Trade Representative has the authority to open negotiations with Mexico and Canada and to have any resulting deal qualify for an up-or-down vote from Congress.

Figure 1: History of U.S. Agricultural Trade with NAFTA Members



Source: USDA FAS Global Agricultural Trading System Data

Figure 2: Composition of Ag Exports and Imports by Partner



THE 'WHAT AND WHERE' OF NAFTA AG TRADE. While the ag industry has benefitted from NAFTA overall, the rising tide of NAFTA's agricultural trade has not raised all boats equally. NAFTA partners prefer to trade in higher-value goods, such as meats, oils, and other consumer-oriented goods (Figure 2). Canadian consumers have valued U.S.-prepared foods, fresh fruits and vegetables, and snack foods. Corn and soybeans remain the top commodities exported to Mexico, but pork, dairy, beef, and poultry products are all close in value. U.S. consumers have benefited from greater access to fresh fruits and vegetables from Mexico (largely during the winter months when U.S. production is reduced) and canola oil and snack foods from Canada. Accordingly, most bulk and intermediate agricultural producers in the U.S. have largely avoided any crowding out from NAFTA partners.

U.S. exports to NAFTA partners come from a wide geographic area. Because of the large quantities of fresh fruits, vegetables, and nuts exported — and due to their geographic advantages for shipping — producers in California, Florida, and Washington benefit tremendously from the increased market access. However, landlocked producers throughout the Midwest also benefit by sending corn, soybeans, beef, pork, and wheat to Mexico and Canada, making NAFTA a topic of interest to numerous farmers and ranchers across the country (see Figure 3). Politically, the breadth of the geographic regions from which exports originate also help keep agricultural interests at the table during trade agreement negotiations by demonstrating the broad scope of the economic impact of agricultural trade.

WHAT'S NEXT? NAFTA is an important trade pact for U.S. agriculture, and the recent uncertainty surrounding its future has many industry trade associations mobilizing. At a three-day hearing in Washington this past June, representatives from several agricultural trade associations testified to the Trade Policy Staff Committee. Lines were well-divided among the beneficiaries of liberalized trade (such as grain growers, livestock processors, and grocers) and those who feel the pinch of increased competition (such as fresh fruit and vegetable growers and the dairy industry). Regardless of their initial position, all hearing panelists cited room to improve the agreement through modernization. Ironically, many of the measures cited were included in the most recent versions of the TPP, an agreement from which President Trump withdrew the United States in early 2017. Common calls for improvements include better market access (primarily for Canadian dairy, poultry, and egg markets), improving sanitary and phytosanitary requirements above those required by the World Trade Organization, streamlined dispute resolution processes, and exclusion of geographical indications. Most of these topics drew attention in the lengthy "Summary of Objectives for the NAFTA Renegotiation" published by the Office of the United States Trade Representative on July 17, 2017.

Like most things in Washington, the renegotiation of NAFTA is not likely to unfold quickly. Formal trade negotiations with Mexico and Canada began on August 16, 2017, and these talks could continue for months. The Trade Priorities and Accountability Act of 2015 requires any agreement be reported to Congress 180 days prior to it being signed. There is then an analysis period followed by a 90-day maximum waiting period for the agreement to be ratified by Congress. For now, the ag industry will have to remain in suspense. Hopefully, good things will come to those who wait.

Figure 3: Index of Recent Agricultural Exports to NAFTA Members by State of Origin



LAND VALUE UPDATE

(resource 7, 8, 9, 10)

Figure 4: Percentage Change in Crop Land, Pasture Land, and Farm Real Estate Values from 2016 - 2017

Key Highlights

The USDA Land Value Survey indicates farm real estate values rose 2.3 percent nationally.

The increase was driven by rising building values rather than increases in the value of land.

Many Midwestern states are still showing declining land values, but the pace appears to be moderating.





Source: USDA June Area Land Value Survey

According to new data from the USDA National Agricultural Statistics Service, the average per-acre value of U.S. farm real estate has rebounded from last year's decline. The data show that year-over-year farm real estate (including buildings) values rose 2.3 percent from June 2016 to a record \$3,080 per acre in June 2017. Coming off only the second decline in the national average farm real estate value in the last 30 years, and the USDA predicting a fourth straight year of lower farm income, many agricultural industry participants had expected farm real estate values to decline. To many, these increases may therefore come as a surprise.

Rather than reflecting a rebound in farm profitability, the increases are primarily due to the rising value of farm buildings. The national average price per acre of cropland is unchanged, while the price of pasture land was up 1.5 percent in 2017 (Figure 4). Accordingly, the 2.3 percent overall increase in U.S. farm real estate values largely reflects the rising value of farm buildings. Over the last year, farmland values have risen most quickly in the Pacific (CA, OR, WA), Southern Plains (OK, TX), and Southeast (AL, FL, GA, SC) regions. Each of these regions has also seen farm real estate appreciate quicker than crop or pasture land, again signaling the impact of rising building values.

Under the capitalization model, farmland prices reflect the present value of the future income stream attributable to the land. Accordingly, farmland values are determined by two fundamental levers: income growth and the required rate of return (or discounting interest rate). As ag economists, we often focus on changes in the farm component of these cash flows. However, extensive research has recognized the importance of off-farm factors in supporting farmland values. Factors like recreational income, proximity to ethanol plants, urban influence, and the macroeconomy have all been linked to higher valued farm real estate. The importance of rising farm building values in driving farm real estate appreciation over the last year suggests these non-ag factors played an important role. In particular, the strengthening U.S. economy may have helped lift farm real estate values by placing upward pressure on the value of farm dwellings. The most recent Wall Street Journal Economic Survey predicts the economy should grow by at least two percent over the next several years, while unemployment should stay at historically low levels. If realized, this could result in further upward pressure on land values.

The macroeconomy will also impact farmland values by influencing the pace of future interest rate changes. In theory, rising interest rates would mean that future cash flows will be more heavily discounted, reducing the value of farmland. Higher interest rates also make borrowing to acquire farmland less attractive, all else equal, which could negatively impact demand for land. However, increases in the Federal Reserve's policy rate have been unrushed to date. As we discuss in this issue, the market expects the pace of future increases to be somewhat slower, with the probability of another rate increase this year at less than fifty percent. Longer-term rates like the 10-year U.S. Treasury yield, which are more reflective of farm borrowing costs, have also been relatively slow to increase in response to the Fed's actions.

Of course, the returns from farming the land remain important. Even though farm real estate values increased elsewhere in the country, the price of farmland in many Midwestern states has continued to decline (Figure 5). Over the last few years, U.S. farm real estate values have declined in many areas of the Corn Belt and Northern Plains, as commodity prices and sticky input costs have weighed on farm sector profitability. Throughout 2017, however, data points from Federal Reserve banker surveys, university surveys, and transaction-based price indices all began to suggest that the decline in value in the Midwestern farm real estate market was slowing. The new USDA data are largely in agreement with this suggestion. Compared to last year, declines are somewhat less widespread and tend to be smaller in magnitude, with South Dakota's 3 percent decline being the largest in 2017. States that have seen large declines in recent years, including Kansas and Nebraska, also saw farm real estate values decline in 2017, but at a slower rate than in past years. Meanwhile, Iowa farmland values rebounded, gaining 1.9 percent after declining by the same percentage last year.

Although the new data suggest that the farm real estate market may be stabilizing, memories of past downturns

likely linger in many industry participants' minds. The question everyone wants answered is: "Where do values go from here?" The Purdue University and CME Group Ag Economy Barometer suggests that producers still have concerns about profitability. Banker surveys also indicate that lenders throughout the country are still reporting lower farm incomes. At the same time, the Ag Barometer data show that optimism about the state of the ag economy has improved since last year, and that fewer producers expect profitability and land values to diminish further. Likewise, banker surveys also show that fewer lenders expect farmland prices to fall over the coming year. If their expectations play out, we may look back at 2017 as a turning point in the ag economy.



Figure 5: Percentage Change in Farm Real Estate Values from 2016 - 2017

ANALYZING USDA'S FARM INCOME FORECAST ACCURACY (resource 11, 12)

Key Highlights

Forecast precision improves in later forecasts as more data become available to analysts.

The accuracy of net cash income forecasts improves more than net farm income forecasts.

The USDA's August release may provide the best look at the ag economy.

The last issue of The Feed took the first of several looks at the historical accuracy of the USDA's farm income forecasts, finding that the USDA's initial net farm income (NFI) and net cash income (NCI) projections tend to under-predict actual income. As economic information unfolds during the year, the USDA's forecasters should have a better picture of the agricultural economy that, hypothetically, should increase forecast accuracy later in the year. This article will focus on how the accuracy of the USDA's NFI and NCI forecasts change over the course of the USDA's forecasting cycle.

When the USDA releases its first forecast of current-year income each February, data on the previous year's actual income levels are not vet known. Farmers' current-year production decisions are also unknown. This combination of unknowns creates greater uncertainty in earlier forecasts than for later ones. Figure 6 shows that the median absolute percentage error (APE) of the USDA's initial NCI and NFI predictions are higher than forecasts made later in the year.





Source: USDA ERS Farm Income Forecasts, Historical

Each August, the USDA releases its first official estimate of the prior year's income level and issues a revised forecast of the current year's income level. Not only do the August forecasts have the benefit of improved clarity on prior income level, but they also have significantly more information on commodity production and pricing. By August, planted crop acreage and in-progress crop quality data can aid in yield projections. Given the additional information, the median APE for NCI and NFI both decline substantially, falling from 13 percent in February to below 6 percent in August. The improvement is greatest for NCI, which saw its median deviation fall to 4.3 percent.

The USDA makes additional forecasts of the current year's income in November and a final forecast in February of the following year. Although more information is available at these later dates - for example, preliminary information on crop harvests, additional data on livestock production, and a few additional months of commodity prices - the median APE for each series is slightly higher in each of these periods than in August (although the differences are not statistically significant).

The dispersion of prediction errors as measured by the spread between the 25th and 75th percentiles also varies by USDA release month and series. The dispersion of NCI forecast errors shrinks throughout the forecasting cycle, while NFI shows increased dispersion for forecasts made as in August before moving back toward initial levels later in the forecasting cycle. Taken in conjunction with the greater improvement in median APE, this indicates that the USDA's forecasts are better at pinpointing a year's NCI level relative to NFI. Interestingly, all the improvement in forecast accuracy for either series occurs by the time the August projections are released. Therefore, the USDA's August forecasts may provide us with the best look at the state of this year's ag economy.

INTEREST RATE OUTLOOK

(resource 10, 13)

Key Highlights

The Federal Open Market Committee of the Federal Reserve has raised rates three times in the last 12 months but is likely to pause in 2017.

Long-term real estate rates moved up significantly in early 2017 but have reversed to give producers another opportunity to lock in low rates for a long time horizon.

Future Fed activity may target long-term rates more than short-term rates.

Heading into 2017, the conventional wisdom surrounding interest rates seemed to be that they will go only one direction: up. Following the 2016 election cycle, yields on 10-year U.S. Treasury bonds jumped from 1.88 percent on election day to 2.60 percent just one month later. The Federal Open Market Committee (FOMC) resumed monetary tightening in December 2016, and they have raised the target federal funds rate three times since the 2016 election. During this same timeframe, the 3-month London Interbank Offered Rate (an often-used financing index for floating rate loans), has increased by 0.45 percentage points, a more than 50 percent increase.

However, by the second and third quarters of 2017, the dynamics changed. Economists' expectations for growth in the U.S. economy weakened, global growth prospects began to look rosier, and the outlook for inflation dropped off. Fixed income investors sensed a turn in sentiment, and the 10-year U.S. Treasury yield fell from its March peak to settle at around 2.30 percent by August. Short-term rates continued to march upward, but the FOMC softened its message considerably in June. As of early August, the

market was pricing in a 43 percent probability of one more rate hike in 2017, and that percentage is trending downward. Given the low levels of realized inflation, the FOMC is more likely to focus the remainder of 2017 on unwinding the Fed's balance sheet rather than on rate tightening. Because the Fed's balance sheet contains a significant amount of long-dated U.S. Treasury bonds and mortgage-backed securities, a decline in rollovers or a sale of assets would likely put upward pressure on long-term market interest rates.

These trends have some important implications for farmers and ranchers. First, interest rates on operating line renewals are likely to tick higher in 2018. Historically, operating loan rates have averaged Federal Funds rate plus 3.75 percent. Holding the current Federal Funds rate constant through the end of 2017, the historical

relationship implies an average operating loan rate of 4.75 percent in 2018, or about a 20 percent increase in operating interest expense. Second, real estate financing rates have paused in 2017, giving farmers and ranchers yet another chance to lock in low interest rates for decades into the future. Figure 7 shows the approximate note rates a typical borrower may have received at three historical points in time based on Farmer Mac's internal data and assumptions related to Farmer Mac's various product offerings. While long-term rates moved significantly between August 2016 and February 2017, they retreated during the second quarter 2017. The decline may be only a fraction of the likely increase in operating rates, but the expense savings could be substantial over the life of a loan. Producers should not expect this hiatus to last forever - a shrinking Federal Reserve balance sheet could end the party before it begins.

Figure 7: Trends in Market Rates for Agricultural Real Estate Mortgage Loan Yield Curves



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(resource 14, 15)

Key Highlights

Drought conditions persist in the upper Midwest.

Favorable growing and harvest conditions look probable for much of the Corn Belt.

Throughout much of the remainder of the country, typical weather conditions are anticipated.

Over the summer, crop conditions throughout much of the Midwest have remained favorable, with crop progress and quality close to average. One exception to this trend is the corridor from Nebraska through the Dakotas, as unusually hot and dry weather has adversely affected crops in this region. Looking ahead into the fall harvest season, conditions are likely to remain favorable for the final development of the crop as well as harvest, though drier than normal conditions are likely to persist in the Dakotas and Montana.

The El Niño that was developing during the spring has petered out, and a more neutral condition is setting up for the fall. Impacts from this change would trend toward more seasonal amounts of precipitation throughout the southern portion of the country. Throughout the West, typical dryness will continue until the rainy season begins in the middle to late fall. At the beginning of August, most Western states had above-average reservoir storage levels, so water availability is likely to be good heading into the start of the rainy season.









WEATHER



(resource 16, 17, 18, 19)

Key Highlights

California almond acreage continues to increase, and this has led to growing production.

Global and domestic demand remains high, but almond stocks have increased.

Export volume has been strong, and the recent weakening of the U.S. dollar could push it higher.

August marks the start of the 2017 almond marketing year. California's almond producers, who grow more than 75 percent of the world's almonds, are expected to have plenty of trees ready for shaking this year. The number of almond-bearing acres in California has increased by nearly 50 percent in the last decade, reaching a record high of 940,000 acres in the 2016 marketing year (see Figure 10). Based on the National Agricultural Statistics Service's (NASS) latest forecast for the 2017 harvest, almondbearing acreage is predicted to increase another 6 percent this year. If this forecast is realized, bearing acreage will reach the one-million-acre mark for the first time. Given the projected growth in acreage, production is predicted to hit a record 2.25 billion pounds.

The recent growth in bearing-almond acreage and almond production is also likely to continue for at least the next several years. Nonbearing-almond acres – the acreage associated with trees three years or younger that are not yet ready for commercial harvest – have increased every year since 2012 and hit record levels in each of the last three years (Figure 10). As the trees on these acres mature, California almond production should continue to grow. In 2014, the average crop marketing year price for almonds reached a record \$4.00 per pound on the strength of increasing domestic per capita consumption, healthy foreign demand, and lower yields. Since then, almond prices have trended lower as acreage has increased, yields have rebounded, and year-end stocks have grown to near record levels. Recently released 2016 crop marketing year data show a price of \$2.44 per pound. Data from the Bureau of Labor Statistics Producer Price Index for Almonds show lower prices so far in 2017, despite an uptick in export demand.

With a record harvest projected, this trend could continue even if demand remains strong. Reports from the University of California, Davis's extension program indicate that the typical operating costs per pound of almonds can range from \$0.72 to \$2.05, depending on the farm's location, production practices, and yields. Therefore, the industry will be keenly watching how prices evolve over the 2017 marketing year. If the trend of lower prices continues toward the low \$2 range, some producers could begin to struggle to cover operating costs.

Two-thirds of the almond crop is typically exported. Therefore, exchange rates can play a key role in the level of foreign demand. The increase in almond prices in 2014 coincided with a strengthening of the U.S. dollar, which made almonds even more expensive for foreign buyers. Despite the strong dollar continuing through most of the 2016 marketing year, year-to-date almond exports have been higher for most major export regions. The USDA is also projecting the tree nut-specific real exchange rate to weaken over the remainder of the year, which could further spur demand.

Figure 10: California Bearing and Non-Bearing Almond Acreage, 1995-2016



Source: USDA NASS Almond Data

CORN AND SOYBEANS (resource 19, 20, 21, 22)

Key Highlights

Historically high levels of last year's corn and soybeans remain in bins this June.

Producers reported average crop conditions in July, with growers in North and South Dakota experiencing poor conditions.

Demand is holding up for both corn and soybeans, but there are very few paths that would lead to significant price improvements this fall.

Grain market news continues to be dominated with supplyside stories. The incredible run in U.S. production of corn and soybeans since 2014 has kept supplies steadily growing. All major grain-producing states had June ending stocks well above their five-year historical averages, particularly in Illinois and Iowa (see Figure 11). Three years of bumper crops have left producers with ample stocks this year, and many producers are showing a willingness and ability to hold the crops to wait for better marketing conditions. The amount of grain reported in on-farm storage at the end of June set records in most states. Competition from other exporters has been stiff this year, with excellent corn and soybean crops in Argentina, Brazil, and the Black



Figure 11: Grain Production and June Ending Stocks by State

Source: USDA NASS Quickstats Data

Sea region. Global ending stocks for both commodities are projected to increase in the 2017/18 marketing year, due to the large gains in production in North and South America.

U.S. production expectations are mixed heading into the final weeks of the summer. Farmers planted a record number of soybean acres this spring, and the acres planted to corn and soybeans combined also set a record. The crops have progressed in line with historical averages, but the reported crop conditions have lagged recent experience. Figure 12 displays the difference between the percentage of corn and soybean acres reported in "Excellent" or "Good" condition compared to the five-year average of the Excellent/Good percentage by state. The drought conditions in the Northern Plains have taken a toll on the quality of the corn and soybean crop – the crops in North and South Dakota are running 30 percentage points lower than their five-year average. Nebraska growers are reporting significant deterioration since May as a result of hotter, drier weather in the summer months. Producers in Missouri and Minnesota are reporting the highest quality

crops, with most producers reporting near-average crops. As a comparison, during August 2016, all states were reporting corn and soybean crop qualities more than ten percentage points higher than their five-year averages. July and August are a critical period in the crop growing cycles; if unfavorable weather conditions persist, yields in several of the key grainproducing states could be below-trend this fall.

Demand for corn and soybeans has remained solid throughout the summer months. While the number of grain-consuming animal units has not risen as much as originally projected, ethanol production remains high. Fuel ethanol production through July is up 1 percent over 2016, but ethanol exports through May are up 50 percent, led by Brazil where exports are up 300 percent. Soybean exports to China increased 16 percent by volume in the first half of 2017. South American producers have significant stocks, but they are holding off on sales until currency fluctuations move world prices higher.

When taken together, the supply-and-demand dynamics for both corn and soybeans indicate prices should trade in a fairly narrow band this fall. U.S. growers have ample carryover from 2016 to offset some yield declines in 2017, so a marketmoving supply shock is unlikely for the coming harvest. Furthermore, any increase in price for either grain is likely to spur South American producers and grain traders to take more grain to market, putting a virtual cap on world prices. However, the strong demand for both major grain crops limits the downside for grain prices. There is also a weakening U.S. dollar trend, and that could improve the competitiveness of U.S. grain. The USDA puts the 2017/2018 marketing year corn price between \$2.90 and \$3.70 per bushel and marketing year soybean price between \$8.40 and \$10.40 per bushel. Futures prices in early August would allow U.S. producers to lock in the high-end of those price ranges through the entirety of 2018.



Figure 12: Difference Between Excellent/Good Corn/Soybean Ratings and 5-Year Average by State

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Figure 13: Index of Cattle on Feed 120+ Days Relative to 5-Year Average

Key Highlights

(resource 23, 24, 25)

Cattle and hog production expected to continue expanding in 2017 and 2018, but strong export demand has helped keep prices higher than projected at the beginning of the year.

Fewer cattle on feed for at least 120 days has meant lower weights for marketed cattle, helping to support prices.

Beef exports may not be able to keep up their robust pace with the recent increase in Japan's tariff on frozen beef imports.

The story in the livestock sector remains much the same as last quarter: increasing production but better than expected prices. The U.S. pork and cattle industries are both expected to continue growing into 2018. Strong foreign demand remains a key to each sector being able to market increased production without seeing prices and profitability shift lower.

The pork industry has already seen production expand in the first half of the year, and the USDA's recent industry data suggest producers expect further expansion in the second half of the year. Commercial slaughter is likely to continue near capacity as the industry awaits the opening of several new plants in the last quarters of 2017 and 2018. In the meantime, continued global demand (particularly from Mexico) has been instrumental in helping prices rebound somewhat from 2016's levels, despite rising production.

In the cattle sector, the number of cattle on feed is running 4 percent ahead of last year as of July 1, but the Source: Author's Calculations from National Agricultural Statistics Service Cattle on Feed Data. Previous 5-year average is refers to average for the same month.

number of cattle on feed for more than 120 days is lower than last year. The result has been fewer than expected heavy cattle that are ready for market, and lower overall dressed weights. Accordingly, the USDA's outlook for annual fed steer prices remains \$13.50 above the price expected in January. As we mentioned last quarter, exports (particularly to South Korea and Japan) have been a key driver of additional beef demand and higher prices. However, questions remain about whether U.S. beef can remain competitive, particularly in the Japanese market.

Following rapid year-over-year growth in frozen beef imports, Japan recently triggered a trade mechanism that increases the tariff on these imports. The U.S. and other countries without free trade agreements with Japan will now face a 50 percent tariff (up from 38 percent) on frozen beef exports until March 2018. Meanwhile, Australian beef will continue to face a lower 27.5 percent tariff due to

an existing trade agreement with Japan. If the new tariff hampers demand, U.S. beef that otherwise would have been exported to Japan will need to find a home elsewhere in the global supply chain.

Although the recent revival of beef trade with China has garnered considerable attention, it not likely to result in an immediate demand surge. There have been reports of strong interest in U.S. beef from Chinese buyers, but the agreement requires beef exported from the U.S. to China to be free of added hormones and other additives to promote growth or leanness. Much of the U.S. beef supply is ineligible under these requirements. In many cases, the existing hormone-free beef available for marketing is already contracted to U.S. retail markets, leaving a relatively small quantity available for export. Time will tell if the composition of the U.S. beef supply responds to the potential demand from Chinese consumers.



LIVESTOCK

(resource 26, 27, 28)

Key Highlights

U.S. milk and dairy product supplies continue to increase, but the recent hot weather is expected to reduce milk output per cow.

Despite sluggish growth domestically, global demand has buoyed dairy prices.

World butter prices have risen substantially, leading to potential marketing opportunities for U.S. butter in the coming months.

Growth in the U.S. dairy supply quickened in the second quarter, supported by continuing herd growth and increased output per cow. However, recent increases in output per cow has been more muted. Temperatures in California and other areas throughout the West were much hotter than average in late June and early July. Continued hot weather is expected to dampen herd productivity in these areas. In combination, these factors have led the USDA to lower its forecasts for U.S. milk production. Although the USDA now expects slower growth, milk production is still expected to rise by 1.8 percent in 2017 and another 2.3 percent in 2018.

With U.S. production expected to continue increasing, finding destinations for American dairy products will be key. To date, there have been conflicting signals from domestic and foreign markets. Domestic demand has been modest throughout the year, leading to increasing U.S. nonfat dry milk, cheese, and butter stocks. On the other hand, foreign demand has been robust. Year-to-date dairy exports are up nearly 22 percent from 2016, with growth led by strong global demand for cheese and nonfat dry milk. Demand has been up from most of the U.S.'s major dairy trading partners, but Mexico has been the largest



Source: USDA ERS National Milk Cost of Production Estimates

driver. Mexico has typically represented the largest market for U.S. dairy and has seen the largest annual increase in exports, highlighting the importance of this NAFTA trade partner to the U.S. dairy sector.

While butter stocks have increased in the U.S., foreign butter markets have been much tighter. The result has been high world butter prices, including record levels in Europe, throughout 2017. The mismatch between U.S. and world stocks may lift U.S. exports further in the coming months. In their most recent dairy outlook, the USDA noted that it could take several months for differences between domestic and foreign butter prices to lead to an uptick in exports. Given the recent increase in world butter prices, exports have now looked relatively more attractive for several months, and the U.S. may begin to see export volume pick up later in 2017.

The differences in domestic and foreign dairy demand have had offsetting effects on U.S. milk prices. Rising U.S. stocks have put downward pressure on U.S. prices, leading the USDA to soften most of their dairy price forecasts since the beginning of the year. The good news is prices are expected to remain at or above last year's prices for the major dairy commodities. The USDA currently projects an all-milk price of \$17.80 in 2017 and \$18.50 in 2018. If today's lower feed costs remain at current levels and demand keeps up, producers should be able to book a positive operating margin into next year (see Figure 14). However, things could change quickly if foreign demand backs off or weather impacts this fall's crop harvest more than currently expected, leading feed prices to climb higher.

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ANALYSTS CORNER: FINANCING, TAX, AND PRODUCTIVITY IMPLICATIONS OF FARM MACHINERY INVESTMENT (resource 29, 30, 31)

Key Highlights

Farm machinery is a complex investment, and it is important to understand the whole picture before making large purchases.

Tax deductions, such as those taken under Section 179 of the Internal Revenue Code, are very beneficial, but machine productivity and expected resale value should drive investment decisions.

It is important to consider long-term effects on working capital when making large-scale investment decisions.



Annual Productivity Gain (% of Purchase Price)

Investment decisions have a large impact on a producer's profitability and capacity for growth. One of the most important sets of investment decisions driving the long-term financial health of a producer centers upon machinery. The purchase of machinery triggers three distinct cash flow streams. By aggregating these into a single effective stream, we can evaluate a machinery purchase using the same tools that can be used to evaluate traditional investments. The goal of this article is to highlight the important aspects of a purchase decision and present a framework to compare potential purchases to traditional investments. Poor investment decisions can tie up working capital for long periods of time, can damage liquidity, and can limit a producer's flexibility to respond to stress in the agricultural economy. The first cash flow stream is financing the purchase. This stream includes outflows such as a down payment made upon purchase and a series of loan payments to service the financed amount over a fixed period, followed by the inflow generated by resale of the asset in the future. The second cash flow stream results from the tax effects of the investment, which include the cash savings resulting from any tax deductions afforded by the investment, along with any gains or losses on disposal of the asset. For simplicity's sake, a tax rate of 35 percent is used for calculations in this article. The last cash stream stems from the productivity gain associated with the machine, or how much more a farm can earn with the machine in service versus operating without it. In this article, productivity gains are expressed as annual cash inflows on an after-tax basis and remain constant over the life of the asset.

To begin, we must highlight several key aspects of the U.S. Internal Revenue Code. Of particular importance is the Section 179 deduction. Under this Section, a farmer may deduct the full cost of machinery, up to \$500,000, with the deduction phasing out dollar-for-dollar on purchase prices above \$2,010,000. Next is bonus depreciation, which allows taxpayers to deduct 50 percent of the remaining cost basis immediately after applying Section 179. The remaining cost basis will be depreciated using a depreciation schedule, such as straight-line, doubledeclining balance, or the Modified Accelerated Cost Recovery System (MACRS) schedules. Section 179 and the related bonus depreciation are valuable, giving farmers the ability to drastically reduce or eliminate their tax bill in a given year. However, making purchases for

Figure 15: Machinery Investment IRR by Annual Productivity Gain

the sole purpose of reducing a tax burden can lead to poor investment choices, especially when considering the opportunity cost of other investments such as stocks and bonds. Financial assets are much more liquid than machinery, meaning that they are easier to turn into cash when a producer must respond to a period of stress.

A commonly-used metric to quantify investment performance is the Internal Rate of Return (IRR), calculated by finding the discount rate that sets the present value of an investment's cash flows equal to zero. By calculating the IRR of cash flows expected from a machinery purchase while considering the risk of the project, producers can decide if they would be better off upgrading to a new tractor or putting their money into the financial markets and continuing to operate with current equipment. Cash flows from an investment in machinery are complex, but some simplified examples can illustrate how sensitive the investment's performance is to both productivity and future sale price.

As a base example, reference the data found in the "Machinery Cost Estimates: Tractors" sheet published by farmdoc from the University of Illinois at Urbana-Champaign. In particular, examine the list price, expected purchase price, and expected resale price in 10 years of the 570 Engine HP 4WD Tractor, assumed to be \$453,665, \$385,615, and \$163,319, respectively. Assume that the farmer pays an initial down payment of 20 percent, while financing the remaining amount with a fully amortizing 10-year note at a 4 percent interest rate and exiting the investment through resale in the 10th year.

Under this circumstance, the tractor must produce an after-tax productivity gain each year of \$19,120, or 5 percent of the purchase price, to break even on an IRR basis. Figure 15 shows the IRR profile as a function of annual after-tax productivity (scaled to purchase price); clearly returns are highly sensitive to productivity gains.

This chart illustrates both the disappointing returns of an idle asset and the phenomenal returns of a productive

one. Another key component to the performance of farm machinery as an investment is the final resale price. Holding all assumptions constant, and assuming the breakeven annual after-tax productivity of \$19,120, Figure 16 demonstrates the IRR profile of the investment as a function of resale price (again, scaled to purchase price).

The purpose of this exercise is not to focus on specific numerical results for a single set of assumptions. Rather, it is to highlight the primary drivers of financial performance that producers should consider when purchasing farm machinery. The ability to use the Section 179 deduction and the related bonus depreciation to reduce a tax burden in the current year is a valuable tool. However, the gains in productivity that the machine will be able to provide and the expected future resale price of the machine should drive the investment decision. A machine that sits idle will almost certainly be an unprofitable investment, while the current Internal Revenue Code allows for tremendous returns when the machine can add materially to productivity. Additionally, tying up working capital in illiquid investments can limit a producer's ability to respond to stress in the future. To ensure every dollar goes as far as possible and works hard to keep the operation financially sound, it is important to consider all aspects of the investment decision, and not just the warm and fuzzy feeling of a lighter tax bill next spring.

Figure 16: Machinery Investment by IRR and Resale Value



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