

The Feed

Farmer Mac's Quarterly Perspective on Agriculture

Winter
2016 | 2017

FARMER  **MAC**
FINANCING RURAL AMERICA



Table of Contents

ABOUT THE FEED

.....	
Executive Summary	2
Special: Bank Consolidation	3
Special: South American Grain	5
Policy Update	7
Macroeconomic Outlook	8
Farm Debt and Interest	9
The Midsized Farm	11
Weather.	12
Grain.	13
Cotton and Rice	14
Livestock and Animal Products	15
Resources	17
About the Authors	18

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 author rotates 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.

ABOUT FARMER MAC

Farmer Mac is the stockholder-owned company created to deliver capital and increase lender competition for the benefit of American agriculture and rural communities. For more than a quarter-century, Farmer Mac has been a vital partner in helping America's rural lenders meet the evolving needs of their customers, bringing the financial strength of the nation's premier secondary market for agriculture right to their customers' farms and ranches. Lenders of all sizes use Farmer Mac's broad portfolio of loan products to offer more financial choices to their rural customers, helping them keep pace with today's capital-intensive agricultural industry.


Contacts

To subscribe to The Feed,
please visit:
www.farmermac.com/thefeed

For media inquiries:
Megan Pelaez, Director – Communications
MPelaez@farmermac.com | 202.872.5689

For business inquiries:
Patrick Kerrigan, Director – Business Development
PKerrigan@farmermac.com | 202.872.5560

Follow Farmer Mac:
  [@FarmerMacNews](https://twitter.com/FarmerMacNews)

Follow the author:
 [@JacksonTakach](https://twitter.com/JacksonTakach)

The Feed is a publication produced by the Federal Agricultural Mortgage Corporation ("Farmer Mac"), which distributes this publication directly. The information and opinions contained herein have been compiled or arrived at from sources believed to be reliable, but no representation or warranty, express or implied, by Farmer Mac is made as to the accuracy, completeness, or correctness of the information, opinions, or the sources from which they were derived. The information and opinions contained herein are here for general information purposes only and do not constitute investment or professional advice. Farmer Mac does not assume any liability for any loss, however arising, that may result from the use of or reliance upon any such information or opinions by any person. Such information and opinions are subject to change without notice, and nothing contained in this publication is intended as an offer or solicitation with respect to the purchase or sale of any security, including any Farmer Mac security. This document may not be reproduced, distributed, or published, in whole or in part, for any purposes, without the prior written consent of Farmer Mac. All copyrights are reserved.

EXECUTIVE SUMMARY

Key Highlights

Community banks are declining in number, but most exiting ag banks are purchased by other, expanding ag banks.

After a down year in 2016, corn and soybean production in South America looks to rebound in 2017. Weather remains the biggest source of uncertainty in projections.

Debt-to-earnings and interest expense-to-earnings are climbing for the ag sector. Current and projected levels are still far below levels experienced in the 1980s.

Record corn, soybean, and wheat yields helped contribute to an excess of grain stocks this winter. Prices are at multi-year lows, although soybeans have held up better on strong demand from China.

Beef, pork, and poultry prices are down as a result of abundant supplies, but dairy prices are holding due to strong export demand and durable cheese demand.

- More than 10,000 community banks have exited banking through failure, mergers, and acquisitions since 1984. Exiting ag banks tend to be small with a limited number of employees, and banks acquiring ag banks tend to be about four times larger than the banks they acquire. The clear majority of acquisitions of ag banks were by other community ag banks.
- Crop production in Brazil and Argentina looks to bounce back in 2017. Brazil's soybean crop looks to set records in 2017, giving greater competition to U.S. producers in the world markets. An

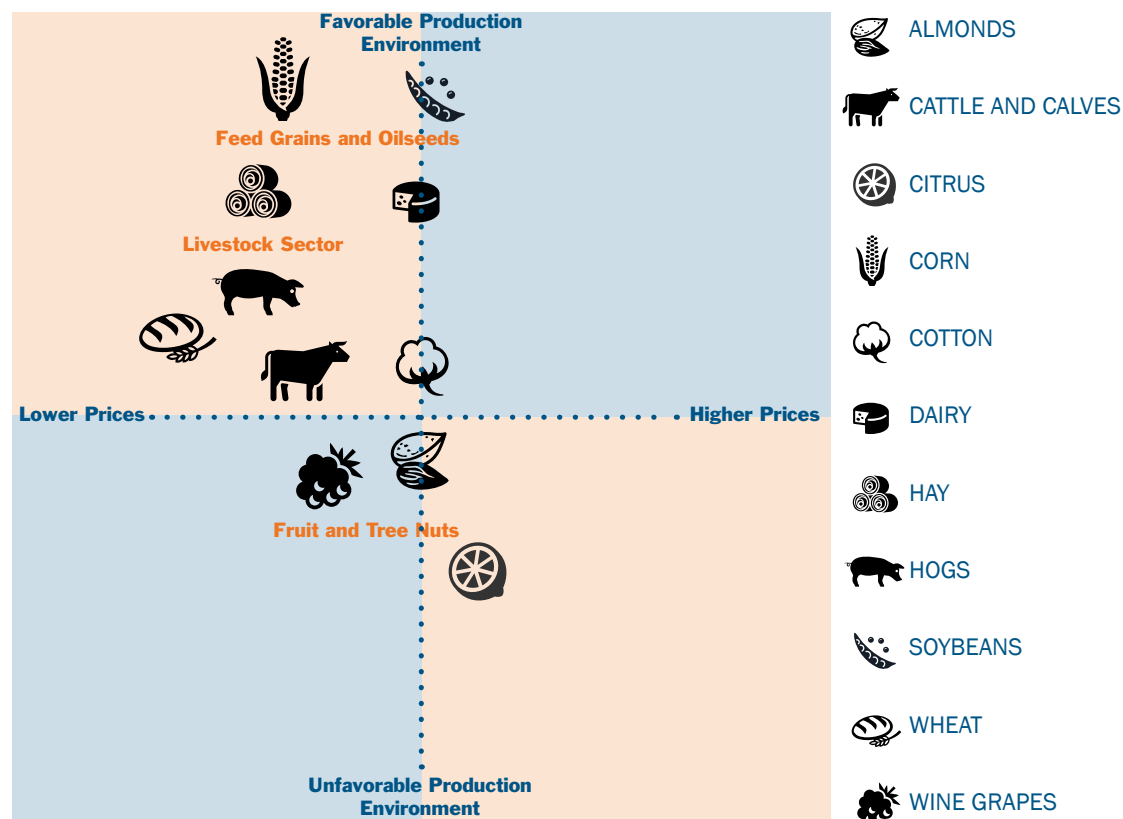
expansion in planted corn acreage in Argentina will likely lead to a bumper corn crop and increased exports.

- The U.S. President's positions will likely have mixed effects for U.S. agriculture, but many are thought to be beneficial for the production sector.
- Markets are expecting two additional interest rate hikes in 2017, which would put the expected average farm operating interest rate between 5.2 and 5.7 percent by the end of 2017.
- It would take a debt-load increase of more than 10 percent, combined with a rate increase of more than 300 basis points and an income decline of more than 50 percent, to shock the interest-to-earnings ratio in 2017 to 1980 peaks.
- While the number of mid-sized farms is declining, these operations had the highest probability of remaining in

farming and the highest probability of either expanding or contracting within a five-year window.

- There has been a dramatic improvement in drought conditions throughout California, and conditions in the Midwest are shaping up for a favorable spring plant.
- Large corn, soybean, and wheat crops have driven ending supplies higher and kept downward pressure on market prices.
- Lower retail prices have put downward pressure on profitability in the cattle industry, but market equilibrium may be in sight. Milk prices are up due to greater consumer demand for cheese.
- A record U.S. rice crop in 2016 has contributed to lower prices, but strong global demand should provide a backstop for further drops. Cotton prices stabilized in 2016 due to weather disruptions in global production.

Production and Market Price Perceptual Map



SPECIAL REPORT: CONSOLIDATION IN COMMUNITY BANKS AND AGRICULTURAL LENDING

(resource 1,2,3,4)

By Brittany Kleinpaste (Director of Economic and Policy Research with the ABA), Ryan Kuhns, and Jackson Takach

Key Highlights

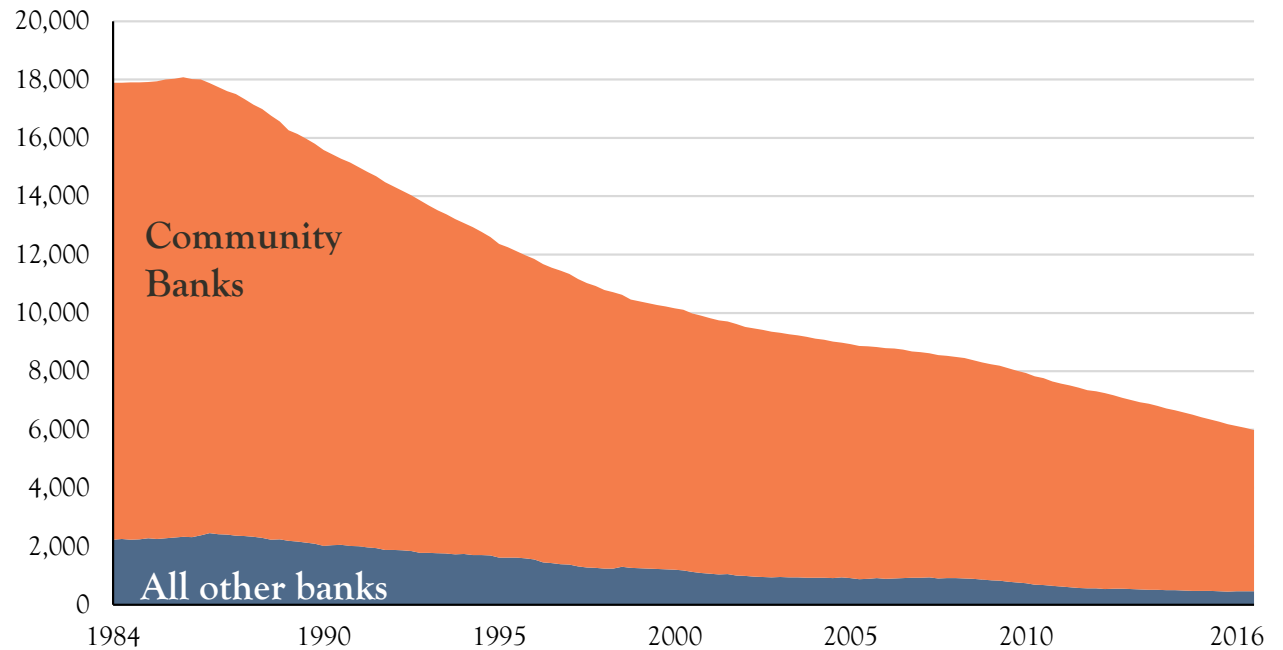
More than 10,000 community banks have exited banking through failure, mergers, and acquisitions since 1984.

Exiting ag banks tend to be small with a limited number of employees, and banks acquiring ag banks tend to be about four times larger than the banks they acquire.

The clear majority of acquisitions of ag banks were by other community ag banks.

Figure 1: Number of Banks by Community, Non-Community Status

Figure 1: Number of Banks by Community, Non-Community Status



Source: Authors' calculations using FDIC, Historical Community Banking Reference Data.

THE DISAPPEARING COMMUNITY BANK. The Federal Deposit Insurance Corporation (FDIC) defines a “community bank” as one that provides traditional financial services to their local communities, with a focus on relationship rather than transactional banking. Through their emphasis on relationship banking, these banks are particularly important to small businesses in the community who rely on the bank for loans. This is especially true in rural America, where community banks are economic engines providing a source of credit to both agricultural and non-agricultural businesses, and are important employers.

Although quarterly aggregate data representing the performance of community banks has recently been relatively positive (indicative of surviving community banks), community banks are disappearing at an astonishing rate. In the mid-to-late 1980s, there were roughly 15,000 community banks providing financial services to their local communities. Thirty years later, there are only one-third as many community banks, many of which have total assets less than \$100 million. The pace of consolidation has increased since the Dodd-Frank Act was enacted in July 2010 from 173 mergers per year to 273 - a 54 percent increase. In the past six years alone,

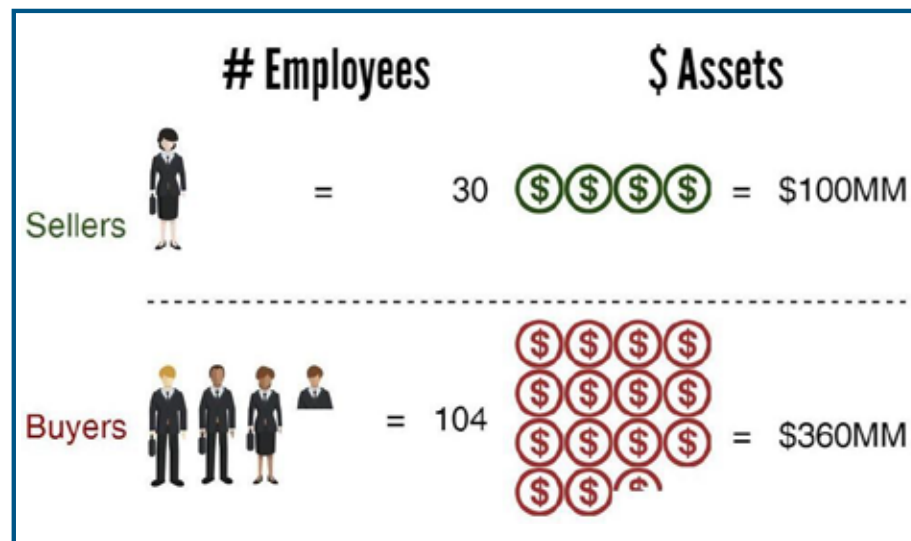
over 1,000 (43 percent) banks with assets less than \$100 million have exited the market, the clear majority of them through mergers and acquisitions.

While bank consolidation occurs because of the interplay of complex factors, rising costs - at least partially due to regulation - and efficient use of capital likely contribute. In particular, high compliance costs, greater capital requirements, and restrictions on products such as mortgages, have led to a rapid and accelerating pace of consolidation within the industry. The median community bank has limited resources with 41 employees and around

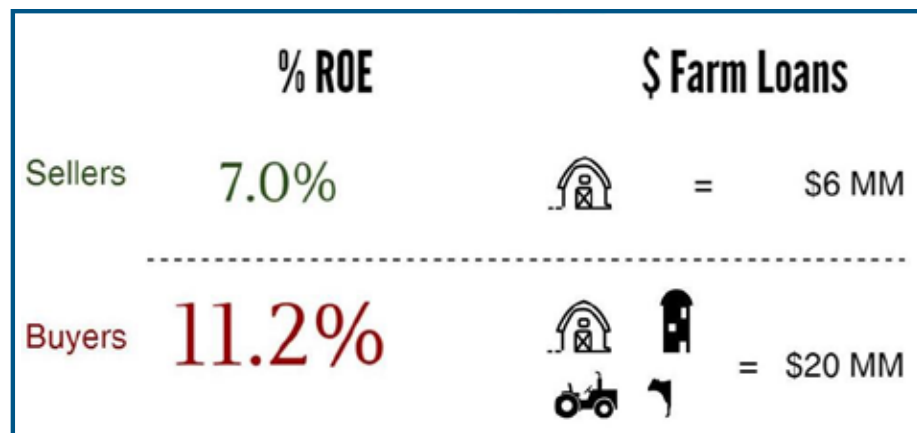
\$188 million in assets. The median asset size of banks being targeted for purchase in 2015 was \$151 million. Over 80 percent of the banks targeted in 2015 had assets totaling \$500 million or less. On the other side of the transaction, the median asset size of banks acquiring other banking institutions in 2015 was \$868 million. Many of these transactions are community banks merging with other community banks to survive a challenging economic landscape. And the trend is showing no signs of slowing: 46 percent of banks responded in a Bank Director's 2017 Bank M&A Survey sponsored by Crowe Horwath LLP that their community banks were planning to purchase a healthy bank in the next 12 months.

AG BANK DEPARTURE DYNAMICS. The authors analyzed ag-related bank exits (“Sellers”) between 2014 and mid-2016 in 40 different states, more than 90 percent of them through acquisition or merger rather than economic failure. It probably comes as little surprise that ag banks that sold or merged tended to be relatively small. The Sellers had a median asset size of around \$100 million, employing an average of just 30 employees. Over 90 percent of these institutions were profitable in the last three years leading up to their exit, with a median return on equity (ROE) of 7.0 percent per year. Finally, the average total farm loan portfolio was somewhat low at a median of \$6 million, but the median ag concentration ratio (i.e., farm loans divided by tier-one capital) was roughly 70 percent.

Similarly, the research includes a look at exactly who acquired exiting ag institutions (“Buyers”). In general, acquirers and surviving entities of ag bank exits were about four times the size of their targets. For Buyers, the median number of employees stood at over 104, while median assets totaled \$360 million. ROE tended to be higher as



well, driven primarily by a lower tier-one capital ratio (i.e., higher efficiency). Buyers also have a larger agricultural loan portfolio, at a median value of \$20 million per institution as well as a comparable ag concentration ratio at a median of 55 percent. Along the same lines, over 95 percent of these institutions are now or were at one time agricultural lenders. Nearly 90 percent of the banks were also classified as community banks.



These initial research results generate some interesting findings but also additional questions. Like community banks in general, ag banks are consolidating at a steady pace. However, ag banks tend to buy other ag banks, and most of them are also community banks. A primary motivator for consolidation is clearly efficiency, as small banks tend to be targets and medium-to-large community banks tend to be surviving institutions. But the institutional knowledge associated with ag lending lives through mergers and acquisitions, demonstrated by the fact that the average surviving institution already has a sizable farm loan portfolio. The net impact on borrowers is likely mixed, as they will have fewer lenders to choose from but each one will have a higher individual lending limit. Finally, the Farm Credit System (FCS) is going through a similar consolidation, with the number of unique institutions falling from 95 in 2010 to 78 in 2016; the correlation of the two trends may be spurious but warrants some analysis. In future research, the authors will attempt to further analyze these issues and statistically measure predictors and causes of consolidation.

SPECIAL REPORT: ASSESSING SOUTH AMERICAN CORN AND SOYBEAN CROPS FOR 2017

(resource 5)

By Dr. Todd Hubbs, University of Illinois, Clinical Assistant Professor of Agricultural Commodity Markets and contributor to farmdocdaily, <http://farmdocdaily.illinois.edu/>

Key Highlights

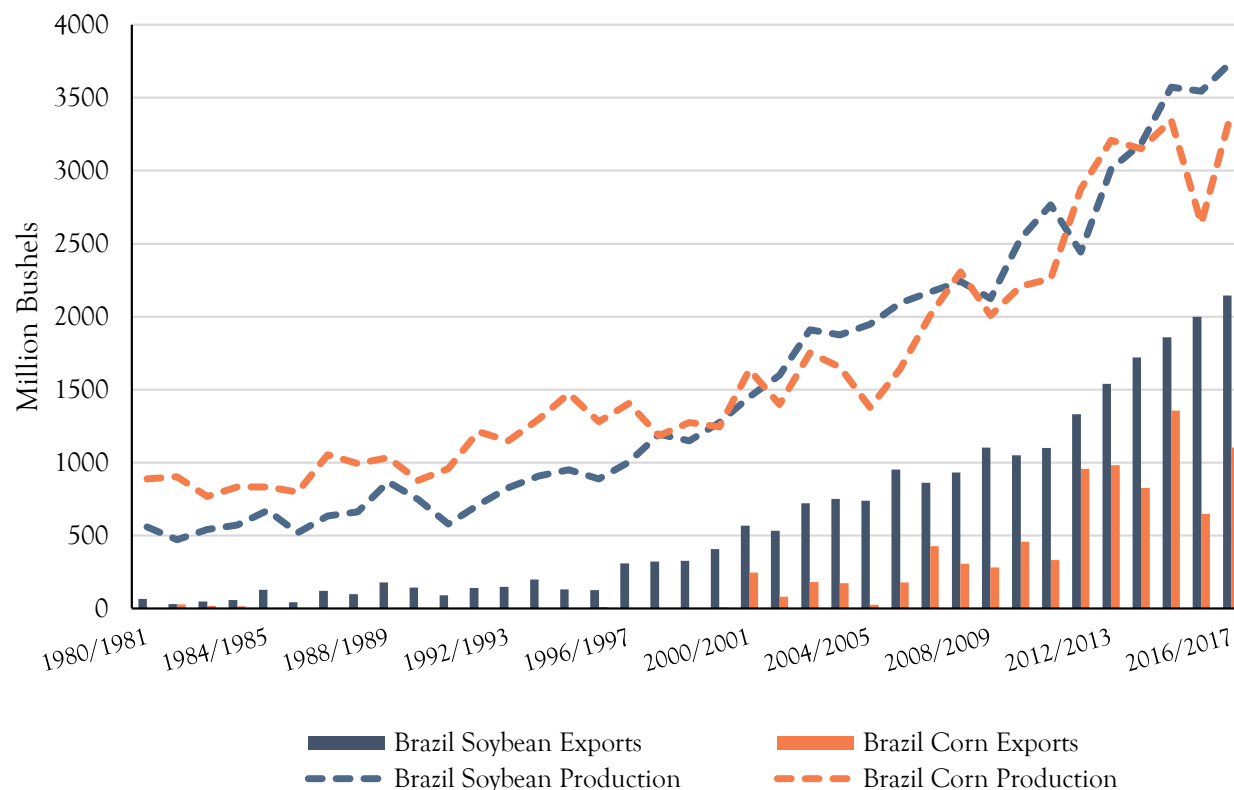
Crop production in Brazil and Argentina looks to bounce back in 2017.

Brazil's soybean crop looks to set records in 2017, giving greater competition to U.S. producers in the world markets.

An expansion in planted corn acreage in Argentina will likely lead to a bumper corn crop and increased exports.

South American corn and soybean production prospects for 2017 have significant implications for U.S. crop prices. When considering the potential impacts of South American production, the predominance of Brazil and Argentina in corn and soybean production and exports in the region is paramount. According to data provided by the Foreign Agricultural Service (FAS), the two nations produced approximately 91 percent of South American soybeans and 92 percent of the corn in 2016. Brazil and Argentina have also emerged as major exporters in the world market for each crop after years of growth in production and exports as shown in Figures 2 and 3. In 2016, Brazil exported 42 percent of the world's soybeans and 19 percent of the world's corn. While smaller, Argentina still exported approximately 6.5 percent of world soybeans and 17 percent of world corn. This article explores the potential associated with corn and soybean production and exports in each country for 2017.

Figure 2: Brazil Corn and Soybean Production and Exports

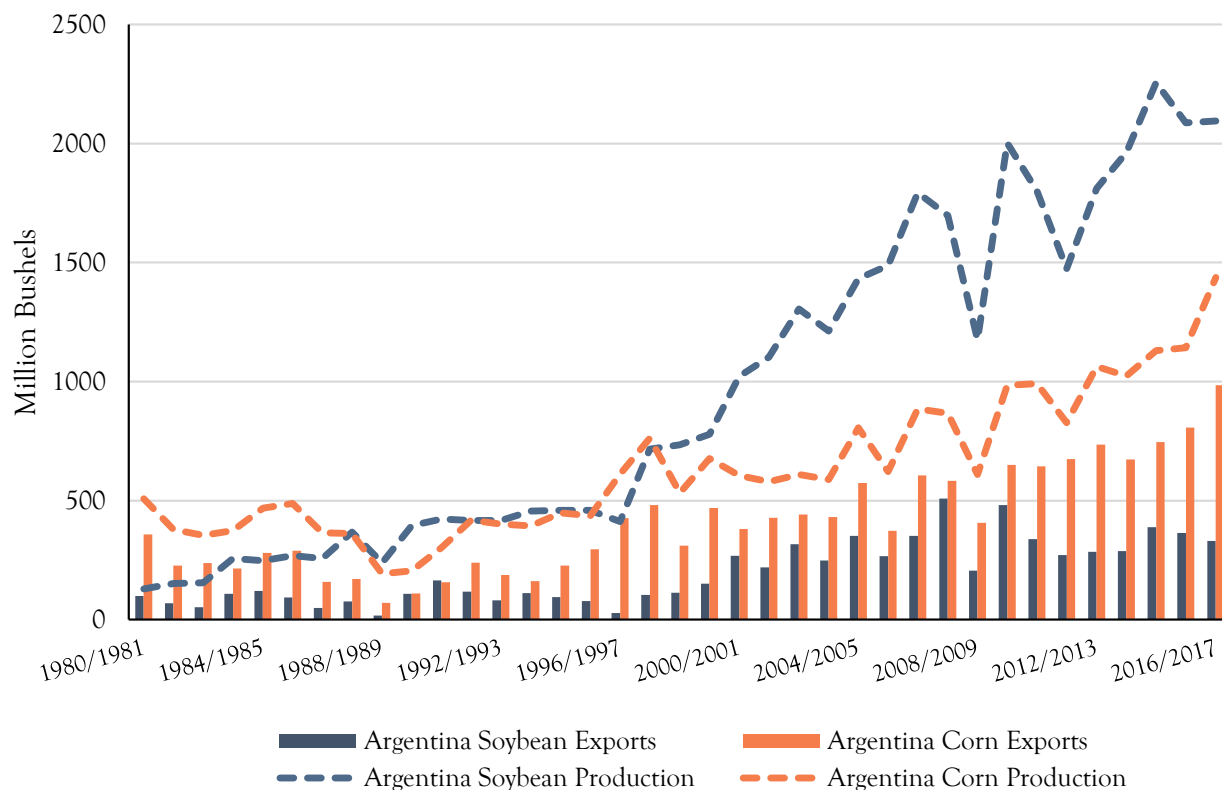


Current World Agricultural Production forecasts for 2017 set Brazil corn production at 3.4 billion bushels, a 43 percent increase over the drought-plagued 2016 level, with 1.1 billion bushels projected for export markets. Brazil is unique in that it has two corn crops. Beginning in the early 2000s, Brazil's corn acreage has trended toward the second crop, with second crop acres rising while first crop acres continued a steady decline. In 2016, second-crop corn acres accounted for approximately 65 percent of total planted corn acres in Brazil.

The second crop, or *safrinha*, is typically planted between January and March and harvested between June and August. The rise in *safrinha* production strategy is directly linked to the increase in Brazilian corn exports.

The majority of the first crop is used domestically, while *safrinha* tends to be exported because the harvest of second crop corn occurs after Brazil's major soybean export period, allowing for more efficient movement of corn out of the country. A greater reliance on second crop corn for export markets exposes the potential for weather risk associated with the dry season in Brazil. The second crop is often grown as part of a double-cropping strategy following soybean planting as a first crop. Accordingly, a large portion of the second crop is grown in the Central-West region of Brazil rather than the typical corn growing region and is susceptible to the Brazilian dry season. A production shortfall in Brazilian corn production due to a drought in 2016 directly impacted the second corn crop, and in turn, exports. Therefore, the weather in the

Figure 3: Argentina Corn and Soybean Production and Exports



Central-West region of Brazil (where the *safrinha* corn crop is grown) bears scrutiny as we move into 2017.

Argentina corn production is forecast at 1.44 billion bushels in 2017 with 984 million bushels pegged for export. This production forecast is a 26 percent increase over 2016 corn production estimates and is a record amount for the nation (Figure 3). Unlike Brazil, Argentina plants a traditional single corn crop either before or after November, to prevent pollination in the hottest part of the year. Recent reports from FAS indicated heavy rains in late October and early November, delaying planting in some areas. Despite planting issues, there are expectations for a large crop due to increased acreage, driven by local market prices favoring corn and the lack of an export tariff on corn exports.

Brazil continues to plant more acreage in soybeans with a steady upward trend in planted acreage over the last decade (Figure 2). In 2017, Brazilian soybean production is forecast to increase 6 percent to a record 3.75 billion bushels, while exports are expected to increase 7.4 percent to 2.14 billion bushels. The double cropping system leads to early soybean planting in preparation for another crop, often corn, in the growing season. Soybean planting throughout the predominate Central West and South growing regions was excellent in the fall of 2016, and current indications point to a large crop for most regions. There is some suggestion that soybeans will be harvested as early as January. Weekly export numbers should receive close attention through the early part of 2017, as Chinese buyers may switch to Brazilian soybeans.

Soybean production in Argentina is forecast to increase slightly from 2016 to 2.09 billion bushels (Figure 2). However, soybean exports are forecast to be down 9 percent from 2016 at 331 million bushels. Argentina, while not exporting huge levels of soybeans, possesses extensive crushing capacity and is the world leader in soy oil and soybean meal exports. Argentina's current export tax on soybeans discouraged planting increases. While the government revealed plans to cut soybean export taxes to 18 percent by 2020 via a .5 percent per month reduction beginning in 2018, this cut is not yet in effect, and the export tax stands at 30 percent. For 2017, expect lower export numbers in soybeans, despite a slightly larger crop. Additionally, extensive flooding in certain regions of Argentina delayed soybean planting and may reduce overall production numbers.

If production prospects unfold as projected, U.S. corn and soybean farmers will face stiff competition on the world market in 2017. There are prospects for large corn crops and strong corn exports in Brazil and Argentina. Likewise, Brazilian soybean production and export numbers are poised to set records in the coming year. Even though Argentina may present a slightly reduced level of soybean exports while dealing with delayed planting and a possible reduction in production, the combined South American production continues to be a market competitor for U.S. soybeans. However, as always, the weather will play a key role; there are signs that weather has a chance to impact the 2017 corn crops moving forward. Brazil's increasingly important second corn crop and the weather patterns impacting it are significant in shaping the possible degree of export competition as we move through 2017.

For a detailed analysis of yield trends in Brazil and Argentina, a series of articles on farmdoc present overall historical trends and expectations for 2017 crop potential. The articles are available at <http://farmdocdaily.illinois.edu/> with the first article published on November 2, 2016.

Key Highlights

**President Trump won many votes in rural
and agricultural areas.**

**The President's positions will likely have
mixed effects for U.S. agriculture, but
many are thought to be beneficial for the
production sector.**

**Congress will have the final say in new
policy initiatives, and agriculture is
generally non-partisan.**

It is no secret that our recent presidential election contained an extraordinary amount of drama, and was perhaps one of the most contentious for the American electorate to watch and listen to in quite a number of years. Another thing that is also certainly not a secret is that, to a great extent, rural America and agricultural interests played a substantial role in electing President Donald Trump.

Although agriculture was discussed somewhat in the early stages of the campaign, including then-candidate Trump's comments concerning his support for ethanol production, in the later stages of the campaign, agricultural production stayed out of the limelight. Of course, comments regarding illegal immigration and international trade were highlighted, but President Trump did not bring to light any actual details on these topics or how they would affect agricultural interests.

It is important to keep in mind that, according to all those that know him, President Trump is loyal to supporters. Political analysts and trade association heads in the

agriculture sector mostly agree on this point, with some saying that they expect the next administration will seek and promote policies that are very favorable to agriculture and rural America. Certainly, a reduction in regulatory burden, lower tax rates, and reduced energy costs would benefit agriculture producers greatly.

Of course, the branch of the government that will have much of the responsibility of deploying policies that can assist rural America and agriculture is the U.S. Congress. For the most part, agriculture policies have been non-partisan affairs, and few believe that partisan politics will create divisions within the agriculture community. The first few months of the next Congress will contain a plethora of hearings and business meetings on the President's nominees for the senior leadership positions in his administration. Once those individuals are in place, expect to see specific policy positions and ideas rolled out and shared with the policy makers in the U.S. House of Representatives and the U.S. Senate, likely in the early summer.



Key Highlights

Real GDP growth forecast just above 2 percent in 2017; economists see new policy initiatives taking time to get approved and/or become effective.

Solid job growth looks to continue into 2017, particularly in the services sector, but with some good prospects in construction and manufacturing.

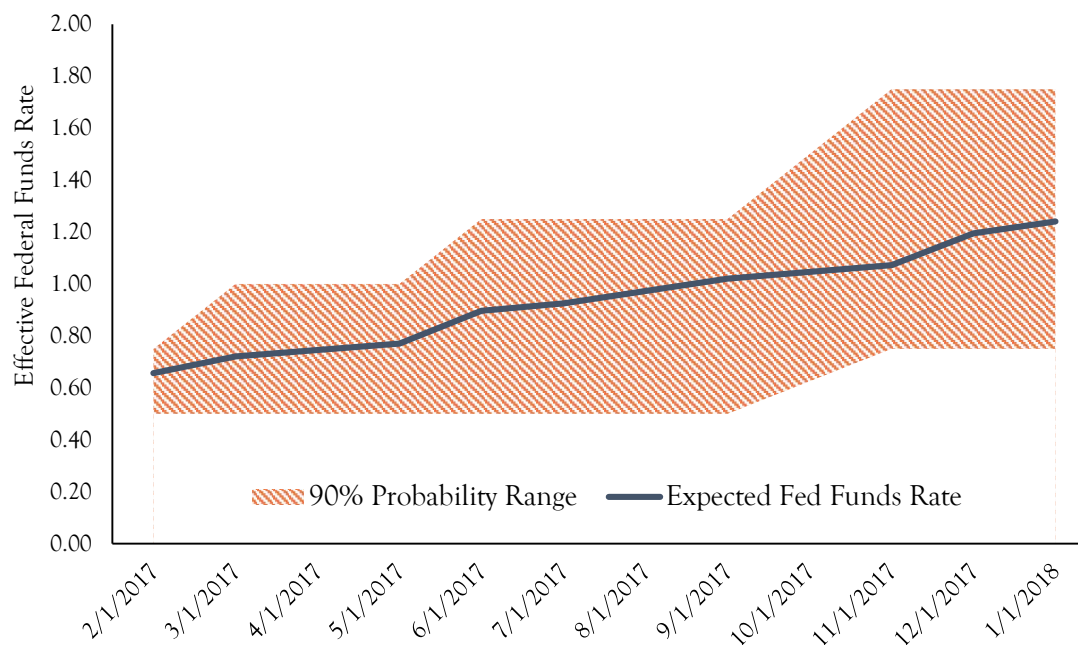
Markets are expecting two additional interest rate hikes in 2017, which would put the expected average farm operating interest rate between 5.2 and 5.7 percent by the end of 2017.

ECONOMIC GROWTH. The consensus estimate is for real GDP growth to increase at a pace of 2.1 percent in 2017. The forecast is based on improving economic data that indicates robust job creation, diminished labor market slack, strong consumer spending, increased inflation, and a healthy housing market. The 2017 projection represents an improvement relative to recent growth. U.S. real GDP grew at tepid rates over the past three quarters; the annual growth rate from September 2015 to September 2016 averaged 1.5 percent. The outcome of the U.S. election may provide longer term economic tailwinds. The newly-elected Trump administration has signaled a desire to invest in national infrastructure, but any proposals will likely take most of 2017 to get approved by a budget-conscious House of Representatives. GDP growth could exceed targets if the Trump administration can launch a fiscal stimulus sooner than 2018, or if the administration and Congress can spur business investment.

JOBS. In 2017, the labor markets are expected to improve, paired with steadily rising wages. The consensus outlook is that the U.S. labor market will continue to be tight for 2017 with a near equilibrium in the supply and demand of labor. Job reports throughout much of 2016 demonstrate an improved job market and solid wage growth. The share of the labor force working part-time for economic reasons has sharply declined since January of 2016. The number of unemployed and discouraged workers per job opening is now below pre-crisis level. At the beginning of the crisis recovery, the ratio of unemployed workers per job opening was 7 to 1. Today, there are 1.5 job seekers for every job opening. The largest and most consistent job gains have been services sectors, but construction and goods manufacturing have seen some modest growth as well.

INTEREST RATES. U.S. interest rates were stagnant for most of 2016. The Federal Open Market Committee

Figure 4: CME FedWatch Implied Fed Funds Interest Rate Path



(FOMC) raised the federal funds interest rate target from 0 to 0.25 percent in December 2015 for the first time since the financial crisis. The next quarter-point raise didn't come until December 14, 2016. Based on the minutes of the December 2016 meeting, FOMC members seem more optimistic about the opportunities for economic growth a return of positive inflation, and thus the expected path of rate increases is steeper than after most meetings throughout the year. The market is currently pricing in an average of two more rate increases (i.e., 0.5 percent in 2017 - see Figure 4) with a 90 percent probability of no more than four increases (i.e., 1 percent). On average, agriculture producers pay an interest rate of the federal funds rate plus 4 percent. Thus, the markets imply a 90 percent confidence that farmers will experience average operating interest rates at or below 5.70 percent in 2017 and into 2018. To put that high-end estimate into perspective, that is roughly the level of non-real estate bank loans in 2008.

Key Highlights

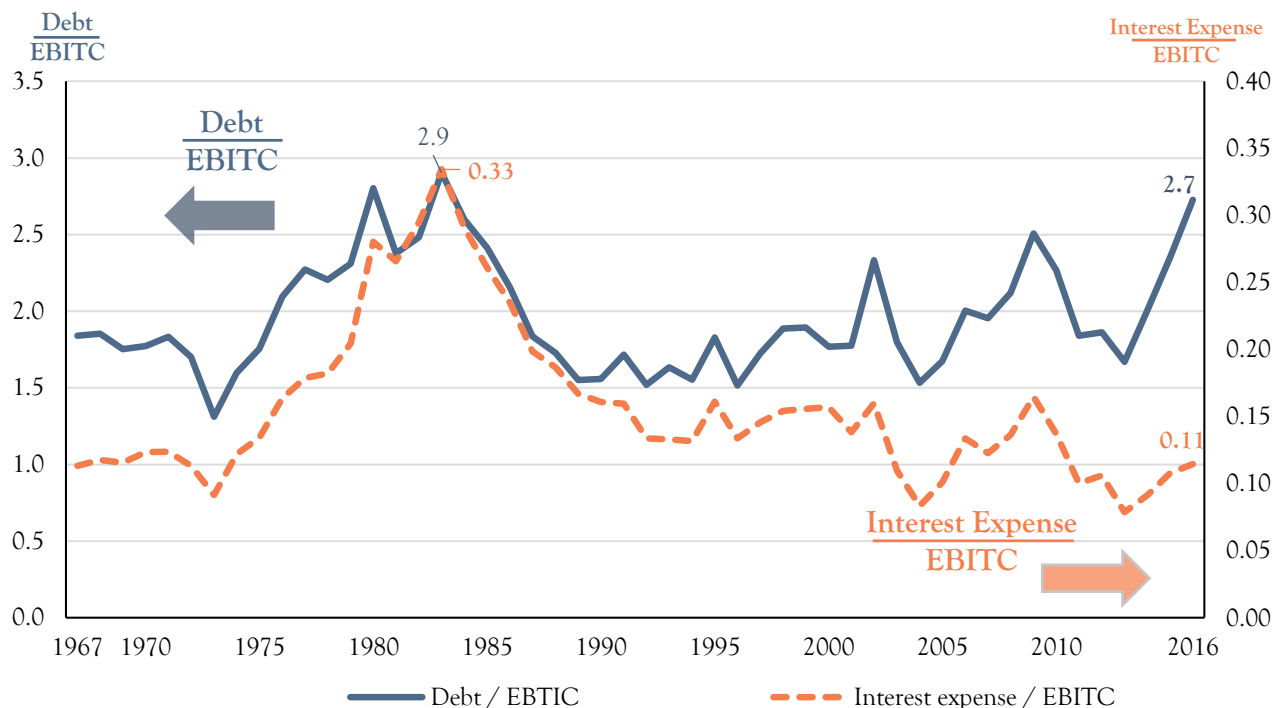
A debt-to-earnings ratio is nearing 1980s highs, but an interest expense-to-earnings ratio shows sector repayment capacity remains.

It will take a debt-load increase of more than 10 percent combined with a rate increase of more than 300 basis points and an income decline of more than 50 percent to shock 2017's interest-to-earnings ratio to 1980 peaks.

Over the last decade, farm sector debt has grown by more than \$130 billion dollars, and the USDA is forecasting inflation-adjusted farm debt levels in 2016 to reach the highest levels since 1984. Combined with multiple years of declining income, this increase has led to growing interest in the strength of the farm sector's financial position. Farm sector leverage, as measured by debt-to-asset ratios, remains low by historical standards. However, debt-to-asset ratios have been buffered by resilient farm real estate values and are not designed to measure the sector's ability to service debt loads. One alternative is to compare the level of outstanding debt and interest expense to the sector's cash flows. At the farm sector level, earnings before interest, taxes, and capital consumption (EBITC) can be thought of as a proxy for cash flows like earnings metrics used in other industries.

As shown above (Figure 5), the sector's debt-to-EBITC ratio has been climbing over the last several years, reaching 2.7 in 2016, the highest value since the 1980s. This suggests building liabilities relative to the sector income, but the ratio remains below the 1980s peak. While this could

Figure 5: Historical Farm Debt and Interest Expense Ratios



EBITC = earnings before interest, taxes and capital consumption; Source: Calculated from USDA, Economic Research Service data.

suggest growing stress on the balance sheet, the sector's interest expense-to-EBITC ratio remains at a historically low level. In comparison, the interest expense-to-EBITC ratio steadily increased in the late-1970s and early-1980s, with interest expenses accounting for a record 33 percent of the sector's cash flows in 1983. Today, the value is estimated at only 11 percent.

Combining the information from both ratios shows the farm sector has benefitted from today's low-interest rate environment. Debt levels are growing relative to cash

flows, but interest expenses have not grown as quickly, allowing the sector to continue to generate cash flows capable of servicing the sector's interest expenses. In contrast, the high debt-to-EBITC ratios of the 1980s coincided with historically high interest expense-to-EBITC ratios, as farmers had a relatively large amount of debt and dealt with the high interest rate environment of that time.

While farmers have been able to borrow at relatively low rates in recent years, interest rates have begun to

rise. During the December 2016 Federal Open Market Committee meeting, the Federal Reserve raised the Federal Funds by 25 basis points and signaled that further upward movement is likely if the economy stays on its current path. The CME Group's FedWatch tool indicates a market expectation of a roughly 50 basis point increase by the end 2017. Given the expectation of additional rate increases, it is important to evaluate sector debt and interest expense ratios under several interest rate scenarios.

To accurately assess the sector's interest rate sensitivity, it is necessary to determine the portion of farm sector debt likely to be affected by any potential interest rate increase. According to the most recent Agricultural Resource Management Survey data, 72 percent of the year-end farm operator debt volume had a fixed interest rate. While the average interest rate on fixed rate debt will increase in the long-run as farmers take out new loans and pay off existing balances, in the very short-run the interest expense on this portion of farm debt volume should not be affected by rate increases. The remaining 28 percent of the debt is in variable rate products, with the majority scheduled to reprice on an annual or more frequent basis.

For the first set of three scenarios, outstanding debt is held constant at the USDA's most recent 2016 forecast. To project the effects of an interest rate increase, upward adjustments of either 50, 100 or 300 basis points for all variable rate debt are considered. Accordingly, each of these scenarios simulates the effect of an instantaneous increase in interest rates. The next two sets of scenarios simulate the sector's potential interest rate sensitivity in 2017. To accomplish this, the previous process is repeated, allowing farm sector debt, both fixed and variable, to increase by either 5 or 10 percent. In this case, the interest rate and volume behavior on all variable rate debt and fixed rate debt growth are adjusted to reflect the changing interest rate environment.

Figure 6: Interest and Debt Level Scenario Analysis

Scenario		Projected Ratios		EBITC % Δ Required to Reach Peak 1980s Level ¹	
Debt Δ	Interest Rate Δ	Debt EBITC	Interest Expense EBITC	Debt EBITC	Interest Expense EBITC
No Δ	50 Bps ↑	2.7	0.124	-6%	-63%
No Δ	100 Bps ↑	2.7	0.128	-6%	-62%
No Δ	300 Bps ↑	2.7	0.143	-6%	-57%
5% ↑	50 Bps ↑	2.9	0.132	-1%	-61%
5% ↑	100 Bps ↑	2.9	0.138	-1%	-59%
5% ↑	300 Bps ↑	2.9	0.160	-1%	-52%
10% ↑	50 Bps ↑	3.0	0.143	3%	-57%
10% ↑	100 Bps ↑	3.0	0.149	3%	-55%
10% ↑	300 Bps ↑	3.0	0.175	3%	-48%

¹ Record high debt-to-EBITC and interest expense-to-EBITC ratios were reached in 1983 and are used in the comparison.

Under each of the three sets of debt change scenarios, the farm sector's debt-to-EBITC remains historically high. Relatively small declines in EBITC would be needed to lever earnings at a record level under the no change and 5 percent debt growth scenarios, while debt-to-earnings would reach a record level if the sector adds 10 percent more debt volume. However, the sector's recent increase in debt has occurred in a more accommodating interest rate environment. If interest rates increase by 50 or 100 basis points in 2017, the sector's interest expense-to-EBITC ratio is unlikely to breach the recent high experienced in 2009. In the unlikely event of a 300 basis point shock coinciding with a 10 percent increase in debt in 2017, interest expenses are still projected to account for less than 18 percent of sector cash flows. Even in this scenario, the 2017 interest expense ratio is likely to be nearly half of the 1983 record high, and it would take very

large declines (nearly 50 percent) in EBITC for the farm sector to reach this level in the short run.

Although the farm sector has benefited from the current low-interest rate environment, the results of this analysis suggest it should maintain ample cash flows to service interest payments. While the sector's resilience is heartening, rising interest rates will impact some farms more than others. Farms that have more highly leveraged their earnings with a high proportion of variable rate debt are most susceptible to increased costs associated with higher interest rates. For these farms, increasing interest rates could be substantial headwinds to profitability. Since rates remain relatively low, these operators will need to consider locking in interest expenses with a higher proportion of fixed rate products to manage rate sensitivity.

Key Highlights

A recent USDA report highlighted the recent decline in the number of midsize farms in U.S. agriculture.

While there were several exits, a high percentage of midsize farms simply changed size classification.

Midsize farming operations had the highest probability of remaining in farming and the highest probability of either expanding or contracting within a five-year window.

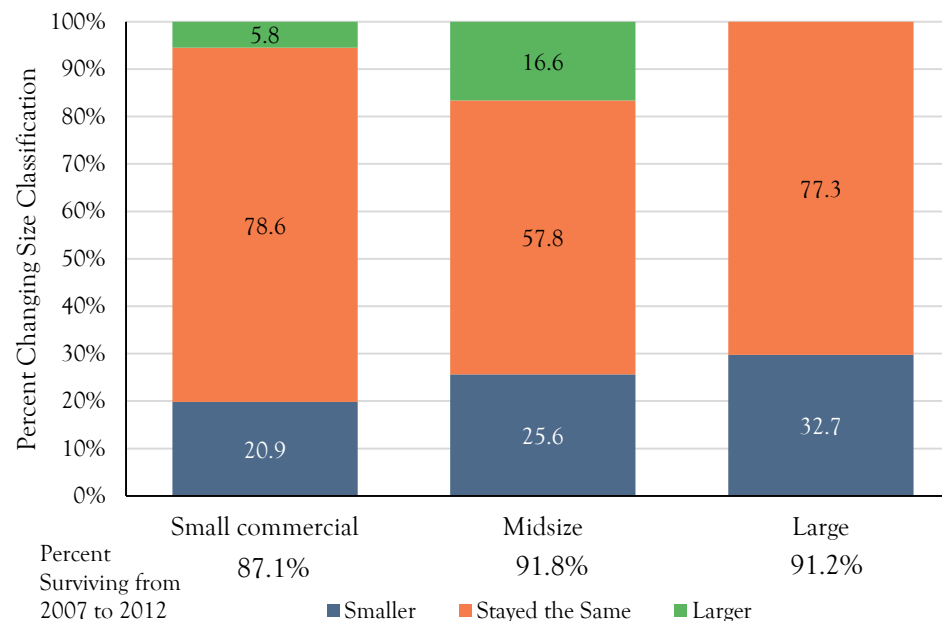
Early in this issue, we highlighted a trend in bank consolidation while the average size of banks has grown. A similar trend has been playing out among farm operations. Over the last several decades, the American agricultural landscape has shifted toward a greater amount of production occurring in large operations, while the number of midsize farms has declined. Since most farms are family owned, these changes may have a profound impact on rural households and their communities. A recent report by the USDA's Economic Research Service looked at agriculture's changing structure and how it has affected the well-being of midsize farms.

The report confirmed the shift toward production on bigger farms, noting that the number of large farms with inflation-adjusted gross cash farm income (GCFI) greater than \$1 million has more than doubled since 1992. At the same time, the number of midsize farms (GCFI between \$350,000 and \$1 million) has declined by roughly 5 percent, and small commercial farm (GCFI between \$10,000 and \$350,000) numbers have declined

even further. These changes highlight a production environment reshaped by technological advancement. By employing new technological advances at a greater scale, large farms have reduced the amount of labor and capital inputs per unit of production. This allows many large farms to operate at lower unit costs, creating a profitability incentive to operate at a larger size.

The trend toward fewer midsize farms and the potential profit advantages from operating at scale have led to concerns that the midsize farm may disappear. However, a declining number of midsize farms does not necessarily mean that midsize farms are failing. Standard financial measures for midsize farms have mirrored changes in the overall sector, suggesting a better financial position as of 2014 relative to 1992. After adjusting for inflation, today's median midsize farm has substantially more operational equity, while having a more-than-doubled total household income (including off-farm income) and household net worth. Furthermore, many midsize operations simply expanded or contracted into a different size class. From

Figure 7: Farm Size Migration Trends



2007 to 2012, all farm size classes had a negative net entry rate, meaning more farms exited the sector than entered. Although some midsize farm operations stopped farming, midsize farms were also more likely to continue farming, with 91.8 percent of producers continuing to farm five years later (Figure 7). Ultimately, the decision to stop farming is often intertwined with the primary operator's age, with retirement age operators more likely to stop farming. Finally, midsize farms were more likely to transition into another size class over this period than either small commercial or large farms (Figure 7). While many midsize farms shrank, more than 16 percent of midsize farms grew into the large farm category.

Given the increasing age of farmers, some operators may choose to stop farming, but most often this reflects a farmer's preferences rather than business failure. Additionally, some farms will simply change size class. This provides the opportunity for small farms to grow to midsize, and today's midsize farm to be tomorrow's large operation.

Key Highlights

There has been a dramatic improvement in drought conditions throughout California.

Dryness in the Southeast is likely to persist into the spring months.

Conditions in the Midwest look favorable for the spring crop planting.

This winter season has brought with it a mix of weather conditions. Impressive storms brought significant precipitation to western states, particularly to drought-weary California. Many reservoirs registered as full at the beginning of the new year, and pre-emptive releases of water continued for much of the month. Additionally, statewide snowpack water equivalents peaked at over 190 percent of normal in late January. However, the storm tracks disproportionately drenched the northern regions, and drought conditions may persist in southern California in 2017. Many parts of the Southeast continue to see dryness as winter precipitation missed much of the drought-affected areas. Areas of dryness will likely persist into the spring which could impact crop planting and the flowering and development of tree-based products such as peaches. Midwestern producers are likely to experience slightly cooler than normal weather with normal levels of precipitation through late winter. Given current soil moisture levels, the spring planting conditions should be respectable. However, one exception could be in North Dakota, where snowpack has been above normal and a rapid spring melting of the snowpack could result in localized flooding and poor planting conditions. The Plains states and southern Corn Belt have seen some dryness developing, which may stick around into the spring.

Figure 8: Drought Monitor Map (USDA, NOAA, University of Nebraska-Lincoln)

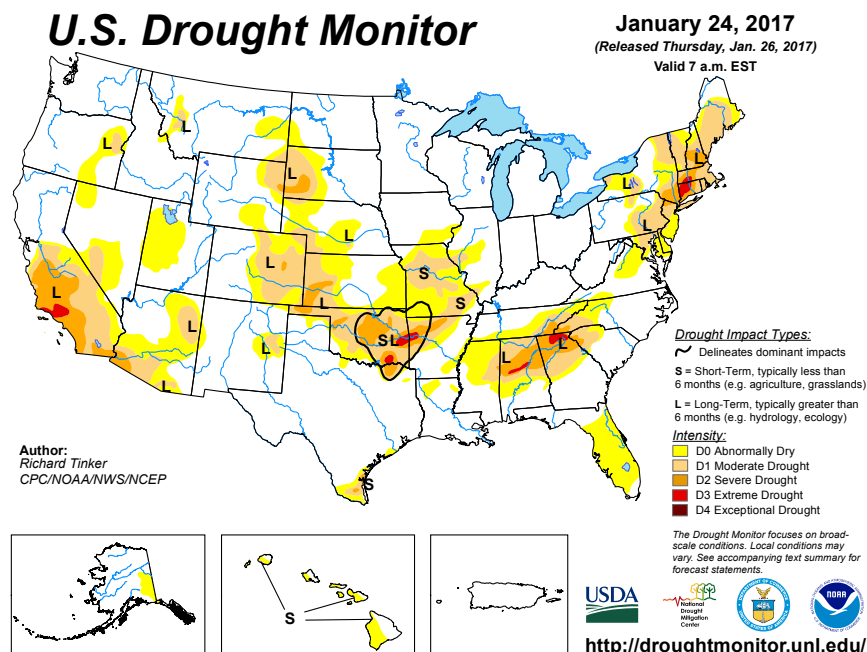
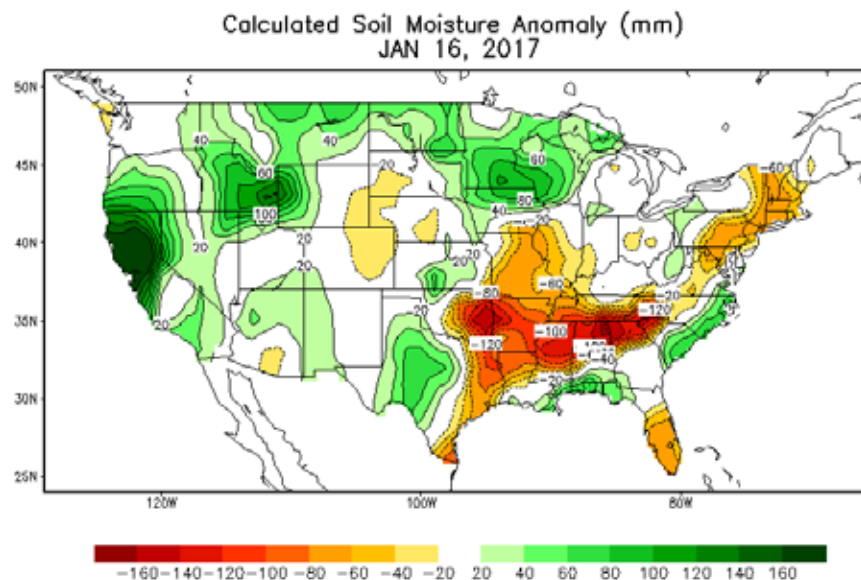


Figure 9: U.S. Soil Moisture Ranking



Key Highlights

.....
Large corn, soybean, and wheat crops have driven ending supplies higher and have kept downward pressure on market prices.

Soybean demand continues to outperform other commodities due to strong consumption in China.

Prices for major grains are projected to be stable into 2017 on good consumption fundamentals.

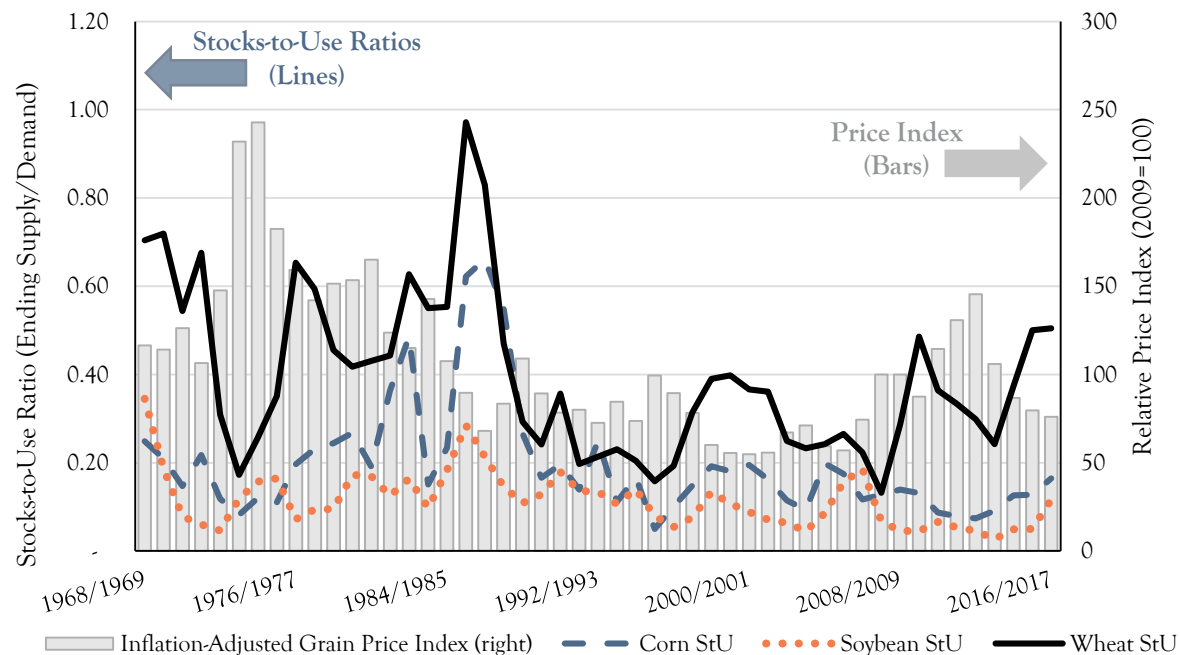
The U.S. grain complex set many records in 2016, most of them positive. There were record crop yields for corn (175 bushels per acre, 2.5 percent above the previous high), soybeans (52.6 bushels per acre, 9.4 percent above the previous high), and wheat (52.6 bushels per acre, 11.6 percent above the previous high). Producers planted a historic number of soybean acres in 2016, and growers planted the third highest corn acreage in more than 70 years. The U.S. exported more soybeans than ever in 2016, beating the prior high by nearly 6 percent. Domestic corn consumption from this year's crop is also expected to set a record high that, if realized, will beat the prior high set in 2014 by more than 500 million bushels. These are impressive statistics demonstrating the tremendous productive capacity of U.S. producers.

However, these success stories are part of a bigger story. For corn and soybean growers, the record 2016 crop comes after four years of record-setting seasons. The USDA estimates that ending stocks of corn, soybeans, and wheat for 2016 will be the sixth, third, and seventh highest in last 57 years, respectively. Ending stocks are a good signal for oversupply, particularly when combined

with total use in the stocks-to-use ratio. The stocks-to-use ratios for each of the three major crop commodities have been steadily increasing as stocks have increased. And this supply issue could be further exacerbated by a big grain crop that is brewing in South America (see the earlier article in this issue).

Despite the excess supply, there does exist some reason for optimism in U.S. grain. Corn demand has been robust, led by increases in animals on feed, strong exports, and continued demand for biofuels. Soybean demand also remains durable because of gains in exports to China and a boost from the EPA in biodiesel mandates. Wheat faces the toughest market conditions, with excess supply facing the world market on good consecutive crops in the U.S., China, the European Union, and Oceania. However, the low market prices in 2016 have many ag economists forecasting fewer acres planting to wheat in 2017, which could help reduce supplies throughout the year.

Figure 10: Grain Stocks-to-Use and Composite Price Index



Source: USDA NASS Quickstats; USDA PSD Online

Netting out supply and demand for U.S. grain, 2017 looks to see market prices leveling off. Increasing stocks-to-use ratios tend to correlate with periods of low prices (see Figure 10). The collapse of grain prices in the 1980s corresponded with the highest stocks-to-use ratios for all three major grain commodities. Fortunately, the current level of stocks-to-use is far from peak levels, and the price levels have not fallen nearly as far in recent periods as they did between the 1970s and the 1980s. Based on current market fundamentals, the USDA is projecting a wheat price of nearly \$4.00 per bushel, a corn price of \$3.30 per bushel, and a soybean price of \$9.35 for the 2017/18 marketing year - projections not terribly different than current farm prices. Weather, foreign production, and global trade conditions are major factors that could move these projections.

Key Highlights

A record U.S. rice crop in 2016 has helped put market prices down, but strong global demand should provide a backstop for further drops.

Cotton prices stabilized in 2016 due to weather disruptions in global production.

USDA projections show a good market balance for both commodities in the coming years.

Like many other crop commodities, the rice and cotton markets have recently dealt with excess supply, and production of both commodities is expected to have increased again in 2016. In turn, this is expected to keep pressure on prices, which are already low relative to recent years (see Figure 11). Although prices for both commodities should remain near current levels, prices remain above the 25-year average. Additionally, underlying supply and demand factors driving each market provide several reasons to be optimistic about each commodity's prospects in the future.

The level of 2016/17 U.S. rice supplies are expected to be the second largest ever, mainly due to an increase in long-grain rice acres and a rebound in global rice production after El Niño related disruptions in 2015. The USDA projects global rice stocks to increase for the third consecutive year, reaching the highest levels since the 2001-02 crop marketing year. Similarly, the USDA projects U.S. rice stocks will reach their highest level in 30 years. The stockpile of rice has weighed on prices: the average price for U.S. rice is at its lowest level in a decade. Despite the recent price movements, rice consumption remains strong globally at a near record 477.8 tons per

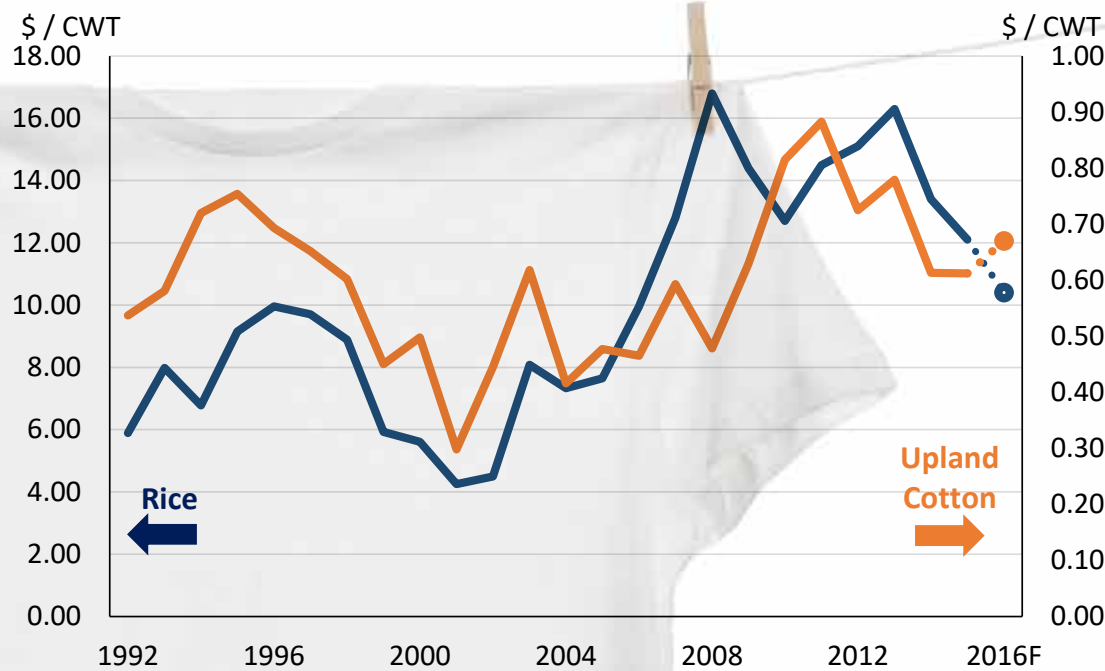
year. Demand strength provides a counter-balance to any further downward price movement and presents the opportunity for rising prices in the event of future supply disruptions.

U.S. cotton production also increased in 2016, largely due to weather driven yield increases in the Delta, Southwest, and West. However, dry weather kept yields and production below the 5-year average in the Southeast. Regardless of region, USDA predicts cotton farmers will find a more receptive market as a larger, higher quality U.S. crop fills international supply gaps and gains a larger export market share. Poor weather led to a substantial drop in global cotton production in the 2015-16 crop year, allowing global cotton consumption to exceed production for the first time in 6 years. Although the USDA forecasts world cotton production to increase in the 2016-17 crop year, it is projected to fall below consumption for the

second consecutive year. Accordingly, the historically high ending stocks accumulated from 2010-2014 are projected to decline to 5-year lows.

After several years of lower income, the combination of a modest reduction in world stocks and a growing export share is expected to support higher prices for U.S. cotton producers. The recently-released USDA long-term projections also suggest higher long-run profitability for cotton producers. One driver is the potential for an improvement in the recent sluggish global cotton demand. China is expected to hold another cotton reserve sale in March of 2017. After the short-run world price impacts of an auction, a reduction of the Chinese cotton stockpile may rekindle import demand in that market. Finally, oil prices have rebounded after falling to 14-year lows in 2016. If oil prices maintain or rise higher, cotton could benefit from relatively higher prices for manmade fibers.

Figure 11: Cotton and Rice Price History



Source: USDA, National Agricultural Statistics Service (historical data marketing years) and USDA, World Agricultural Supply and Demand Estimates (2016/17 marketing year forecast).

LIVESTOCK AND ANIMAL PRODUCTS

(resource 20, 21, 22, 23, 24, 25)

Key Highlights

Lower retail prices have put downward pressure on profitability in the cattle industry, but market equilibrium may be in sight.

Poultry and pork producers are experiencing the effects of oversupply on market prices as both industries overcome disease setbacks from prior years.

Consumers' love of cheese is sustaining dairy prices at near breakeven levels.

CATTLE. The beef supply chain continues to adjust to the new reality of growing stocks and lower retail prices. All signs point to an expanding cattle herd, and the amount of U.S. beef in cold storage set a record in October and remained seasonally high in November. Demand for beef weakened throughout 2016, as consumers substituted cheaper protein alternatives like pork and poultry. Retail prices have fallen more than 10 percent since hitting record highs in May of 2015. Despite a stronger U.S. dollar, beef exports have been a bright spot for the industry, as the lower cattle and beef prices spurred more overseas demand. Exports were up an estimated 9.7 percent in 2016 over the prior year, providing some support for downstream cattle prices. For cow/calf producers and feedlot operators, 2016 was somewhat of a wild ride due to the volatility in these supply and demand dynamics. Cattle futures prices have stabilized in early 2017, but if beef supplies continue to build or foreign demand for U.S. beef declines, prices could drop further. USDA projections show cattle price supports at around \$100 per hundredweight on live cattle in 2017. That is a steep drop from the heights of over \$165

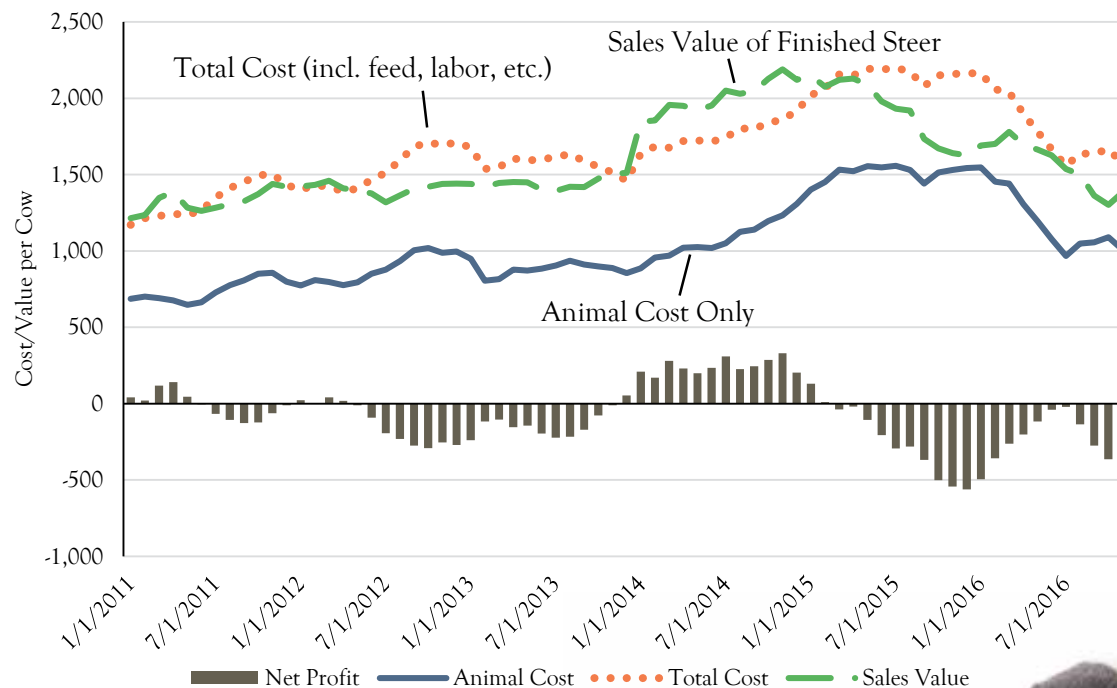
per hundredweight experienced in late 2014, but the floor is a welcome sign for reduced downside price risk.

POULTRY. Lower prices in all subsectors of the poultry sector have been driven by supply growth that outstripped demand growth in 2016. For broiler meat, production is expected to be up 1.6 percent during the year, more than double the growth in domestic consumption per capita. And while exports are rebuilding from nearly two years of avian-influenza-fueled bird bans, stocks of frozen chicken in cold storage remain 7 percent above the ten-year average. Turkey producers can claim a similar story in which consumption cannot seem to keep up with the growing level of stocks, and exports remain 26 percent below 2014-levels before the extensive outbreak of avian

influenza.

Egg production has nearly returned to pre-2015 levels as well, which has dramatically decreased egg prices, overshooting prices experienced in 2013 and

Figure 12: Historical Iowa Feedlot Operation Profitability



Source: Iowa State University Extension and Outreach, Estimated Livestock Returns

2014. The next year could hold some upside potential for producers as avian influenza outbreaks in the EU and Asia in January may spur greater foreign demand. The USDA expects prices levels in 2017 to be roughly equal to those experienced in 2016, so improved profitability must come from reduced costs (e.g., lower feed costs) and good marketing plans.

PORK. Hog producers have been busy these last two years. After a brutal bout with porcine epidemic diarrhea virus (PEDV) in 2013 and 2014 that cut hog inventories by more than four million head, the combination of high prices and cheap feed impelled producers to expand rapidly. By December of 2016, the reported inventories surpassed 71 million hogs, an incredible 11 percent expansion since the PEDV lows experienced in 2014. This brisk increase has put pressure on slaughter capacity, giving packers a healthy hand in pricing power. Demand for pork has been very responsive to lower prices, up nearly 10 percent since 2014. However, hog prices have fallen more than 40 percent in just two years because of the imbalance in hog supply and demand. The USDA does not forecast much of a price recovery in 2017, but continued low feed costs should help the industry limit losses.

There is also some relief coming to packing capacity with five new facilities expected to open in 2017 and 2018

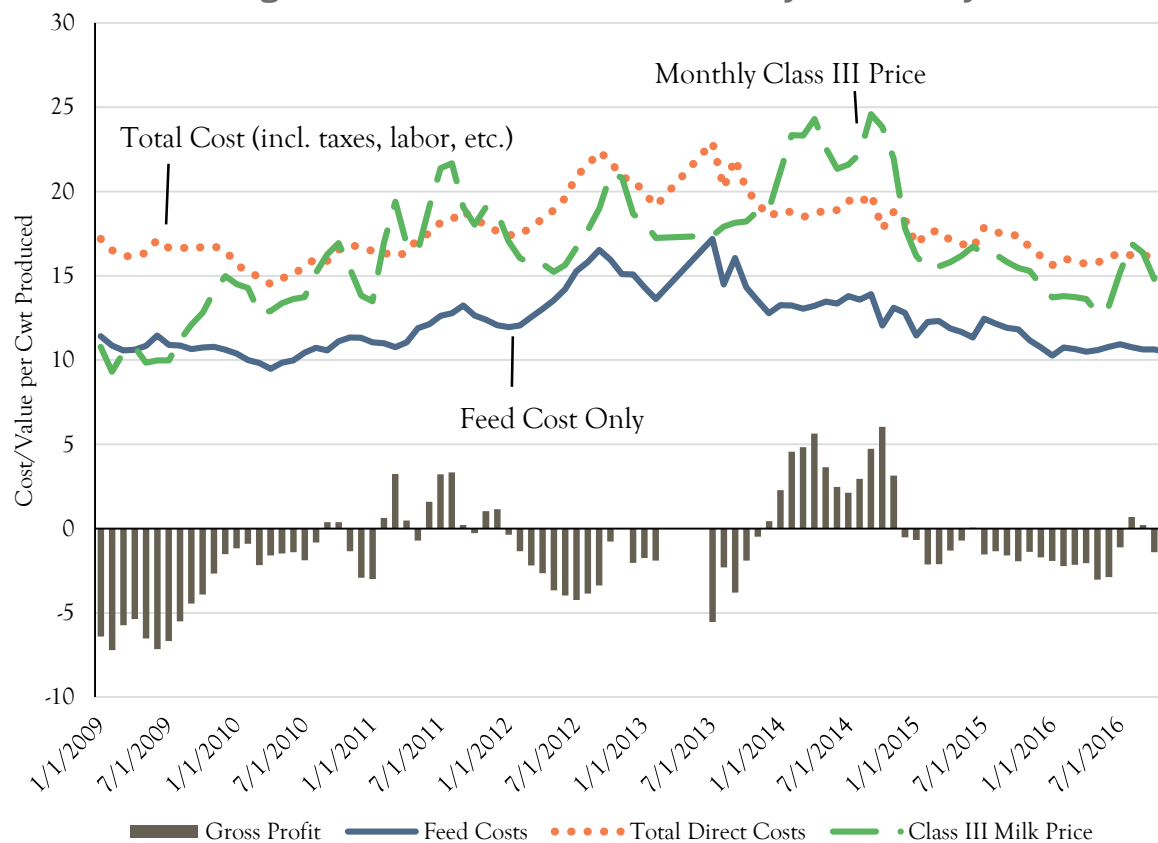
adding a combined capacity of 46 thousand head per day, or roughly 9 percent of additional slaughter capacity.

DAIRY. The dairy industry ended 2016 on somewhat of a high note. For the first half of 2016, dairy producers spent their days in the red, with low prices and steady production costs. Prices

picked up significantly beginning in July, and - except in October when cheddar cheese prices temporarily dropped due to supply concerns - the Federal Class III milk price has been near breakeven levels since the rally. Much of the improvement is explained by a pickup in foreign demand for U.S. dairy products. Export volumes were up nearly 15 percent in the last six months of 2016, with increases in nearly all dairy product classes. Producers in the EU, Oceania, and South America reduced output each month beginning in May, and the drop in global supply lifted world prices. Production conditions have been somewhat mixed across the U.S., with dramatic improvements for California

producers being partially offset by drought conditions in eastern states. Efficiency per cow continues to increase with an estimated increase of nearly 2 percent in 2016 and another 2 percent expected in 2017. But if demand holds, the market can support these sizable increases in production. The USDA estimates Federal Class III milk price to moderate around \$16 per hundredweight, which is right near the national average breakeven price. If feed costs come down again in 2017, the dairy industry could have a moderately profitable run for the year. Hurdles for the industry could be the trade impacts of a stronger U.S. dollar and/or a rebound in global dairy production.

Figure 13: Cattle Historical U.S. Dairy Profitability



Source: USDA ERS National Milk Cost of Production Estimates

RESOURCES

The information and opinions or conclusions contained herein have been compiled or arrived at from the following sources and references:

- 1 FDIC Call Report Data (<https://cdr.ffiec.gov/public/>)
- 2 FDIC Community Bank Initiative (<https://www.fdic.gov/regulations/resources/cbi/data.html>)
- 3 Federal Reserve Bank of Chicago Bank Merger Data (<https://www.chicagofed.org/banking/financial-institution-reports/merger-data>)
- 4 BankDirector Bank M&A Survey (<http://www.bankdirector.com/issues/manda/>)
- 5 USDA Foreign Agricultural Service Production, Supply, and Distribution Data (<https://apps.fas.usda.gov/psdonline/psdhome.aspx>)
- 6 Federal Reserve Bank of St. Louis FRED Database (<https://fred.stlouisfed.org/>)
- 7 Wall Street Journal Economic Forecasting Survey (<http://projects.wsj.com/econforecast/>)
- 8 CME Group FedWatch Tool (<http://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html>)
- 9 USDA Economic Research Service Farm Income and Wealth Statistics (<https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx>)
- 10 The Changing Organization and Well-Being of Midsize U.S. Farms, 1992-2014. USDA Economic Research Service Publication (2016) (<https://www.ers.usda.gov/publications/pub-details/?pubid=80691>)
- 11 Farm Size and the Organization of U.S. Crop Farming. USDA Economic Research Service Publication (2013) (<https://www.ers.usda.gov/publications/pub-details/?pubid=45110>)
- 12 Small Farms in the United States: Persistence Under Pressure. USDA Economic Research Service Publication (2010) (<https://www.ers.usda.gov/publications/pub-details/?pubid=44463>)
- 13 National Drought Mitigation Center's Drought Monitor (UNL/NOAA; <http://droughtmonitor.unl.edu/>)
- 14 NOAA Weather Prediction Center (<http://www.wpc.ncep.noaa.gov/>)
- 15 USDA Office of the Chief Economist – World Agricultural Supply and Demand Estimates Reports (<http://www.usda.gov/oce/commodity/wasde/>)
- 16 USDA Economic Research Service Feed Outlooks (<http://www.ers.usda.gov/publications/fds-feed-outlook.aspx>)
- 17 USDA Economic Research Service Oil Crop Outlooks (<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1288>)
- 18 USDA Economic Research Service Wheat Outlooks (<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1293>)
- 19 USDA National Agricultural Statistics Service QuickStats Database (<https://quickstats.nass.usda.gov/>)
- 20 University of Wisconsin – Understanding Dairy Markets (<http://future.aae.wisc.edu/>)
- 21 U.S. Dairy Export Council (<http://www.usdec.org/>)
- 22 Eurostat (<http://ec.europa.eu/eurostat/data/database>)
- 23 USDA Economic Research Service Livestock, Dairy, and Poultry Outlook (<http://www.ers.usda.gov/publications/ldpm-livestock,-dairy,-and-poultry-outlook/.aspx>)
- 24 Iowa State University Extension (<http://www2.econ.iastate.edu/estimated-returns/>)
- 25 USDA Meat Price Spreads (<http://www.ers.usda.gov/data-products/meat-price-spreads.aspx>)
- 26 USDA Economic Research Service Rice Outlook (<https://www.ers.usda.gov/webdocs/publications/rcs16l/rcs-16l.pdf?v=42717>)
- 27 USDA Economic Research Service Cotton Outlook (<http://usda.mannlib.cornell.edu/usda/current/CWS/CWS-12-13-2016.pdf>)

ABOUT THE AUTHORS



Co-Author - Jackson Takach, Farmer Mac's resident economist, is a Kentucky native whose strong ties to agriculture began while growing up in the small farming town of Scottsville. He has since dedicated a career to agricultural finance where he can combine his passion for rural America with his natural curiosity of the world and his strong (and

perhaps unrealistic) desire to explain how we interact within it. He joined the Farmer Mac team in 2005, and has worked in the research, credit, and underwriting departments. Today, his focus at Farmer Mac currently includes quantitative analysis of credit, interest rate, and other market-based risks, as well as monitoring conditions of the agricultural economy, operational information systems analysis, and statistical programming. He holds a Bachelor's degree in economics from Centre College, a Master's degree in agricultural economics from Purdue University, and a Master's of Business Administration from Indiana University's Kelley School of Business. He has also been a CFA Charterholder since 2012.



Co-Author - Ryan Kuhns joined the Farmer Mac team as a Research Analyst in 2016. Prior to joining Farmer Mac, Ryan was an Economist with the USDA, Economic Research Service, where he forecast farm sector income and researched topics related to agricultural finance. His passion for agriculture developed from his time at USDA and frequent

exploration of rural America. At Farmer Mac, he gets to focus that passion on analyzing the agricultural economic environment, developing quantitative credit risk models, and statistical programming. Ryan has a bachelor's degree in economics from Bucknell University, a Master's degree in economics from Georgia State University, and Certificate in Forecasting through Johns Hopkins University and the International Institute of Forecasters.



Contributing Author - Curt Covington, Farmer Mac's SVP, Agricultural Finance leads the company's business development efforts in the Farm & Ranch and USDA Guarantees business segments, in addition to overseeing the company's credit administration and underwriting functions. Curt's passion for rural America developed

at a young age on his family's grape and tree nut farm in Selma, California. His extensive experience in ag lending spans over three decades. In addition to his role at Farmer Mac, Curt is a respected leader in the agricultural mortgage industry and is actively involved in leadership roles within industry trade groups. He is the present chairman of the RMA Agricultural Lending Committee. Curt also serves as co-chair and manages two agricultural Lender programs: The Agricultural Lending Institute, a joint venture with California State University, Fresno, and The Agricultural Banking Institute of the Americas, a joint venture with Universidad del Pacifico, in Peru. Curt studied finance at the University of Southern California and earned a Masters in Agribusiness from Santa Clara University.



Contributing Author - Brian Brinch joined Farmer Mac in 2000 as a Financial Research Associate. Since then, he has held various roles within the Financial Research department and in 2014, was promoted to VP, Financial Planning and Analysis, where he now leads the team responsible for the development of Farmer Mac's

financial projections and plans, as well as the data analytics used to analyze the company's loan portfolios. Brian follows agricultural and rural utility industry trends and risks while he oversees the company's stress testing and capital plans. Brian received both his undergraduate degree in meteorology and his master's in Agriculture and Applied Economics from Penn State University. He is a CFA Charterholder and FRM Certified.



Contributing Author - Chris Bohannon, Farmer Mac's Vice President - Corporate Relations, is responsible for the company's public relations and government affairs efforts. A seasoned expert with a vast knowledge of agriculture and energy policy issues, Chris's career has been spent advocating for rural America in the political arena.



Contributing Author - Brittany Kleinpaste is a Director of Economic & Policy Research Manager for the American Bankers Association in Washington, D.C. Since joining the ABA in 2011, Brittany has monitored the financial performance and condition of the banking industry; studied legislative and regulatory issues impacting the

banking industry; and focused on a variety of research topics, including agricultural credit and the credit union industry. Brittany is a frequent presenter to a variety of ABA committees and banker visits. Brittany graduated from Michigan State University and is originally from the Upper Peninsula of Michigan.



Contributing Author - Todd Hubbs is an agricultural economist specializing in commodity market analysis and risk management. His research focuses on commodity price forecasting and risk analysis in the agricultural sector. Todd is currently a clinical assistant professor of agricultural commodity markets at the University of Illinois. His weekly

market outlook and research on agricultural commodity markets can be found at <http://farmdocdaily.illinois.edu/>. Todd received his doctorate in agricultural economics from Purdue University.

Corporate Stewardship | Unparalleled Service | Innovative Thinking | Collegial Collaboration



**1999 K Street, N.W. Fourth Floor
Washington, DC 20006
Phone: 800.879.3276
Fax: 800.999.1814
www.farmermac.com**

Issue No. 6

Unrelenting Excellence | Absolute Integrity | Passion for Rural America | One Farmer Mac