Agricultural Economic Update

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The views expressed are those of the author and do not necessarily reflect the opinions of the Federal Reserve Bank of Kansas City or the Federal Reserve System.
Regional Federal Reserve Banks are important to the structure of U.S. monetary policy.
Commercial banks connected to agriculture are concentrated in the region.

Agricultural Banks in the U.S.

Bank Ag Loan Concentration, %
- 15 - 25
- 26 - 50
- Greater than 50

Source: Federal Reserve Board of Governors.
Outlook Themes

• U.S. economic growth has generally been steady, providing support for a modest increase in interest rates.

• Export-oriented, commodity-dependent regions and industries continue to face headwinds.

• The downturn in agriculture is in a 4th consecutive year.
The U.S. economy continues to grow at a modest, yet somewhat sluggish pace.

U.S. Real GDP Growth

Note: 2017 Q1 is a forecast from Macroeconomic Advisers as of March 10.
Sources: Bureau of Economic Analysis, Macroeconomic Advisors and Haver Analytics.
Globally, economic growth has been positive, but also somewhat sluggish.

Global Real GDP Growth

Sources: IMF and Haver Analytics.
Exports have weighed on U.S. GDP growth, but consumers have driven further gains.

**U.S. Real GDP Growth by Component**

Sources: Bureau of Economic Analysis and Haver Analytics.
Improved consumer confidence has continued to boost personal consumption.

U.S. Consumer Sentiment and Vehicle Sales

Source: University of Michigan, U.S. Census Bureau and Haver Analytics.
Equity prices and expectations for future corporate dividends have increased since November.

S&P 500 Dividend Index Futures

Source: Bloomberg.
Unemployment is near its long-run level and inflation is close to the FOMC target.

Sources: BLS, Federal Reserve Bank of San Francisco and Haver Analytics.
Interest rates have been projected to rise gradually.

U.S. Interest Rates

Sources: Federal Reserve Bank Board of Governors and Haver Analytics.
Per capita incomes are still rising, but have slowed in the central U.S., a commodity-dependent region.

**Per Capita Personal Income**

Change from 2008 to 2014

Change from 2014 to 2016

Source: BEA.
Commodity prices, not just in agriculture, have fallen sharply since 2013.

Change in Commodity Prices since 2013

*Through 3/13/2017
Sources: The Wall Street Journal and Haver Analytics.
Farm income has dropped from recent highs and future projections have become more pessimistic.

U.S. Farm Income

Source: USDA.
Note: Future years assume a deflator of 2% to match projections made in nominal terms with the inflation-adjusted historical data.
A strengthening dollar has been a headwind for U.S. exporters.

Currency Exchange Rates

*Nominal broad trade-weighted exchange value of the U.S. dollar.
Sources: Federal Reserve Board and Haver Analytics.
The dollar has also strengthened significantly against the currencies of other key agricultural producers.

Sources: FRB, IMF and Haver Analytics.
Last year’s crop production boosted cash flow for some producers, but has weighed on prices.

Crop Yields: Deviation from Trend

Source: USDA and staff calculations.
Multiple years of record production, and the drop in commodity prices, have cut farm income.

Net Farm Income and Production

Billion Dollars, (2016 $)

$/bu

160
140
120
100
80
60
40
20
0


Record Global or U.S. Production
U.S. Farm Income (Left Scale)
U.S. Corn Price (Right Scale)

Note: The shaded areas represent years when either U.S. or global production of corn, soybeans and wheat set a new record.
Sources: USDA.
The decline in revenue has spanned across many different industries.

Farm Sector Cash Receipts

Billion Dollars, (2016 $)

Source: USDA.
Some input costs have declined modestly.

Farm Sector Input Costs

Billion Dollars, (2016 $)

Sources: USDA, Haver Analytics, EIA, and Federal Reserve Bank of Kansas City.
But profit margins have generally remained low in both the livestock and crop sectors.

U.S. Livestock Sector Profit Margins

Cattle

Cow / Calf

Sources: USDA, Haver Analytics and CME.
Note: Production costs are calculated from USDA's Economic Research Service (Commodity Costs and Returns) and national yield averages for each year shown, but exclude the opportunity cost of unpaid labor from the calculation.
But profit margins have generally remained low in both the livestock and crop sectors.

U.S. Crop Sector Profit Margins

**Corn**

<table>
<thead>
<tr>
<th>Year</th>
<th>Price Range</th>
<th>December Futures Price</th>
<th>Production Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4-8</td>
<td>7</td>
<td>3-4</td>
</tr>
<tr>
<td>2014</td>
<td>4-8</td>
<td>7</td>
<td>3-4</td>
</tr>
<tr>
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<tr>
<td>2017</td>
<td>4-8</td>
<td>7</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Soybeans**

<table>
<thead>
<tr>
<th>Year</th>
<th>Price Range</th>
<th>November Futures Price</th>
<th>Production Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>10-16</td>
<td>14</td>
<td>8-12</td>
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Sources: USDA, Haver Analytics and CME.

Note: Production costs are calculated from USDA’s Economic Research Service (Commodity Costs and Returns) and national yield averages for each year shown, but exclude the opportunity cost of unpaid labor from the calculation.
Reduced income has spurred demand for financing, and loan repayment rates have softened.

Agricultural Credit Conditions
KC Fed District

Diffusion Index
Farm Loan Demand
Loan Repayment Rates
Loan Renewals or Extensions

Expected in three months

Source: Federal Reserve Bank of Kansas City.
Collateral requirements have risen steadily and fund availability has declined somewhat.

Agricultural Credit Conditions
KC Fed District

Source: Federal Reserve Bank of Kansas City.
Interest rates have edged up, particularly for variable rate loans.

Source: Federal Reserve Bank of Kansas City.
Farmland values have continued to decline from their peaks in 2013-2014, but gradually.

High Quality Farmland Values
2016:Q4
Percent change from previous year

<table>
<thead>
<tr>
<th>State</th>
<th>Peak Quarter</th>
<th>Percent Change from Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain States*</td>
<td>2016:Q2</td>
<td>-27</td>
</tr>
<tr>
<td>Kansas</td>
<td>2013:Q4</td>
<td>-21</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2013:Q1</td>
<td>-21</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>2015:Q3</td>
<td>-19</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>2014:Q3</td>
<td>-17</td>
</tr>
<tr>
<td>Iowa</td>
<td>2013:Q2</td>
<td>-17</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2013:Q3</td>
<td>-11</td>
</tr>
<tr>
<td>N. Illinois</td>
<td>2014:Q2</td>
<td>-10</td>
</tr>
<tr>
<td>Missouri</td>
<td>2013:Q3</td>
<td>-9</td>
</tr>
<tr>
<td>N. Indiana</td>
<td>2013:Q4</td>
<td>-9</td>
</tr>
<tr>
<td>S. Wisconsin</td>
<td>2015:Q1</td>
<td>-9</td>
</tr>
<tr>
<td>Texas</td>
<td>2016:Q4</td>
<td>No Decline</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>2016:Q4</td>
<td>No Decline</td>
</tr>
</tbody>
</table>

Source: Federal Reserve Bank of Kansas City.
Farmland values are still expected to trend lower.

Expected Change in Nonirrigated Cropland Values

Percent change expected over next 12 months

Avg. = -6.7

Avg. = -5.7

Avg. = -4.4

Source: Federal Reserve Bank of Kansas City.
If debt continues to grow and land values continue to fall, significant problems may still arise, but slowly.

### Farm Sector Debt-to-Asset Ratio

<table>
<thead>
<tr>
<th>Percent</th>
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<tbody>
<tr>
<td>0%</td>
</tr>
<tr>
<td>2%</td>
</tr>
<tr>
<td>4%</td>
</tr>
<tr>
<td>6%</td>
</tr>
<tr>
<td>8%</td>
</tr>
<tr>
<td>10%</td>
</tr>
</tbody>
</table>

### Annual Change in Farmland Values

| Number of Years to Reach Debt-to-Asset Ratio of 20% |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Annual Change in Farm Debt                         | 0%              | 2%              | 4%              | 6%              | 8%              | 10%             |
| 0%                                                    | --              | 18.2            | 9.2             | 6.2             | 4.7             | 3.8             |
| -2%                                                   | 21.9            | 9.9             | 6.5             | 4.8             | 3.9             | 3.2             |
| -4%                                                   | 11.0            | 6.8             | 5.0             | 3.9             | 3.3             | 2.8             |
| -6%                                                   | 7.3             | 5.1             | 4.0             | 3.3             | 2.8             | 2.5             |
| -8%                                                   | 5.4             | 4.1             | 3.4             | 2.9             | 2.5             | 2.2             |
| -10%                                                  | 4.3             | 3.4             | 2.9             | 2.5             | 2.2             | 2.0             |

Source: USDA and author's calculations.
Ag and rural consolidation is a potential implication of a prolonged downturn.

**Number of Farms by Economic Class**

Index, 2000 = 100

- More than $1m
- $500k to $1m
- $250k to $500k
- $100k to $250k
- Less than $100k

Source: USDA.

**Total Number of Farms**

Index, 2000 = 100

- Northern Plains
- Southern Plains
- Heartland

Source: USDA.
Concluding Remarks

• Economic growth in the U.S. continues, driven largely by urban areas concentrated in service-based industries.
• The recent downturn in the rural/ag economy would have been more severe if farmland values dropped more significantly.
• Although the outlook for ag is not a crisis, there is potential for further consolidation.
Questions?

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