Agricultural Outlook
“Running Against the Wind”

February 1, 2017

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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.
Outlook Themes

• Global demand for agricultural products remains strong, but there are macroeconomic headwinds.
• As with other commodities, supply has caught up with demand, and profits have been tight.
• Financial stress has increased gradually, and pressure could continue to build.
Economic growth has generally been positive, but has consistently fallen short of expectations.

U.S. Real GDP Growth

Percent, annualized

Sources: Bureau of Economic Analysis, Haver Analytics, Macroeconomic Advisors and Blue Chip Financial Forecasts.
Globally, economic growth has also been sluggish.
Commodity prices, not just in agriculture, have fallen sharply since 2013.

Change in Commodity Prices since 2013

Sources: The Wall Street Journal and Haver Analytics.
Lower energy prices have reduced transportation costs and have led to swings in regional price spreads.

Regional Corn Price Spreads

- Illinois / Kansas Spread
- Gulf / Kansas Spread

Better Price in IL, Gulf
Better Price in Kansas

Note: Gulf price is for delivery in 30 days, Central Illinois and Western Kansas are cash.
Source: USDA.
A strengthening dollar, however, has been a major headwind for U.S. exports.

*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.
Slower demand growth and rising production has boosted inventories of ag commodities.

**Stocks – to – Use Ratios**

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

Net Farm Income and Production

- Billion Dollars, 2016 Dollars
- $/bu

- 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

<table>
<thead>
<tr>
<th>Billion Dollars, 2016 Dollars</th>
<th>Billion Dollars, 2016 Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>50</td>
</tr>
<tr>
<td>Soybeans</td>
<td>40</td>
</tr>
<tr>
<td>Wheat</td>
<td>10</td>
</tr>
<tr>
<td>Cattle</td>
<td>90</td>
</tr>
<tr>
<td>Hogs</td>
<td>30</td>
</tr>
<tr>
<td>Dairy</td>
<td>40</td>
</tr>
<tr>
<td>Broilers</td>
<td>20</td>
</tr>
<tr>
<td>Veg, Fruits, Nuts</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: USDA.
On the positive side, input costs have declined in some areas.

Farm Sector Input Costs

<table>
<thead>
<tr>
<th>Diesel</th>
<th>Machinery</th>
<th>Seeds</th>
<th>Cash Rent*</th>
<th>Fertilizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3%)</td>
<td>(15%)</td>
<td>(15%)</td>
<td>(27%)</td>
<td>(20%)</td>
</tr>
</tbody>
</table>

Note: Percentages in parentheses indicate each input’s share of the total cost of production for corn in 2016.
Sources: USDA, Haver Analytics, EIA, and Federal Reserve Bank of Kansas City.
But profit margins have generally remained poor in both the livestock and crop sectors.

U.S. Livestock Sector Profit Margins

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 poor in both the livestock and crop sectors.

U.S. Crop Sector Profit Margins

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.
Profit opportunities for corn producers have been limited since 2013.

U.S. Corn Profit Margins

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.
Opportunities to sell soybeans for a profit have been greater.

U.S. Soybean Profit Margins

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.
Still, reduced farm income has spurred demand for financing, and loan repayment rates have softened.
Collateral requirements have risen steadily and fund availability has declined.

Agricultural Credit Conditions
KC Fed District

Diffusion Index

Collateral Requirements
Available Funds

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Operating Loans</th>
<th>Machinery Loans</th>
<th>Farm Real Estate Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5.25</td>
<td>5.50</td>
<td>5.75</td>
</tr>
<tr>
<td>2013</td>
<td>5.25</td>
<td>5.50</td>
<td>5.75</td>
</tr>
<tr>
<td>2014</td>
<td>5.25</td>
<td>5.50</td>
<td>5.75</td>
</tr>
<tr>
<td>2015</td>
<td>5.25</td>
<td>5.50</td>
<td>5.75</td>
</tr>
<tr>
<td>2016</td>
<td>5.25</td>
<td>5.50</td>
<td>5.75</td>
</tr>
</tbody>
</table>

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

High Quality Farmland Values 2016:Q3

Percent change from previous year

Change in U.S. Farmland Values, Peak to 2016:Q3

<table>
<thead>
<tr>
<th>State</th>
<th>Peak Quarter</th>
<th>Percent Change from Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kansas</td>
<td>2013:Q4</td>
<td>-20</td>
</tr>
<tr>
<td>Missouri</td>
<td>2013:Q3</td>
<td>-2</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2013:Q3</td>
<td>-11</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>2015:Q4</td>
<td>-4</td>
</tr>
<tr>
<td>Mountain States*</td>
<td>2016:Q2</td>
<td>-14</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2013:Q1</td>
<td>-16</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>2015:Q3</td>
<td>-9</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>2014:Q3</td>
<td>-16</td>
</tr>
<tr>
<td>Texas</td>
<td>2016:Q3</td>
<td>No Decline</td>
</tr>
<tr>
<td>N. Illinois</td>
<td>2014:Q2</td>
<td>-11</td>
</tr>
<tr>
<td>N. Indiana</td>
<td>2013:Q4</td>
<td>-9</td>
</tr>
<tr>
<td>Iowa</td>
<td>2013:Q2</td>
<td>-19</td>
</tr>
<tr>
<td>S. Wisconsin</td>
<td>2015:Q1</td>
<td>-1</td>
</tr>
</tbody>
</table>

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

Expected Change in Nonirrigated Cropland Values

Annual percent change

Source: Federal Reserve Bank of Kansas City.
If debt continues to grow, and land values continue to fall, significant problems may not arise until 2020 or later.

Source: USDA and author’s calculations.
Interest rates have been projected to rise gradually.

Sources: Federal Reserve Bank Board of Governors and Haver Analytics.
Concluding Remarks

• Persistently lower farm income has intensified the financial stress in the ag economy, but gradually.

• Barring a weather shock that might temporarily boost prices, farm income is likely to remain low. Managing debt and maintaining discipline will be key.

• If you’re running a marathon, manage your heart rate at mile 5… especially if the wind picks up.
Questions?

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