Long-Term Weather Trends and Prospects for a Recovery in the Price of Corn

Scott Irwin
Monthly Farm Price of Corn in Illinois, January 1947 - October 2016 and Projected Future Range

Price ($/bu.)


Avg.=$1.28
Avg.=$2.42

Source: NASS/USDA
U.S. Corn Use For Ethanol, 2000-01 - 2016-17 Marketing Years*

*2016-17: projected

Source: USDA-WASDE
Global Harvested Acreage of Corn, 2000-01 - 2016-17 Marketing Years

Marketing Years*

Source: FAS-USDA *2016-17 projected
Global Average Corn Yield, 2000-01 - 2016-17 Marketing Years*

y = 1.2955x + 67.663
R² = 0.8737

Source: FAS-USDA

*2016-17 projected
Global Ending Stocks-to-Use Ratio for Corn, 2000-01 - 2016-17 Marketing Years*

Source: FAS-USDA

*2016-17 projected
Global Average Corn Yield, 2000-01 - 2016-17 Marketing Years*

Source: FAS-USDA

*2016-17 projected
Global Ending Stocks-to-Use Ratio for Corn, 2000-01 - 2016-17 Marketing Years*

Source: FAS-USDA *2016-17 projected

With trend yields
U.S. Average Corn Yield, 1895-2016*

Source: USDA  
*2016=Nov. estimate
U.S. Average Corn Yield, 1895-2016*

Source: USDA

*2016=Nov. estimate
Deviations from Trend for U.S. Average Corn Yield, 1895-2016*

*2016 based on Nov. USDA estimate
Relationship between July Precipitation in the Corn Belt and Trend Deviation for U.S. Average Corn Yield, 1895-2016* 

\[ y = -2.3396x^2 + 23.151x - 50.842 \]

\[ R^2 = 0.3461 \]
Relationship between July Precipitation in the Corn Belt and Trend Deviation for U.S. Average Corn Yield, 1895-2016

\[ y = -2.3396x^2 + 23.151x - 50.842 \]

\[ R^2 = 0.3461 \]

\( R^2 = 0.51 \) for model with June, July, August Precip & June, July, & August Temp

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Relationship between July Precipitation in the Corn Belt and Trend Deviation for U.S. Average Corn Yield, 1895-2016

\[ y = -2.3396x^2 + 23.151x - 50.842 \]

\[ R^2 = 0.3461 \]

-50 -40 -30 -20 -10 0 10 20 30 0 1 2 3 4 5 6 7 8

Trend Deviation (%)

July Precipitation (inches)

R2 = 0.51 for model with June, July, August Precip & June, July, & August Temp

No evidence of a higher rate of growth in U.S. average trend yields in the mid-90s or later
Deviations from Trend for U.S. Average Corn Yield, 1895-2016*

Good proxy for weather impact

*2016 based on Nov. USDA estimate
Deviations from Trend for U.S. Average Corn Yield, 1895-2016*

*2016 based on Nov. USDA estimate


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-50 -40 -30 -20 -10 0 10 20 30


Year

Percent
Deviations from Trend for U.S. Average Corn Yield, 1895-2016*

*2016 based on Nov. USDA estimate

Percent of Years with Below Trend Deviation for U.S. Average Corn Yield in 20-Year Rolling Windows, 1895-2016
Total of Below Trend Deviations for U.S. Average Corn Yield in 20-Year Rolling Windows, 1895-2016
# Will Corn Prices Recover?

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<thead>
<tr>
<th></th>
<th>Negative</th>
<th>Neutral</th>
<th>Positive</th>
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<td>Weather</td>
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Runs Below Average for the Monthly Average Farm Price of Corn in Illinois, January 1973 - November 2006
Run Number

Runs Below Average for the Monthly Average Farm Price of Corn in Illinois, January 1973 - November 2006

July 2014 - May 2017 = 35 months