Next boost to productivity: Big Data?

Index: 1948 = 1.0

$R&D
Output
Input
TFP

# tractors > # horses + mules
No-till becomes popular
Satellites used for precision ag
Weed and pest resistant biotech
Big data applications?

Source: USDA-ERS.
Record farm equity (net worth) in 2015

Data: USDA-ERS.
Real commodity prices have been trending down for the past 60+ years.

Source: USDA Agricultural Projections to 2024 and OCE, February 2015
Percent of income spent on food

Disposable personal income per capita

Food Share (right axis)

per capita DPI (left axis)

Source: Schnepf (2013), BEA, USDA-ERS.
Recent declines in energy prices help bottom line

Source: EIA.
Ethanol margin tightens but production high

![Graph showing Ethanol Margin and Ethanol Production over time from Jan-10 to Jan-15. The Ethanol Margin graph shows fluctuations in the price per gallon, while the Ethanol Production graph displays the annualized rate in billion gallons.]

Source: ¹ OCE calculations, AMS data for IA, NE, IL/eastern corn belt, ² Energy Information Agency.
Rail transport costs return to normal levels in 2015

Average secondary railcar shuttle market bids per car

Source: USDA Grain Transportation Report
The dollar strengthens, but trade still trends up

Source: InterContinental Exchange, USDA-ERS.
Drought outlook improves, but intensifies in Southwest

- Area of California in Extreme to Exceptional drought (D3-D4) rose since last year (approximately 67% vs. 61% on Feb 11, 2014);
- California statewide average snow water equivalent as of February 10, 2015 is 6” (27% of normal for this time of year and 19% of the April 1 end-of-season total. SOURCE: California Cooperative Snow Surveys).
Farm Bill implementation progressing

Signups for Oct 2011-Dec 2014 livestock disaster assistance

- Apr 2014-Jan 2015
  - Base acre reallocation; Program yield updates
  - PLC, ARC-CO, or ARC-Farm election

Nov 2014-Feb 2015
- First possible 2014 ARC/PLC payments

Nov 2014-Mar 2015
- 2014 and 2015 program year enrollment

Apr 2014
- First payments for 2011-2014 livestock disaster assistance

Sept 2014-Dec 2015
- MPP-dairy registration for Sept-Dec 2014 and calendar 2015

Jan-Mar 2015
- Purchase of 2015 crop insurance, SCO, and STAX policies

Apr-summer 2015
- First possible MPP payments

Apr 2015
- First payments of 2015 crop insurance, SCO, and STAX indemnities

Spring 2016
- First possible 2014 ARC/PLC payments

Oct 2015
- First payments of 2015 crop insurance, SCO, and STAX indemnities

MPP - dairy registration for Sept-Dec 2014 and calendar 2015

2014 and 2015 program year enrollment

First possible 2014 ARC/PLC payments

First payments for 2011-2014 livestock disaster assistance

Purchase of 2015 crop insurance, SCO, and STAX policies

First possible MPP payments

First payments of 2015 crop insurance, SCO, and STAX indemnities
Second highest year for exports expected; China remains top destination

FY 2015 Ag Exports $141.5 billion
Imports $119.0 billion
Balance $22.5 billion

Source: USDA (ERS-FAS) Outlook for U.S. Agricultural Trade
Monthly Chinese soybean imports

Source: Global Trade Information Services (GTIS)
Monthly Chinese corn/barley/sorghum imports

Source: Global Trade Information Services (GTIS)
Projections down slightly for China imports, but still increasing

Imports of grains, oilseeds, cotton combined

Last year's projection
This year’s baseline projection

Source: USDA Agricultural Projections to 2024
Global trade growth is expected to continue

Source: USDA Agricultural Projections to 2024
TPP* and TTIP*: Room to grow

*TPP partners include Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam.

TPP Ag Trade
Total $498.5 billion

Exports $150.5 billion
Imports $111.9 billion

U.S. Ag Trade
Total $262.4 billion

U.S exports $62.6 billion
U.S. imports $57.2 billion

U.S. exports $12.6 billion
U.S. imports $19.1 billion

TTIP Ag Trade
Total $222 billion

*TTIP partner is EU-28.

Sources: Economic Research Service, Foreign Agriculture Service, USDA; World Trade Organization; European Commission
Outlook for Crops
Global grain ending stocks build strength

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>112</td>
<td>97</td>
<td>113</td>
<td>111</td>
<td>104</td>
<td>93</td>
<td>98</td>
<td>101</td>
</tr>
<tr>
<td>Corn</td>
<td>82</td>
<td>69</td>
<td>65</td>
<td>56</td>
<td>57</td>
<td>58</td>
<td>67</td>
<td>71</td>
</tr>
<tr>
<td>Rice</td>
<td>115</td>
<td>77</td>
<td>79</td>
<td>82</td>
<td>86</td>
<td>86</td>
<td>82</td>
<td>75</td>
</tr>
<tr>
<td>Soybeans</td>
<td>74</td>
<td>71</td>
<td>93</td>
<td>103</td>
<td>77</td>
<td>80</td>
<td>89</td>
<td>113</td>
</tr>
<tr>
<td>Cotton</td>
<td>190</td>
<td>206</td>
<td>145</td>
<td>160</td>
<td>259</td>
<td>305</td>
<td>340</td>
<td>360</td>
</tr>
</tbody>
</table>

*Fig 17*  

Numbers in red denote record levels.

*Source*: USDA, PSD database
Corn, wheat, and soybean prices still historically strong, given record output

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>3.09</td>
<td>6.78</td>
<td>4.87</td>
<td>5.70</td>
<td>7.24</td>
<td>7.77</td>
<td>6.87</td>
<td>6.00</td>
<td>5.10</td>
</tr>
<tr>
<td>Corn</td>
<td>2.14</td>
<td>4.06</td>
<td>3.55</td>
<td>5.18</td>
<td>6.22</td>
<td>6.89</td>
<td>4.46</td>
<td>3.65</td>
<td>3.50</td>
</tr>
<tr>
<td>Soybeans</td>
<td>5.45</td>
<td>9.97</td>
<td>9.59</td>
<td>11.30</td>
<td>12.50</td>
<td>14.40</td>
<td>13.00</td>
<td>10.20</td>
<td>9.00</td>
</tr>
<tr>
<td>Upland Cotton</td>
<td>46.48</td>
<td>47.80</td>
<td>62.90</td>
<td>81.50</td>
<td>88.30</td>
<td>72.50</td>
<td>77.90</td>
<td>61.00</td>
<td>60.00</td>
</tr>
<tr>
<td>All Rice</td>
<td>5.61</td>
<td>16.80</td>
<td>14.40</td>
<td>12.70</td>
<td>14.50</td>
<td>15.10</td>
<td>16.30</td>
<td>14.00</td>
<td>13.10</td>
</tr>
</tbody>
</table>

Wheat, corn and soybeans in dollars per bushel; rice in dollars per hundredweight; upland cotton in cents per pound. **Numbers in red** denote record levels.

Source: USDA-NASS, Feb 2015 WASDE, and USDA-World Ag Outlook Board
Cropland area expected to remain high in 2015, but down from last year

<table>
<thead>
<tr>
<th>Crop (mil. acres)</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015F</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>86.4</td>
<td>88.2</td>
<td>91.9</td>
<td>97.2</td>
<td>95.4</td>
<td>90.6</td>
<td>89.0</td>
<td>-1.8%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>77.5</td>
<td>77.4</td>
<td>75.0</td>
<td>77.2</td>
<td>76.8</td>
<td>83.7</td>
<td>83.5</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Wheat</td>
<td>59.0</td>
<td>52.6</td>
<td>54.3</td>
<td>55.3</td>
<td>56.2</td>
<td>56.8</td>
<td>55.5</td>
<td>-2.3%</td>
</tr>
<tr>
<td>All cotton(^1)</td>
<td>9.1</td>
<td>11.0</td>
<td>14.7</td>
<td>12.3</td>
<td>10.4</td>
<td>11.0</td>
<td>9.7</td>
<td>-12.1%</td>
</tr>
<tr>
<td>Minor feed grains</td>
<td>13.5</td>
<td>11.4</td>
<td>10.4</td>
<td>12.6</td>
<td>14.6</td>
<td>12.8</td>
<td>14.0</td>
<td>9.1%</td>
</tr>
<tr>
<td>Rice</td>
<td>3.1</td>
<td>3.6</td>
<td>2.7</td>
<td>2.7</td>
<td>2.5</td>
<td>2.9</td>
<td>2.9</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Total 8 crops(^1)</td>
<td>248.7</td>
<td>244.2</td>
<td>249.0</td>
<td>257.4</td>
<td>255.9</td>
<td>257.9</td>
<td>254.6</td>
<td>-1.3%</td>
</tr>
<tr>
<td>CRP</td>
<td>33.7</td>
<td>31.3</td>
<td>31.1</td>
<td>29.5</td>
<td>26.8</td>
<td>25.5</td>
<td>24.2</td>
<td>-5.1%</td>
</tr>
<tr>
<td>8 crops + CRP(^1)</td>
<td>282.4</td>
<td>275.5</td>
<td>280.2</td>
<td>286.9</td>
<td>282.8</td>
<td>283.5</td>
<td>278.8</td>
<td>-1.6%</td>
</tr>
</tbody>
</table>

Source: USDA-World Ag Outlook Board  \(^1\) all cotton, includes both upland and ELS cotton
Specialty crop revenues expected to drop in 2015

Source: USDA-ERS
Livestock outlook
### Pork, dairy and poultry production higher in 2015

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>26.30</td>
<td>26.20</td>
<td>25.91</td>
<td>25.72</td>
<td>24.25</td>
<td>24.22</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Pork</td>
<td>22.44</td>
<td>22.76</td>
<td>23.25</td>
<td>23.19</td>
<td>22.84</td>
<td>24.09</td>
<td>5.5%</td>
</tr>
<tr>
<td>Broilers</td>
<td>36.91</td>
<td>37.20</td>
<td>37.04</td>
<td>37.83</td>
<td>38.55</td>
<td>39.95</td>
<td>3.6%</td>
</tr>
<tr>
<td>Total Meat</td>
<td>92.10</td>
<td>92.75</td>
<td>92.96</td>
<td>93.33</td>
<td>92.17</td>
<td>95.13</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Animal products</th>
<th>Billion Pounds</th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>192.9</td>
<td>196.3</td>
<td>200.6</td>
<td>201.2</td>
<td>206.0</td>
<td>211.5</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Prices in red denote record levels.

Source: Office of the Chief Economist, February 2015
Feed price ratios improved since 2013

Extended period of low price ratios

Source: USDA-NASS
Cattle inventory up – January 2015

US:
Jan 2014: 88,526
Jan 2015: 89,800
Change: 1,274
% Change: 1.4%

Source: USDA-NASS Cattle report
Year-over-year declines in PEDv

New PEDv Case Reports by Week

Meat exports expected to remain high

Source: USDA PSD database
Dairy exports remain high, but down from 2014

Source: USDA PSD database
Hog, dairy, and broiler prices expected to come down from 2014; cattle prices rise

<table>
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<tr>
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<tbody>
<tr>
<td></td>
<td>Dollars per cwt</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Steers</td>
<td>95.38</td>
<td>114.73</td>
<td>122.86</td>
<td>125.89</td>
<td>154.56</td>
<td>162.00</td>
<td>4.8%</td>
</tr>
<tr>
<td>Hogs</td>
<td>55.06</td>
<td>66.11</td>
<td>60.88</td>
<td>64.05</td>
<td>76.03</td>
<td>56.00</td>
<td>-26.3%</td>
</tr>
<tr>
<td>Broilers</td>
<td>83.10</td>
<td>79.90</td>
<td>86.60</td>
<td>99.70</td>
<td>104.90</td>
<td>100.30</td>
<td>-4.4%</td>
</tr>
<tr>
<td>Milk</td>
<td>16.26</td>
<td>20.14</td>
<td>18.52</td>
<td>20.05</td>
<td>23.98</td>
<td>17.75</td>
<td>-26.0%</td>
</tr>
</tbody>
</table>

Prices in red denote record levels.

Source: Office of the Chief Economist, February 2014
Dairy margins nearing $8 per cwt

Source: NASS and AMS data for history, forecast from FSA Margin Protection Program Decision Tool, Feb 13, 2015
Farm income and land values
Net farm income is down, but debt-to-assets remain historically low

Data: USDA-ERS.
High farm incomes in 2012-14 were used to purchase land, inventory, and machinery

Data: USDA-ERS
Farmland values coming down in some areas

Year-over-Year change in Q4

- Illinois
- Indiana
- Wisconsin
- Iowa

Data: Federal Reserve Bank Chicago.
Food CPI remains low

ERS forecast: 2.0-3.0% for 2015

Source: BLS.
Retail meat price inflation is above 10% y-o-y

Source: BLS.
AGRICULTURAL OUTLOOK FORUM

Smart Agriculture in the 21st Century

A Discussion on Innovation, Bio-technology, and Big Data

February 19-20, 2015 —
Crystal Gateway Marriott Hotel, Arlington, Virginia