Agricultural Productivity Values for Missouri Farmland

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Dr. Scott Brown
Agricultural Markets and Policy
Division of Applied Social Sciences

brownc@missouri.edu

College of Agriculture, Food and Natural Resources
http://amap.missouri.edu
What is the Goal?

- Identify the productive use value of agricultural land
- Calculate agricultural use values in a clearly defined, systematic way without sacrificing available information
  - Include as much information on all types of agricultural returns as possible
  - Keep the method straightforward so it is clear exactly what the process includes and what it does not
Challenges

- Market values for land include many things
  - We only care about the productive use value of the land
  - Other factors affecting land market value must be separated from the agricultural use value, i.e. recreational use

- The theoretically “best” way to value an asset includes knowing future returns
  - Data on future returns is not available until it is too late
  - Focus on historical returns (naïve approach) or “expert” future predictions?

- Use values should not vary greatly from the present economic reality, but extreme volatility is not desirable
Theoretical Use Value

- Future stream of returns discounted to today’s dollars

- Use Value = \( \sum \left( \frac{NR_t}{(1 + r_t)^t} \right) \)

\( t = 1 \) to infinity

- If net return and discount rate are assumed constant, it collapses to \( UV = \frac{NR}{r} \)
Methodology to Calculate Missouri Agricultural Use Values

- Use 15-year historical moving averages of crop and cow-calf returns
- Crop returns for 6 crops weighted by state acreage totals
- Prices used are USDA average prices received by Missouri farmers
- Costs are reported USDA production costs excluding land for the Heartland region which includes Missouri
- 2017 agricultural use value estimates based in small part on the University of Missouri’s current outlook
- The 2017 agricultural use value depends on data from the 2003 to 2017 period
- Spreadsheet available at [http://amap.missouri.edu/](http://amap.missouri.edu/)
Corn Prices Used in the Formula

Current Cash – November 2017 Kansas City Price

- Min: 2.03
- 15-yr Avg: 3.93
- Max: 7.34
- Current Cash: 3.20
Cotton Prices Used in the Formula

Current Cash – North Delta, Spot Market Quotation – USDA/AMS
Corn Expenses Versus Market Receipts

Dollars per acre


Overhead Expenses
Variable Expenses
Market Receipts
Crop Expenses Versus Market Receipts

Dollars per acre


- Overhead Expenses
- Variable Expenses
- Market Receipts
Beef Cow Expenses Versus Market Receipts

Dollars per cow

Expenses

Market Receipts
MO Beef Cow Receipts less Expenses

15-Year Moving Average
Agriculture Real Estate Loan Rate, 10th Fed. Reserve

Interest Rate
- 15-year Moving Average


Interest Rate
- 15-year Moving Average
MU Agricultural Use Values, By Grade December 2017 Estimate

From 2015 to 2017 Grades 1 - 4  +17%
MU Agricultural Use Values, By Grade
December 2017 Estimate

From 2015 to 2017 Grades 5 - 7 +10%
Some Other States Have Modified Formula Outcomes

- Illinois – Increases/decreases capped at 10% of last median value
- Indiana – Froze base rate for 1 year in 2016; new formula in ‘17
- Iowa – Ag real estate taxable valuation limited to 3% growth statewide
- Ohio – Cut the time lag in tax year 2016 to more quickly reflect falling crop values into the formula
- S. Dakota – Increases/decreases capped at 10% of last value
- Texas – Increases capped at the greater of 10% or interest rate plus 2.5%
Other Information That Factors Into the Decision

- U.S. farm income has fallen sharply since 2013
  - Crop prices down as stocks build
  - Livestock prices down as supply grows
  - International demand affected by strong U.S. dollar
- Future profitability outlook suggests a similar story
  - Supplies of crops and livestock on firmer ground
  - New demand sources necessary to push prices higher
- Farm income expected to stay near recent level
- Weather, macroeconomic, “wildcard” shocks possible
## November 2017 Outlook for Missouri

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Corn ($ per Bu.)</td>
<td>3.78</td>
<td>3.40</td>
<td>3.23</td>
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<tr>
<td>Soybeans ($ per Bu.)</td>
<td>9.04</td>
<td>9.60</td>
<td>9.36</td>
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<tr>
<td>Wheat ($ per Bu.)</td>
<td>4.53</td>
<td>3.99</td>
<td>4.38</td>
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<tr>
<td>Sorghum ($ per Bu.)</td>
<td>3.65</td>
<td>2.91</td>
<td>3.10</td>
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<tr>
<td>Cotton ($ per Lb.)</td>
<td>0.59</td>
<td>0.69</td>
<td>0.69</td>
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<tr>
<td>Rice ($ per Cwt.)</td>
<td>10.17</td>
<td>9.54</td>
<td>11.72</td>
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<tr>
<td>Cattle ($ per Cwt.)</td>
<td>101.38</td>
<td>120.86</td>
<td>121.34</td>
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<tr>
<td>Calves ($ per Cwt.)</td>
<td>137.47</td>
<td>158.72</td>
<td>159.68</td>
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U.S. Ag Profitability Indicators

Billion Dollars


Net farm income  Net cash income
Missouri Net Farm Income

Billion Dollars