Farmland Value Expectation and Its Impact on Farmland Market: Evidence from Surveys of Agricultural Professionals since 1964

Jiayou Mei*, Wendong Zhang**, Dermot Hayes***

Department of Economics
Iowa State University, Ames, IA, 50010, USA.

jymei@iastate.edu
wdzhang@iastate.edu
dhayes@iastate.edu

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Dermot Hayes

Department of Economics, Iowa State University; jerome@iastate.edu, wdzheng@iastate.edu, dhayes@iastate.edu

Introduction

- Farmland is critically important for producers and the ag economy
  - The most significant asset on the agricultural sector
  - 80% of the total value of U.S. agricultural assets
- Impact of farmland value expectation on economic activity & ag economy is rarely examined
  - Studied in many areas of Economics: Urban Economics (Shiller (2007)), Energy Economics (Kilian (2009)), etc.
  - Only exception: Kuehle (2016) examined farmland value expectation formation using Fed Reserve data
- This paper used a unique data to examine the effects of farmland value expectation on future farmland value and sale activity.

Hypothesis

**Higher expectation → Higher future farmland value and more sales**

- Hypothesis 1: Higher farmland value expectation tends to lead to a higher farmland value in the future.
- Hypothesis 2: Higher farmland value expectation tends to lead to higher farmland sale activities in the future.

Data

- Unique annual on-site survey data on farmland value expectation in Iowa
  - Long time series; 1964 to 2017 - 1980s crisis and late - 2000s hike
  - Quantitative expectations reported by experts
- Different terms of expectation: 6 months, 18 months and 5, 15-year
- Not only relevant for Iowa: Iowa market movements are often leading indicators for Midwest & US

Survey Questionnaire Example – as of May 2017

Part I: Short term expectation

**Methods**

- Following the framework of Falk and Lee (1998) and Weersink et al. (1999), the model is:
  \[
  \Delta \text{Farmland value} = \beta_0 + \beta_1 \Delta \text{Expectation},
  + \beta_2 \Delta \text{Interest rate}, + \beta_3 \Delta \text{Farmland return},
  \]
- New addition: experts' farmland value expectation
  - Data is adjusted for inflation and logarithmic form is taken on the variables
  - Differences are taken to deal with nonstationarity
  \[
  \Delta \text{Variables} = \text{Variable}_t - \text{Variable}_{t-1}
  \]
- Lagged term are added to allow for autocorrelation when regressing on sale activity:
  \[
  \Delta \text{Sale activities} = \beta_0 + \beta_1 \Delta \text{Expectation}, + \beta_2 \Delta \text{Interest rate}, + \beta_3 \Delta \text{Farmland return}, + \beta_4 \Delta \text{Sale activities},
  \]
- Robustness check
  - Various variables are used to proxy for farmland return
    - Crop price
    - Crop basis
    - Cash rent
  - Both 6 months and 18 months expectation are examined

Results

How expectation affect farmland market?

Part I: Impact on future farmland value 6 month later

<table>
<thead>
<tr>
<th>Farmland value</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectation</td>
<td>0.842***</td>
<td>0.877***</td>
<td>1.071***</td>
</tr>
<tr>
<td>Interest rate</td>
<td>-0.0102</td>
<td>-0.0145*</td>
<td>-0.0118</td>
</tr>
<tr>
<td>Crop price</td>
<td>0.181***</td>
<td>-0.516**</td>
<td>-0.388*</td>
</tr>
<tr>
<td>Crop basis</td>
<td></td>
<td>-0.00515</td>
<td>-0.00385</td>
</tr>
<tr>
<td>Cash rent</td>
<td>0.00358</td>
<td>0.779</td>
<td>0.773</td>
</tr>
<tr>
<td>R-Square</td>
<td>0.834</td>
<td>0.779</td>
<td>0.773</td>
</tr>
</tbody>
</table>

Note: Independent variables have been differenced and adjusted as in the regression model. The expectation is for 6-month.

Part II: Impact on future farmland sale activities

<table>
<thead>
<tr>
<th>Lagged sale activities</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmland value</td>
<td>1.701**</td>
<td>1.426**</td>
<td>2.946**</td>
</tr>
<tr>
<td>Expectation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest rate</td>
<td>-0.142</td>
<td>-0.265</td>
<td>-0.456</td>
</tr>
<tr>
<td>Crop price</td>
<td>0.759**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop basis</td>
<td></td>
<td>-3.479**</td>
<td></td>
</tr>
<tr>
<td>Cash rent</td>
<td></td>
<td>-2.287**</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.141**</td>
<td>-0.122**</td>
<td>-0.184**</td>
</tr>
<tr>
<td>R-Square</td>
<td>0.444</td>
<td>0.424</td>
<td>0.297</td>
</tr>
</tbody>
</table>

Farmland Value Expectation +1% Sale Activities +1.70% 6 months later

Conclusion and Policy Implication

- By using the unique and rarely-used data on farmland value expectation, we provide support for the hypotheses that farmland value expectation has a positive impact on future farmland value and farmland sale activity
- Our results suggest that expectations on farmland value can amplify fluctuations and risk in farmland market.
- Expectation overreact to external changes → actual farmland value in the future fluctuate more greatly bubbles and troughs.
- High expectation → premature land purchases → over leveraging and loss of liquidity → risk in farmland market increased

References


Part II: Long term expectation

<table>
<thead>
<tr>
<th>November 1, 2005</th>
<th>November 1, 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND ($/ACRE)</td>
<td>CORN CASH PRICE ($/BU)</td>
</tr>
<tr>
<td>COY WHEAT PRICE ($/BU)</td>
<td></td>
</tr>
</tbody>
</table>