The Economics of Agricultural Land Markets

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Current U.S. Land Market

Characterized by:

• Rapidly rising values
• Generally thin market
• Headline sales that may or may not be representative
• Very strong farmer demand (70%+ of sales)
• Investor interest
• General sense of optimism
2011 Cropland Value by State
Dollars per Acre and Percent Change from 2010

Source: Land Values 2011 Summary (August 2011), USDA, NASS
How High?

• Prices (at least on our survey averages) are likely headed higher, but......
  – Yes prices will go down someday but probably not anytime soon
  – Prices will likely go down substantially at some time in the future – commodity markets are volatile and cyclical
Fundamentals Make Prices Look Attractive

• Today’s earnings and interest rates make prices look attractive
  – Today’s fundamentals were not necessarily yesterday’s
  – Tomorrow’s fundamentals are not necessarily today’s
The following charts are from:


Chart 2
GROSS FARM INCOME AND NET RETURNS TO FARM OPERATORS

Note: Calculations based on U.S. Census Bureau and USDA data deflated with CPI from the Federal Reserve Bank of Minneapolis.
Chart 1

U.S. AGRICULTURAL EXPORTS AND INDEX OF PRICES RECEIVED BY U.S. FARMERS

Note: Calculations based on U.S. Census Bureau and USDA data deflated with CPI from the Federal Reserve Bank of Minneapolis.
Chart 3
FARM CAPITAL EXPENDITURES

Note: Calculations based on USDA data deflated with CPI from the Federal Reserve Bank of Minneapolis.
Note: Calculations based on U.S. Census Bureau and USDA data deflated with CPI from the Federal Reserve Bank of Minneapolis.
All U.S. Agricultural Real Estate Values, 1913-2011, (2005 USD per Acre)
What Drives Value?

• General idea of purchasing capital assets
  – Obtain the rights to future earnings for a price less than the real earnings that it will produce

• Capital asset values are determined by *EXPECTATIONS* of the level of future earnings and their present value
  – Earnings are difficult to forecast
  – Interest rates and inflation drive present values and are equally difficult to forecast
So How Did We Get Here?

• Returns are high driven by
  – Biofuel demand
  – Strong demand from emerging markets
  – Weather shocks/poor yields

• Generally decreasing interest rate environment
  – Rates at 30 year lows
Rental rates have been slow to adjust upward.
Interest Rate on 10-Year Treasury Bonds, 1970-2011

<table>
<thead>
<tr>
<th>Period</th>
<th>Average Interest Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970 to 1979</td>
<td>7.5</td>
</tr>
<tr>
<td>1980 to 1989</td>
<td>10.6</td>
</tr>
<tr>
<td>1990 to 1999</td>
<td>6.7</td>
</tr>
<tr>
<td>2000 to 2009</td>
<td>4.5</td>
</tr>
<tr>
<td>Entire period 1970 to 2009</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Cash rent multiple begins to climb.
A Simple Model of Farmland Values

The income capitalization model:

\[
Farmland\ Value = \frac{Income}{discount\ rate\ (\%) - growth\ rate\ (\%)}
\]

Important points:

\begin{align*}
\uparrow\text{Income} & \quad \rightarrow \quad \text{land value} & \uparrow \\
\uparrow\text{Discount rate} & \quad \rightarrow \quad \text{land value} & \downarrow \\
\uparrow\text{Income growth rate} & \quad \rightarrow \quad \text{land value} & \uparrow \\
\end{align*}

6% discount rate less 1% growth = 5% “cap rate”

Cash rent multiple is the inverse of the cap rate
By this measure farmland looks pricey today.
Reflect expected earnings growth and low interest rates.

Value-to-Cash Rent Multiple for IA, IL, IN Cropland, 1967-2011

Sources: IL and IA compiled from NASS Reports, IN from Purdue Land Value
Land Values Under Alternative Capitalization Rates (Multiples) and Income Levels

- 3% (33)
- 4% (25)
- 5% (20)
- 6% (17)
- 8% (13)

2011 Value HQ IN Farmland $6,521

Current Cash Rental Rate HQ IN Farmland, $230 per Acre

Value per Acre

Income per Acre

150 170 190 210 230 250 270 290 310 330 350 370 390 410 430 450 470
Land rent has averaged 35% of revenue over this period, high = 45%, low = 22%
So What About Corn Prices?

- Darrel Good and Scott Irwin forecast the new plateau prices as follows:

<table>
<thead>
<tr>
<th></th>
<th>Corn</th>
<th>Soybeans</th>
<th>Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Dec 2006 Monthly Price</td>
<td>------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>Average</td>
<td>4.60</td>
<td>11.50</td>
<td>5.80</td>
</tr>
<tr>
<td>High</td>
<td>6.70</td>
<td>19.10</td>
<td>10.15</td>
</tr>
<tr>
<td>Low</td>
<td>3.00</td>
<td>8.20</td>
<td>3.30</td>
</tr>
</tbody>
</table>

Box captures I&G’s corn price range with land receiving 35% of gross revenue @ 188 bu/ac
Two Key Takeaways

• Policy plays a key role in current situation
  – Biofuels
  – Crop insurance
  – Environmental policy

• Macro-economics plays a key role in the situation
  – Interest rates
  – Exchange rates
  – Demand (income growth)
Cap Rate Risk

- Monetary policy change = cap rate ↑
- Economic recovery = cap rate ↑
- Inflation = cap rate ↑
- Increased volatility/risk = cap rate ↑
- Slowing income growth in ag = cap rate ↑
Thoughts on Bubbles

.... you get a bubble when a very high percentage of the population buys into some originally sound premise.... that (the premise) becomes distorted as time passes and people forget the original sound premise and start focusing solely on the price action....

Excerpt from Warren Buffett’s interview with the Financial Crisis Inquiry Commission
So What are Some of the Elements of the Premise and are They Sound?

A. Population and economic growth in emerging economies puts great leverage on food demand

B. Biofuels create large, new sustained demand

C. Ability to expand supply is limited – land and productivity

D. Ag will work when inflation comes
A. Economic growth in populous emerging economies puts leverage on food demand
Big Demand Increases From Ethanol are Likely Over

**Corn to Meet RFS2**

B. World appetite for bio-fuels creates new, large demand?

2011 to 2015 Crops Average **215** million bushels ADDITIONAL/year

2005 to 2010 Crops Average **689** million bushels ADDITIONAL/year

C. Ability to expand supply is limited?

Price Risk is Substantial

Weekly Nearby Corn Futures Contract Prices, 2006-2011
<table>
<thead>
<tr>
<th>Factor</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy</td>
<td>Vibrant</td>
</tr>
<tr>
<td></td>
<td>Sluggish</td>
</tr>
<tr>
<td>Outlook</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>Lenders</td>
<td>Eager</td>
</tr>
<tr>
<td></td>
<td>Reticent</td>
</tr>
<tr>
<td>Capital markets</td>
<td>Loose</td>
</tr>
<tr>
<td></td>
<td>Tight</td>
</tr>
<tr>
<td>Capital</td>
<td>Plentiful</td>
</tr>
<tr>
<td></td>
<td>Scarce</td>
</tr>
<tr>
<td>Terms</td>
<td>Easy</td>
</tr>
<tr>
<td></td>
<td>Restrictive</td>
</tr>
<tr>
<td>Interest rates</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Spreads</td>
<td>Narrow</td>
</tr>
<tr>
<td></td>
<td>Wide</td>
</tr>
<tr>
<td>Investors</td>
<td>Optimistic</td>
</tr>
<tr>
<td></td>
<td>Pessimistic</td>
</tr>
<tr>
<td></td>
<td>Sanguine</td>
</tr>
<tr>
<td></td>
<td>Distressed</td>
</tr>
<tr>
<td>Asset owners</td>
<td>Happy to hold</td>
</tr>
<tr>
<td></td>
<td>Rushing for the exits</td>
</tr>
<tr>
<td>Sellers</td>
<td>Few</td>
</tr>
<tr>
<td></td>
<td>Many</td>
</tr>
<tr>
<td>Markets</td>
<td>Crowded</td>
</tr>
<tr>
<td></td>
<td>Starved for attention</td>
</tr>
<tr>
<td>Recent performance</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>Weak</td>
</tr>
</tbody>
</table>

**The Poor Man’s Guide to Market Assessment – Adapted from *The Most Important Thing: Uncommon Sense for Thoughtful Investors*, by Howard Marks**
Final Thoughts

• There is plenty of room for land prices to go higher
• There are substantial risks associated with higher moves
  – Interest rates (cap rates)
  – These prices and rates will encourage use of leverage
  – Demand growth will face challenges
  – Supply response is coming
  – Will we really end up at $4.60 on corn?
Questions

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