

When Do Farm Booms Become Bubbles?

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Background

- Agriculture's history includes periods of remarkable boom and bust
- Agriculture is capital intensive
 - Large increases in profitability make fixed assets priced in less profitable times look cheap

Key Questions:

- Will these times last or will we retreat to previous levels?
- Are farmland values in a speculative bubble or responding normally to economic conditions?

Types of Shocks which Alter Farming Profitability

- Demand driven: Expansion of demand which calls for more output at all price levels
 - For example, biofuels and income growth and food demand in emerging markets
 - Persistent demand growth can substantially increase land values and capital investment
- Supply induced: Supply contraction where less is available at all price levels
 - Short-term weather shocks do not typically impact fixed asset values
 - Inability of supply to keep up with normal demand expansion. If true could lead asset value increases

Current situation is complicated by interaction of both impacts and extremely low interest rates which make future income more valuable

So How Big are the Recent Increases in Farmland Values?

In Real Terms, Today's Farmland Value Increases are on Par with those of the 70's

Region	Nominal Change Annualized Growth Rate	Real Change and Annualized Growth Rate
<u>Iowa</u>	-----Percent -----	
1971-1981	399	122
	17.4	8.3
2001-2011	248	176
	13.3	10.7
<u>Illinois</u>		
1971-1981	343	97
	16.1	7.0
2001-2011	149	97
	9.6	7.0
<u>Indiana</u>		
1971-1981	381	114
	17.0	7.9
2001-2011	104	62
	7.4	4.9

^a Iowa farmland values from the Iowa State Farmland Survey (Duffy). Indiana, Illinois, and U.S. Values from National Agricultural Statistics Service. Real values calculated using the CPI index.

What is a Bubble?

- Economists:
 - “Substantial and long-lasting divergence of asset prices from what would be determined from the rational expectation of the present value of cash flows from the asset” (Malkiel)
 - “If the reason that the price is high today is only because investors believe that the selling price will be high tomorrow – when “fundamental” factors do not seem to justify such a price – then a bubble exists.” (Stiglitz)

Economists

- Investors value assets on expectations of fundamentals (the value of future earnings)
- Problem:
 - We don't really observe expectations just asset prices
 - Bubbles nearly impossible to predict ex ante
 - Most examples of bubbles (tulips, South Sea, etc.) could be plausibly rationalized in hindsight
 - Speculative bubbles by this definition are very rare

On the Other Hand

- Most people associate the term bubble with large price increases and decreases over a short time
- Usually started by shifts that greatly increase the expectations of future profits generated by an asset (Malkiel)
- Investor psychology can play a key role (Shiller)
 - Can be prone to feedback loops – high prices encourage higher prices
 - Shortage illusions
 - Other irrational behavior

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

How Does This Apply to the Farmland Situation?

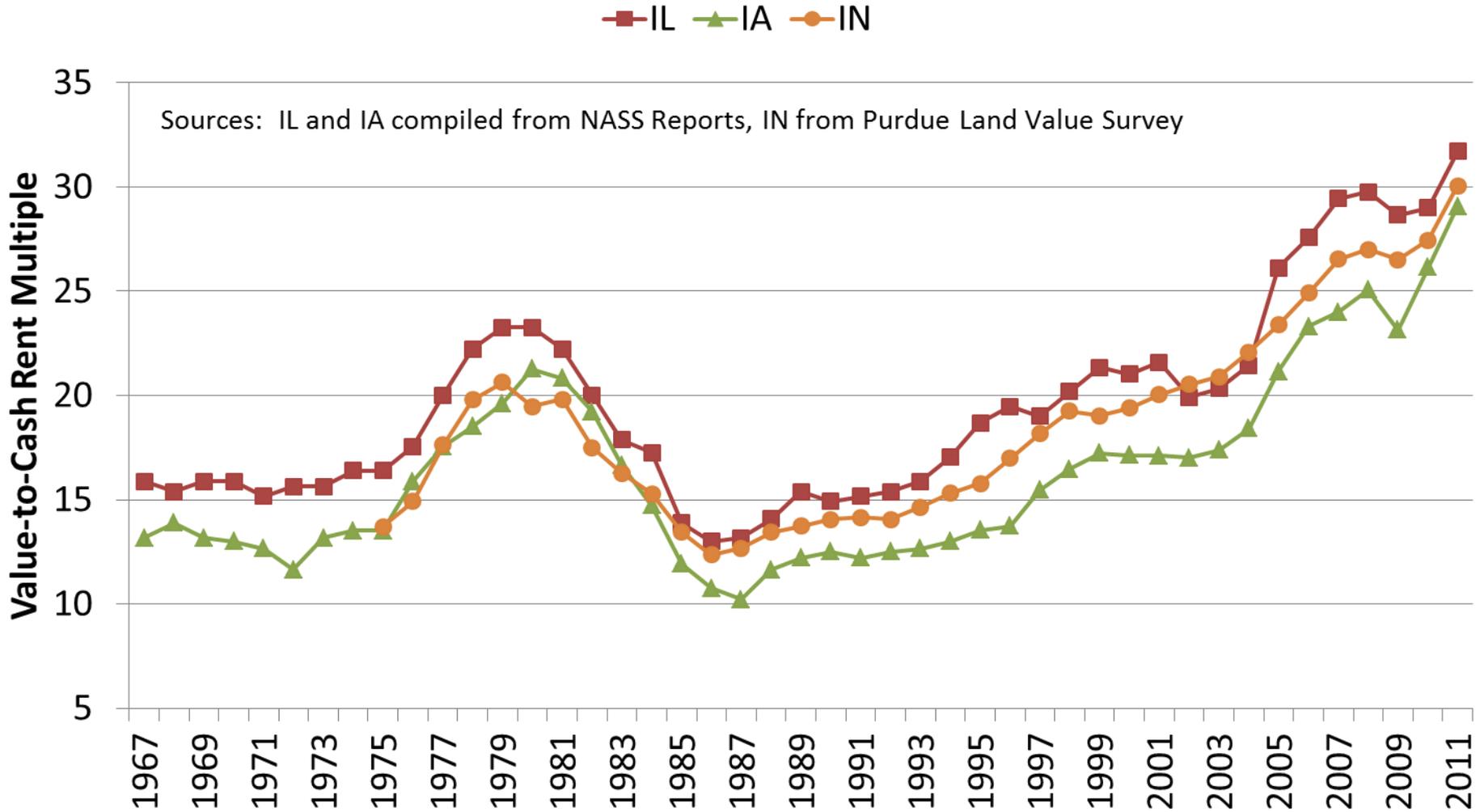
- Fundamentals have undergone dramatic changes
 - Increased demand
 - Reduced interest rates
 - Supply shocks

Are market participants evaluating these factors when pricing farmland?

Let's Examine the Fundamentals

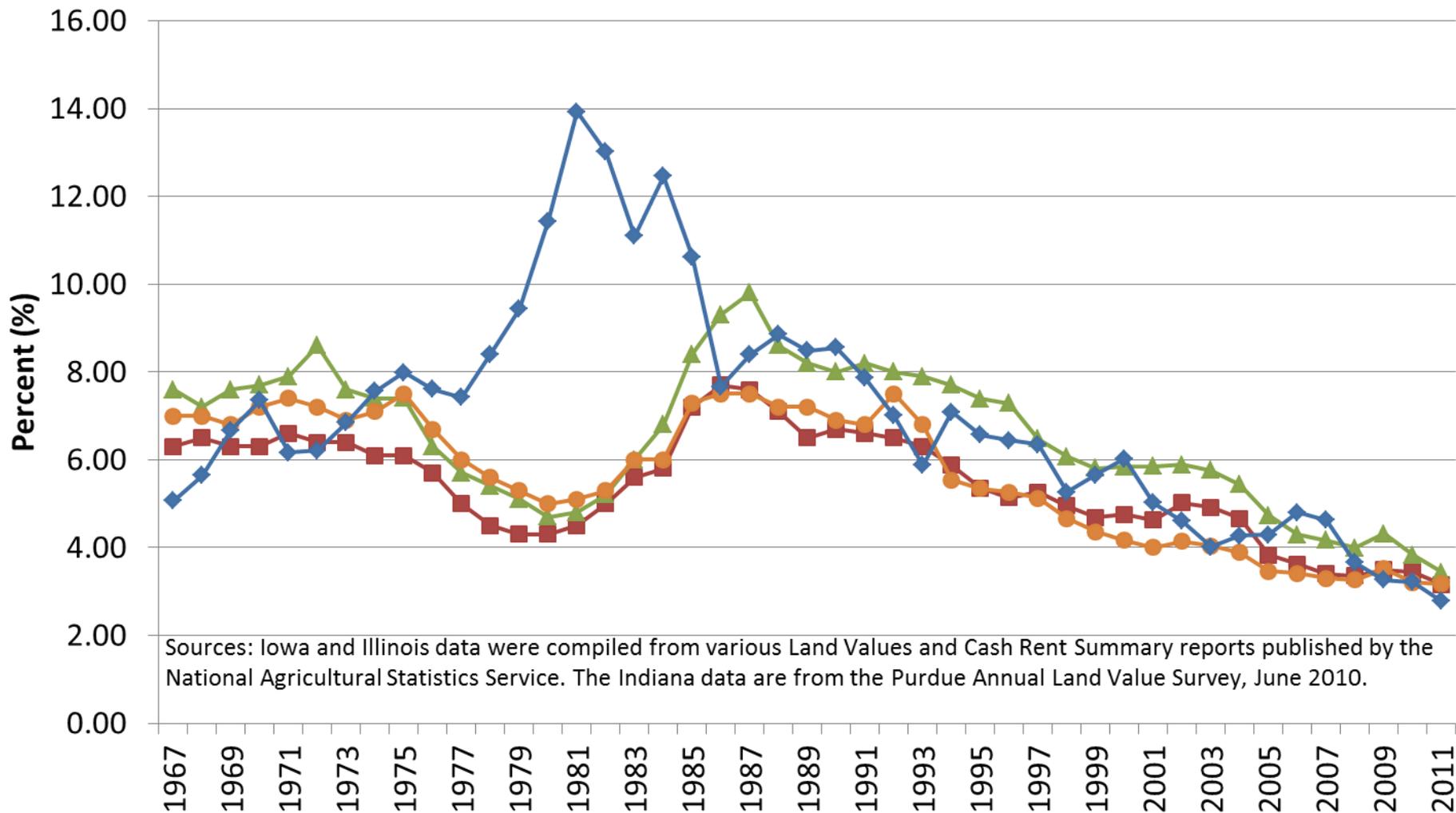
1. The price of earnings and interest rates
2. Sector level relationship between returns and values
3. Farm level returns
4. Farm level interaction of returns and interest rates

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

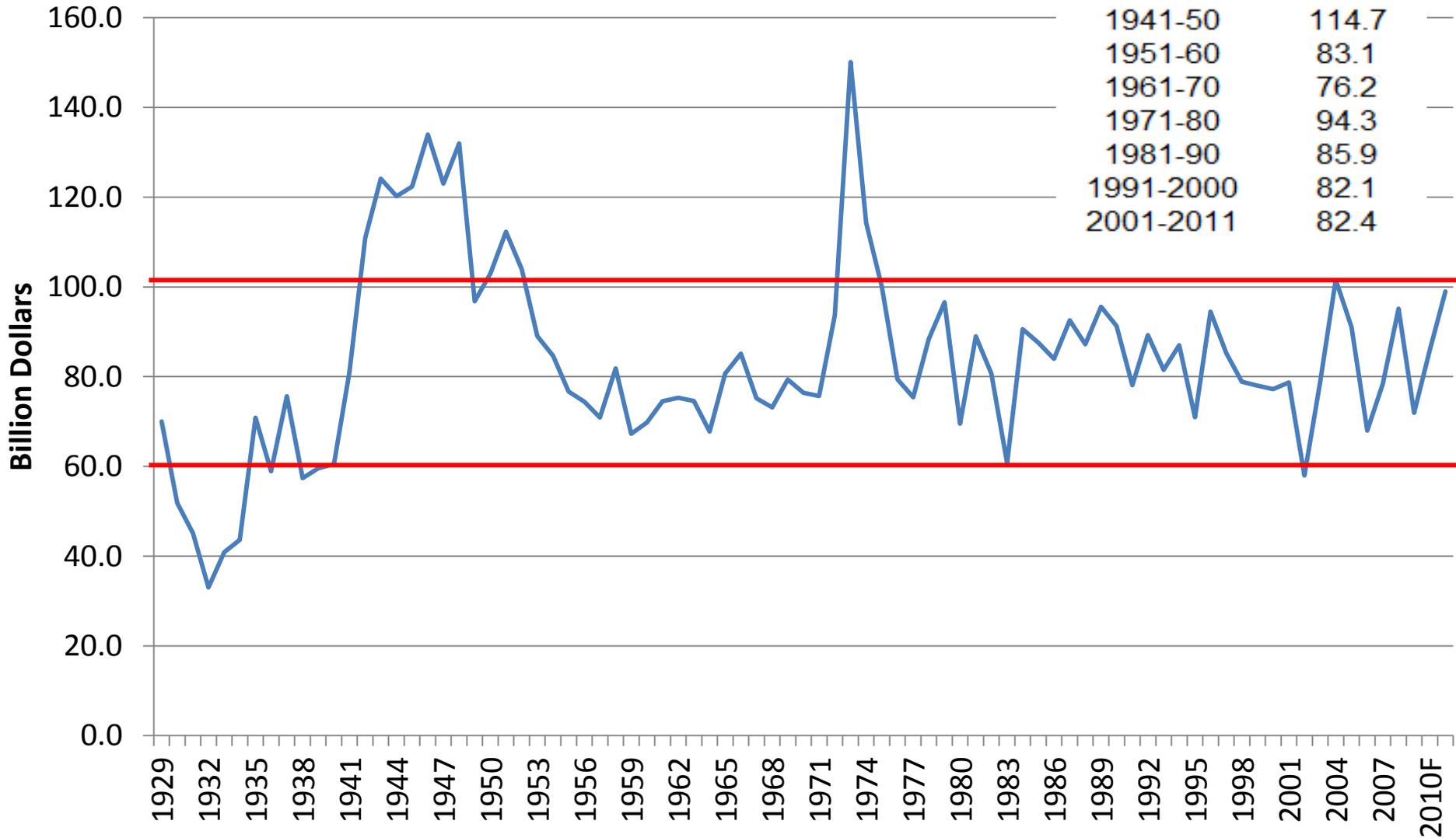


1. Farmland Capitalization Rates and Interest Rates on 10 Year US Treasury Bonds, 1967-2011

IL IA IN 10Y T-Bond

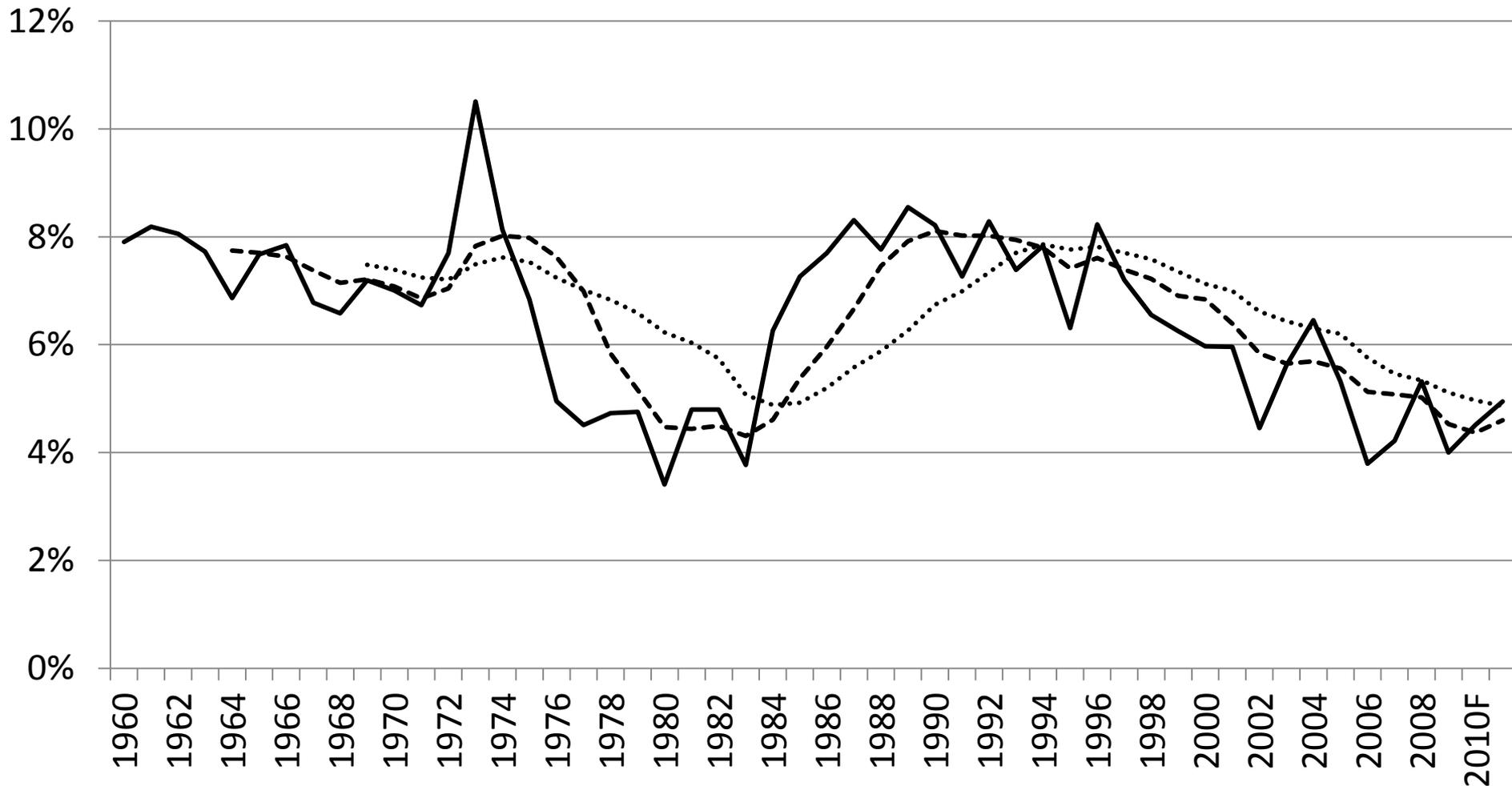


2. Returns to Farm Operators plus Interest and Rent, 1929-2011 (2005 USD)



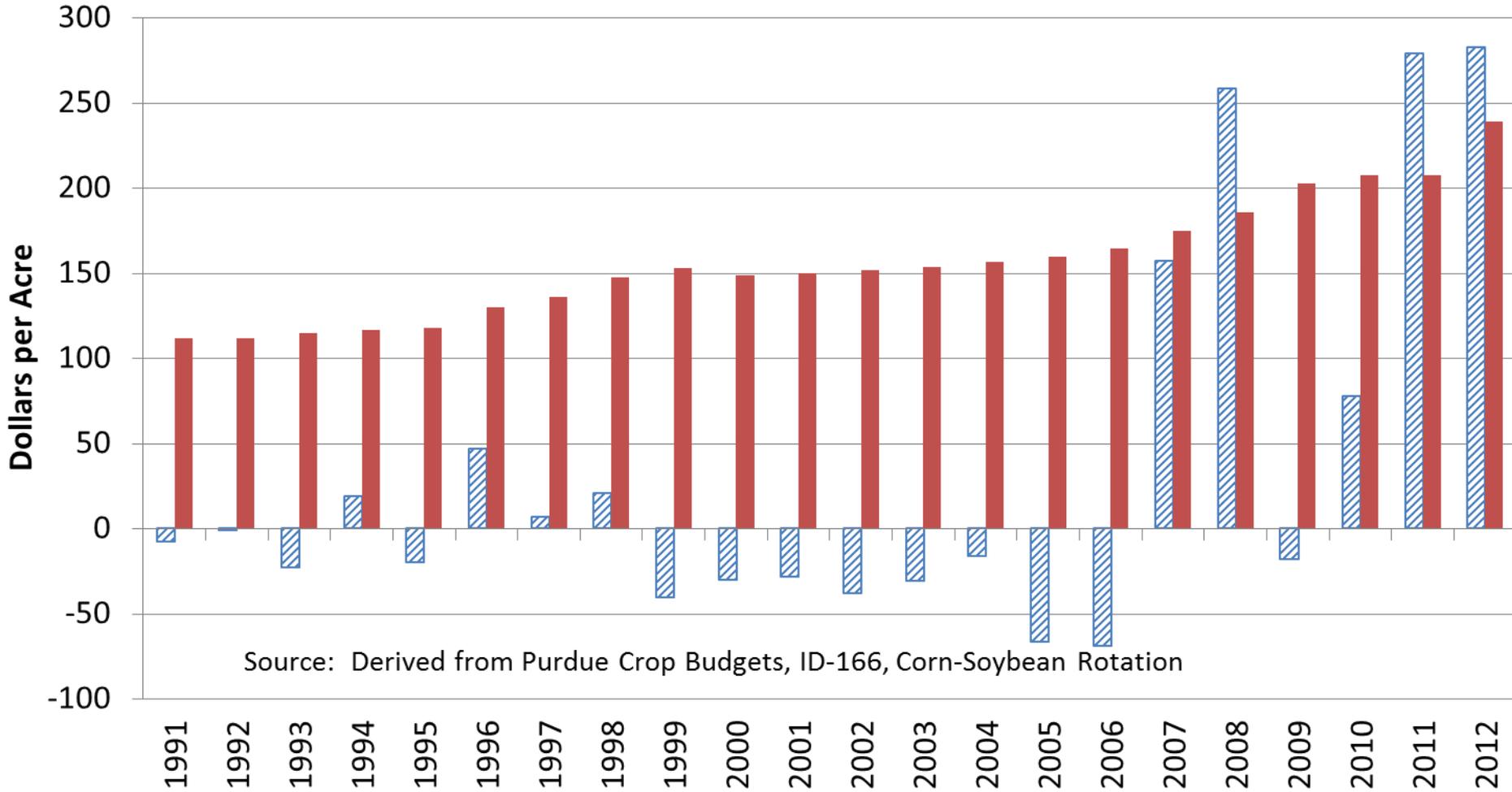
2>Returns to Farm Operators plus Interest and Rent Divided by Farm Production Assets, 1960-2011 (2005 USD)

— Rate of Return 10 Yr Rolling Avg --- 5 Yr Rolling Average



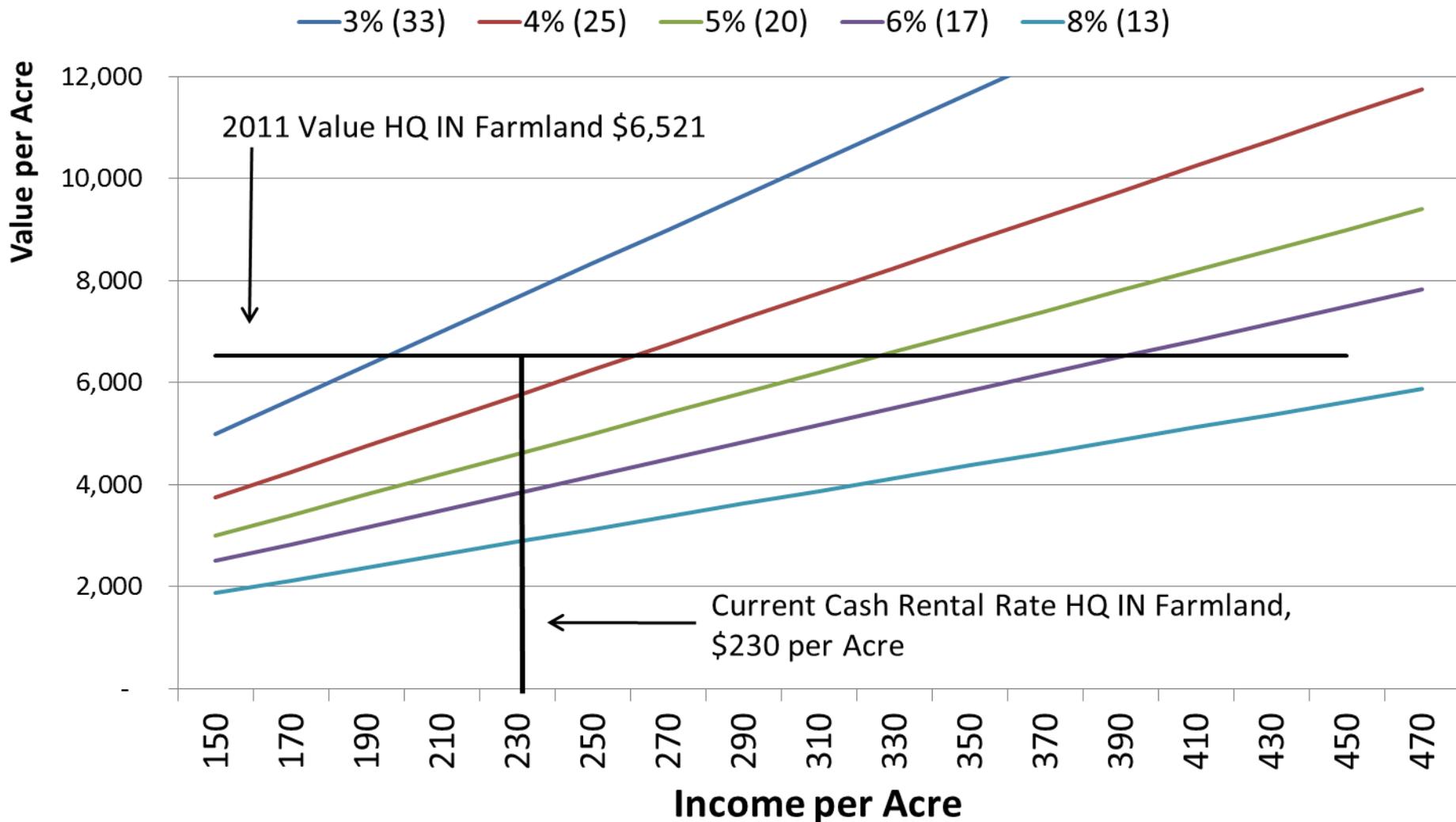
3. Budgeted Profit and Loss for High Quality Indiana Farmland, 1991-2012

Profit and Loss Cash Rent



Source: Derived from Purdue Crop Budgets, ID-166, Corn-Soybean Rotation

4. Land Values Under Alternative Capitalization Rates (Multiples) and Income Levels

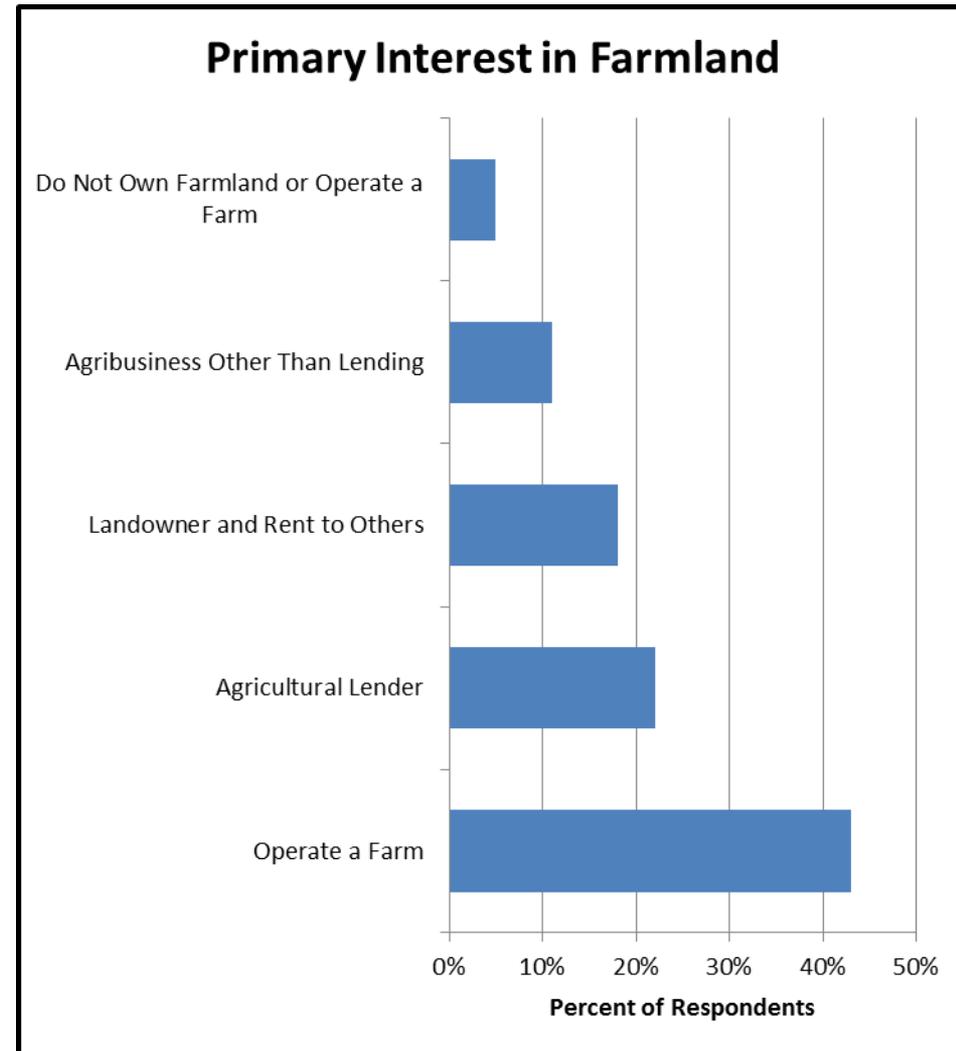


Investor Expectations Drive Prices

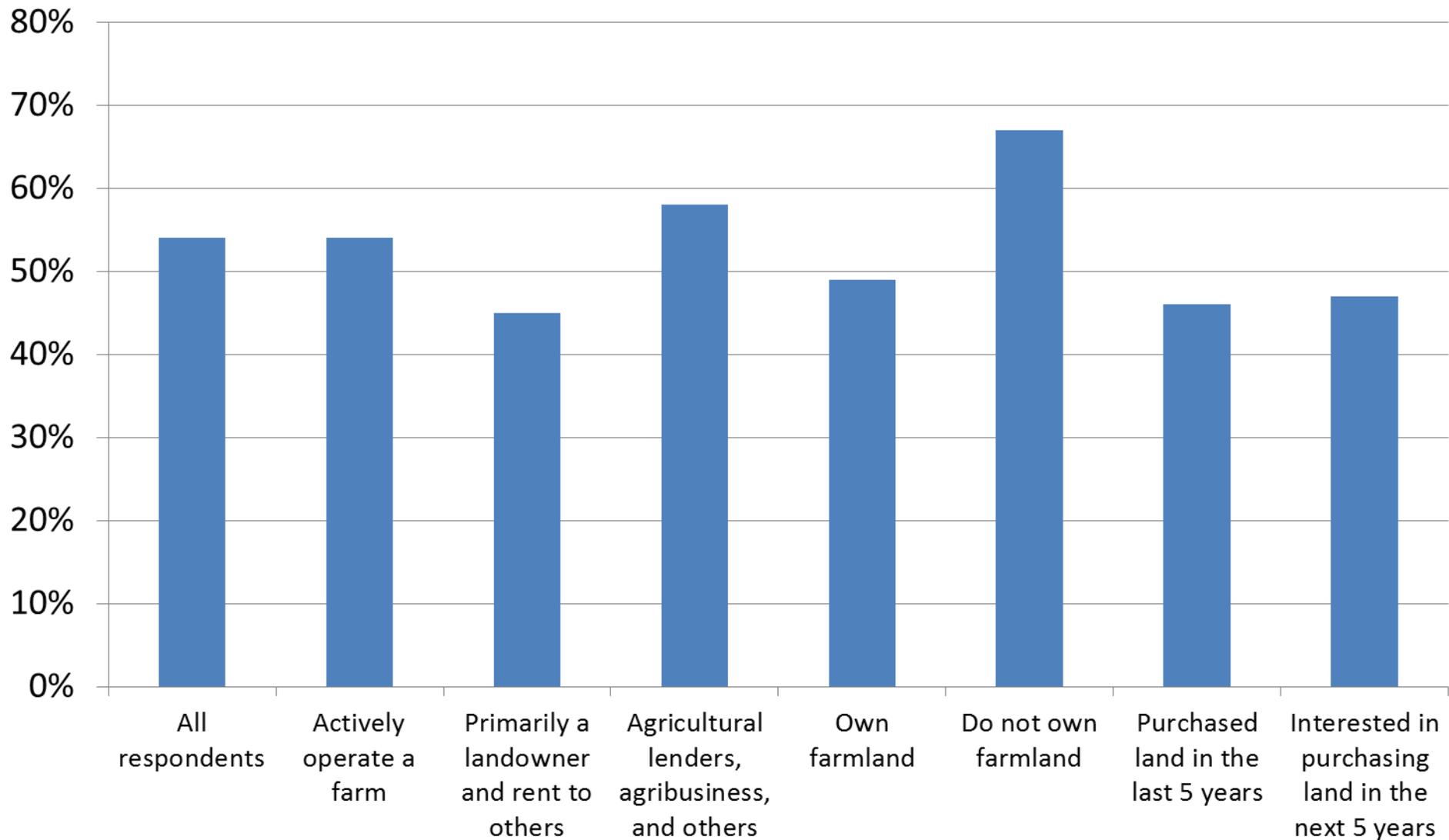
- Current values are dependent upon continuation of low interest rates and high farm returns over variable costs
- Conducted an internet survey in Spring 2012
 - What do farmland investors think about future
 - Farmland prices
 - Cash rents
 - Crop prices

The Respondents

- Individuals in CCA database with interest in farmland and farming
- 246 complete responses (28%)
- 73% owned farmland
- 74% want to purchase more farmland in the next 5 years
- Median acres
 - owned = 500
 - rented from others = 1,200
 - rented to others = 240

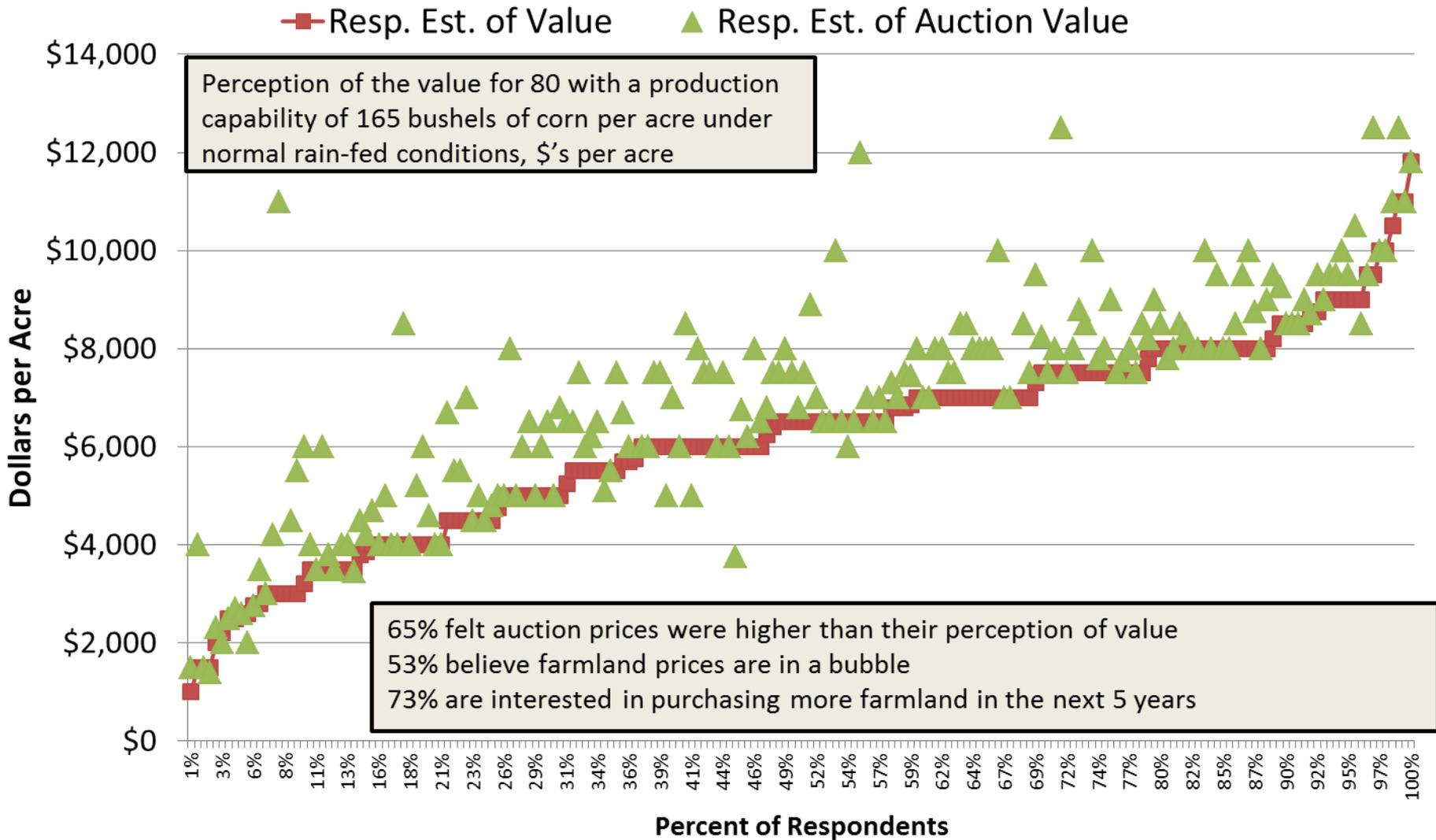


Percent that Believe Prices are in a Bubble

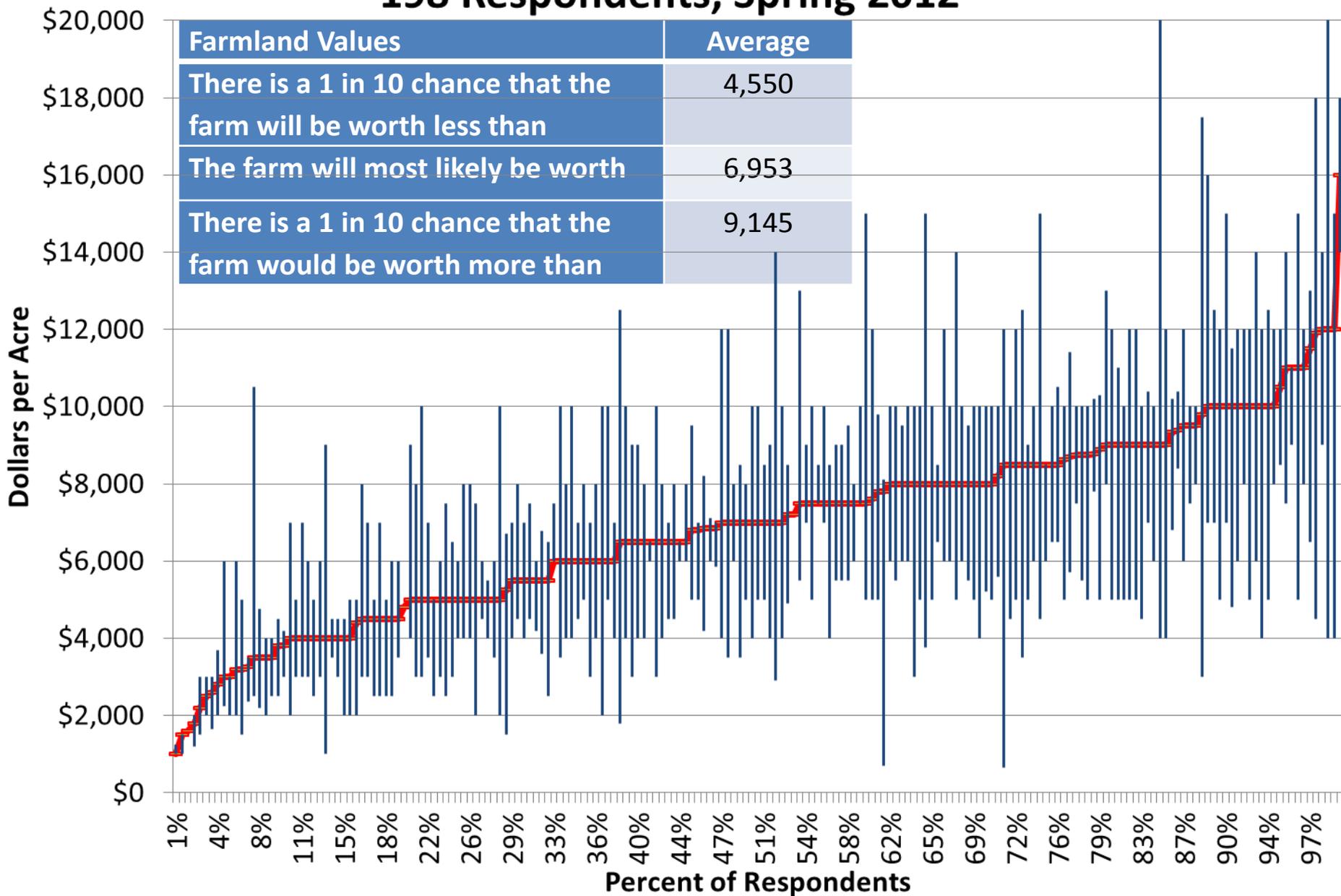


Respondents asked to consider:
80 Acres of Farmland with a
production capability of 165
bushels of corn per acre under
normal rain-fed conditions

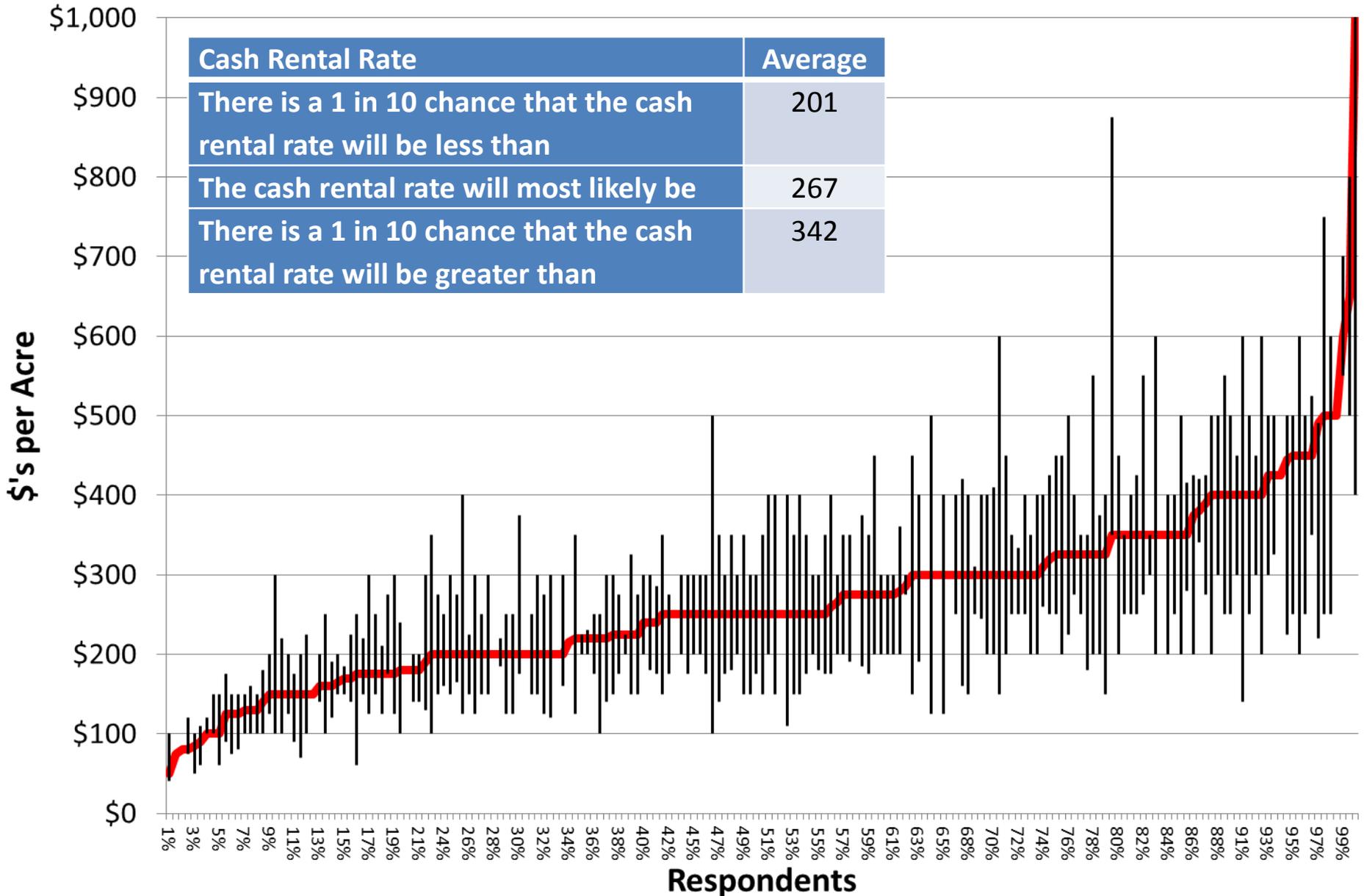
Estimates of Farmland Value and Price at Auction, 196 Respondents, Spring 2012



Distribution of Farmland Values Five Years from Now, 198 Respondents, Spring 2012



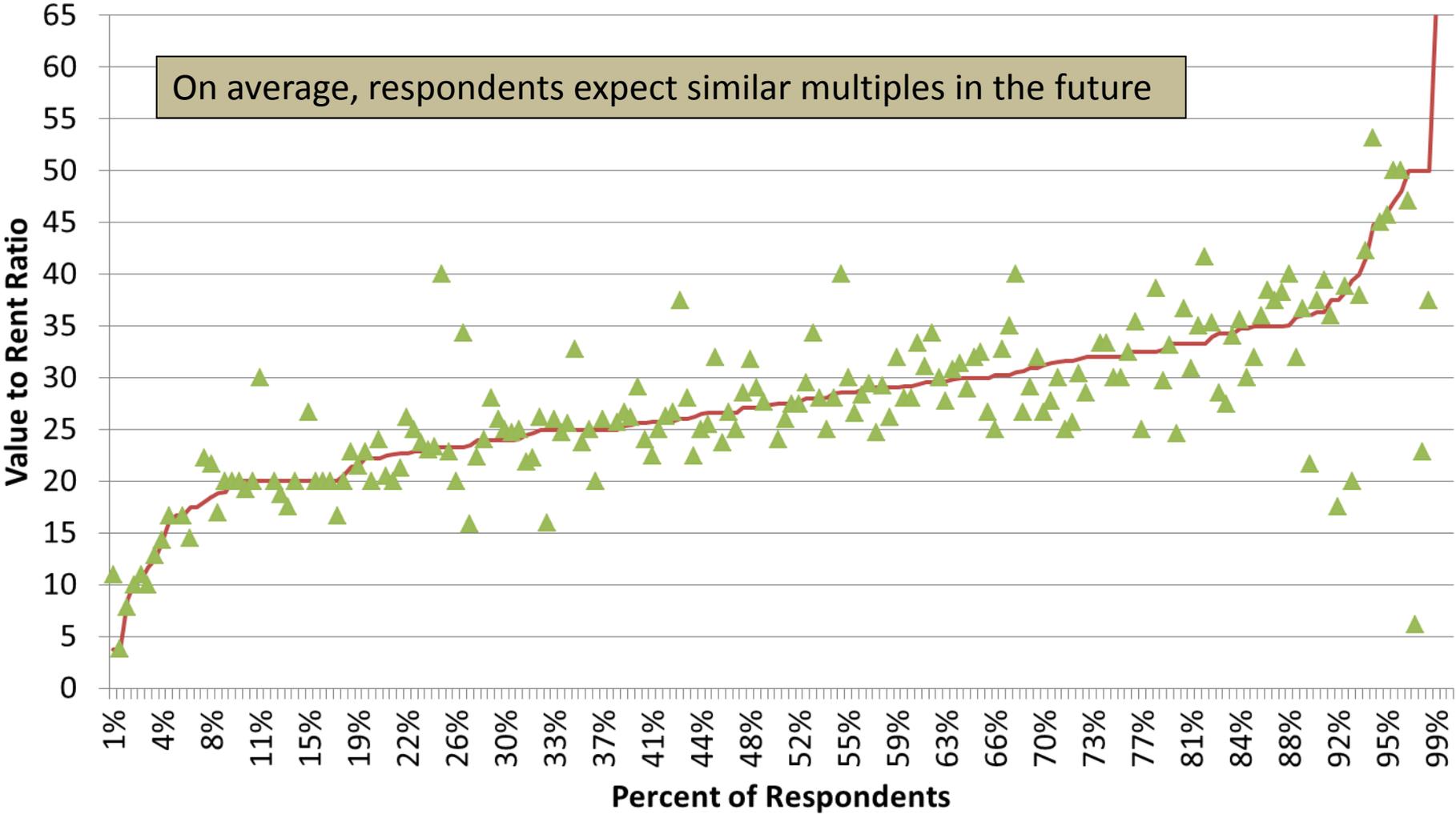
Distribution of Expected Cash Rental Rates Over the Next 5 Years, 191 Farmland Value Survey Respondents



Current and Implied Cash Rent Multiples

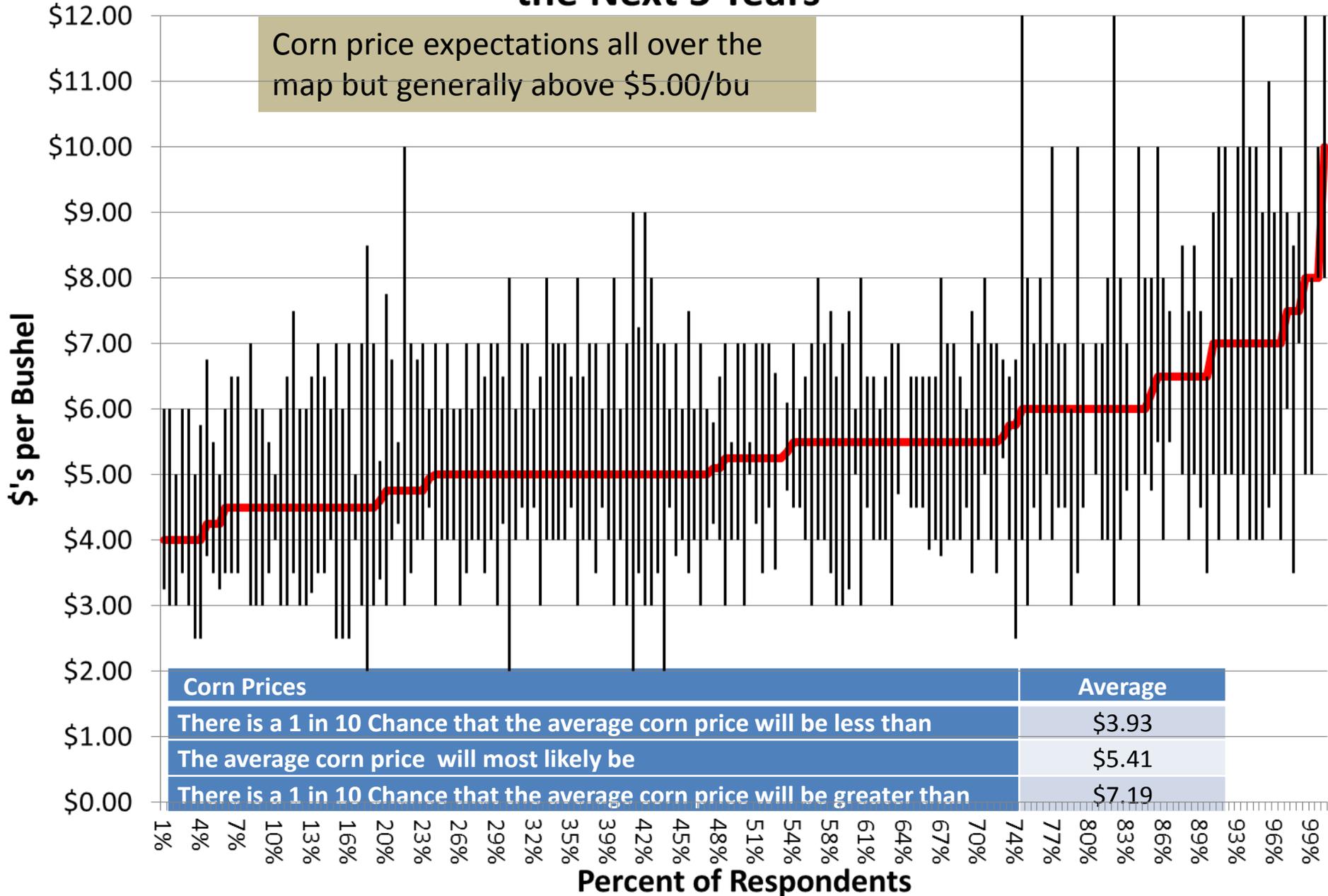
— Value-to-Rent Today

▲ Implied Value-to-Rent in 5 Years

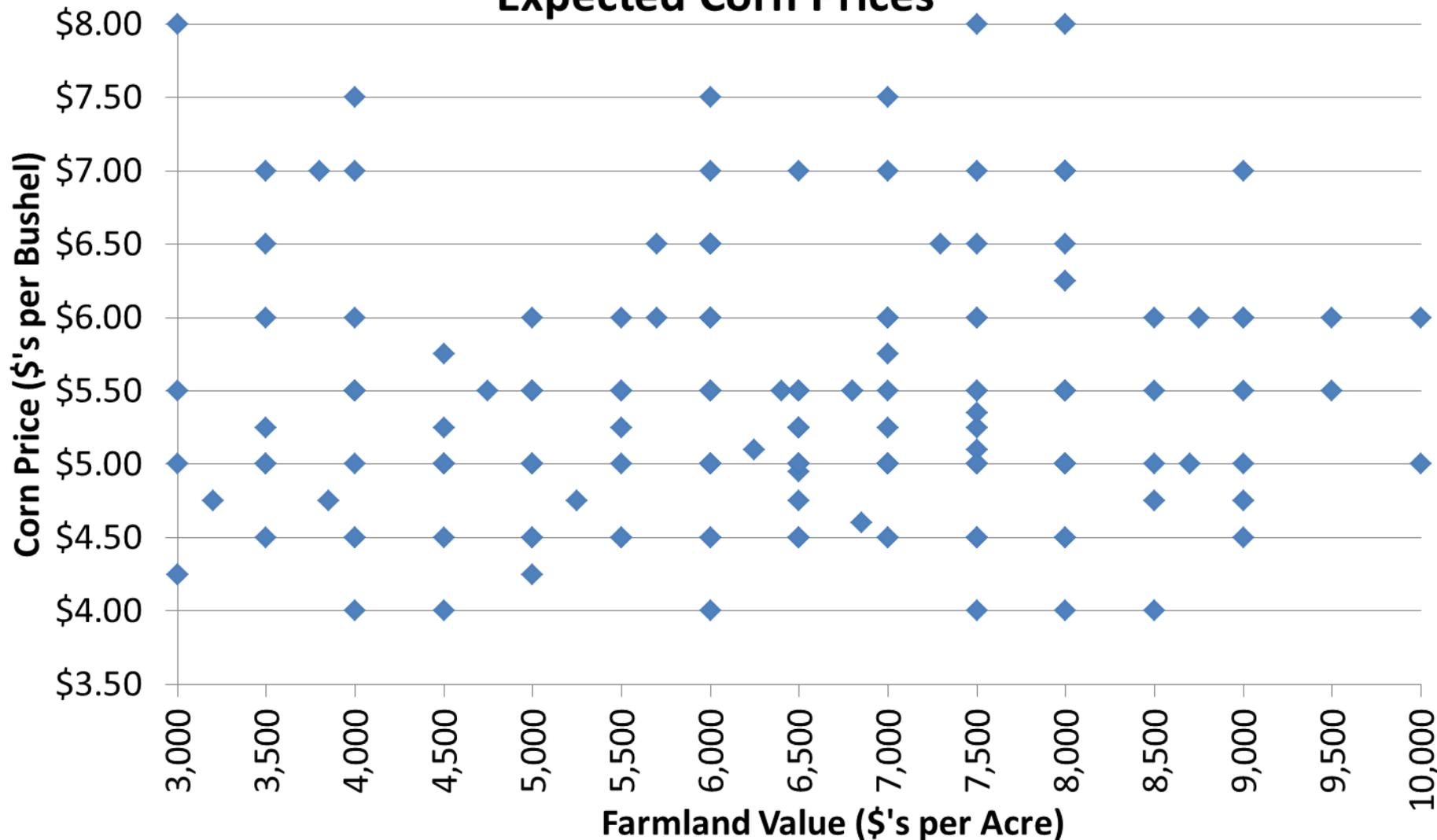


Distribution of Expected Average Cash Corn Prices Over the Next 5 Years

Corn price expectations all over the map but generally above \$5.00/bu



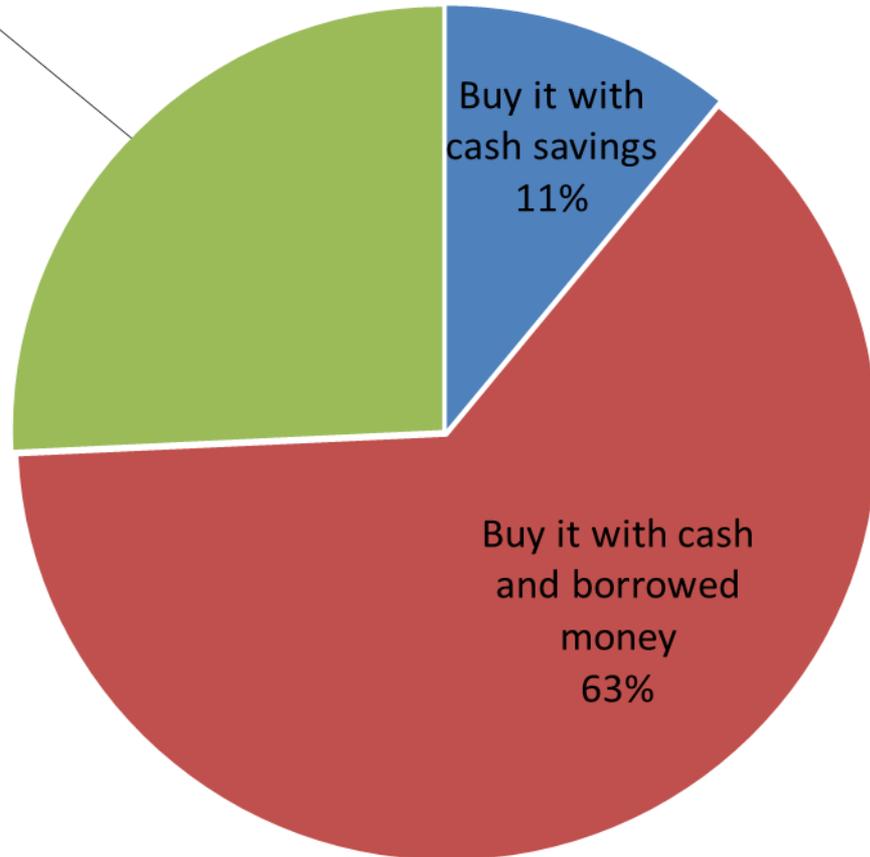
Relationship Between Current Farmland Values and Expected Corn Prices



Almost no systematic relationship between perception of land value and expected corn prices

How Respondents would Finance Additional 80 Acre Farmland Purchase

Buy with borrowed money and pledge additional farmland as collateral
26%



Buy it with cash savings
11%

Buy it with cash and borrowed money
63%

Most would use some debt to fund additional purchases

Summary

- Price increases are on par with most dramatic seen in the last 50 years
- Prices clearly reflect view that returns over variable costs stay high and rates stay low
- It is unlikely that farmland fits the classic economic definition of a bubble, but this does not rule out the possibility that prices could fall substantially

Summary

Investors:

- Show cautious optimism about farmland investments
- Have some concern that market in a bubble
- Appear to be comfortable with multiples approaching 30 -- expect them to be maintained
- Expect corn prices to exceed \$5.00/bu on average
- When values compared against corn prices there is little relationship

Conclusions

- Current rates of return are falling to relatively low levels – should point to asset prices leveling off
- Negative demand shock would create significant pressure on land prices
- Despite some warning signs investors appear to be rationally evaluating fundamentals
- Most investors expect modest price increases going forward
- Those with very optimistic views may push prices higher but there is obvious concern on part of others