

Are Land Values at a Tipping Point?

Terry L. Kastens -- tkastens@kastensinc.com -- 785-626-9000

Kevin C. Dhuyvetter -- kcd@ksu.edu -- 785-532-3527

Department of Agricultural Economics
Kansas State University



Ag economists and ag land

- Tremendous good information from land grants
 - Compared to 1970s, rapid & thorough dissemination
 - Web
 - Farm press
 - Read it and soak it in to improve your intuition
 - i.e., understand our limitations
- Ag economists:
 - Try to numerically understand causal forces
 - Tell stories about how factors relate to results
 - So the focus often is on auxiliary things, e.g., interest rates, farm income, inflation, crop prices, supply, demand, etc.
 - Over-simplify to make the stories more understandable
 - Pretend like they're not predicting but it is the purpose
 - Sure don't want to miss the next land crash

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Is there anything we can add?

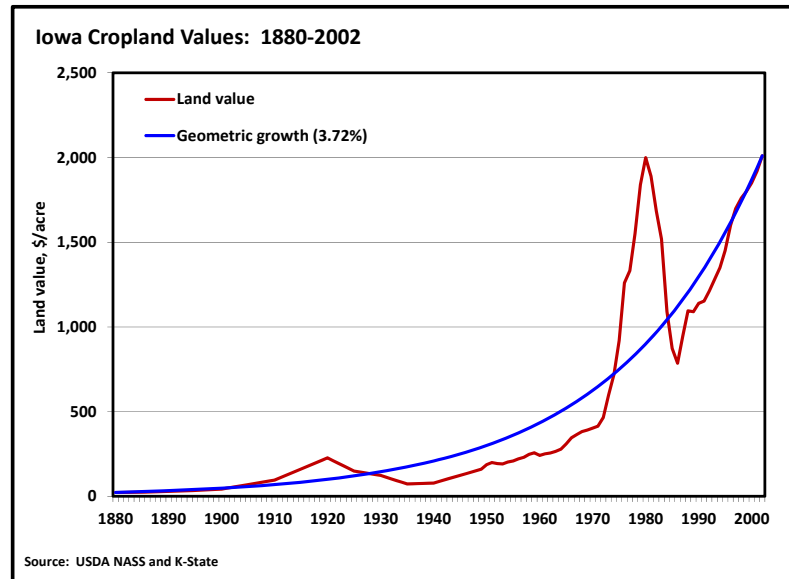
- Though our education was similar to most ag economists, our career backgrounds have been much more management based
 - Spend less time thinking of auxiliary things
 - More time on how to make management decisions
 - Think more of land as an outside investment
 - Rather than a residual claimant on farmers' profits
 - Are closer to the decision-maker
 - We are in fact regularly in the land market ourselves
- Land buyers: “give me a rule to follow”
 - As management guys we try to accommodate

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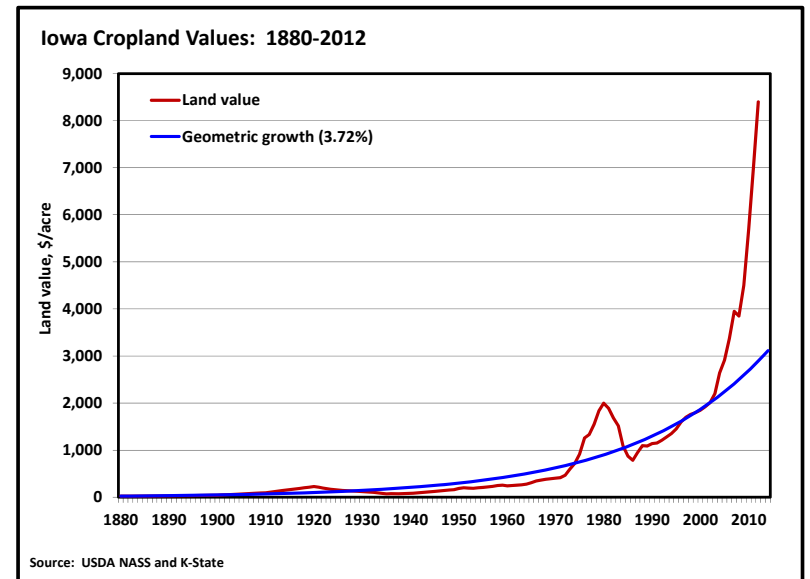
Rule 1 – don't get caught up in the trend

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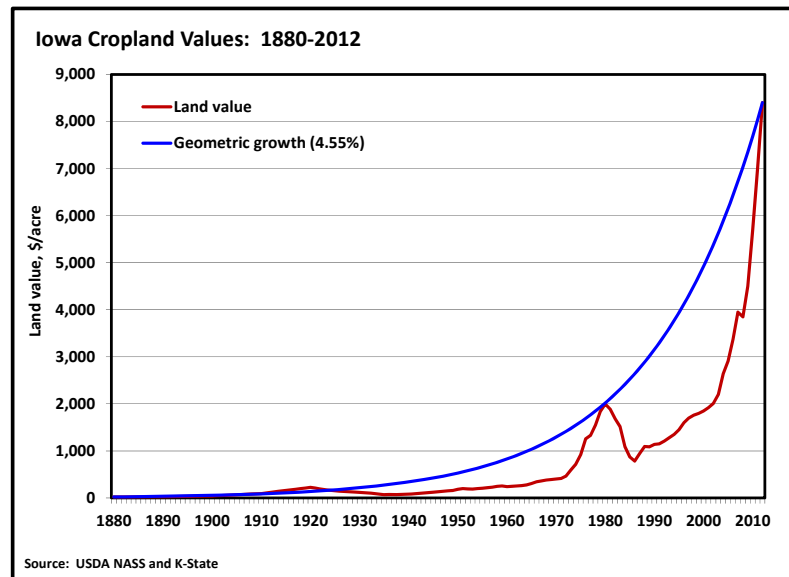
What does the future hold?



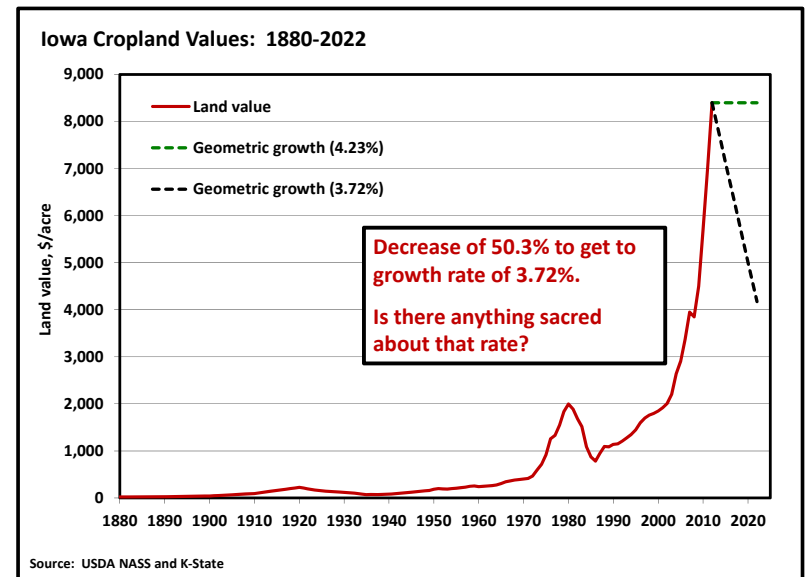
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What does the future hold?



Rule 1 – don't get caught up in the trend

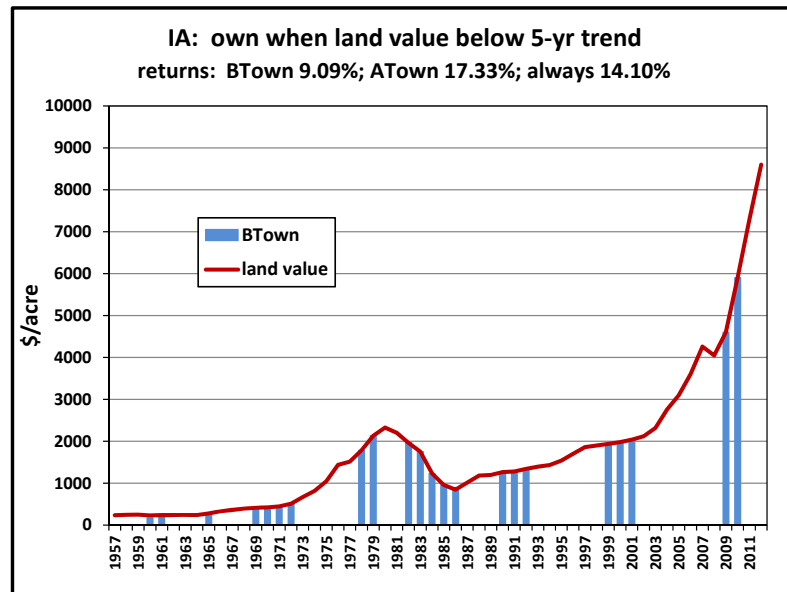
- Land values follow a trend
- Idea is that the difference between the land market and the trend provides an ownership signal
 - actual < trend → below trend own (BTown)
 - actual > trend → above trend own (ATown)
- BTown is consistent with advice that you should sell when market is above trend (what many economists are saying today?)
- ATown is more consistent with technical analysis suggesting that you should buy when markets “break through” a trend

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Operationalizing the trend rule

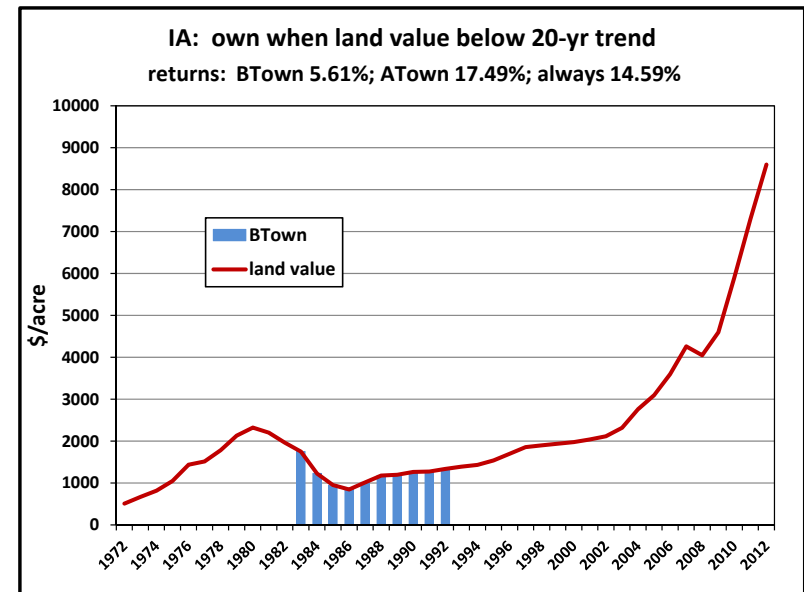
- 1951-2012 land value data
 - only reasonably complete data set
- 5-, 10-, 15-, 20-year linear trends
- Own land when market is below trend (BTown), else not (ATown)
 - Not own & hold, since don't know when to enter market
- Total returns are rent plus capital gain
 - When “BTown” (own land if below trend)
 - When “ATown” (own land if above trend)
 - What would have been if always in the market

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BTown = own when below trend; ATown = own when above trend

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BTown = own when below trend; ATown = own when above trend

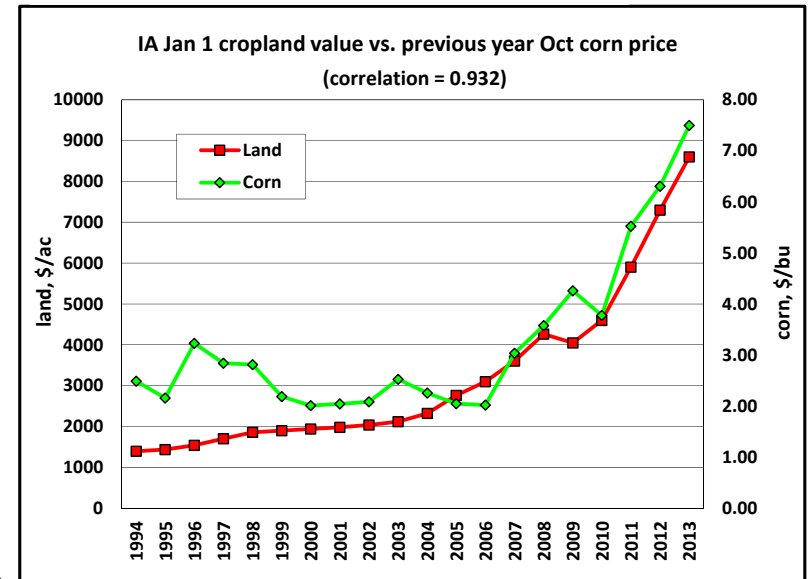
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Results of trend rule

- **Across:**
 - Many ag states
 - Different trend lengths
 - Different assumptions of when data are known
 - To accommodate lag effect of NASS data
- **Results are always the same:**
 - You should do the opposite of what we ag economists say. That is, you should follow the trend.
- **Won't we get burned blindly following the trend?**
 - Sure, if you're highly leveraged with variable interest rate

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Rule 2 – use crop price to predict land value

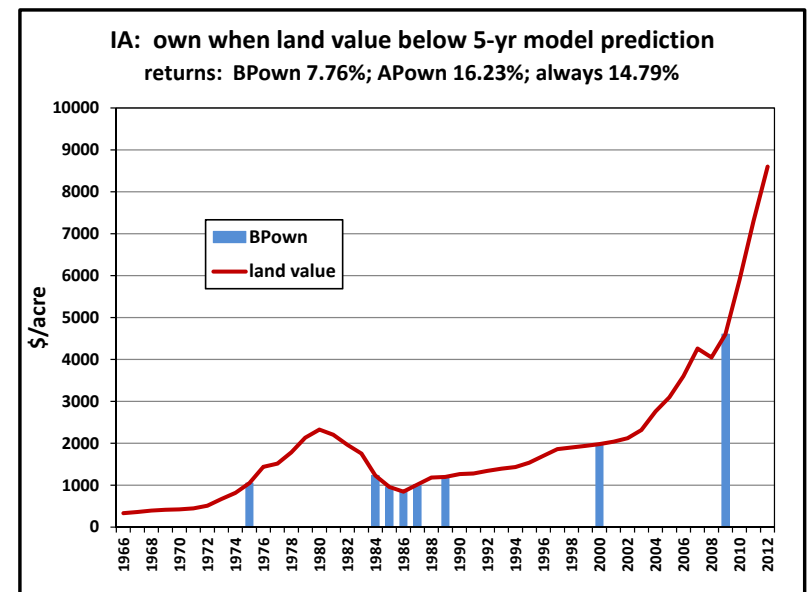


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Operationalizing the crop price rule

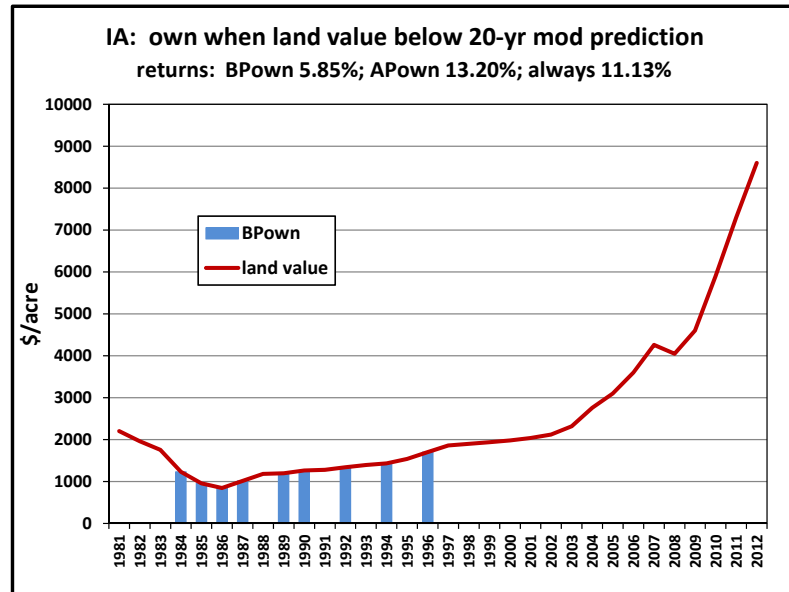
- Use statistical model to predict land values based on current crop prices (Oct price of Dec CBOT corn)
 - Land value Dec 31 (Jan 1) versus Oct corn futures price
- Own land when the land price is below the model-predicted land price (BPown), else not (APown)
 - Predicted land price > Actual land price → Buy land
 - Model is based on either 5, 10, 15 or 20 years of data

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BPown = own when below model prediction; APown = own when above model prediction

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BPown = own when below model prediction; APown = own when above model prediction

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Results of crop price model rule

- Across:
 - Many ag states
 - Different lengths of historical period for model
 - Different assumptions of when data are known
- Results are always the same:
 - You should do the opposite, i.e., follow the trend
- Surely crop price impacts rents and land value?
 - It does, but more short-term rents
 - Not in a real-time predictive accuracy sense
 - Historical correlational relationship are most difficult to duplicate in real time

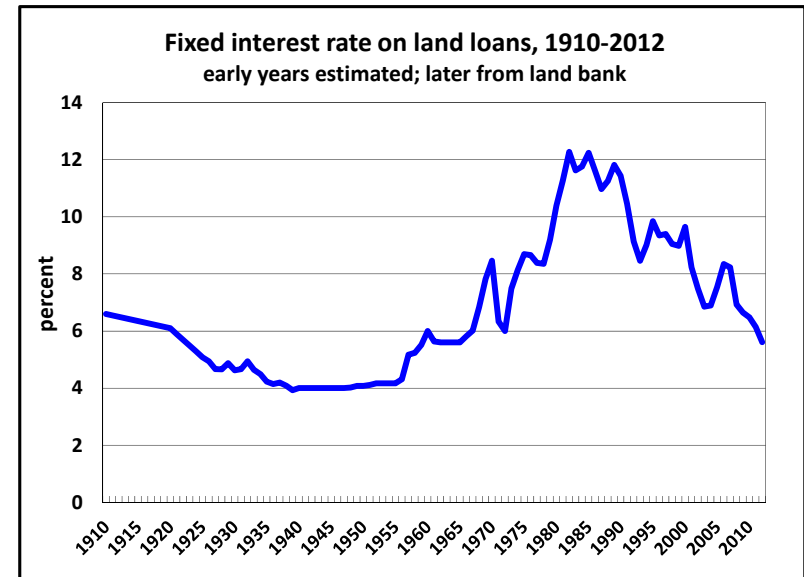
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Rule 3 – watch the capitalized value

$$Value = \frac{Annual\ land\ income}{Capitalization\ rate}$$

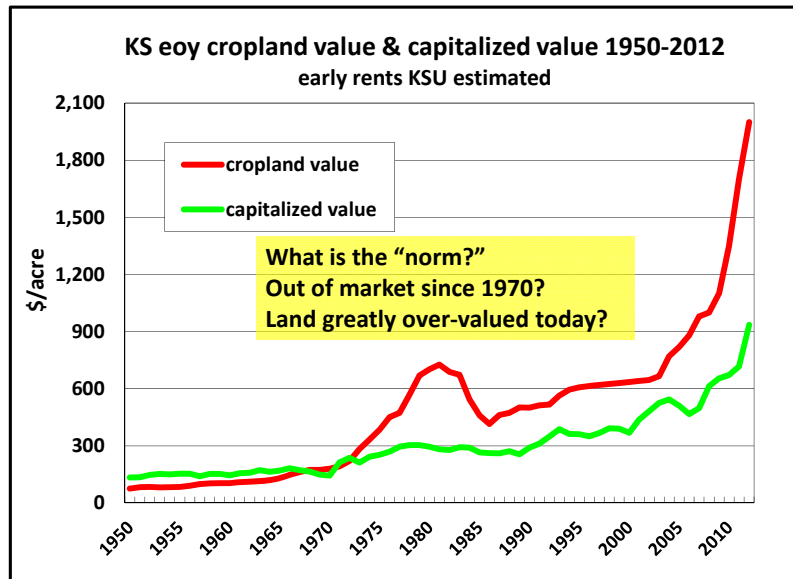
- Idea is that when the difference between the land market and this calculated value goes beyond the “norm” it’s time to quit buying
- What measure of income do you use?
 - Residual farm profit (farmers buy land)
 - Rent (investors buy land)
- What cap rate do you use?
 - Bank CD’s (farmers buy land when cash rich)
 - Land loan interest rate (investors?)
 - Historical average rent-to-value ratio

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Average interest rate is 6.71% -- just how scared of interest rates should we be?

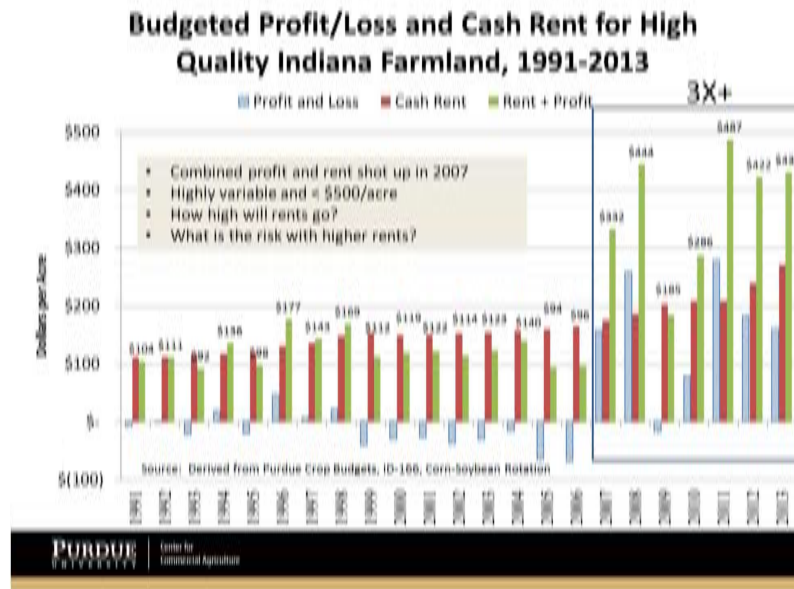
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eoy = end of year (capitalized value based on rent/interest rate)

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But, farmers may still be able to pay greater rents

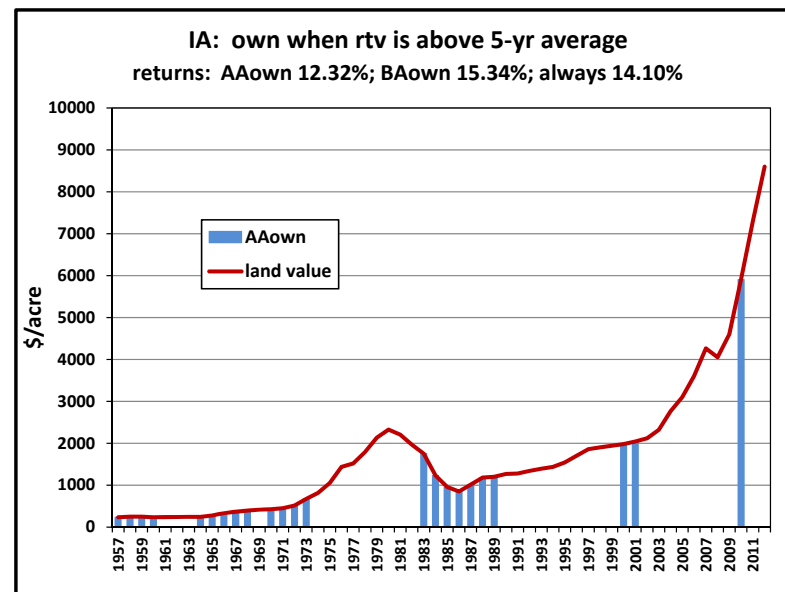


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Operationalizing the capitalized value rule

- 1951-2012 rent-to-value (cap rate) data
- 5-, 10-, 15-, 20-year historical average periods
- Own land when rent-to-value is above the historical average (AAown), else not (BAown)
- Total returns are rent plus capital gain
 - When AAown (own land if rtv above average)
 - When BAown (own land if rtv below average)
 - What would have been if always in the market

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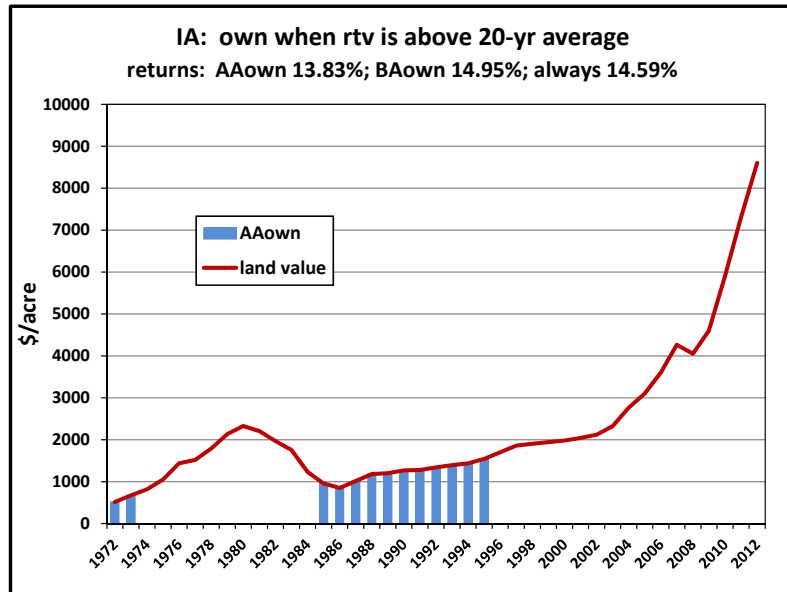


AAown = own when above average; BAown = own when below average

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Results of capitalized value rule

- Across:
 - Many ag states
 - Different historical average lengths
 - Different assumptions of when data are known
- Results are always the same:
 - You should do the opposite of this “it appears the market is getting overbought” rule.
- But, surely the rent-to-value can get “too” low, meaning that price-to-earnings is “too” high?
 - Yes, but it’s hard to make a rule to follow in real time
 - Though, we’ll show something on this

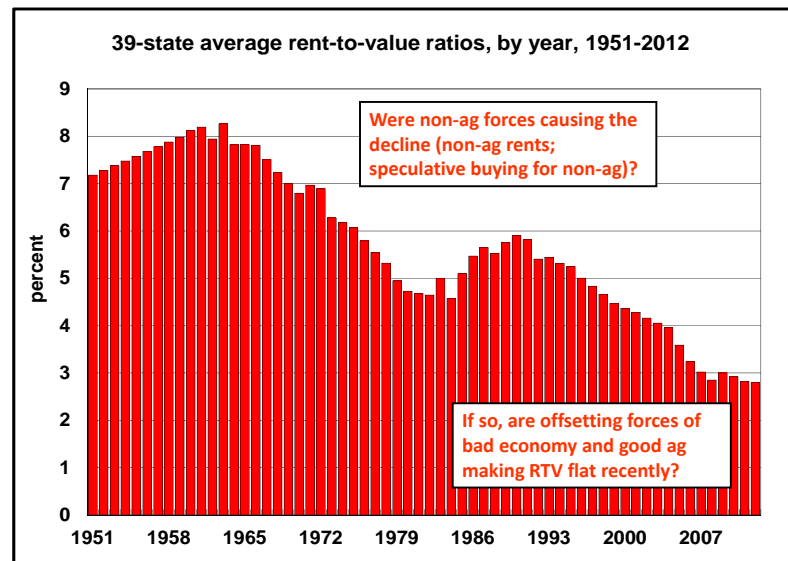


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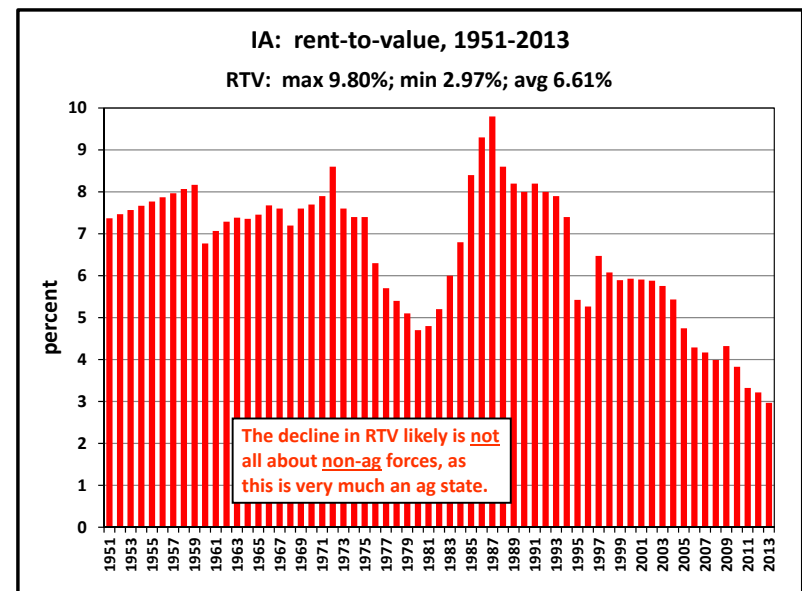
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Have investors been grossly unwise for decades?



Is RTV really a reliable indicator of land price bubbles?



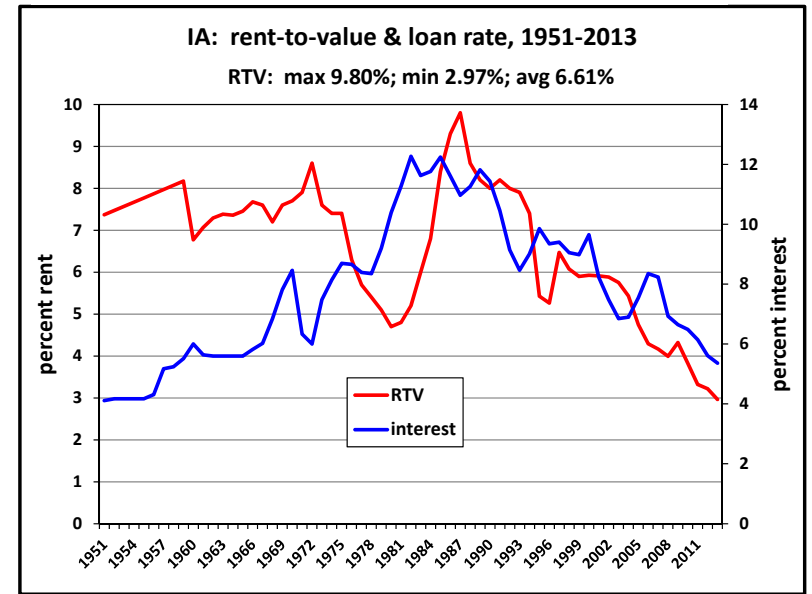
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How much lower can RTV go?

- Near 0 if heavily driven by non-ag (but ignore here)
- Economists often view land as the discounted value (NPV) of an infinite rental stream going forward
 - Rent grows at some fixed annual rate, G
 - An investor discounts those future rents at some discount rate D , typically related to an interest rate
- RTV can be mathematically inferred from G & D

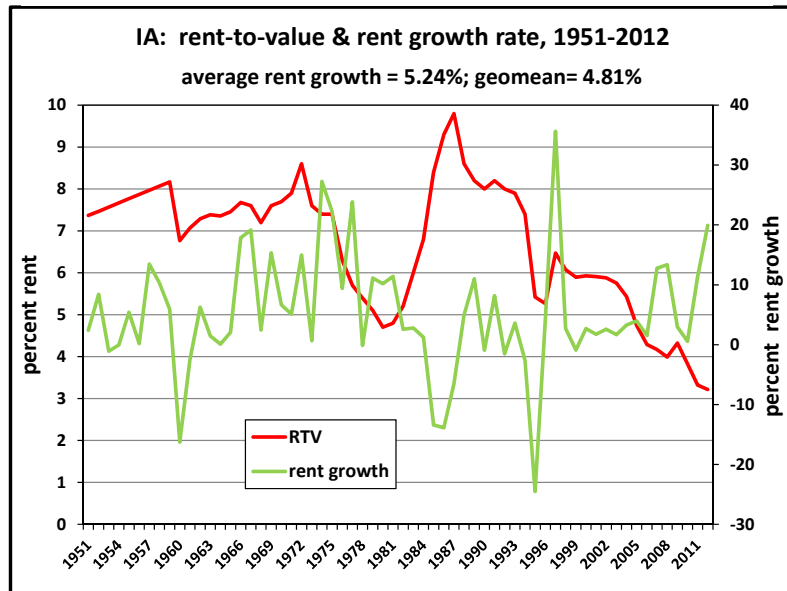
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RTV appears to be somewhat related to interest rate



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RTV does not appear to be closely related to rent growth



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How much lower can RTV go?

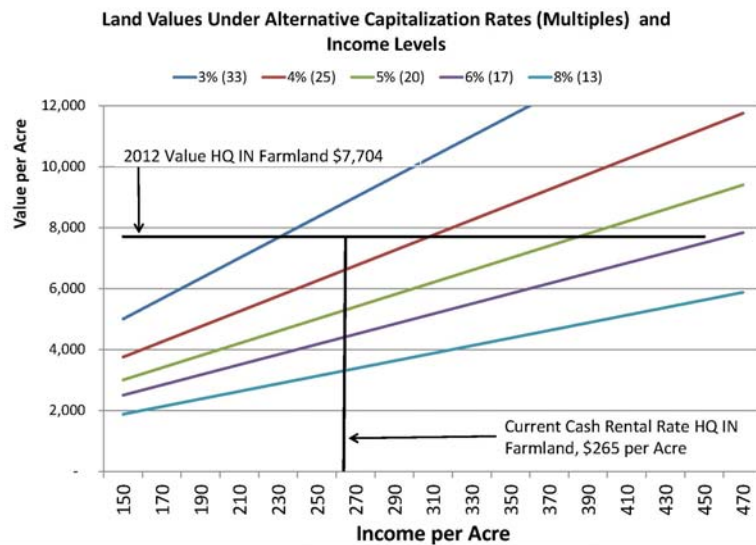
discount =>	6.00%	8.00%	10.00%	12.00%
expected	implied	implied	implied	implied
rentgrow	RTV	RTV	RTV	RTV
2.00%	3.77%	5.56%	7.27%	8.93%
2.50%	3.30%	5.09%	6.82%	8.48%
3.00%	2.83%	4.63%	6.36%	8.04%
3.50%	2.36%	4.17%	5.91%	7.59%
4.00%	1.89%	3.70%	5.45%	7.14%
4.50%	1.42%	3.24%	5.00%	6.70%
5.00%	0.94%	2.78%	4.55%	6.25%
5.50%	0.47%	2.31%	4.09%	5.80%
6.00%	0.00%	1.85%	3.64%	5.36%
6.50%	N/A	1.39%	3.18%	4.91%
7.00%	N/A	0.93%	2.73%	4.46%

- Easy to see how discount rate can affect RTV
 - Land loans might edge up to 8.0%
 - No reason to assume rent growth over 30+ years will be much lower than average

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How much lower can RTV go?

- To rationalize historically observed RTV and rental growth rates, it appears landowners use a discount rate of 2-5 percentage points higher than the interest rates
 - If so, the table suggests 3-4% RTV might be plenty low
- But, none of this takes into account non-ag forces
- Thus, our opinion is that, unless non-ag forces greatly increase . . .
 - You should not consider any landownership strategy that depends on a RTV below around 3.0%
- Okay, we've sort of given you a cap rate rule
 - Though not very "pretty" in its derivation



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But RTV is insufficient as a land buying tool

- We desire a tool that can answer the necessary what-if questions around our assumptions
 - That is, we'd like to know how much we're hurt if assumption X is off by Z
- Across years of research we have found historical land value and returns data to be better predictors of future values than using auxiliary variables such as inflation, interest rates, etc.
- So, we stayed with the present value approach, only severing some of the theoretical mathematical relationships. At least we'll know that:
 - If my assumptions are correct this will be my return

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Buying Land – How Much Should I Pay?

- Valuing the capital gains portion
 - Pick a "selling point," say 30 years from now
 - What will the land be worth then?
 - Assume some annual capital gain % -- ag and non-ag
 - What is left after "sell" & pay cap gains tax?
 - What is that amount worth today?
- Valuing the rent portion
 - What is cash rent today, ag and non-ag?
 - How will rents evolve (grow) over time?
 - What is the future stream of rents worth today?
- Maximum bid = today's value of the capital gain + today's value of the rent stream

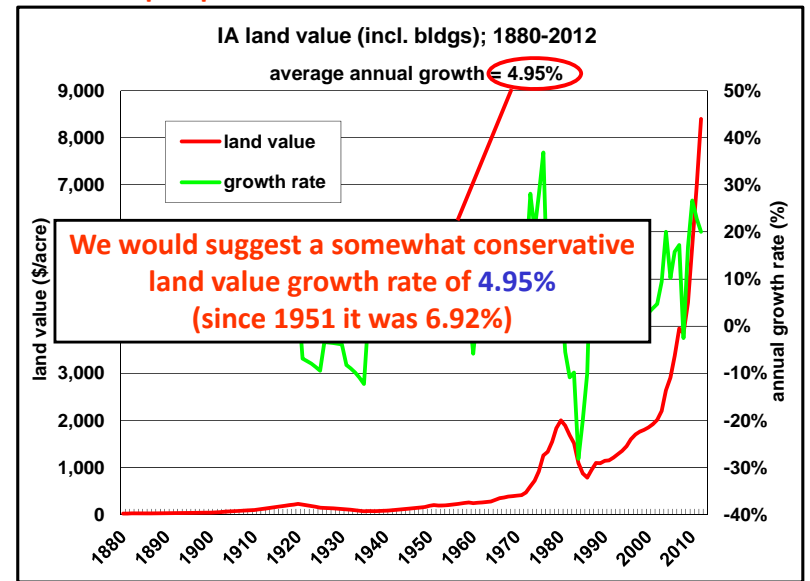
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Inputs to our decision tool, *KSU-Landbuy.xls*

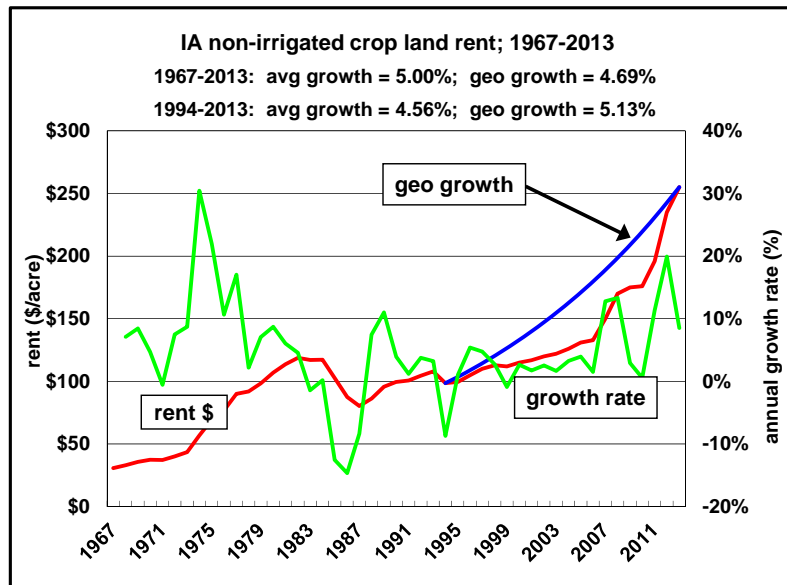
- History provides the guide:
 - Expected growth rate on land value
 - Expected growth rate on rent
- Known by user:
 - Purchase price
 - Current rent
 - Property tax rate
 - Income tax rate
 - Interest rate
- Somewhat known by user:
 - Market price (we assume current rent / 0.04)

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Historical perspective



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We would suggest an ag growth rate (i.e., rent growth) of 4.89% for Iowa

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KSU-Landbuy.xls spreadsheet for land investment decisions

Inputs	IA	IA	IA	IA
Crop	Pasture	Waste	Average	IA
170				
\$6,875				
\$9,230				
\$275.00				
\$23.38				
\$0.00				
30				
10%				
6.00%				
50.0%				
4.89%				
0.00%				
4.95%	4.95%	0.00%	4.95%	
0.06%	2.27%	0.00%	0.06%	

\$275 rent implies \$6875 market price. A purchase price of \$9230 gave us the 9.00% ROA we desire – which happens to be a purchase RTV of 2.98%.

We provide quite a bit of background on the inputs you need to inject to make an informed land ownership decision.

Calculated Outputs	3.90%	3.90%	3.90%	3.90%	I/(1-ix)	After-tax interest rate on land loans
\$163.56	\$12.35	\$0.00	\$163.56			After-tax rent, \$/acre (now property)
\$5,702.80	\$307.50	\$0.00	\$5,702.80			PVRA Discounted value of all future after-tax ag rents
\$0.00	\$0.00	\$0.00	\$0.00			PVRN Discounted value of all future after-tax non-ag rents
\$29,292	\$5,326	\$0	\$29,292			Projected land value in 30 years, based on market price and ag & non-ag growth
\$28,794	\$2,716	\$0	\$28,794			Projected land value in 30 years, based on market price and only ag growth
\$8,659	\$1,561	\$0	\$8,659			PVS Discounted value of land sale in 30 years (after capital gains tax)
\$8,517	\$815	\$0	\$8,517			Present value less purchase price (after capital gains tax) – if only ag growth
\$14,362	\$1,868	\$0				
99%	60%	n/a				rent and growth inputs
58%	24%	n/a				to-value (column J of Guidelines) and after-tax cash rent
\$7,486.79	\$618.27	\$0.00				
\$5,131.79	\$618.27	\$0.00	\$5,131.79			Present value less purchase price
9.00%	8.39%	n/a	9.00%			Approximate pre-tax rate of return on assets
12.00%	10.78%	n/a	12.00%			Approximate pre-tax rate of return on equity

We choose purchase price to target ROA

Land purchases often made with gut-feel

- Often get caught up in:
 - the emotion of bidding
 - local or national price bubbles
 - the fallacy of “comp” sales
 - over (or under) valuing certain attributes (e.g., distance)
 - “tired of missing opportunities of the past”
 - “tired of looking – must buy something now”
- Consistent procedures can help
 - every potential purchase viewed as an investment with an expected cash and growth return
 - unemotionally separates good from bad buys
- We routinely observe individual sales ranging from 70% to 130% of “market.”
 - Were such purchases actually rational economically?



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Opportunities to make a “good buy” do exist

- Even in low-risk areas like Illinois, where a very recent land company reporting sales during a 3-week period showed that:
 - Purchase price per PI point varied from 30% below the average to 30% above
- More risky areas show even greater variation
- Our work shows that it is more important to make a “good buy” any time than it is to time the market
 - And, using such methods greatly reduces risk

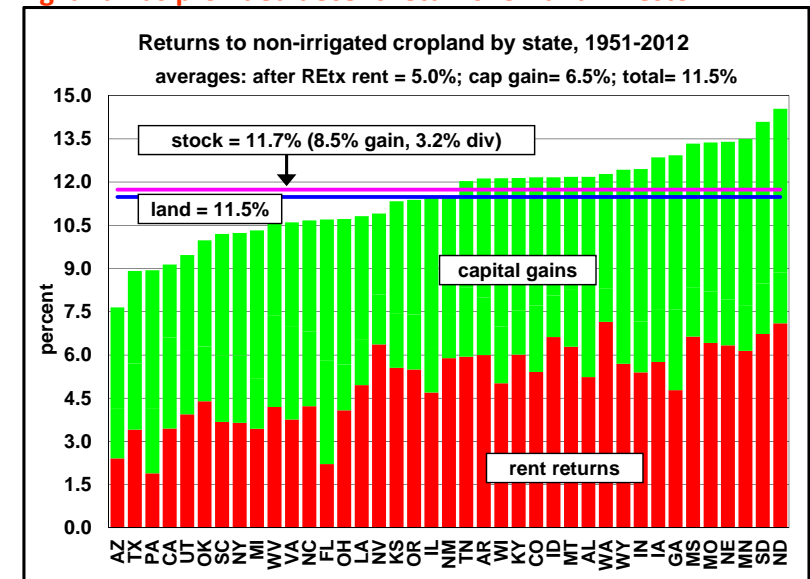
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We believe that good land investments will benefit from consistent methods

- We use KSU-Landbuy.xls with:
 - State-specific growth rates updated annually
 - State-specific real estate tax rates
 - Current parcel-specific cash rental rates
 - Parcel-specific market values (the 0.04 RTV thing)
 - 35% income tax rate; 10% capital gains tax
 - 30-year time horizon
 - A target of 9.0% return on assets
 - We’ve used this target in buying land for 10 years
 - Success rate varies a bit with the times, but not too badly
- Targeting rent-to-value is not quite as rigorous, but it is better than gut-feel
 - Must be localized, both in time and in space if want to use across the years

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Ag land has provided decent returns for land investor



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But, based on years of research in Kansas:

- Larger (generally more profitable) farms generate higher returns to their non-land assets than their land assets
- Why do farmers invest in land?
 - Forced savings for small or less-profitable farms
 - At least get capital gains if can make the payments
 - Psychologically appalled by rent negotiations
 - Think renting is more risky than it is
 - Security of a base of operations
 - Excess cash or borrowing capacity and no rental opportunities thought to be available

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Are we at a tipping point?

- Like other ag economists, we'd say we're darn close
 - But, is it merely going to "slow down?"
 - Is it going to flatten?
 - Will it drop?
- If you still want to buy, use a mechanical procedure to ensure decent buys for the time
 - **This is the take-home message**
- If you're a farmer rather than an outside investor and are worried about where we are:
 - Just rent the land you need for your operation

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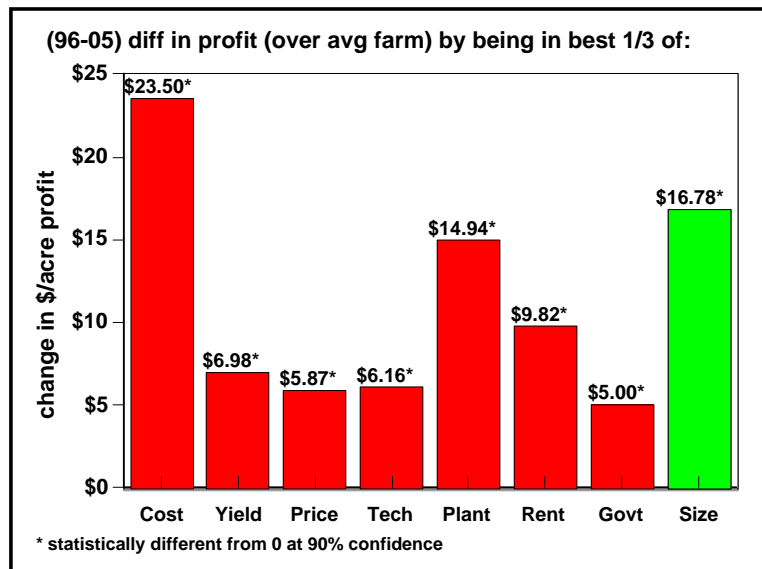
Farm consolidation: a potential bullish sleeper for the long term (not for 2014)

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Economies of size: the driving force

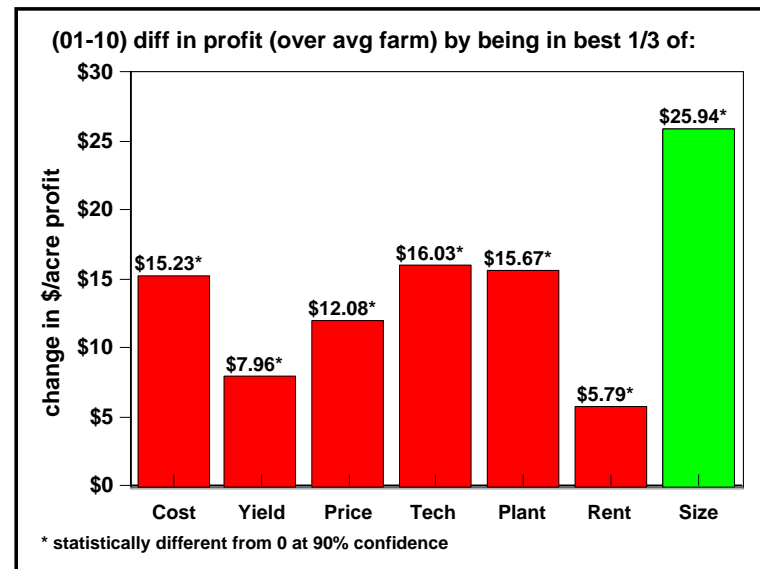
- Per-unit costs fall as a firm gets larger, typically due to:
 - A technology or activity that has
 - great economic benefit, but which happens to have also a large investment or fixed cost
- But, does it even exist in farming?
 - Isn't it merely an accident of good management, with owner-managers merely plowing their profits back into their businesses, causing us to observe a correlation between profits and size?
- Years of our research cause us to conclude that EOS does exist in crop farming and it is quite large

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A size effect remains – evidence that EOS is for real

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EOS is becoming even harder to ignore

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...and this size effect has been increasing over time

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Consolidation in production agriculture

- Farms have been consolidating for decades
- But, rapid consolidation is more extreme
 - Poultry in the 1960s
 - Cattle feeding in the 1970s
 - Swine in the 1990s
 - Dairy in the 2000s
- Will crop production be next?

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Will consolidation in crop production speed up?

- Farm machinery:
 - More like a fixed investment in factory facilities
 - Sophisticated, expensive, for round-the-clock use
- People:
 - Skills required are becoming more specialized
 - often requiring different people (like other businesses)
 - Management becomes fixed cost
 - Business continuity means a management team
 - even larger fixed cost
 - Some operators have really been making large investments in managing, partnering, employing, financing
 - They're ready or nearly ready for rapid expansion!
- Remember, we never saw the rapid consolidation in poultry, swine, and dairy coming either

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What does rapid consolidation in crop production mean?

- Dramatic reductions in per-unit costs of production
- Intergenerational wealth transfer coupled with debt will not keep up with the growing demand for capital
- Driving force will be bottom-up
 - Farmers will offer high rents, indicating their demand
 - Outside investors will seek good returns from hands-off investment rather than from vertical integration
 - Land will be the first investment of choice, followed later by machinery and crop inputs
- Increase in farming profits
 - An extra increase in ag rents
 - An extra increase in land values
 - Remember that land is the residual claimant
- Could our historical analysis be too conservative?

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- Rapid consolidation: opportunity for investment
- But many outside investors will fail, by:
 - Making the same old mistakes of land investment:
 - Emphasizing market timing rather than good tract buys
 - Failing to use a mechanistic land evaluation technique
 - Having too short of a time horizon
 - Thinking that all high-rent payers must be positioned for rapid consolidation
 - Failing to build a true partnering business arrangement with a tenant, where both tenant and landowner have the same business goals
 - Not merely the age-old “personal” relationships
 - Not an impersonal “find highest bidder” relationship

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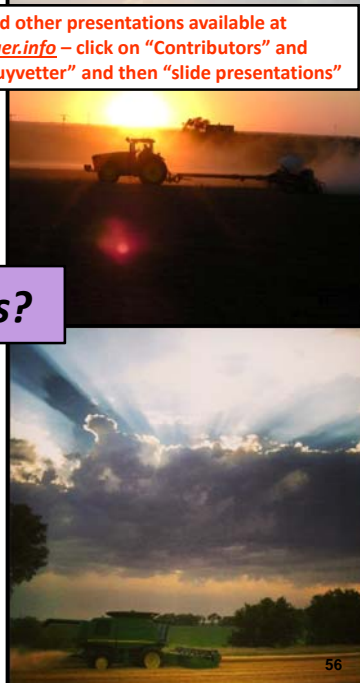
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Questions?

For more information and decision tools related to farm management, marketing, and risk management go to www.AgManager.info

Kevin Dhuyvetter	Terry Kastens
785-532-3527	785-626-9000
kcd@ksu.edu	tkastens@kastensinc.com



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