Overview of Grain Crop Agriculture

Where are we headed?

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Outline

1. Background – ag investment
2. Farm land as an investment
3. Trends in ag – consolidation
4. Economies of size – an important driver
5. Trends in ag – technology

Background – ag investment

Agriculture

- A very old industry
  - food, fiber, and sometimes fuel

  1) Production agriculture
     - FARMS: raising crops and animals
  2) Purchase & transportation of commodities from farm
  3) Processing of commodities
  4) Retailing of processed goods

- Big business has become involved everywhere except in crop farms themselves
  - even in providing inputs to farms, but not in production

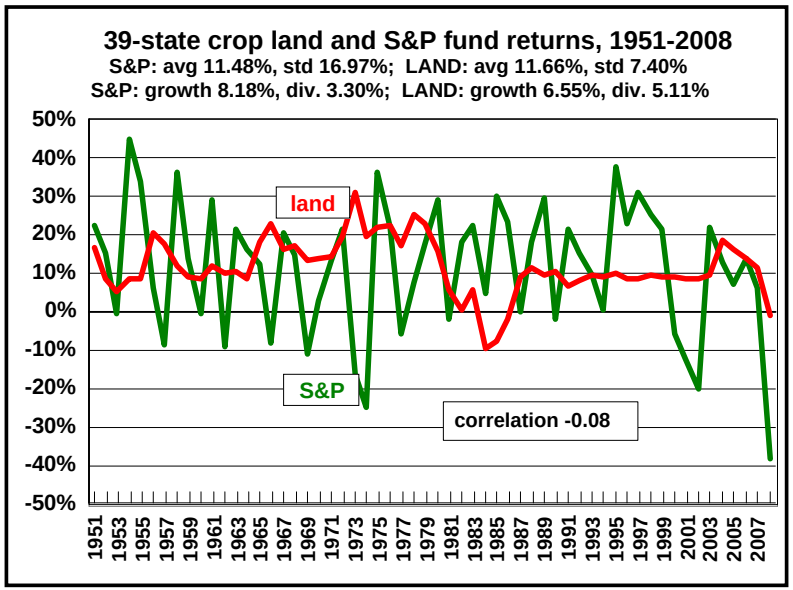
Farming (production agriculture)

- Ag finance & risk management has long history with:
  - government
    - USDA
    - FmHA (now FSA)
  - quasi-government
    - Farm Credit
    - federal crop insurance
  - private
    - futures contracts
    - insurance
    - lending
- Yet, small individual investors hold the equity
  - Where are the institutional investors?

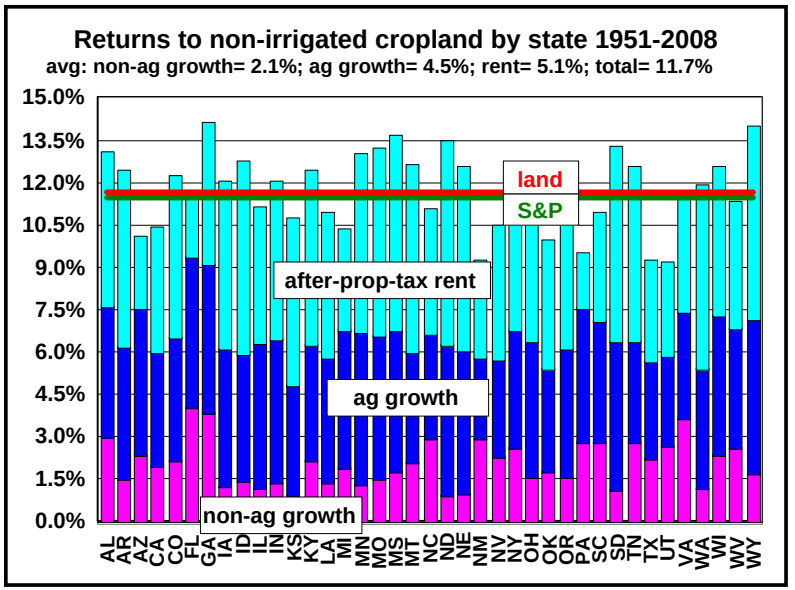
Why are there few big investors in farms?

- Are the returns too low?
- Is the risk too high?
- Unsure of asset class?
  - Farm land
  - Buildings, machinery and crop inputs
  - Livestock
- Unsure where geographically to invest?
- Is the market too thin and imperfect?
- We are going to focus on the asset class of farm land

Are the returns too low or is the risk too high?



Where geographically should one invest?



A little like picking business sectors rather than a broad mutual fund

Is the market too thin and imperfect?

- Not for those who understand farm land as an investment
- Understanding farm land:
  - Suitability for agriculture (always an important driver)
    - Soil quality (fertility, slope, etc.)
    - Landowner-tenant relationship (critical)
  - Suitability for non-ag benefits (recently important)
    - Current or future home sites
    - Hunting and other recreation
    - Value of water (even wind) or carbon credits
    - Value of minerals

Farm land as an investment

Factors/issues impacting land values

(alphabetical order)

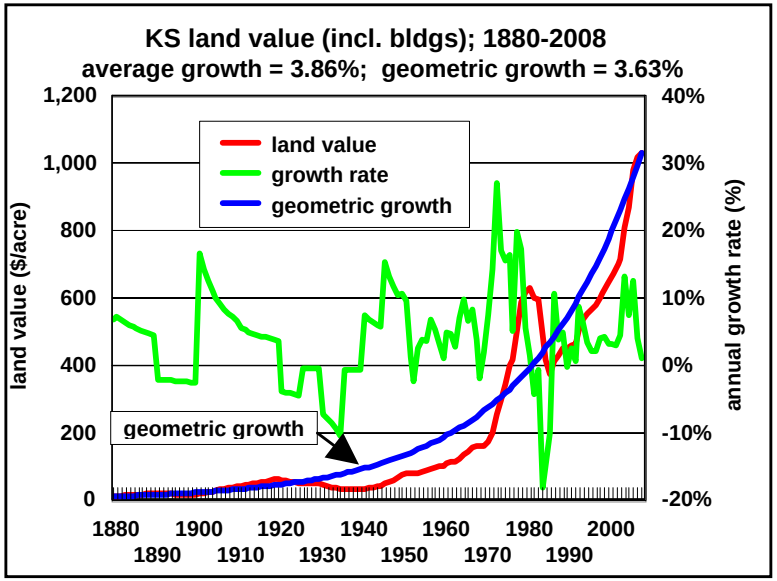
- Farm profitability
- Farm size
- Government programs
- Input costs (e.g., fuel and fertilizer)
- Interest rates
- Outside investors (i.e., stock market money)
- Recreation uses (e.g., hunting)
- Ethanol and bio-diesel / global demand for grain
- Section 1031 tax exchanges
- Technology (e.g., no-till, precision ag, bio-tech, DNA)
- Urban sprawl
- Weather (i.e., drought, flood)

Factors impacting agricultural land values…

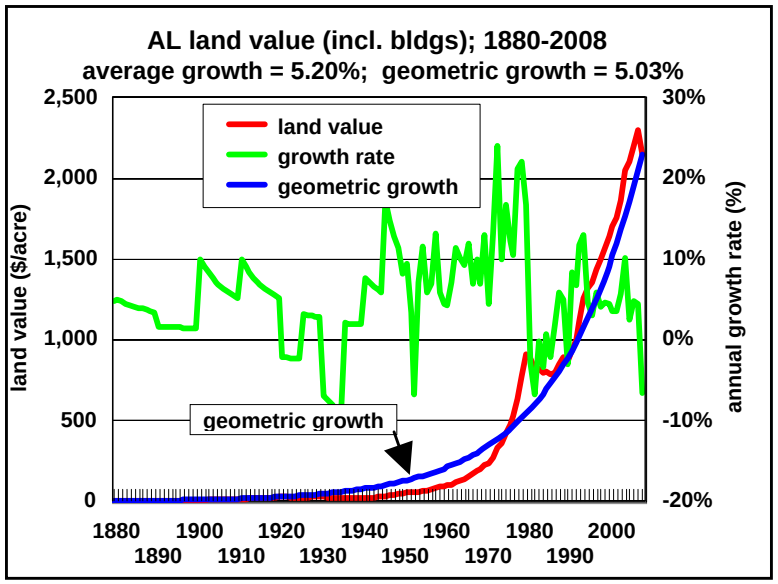
- Ag factors
  - Ag portion of agricultural land has been diminishing
  - Reduced ability to cash flow traditional land loans with value of agricultural production
- Non-ag factors
  - Urbanization, recreational use of land, etc.
- While agricultural land may continue to be a good investment, producers need to decide if they want to tie up equity in land versus other assets
- Analyzing/evaluating land purchases/prices may become more difficult due to non-ag forces

Land is Unique

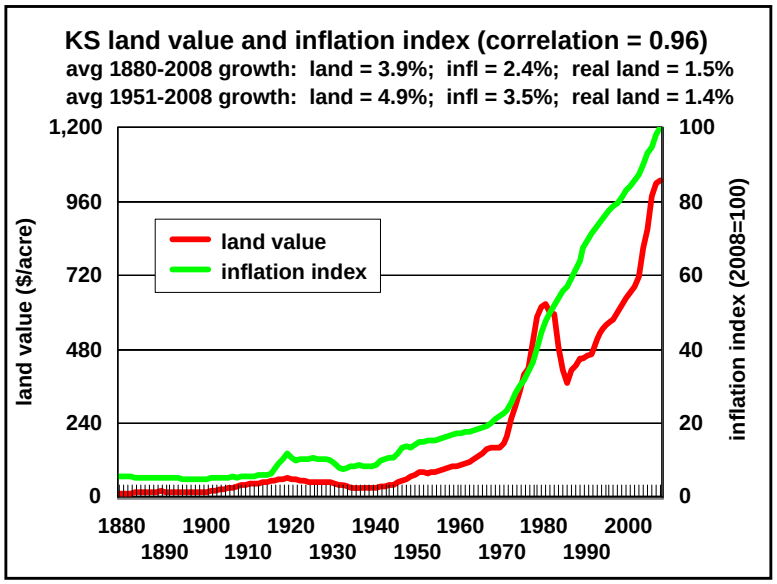
- Most fixed of farming assets
  - Residual claimant
  - Capitalizes government subsidies
- Often is taxed
  - Favorably or unfavorably
- Has non-ag benefits that may be pecuniary
- Has non-pecuniary benefits
- A long term investment involving long term expectations – history is a guide

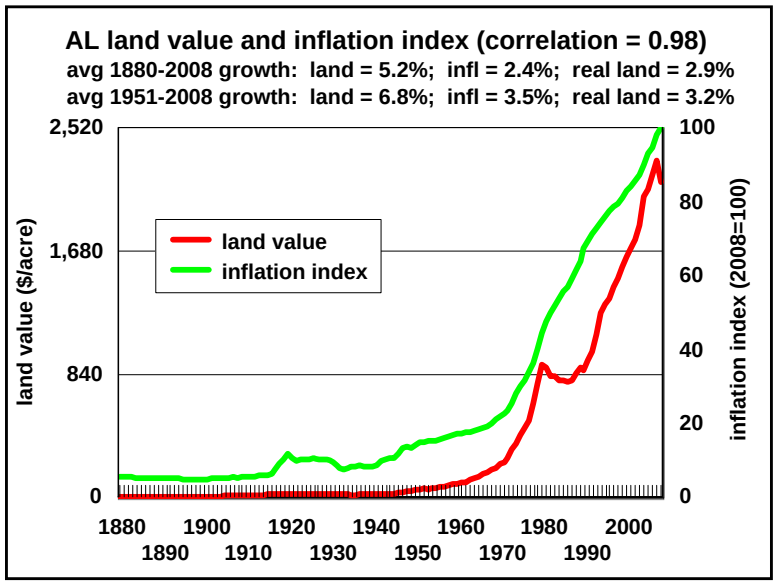


1879 starting land value for Kansas was $10.30



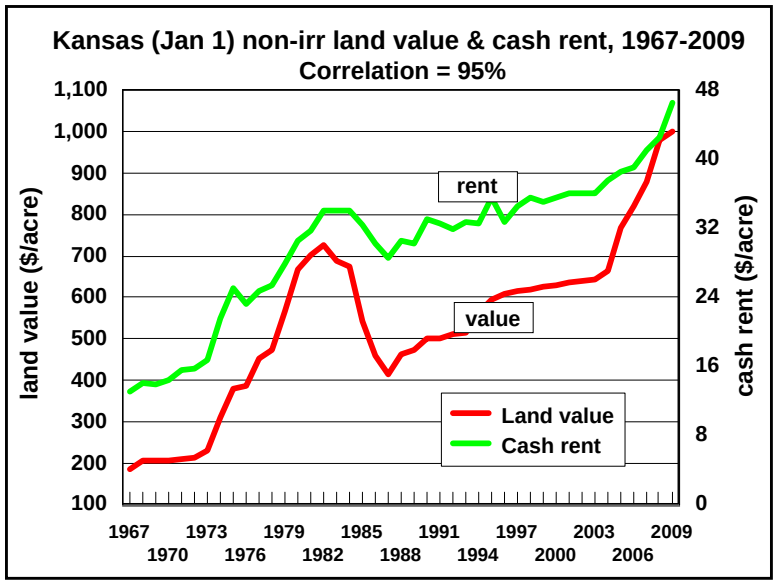
1879 starting land value for Alabama was $3.82

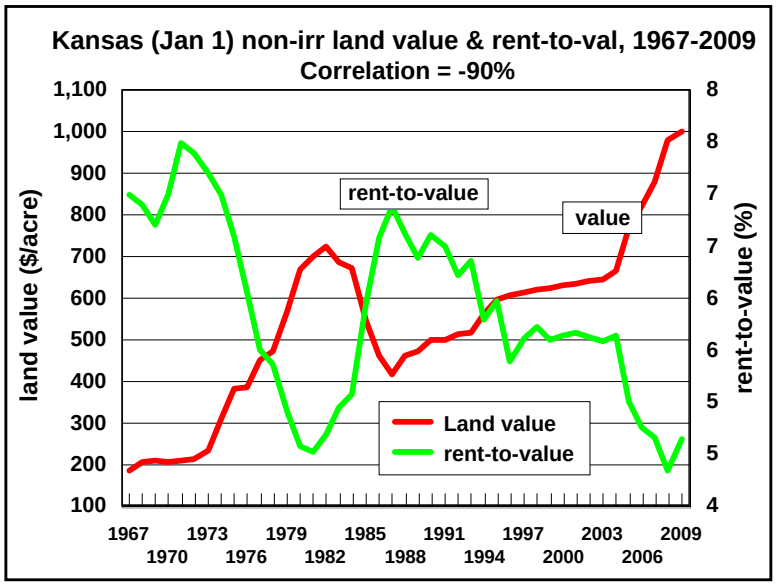




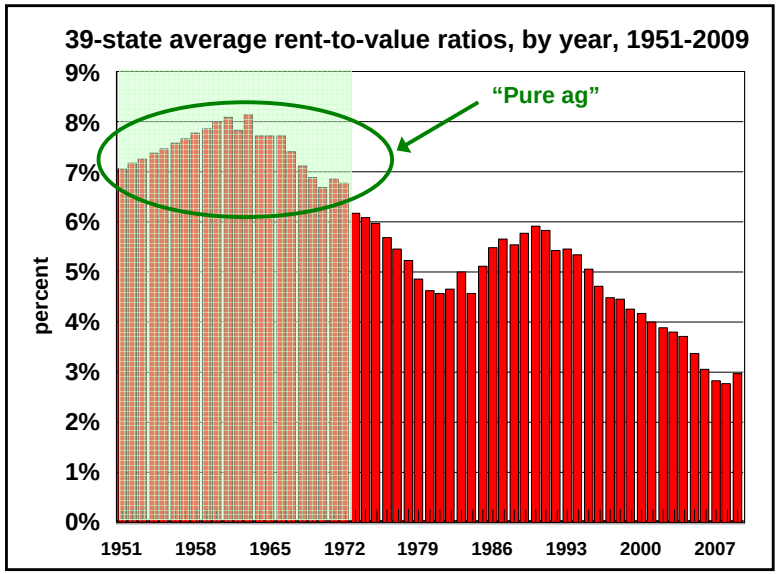
Returns to land

- Capital gains (growth)
- Cash returns (rent)
- The two returns to land are similar to other investments such as the stock market (capital gains and dividends)

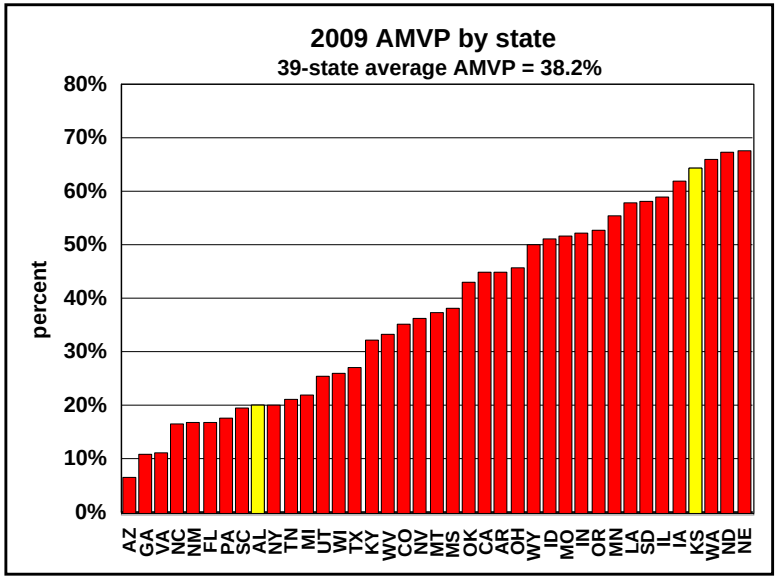




Using RTV triggers is like using PE ratio triggers in the stock market – not easy

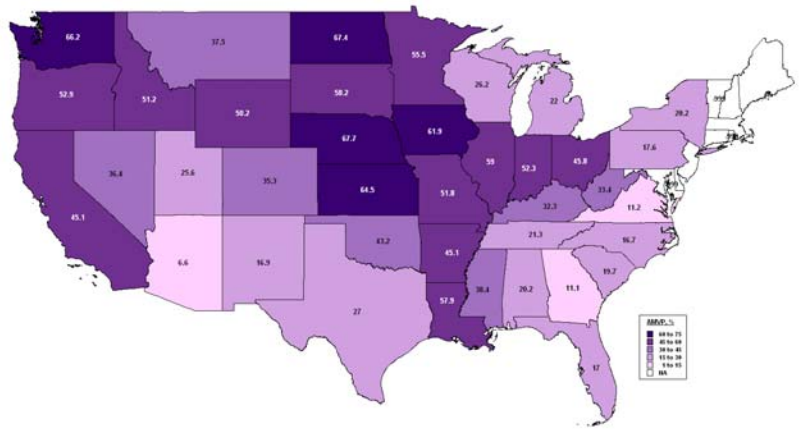


When would you pull the trigger?



percent of land value that is due to agriculture

Portion of Land Value Attributed to Agricultural (production and government payments)

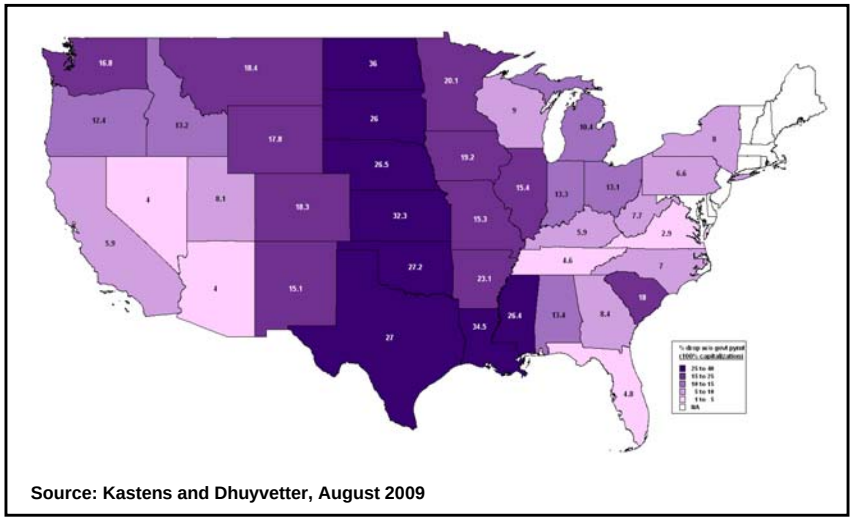


Source: Kastens and Dhuyvetter, August 2009

Government Program Payments

- Generally, are thought to be capitalized into land values and cash rents
- Many Great Plains states and many Southern states are highly dependent on government program payments

Estimated Reduction in Land Value with the Elimination of Government Programs (100% cap)

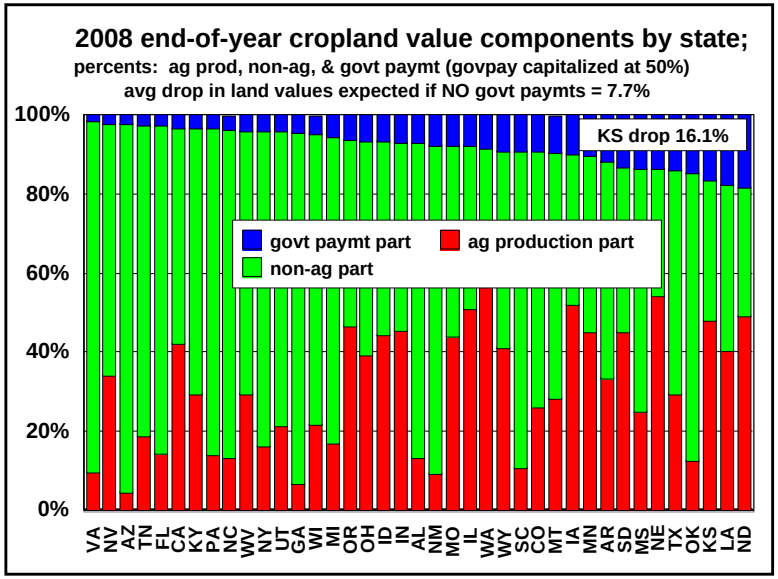


Source: Kastens and Dhuyvetter, August 2009

reduction is proportional to capitalization rate (e.g., KS=16.15% with 50% cap)

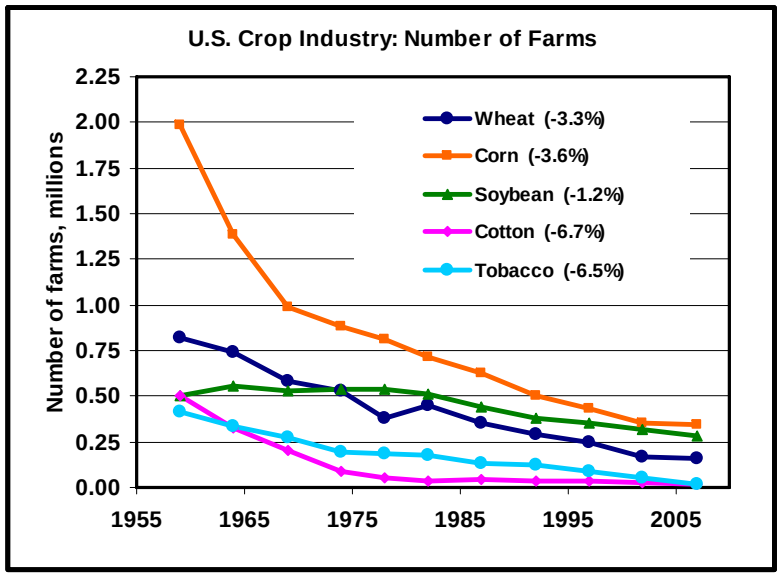
2008 end-of-year cropland value components by state;

percents: ag prod, non-ag, & govt paymt (govpay capitalized at 50%)
avg drop in land values expected if NO govt paymts = 7.7%



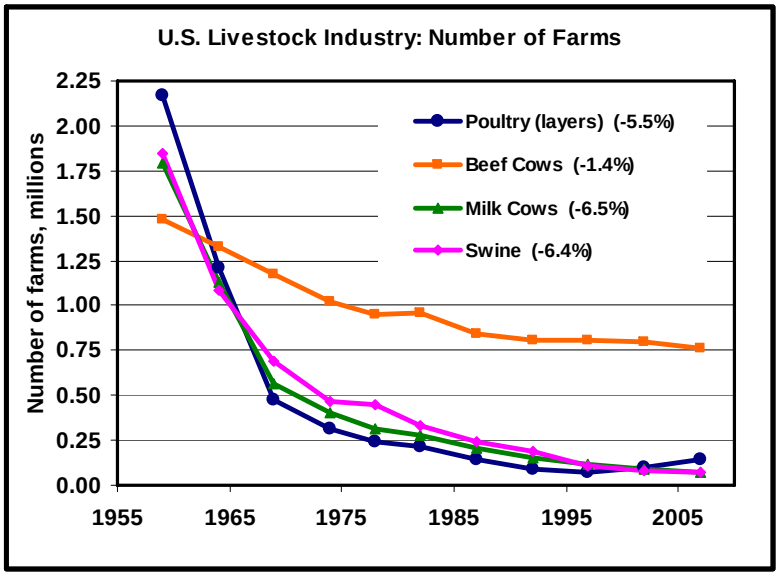
Trends in ag – consolidation

Trends in crop farm numbers …



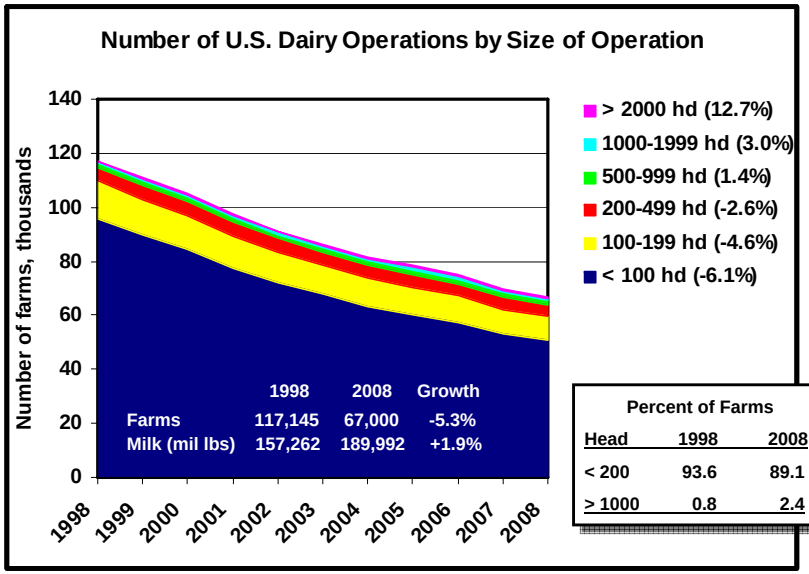
Source: Census of Agriculture

Trends in livestock farm numbers …



Source: Census of Agriculture

Dairy industry is looking a lot like the swine industry

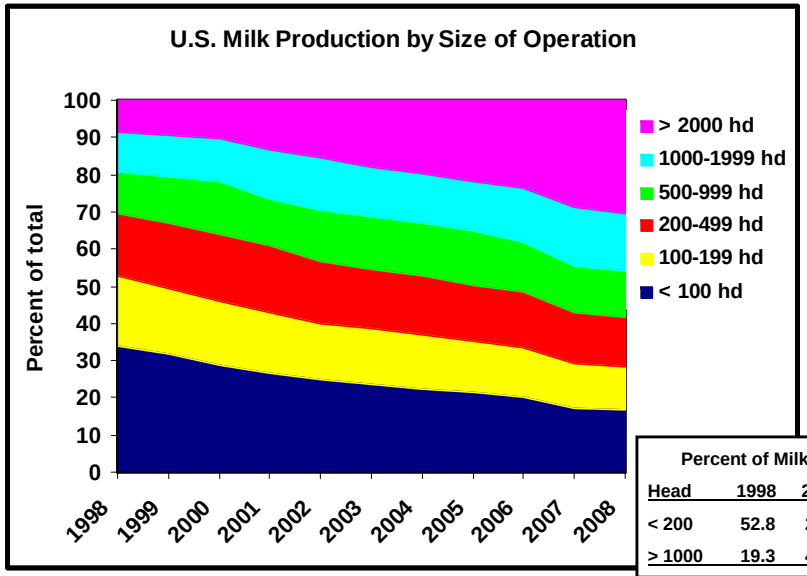


Percent of Farms

Head	1998	2008
< 200	93.6	89.1
> 1000	0.8	2.4

Source: USDA NASS

Consolidation in dairy is happening…



Percent of Milk

Head	1998	2008
< 200	52.8	28.4
> 1000	19.3	46.0

Source: USDA NASS

Concentration of U.S. animal agriculture in 2008

(percent of operations to generate approximately 50% of production)

	Size of operation (hd)	Percent of operations	% of I, M, or P*
Beef cows	100+	9.7%	54.1% (I)
1000+ head Feedlots**	32,000+	5.9%	50.6% (M)
Dairy	1000+	2.4%	46.0% (P)
Swine	5,000+	4.0%	61.1% (I)

* I = Inventory, M = Marketings, P = Production

** Feedlots with 1000+ head represent 2.6% of all feedlots and account for 84.7% of marketings (2008 data)

Source: USDA NASS and K-State

Economies of size –
… an important driver

What motivates farmers?

- Farming: profit or lifestyle?
- About what will make *some* farms profitable in the future
  - The ones that will be around in commercial ag
- One part of a bigger picture
  - What to do with wealth
  - What to do with human capital (personal skills)
  - Ultimately, it's about HAPPINESS

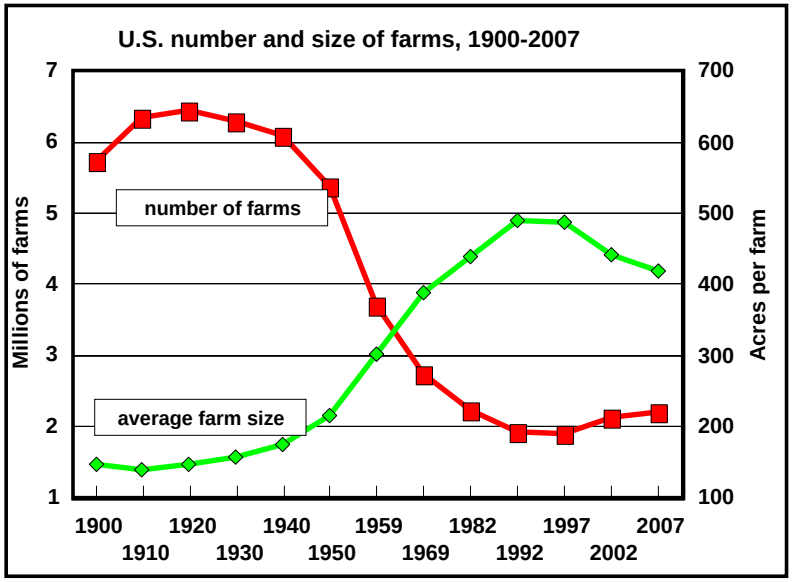
Economies of size: the driving force

- Per-unit costs fall as a firm gets bigger
  - Essentially about spreading fixed costs
  - May mean higher prices instead

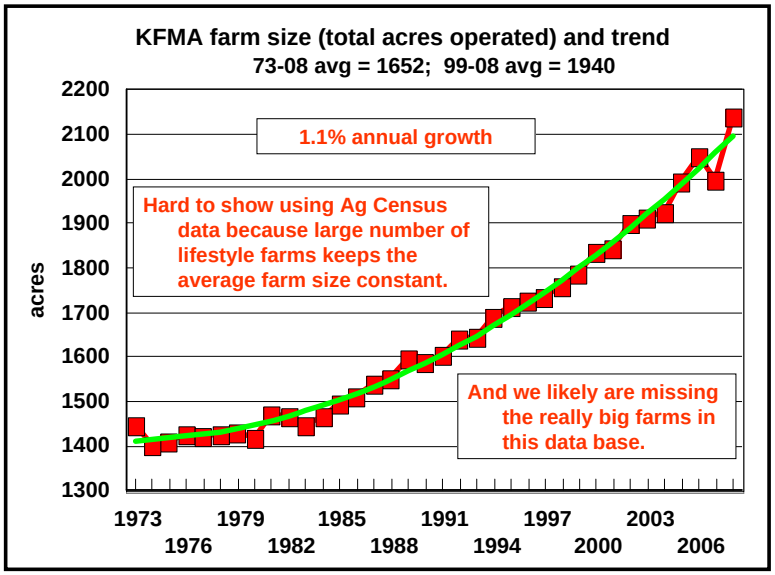
Is EOS for real?

- Is there a benefit to targeting growth and size?
- Or, is growth an accident of good management (plowing profits back into the farm or business)?

Average farm size…



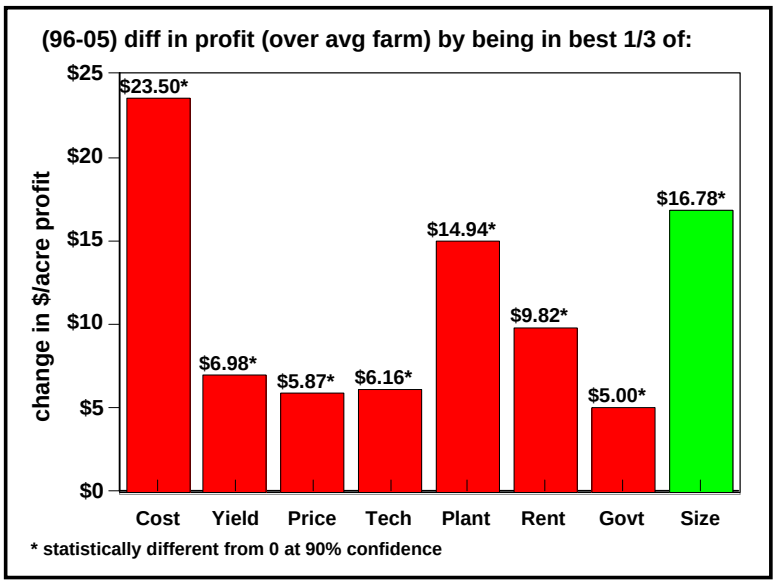
Source: Census of Agriculture



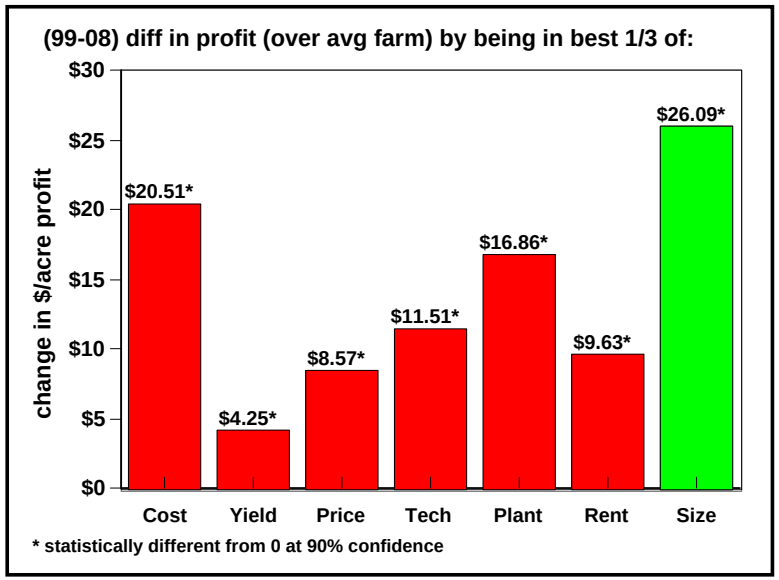
Farm size has been increasing at an increasing rate for COMMERCIAL farms

Is EOS for real?

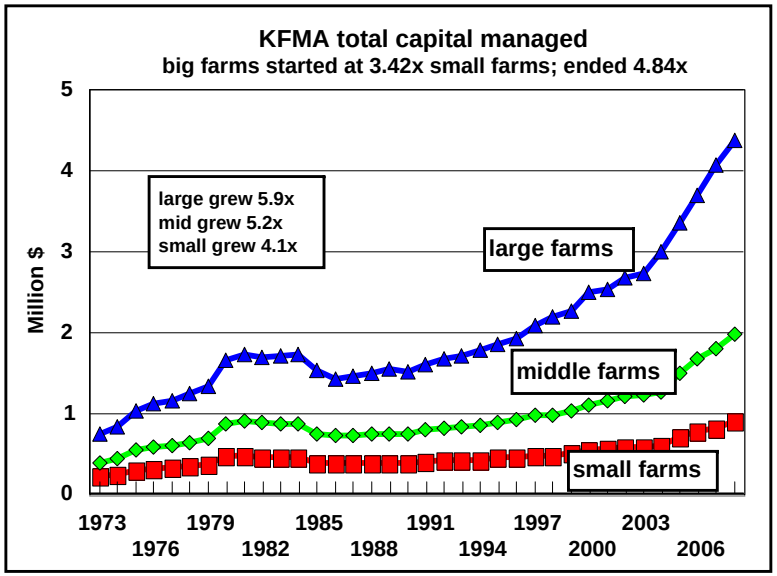
- Hard to distinguish effect of good management and other factors from the effect of size
- Statistical regression is one way to do it
  - After you correct or adjust for the impact of other factors, is there still a positive impact on profit associated with size?

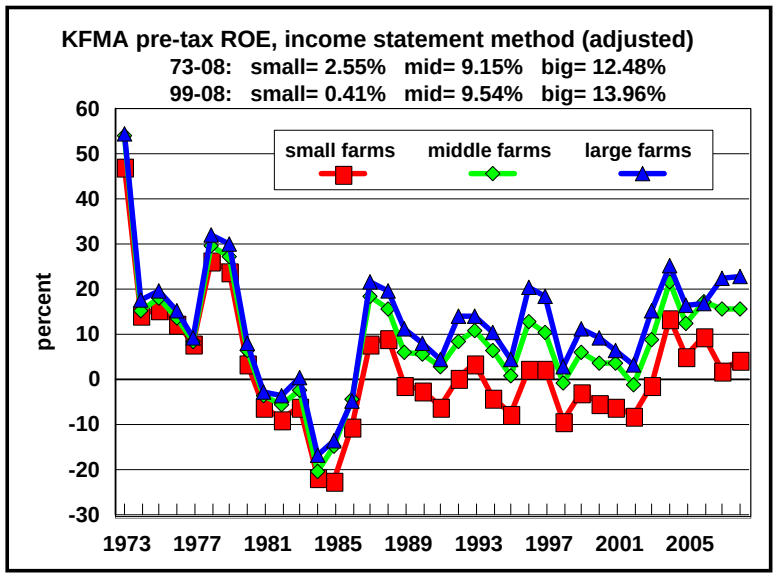


A size effect remains – evidence that EOS is for real



EOS becoming more important, absolutely and relatively





The characteristic differences across farm sizes result in profit differences

Why are large farms more profitable?

- Lower cost is the obvious benefit, but other benefits arise from the research
- Larger farms:
  - Have much lower costs
  - Get somewhat higher yields
  - Get slightly higher prices
  - Farm more intensively
  - Are much faster adopters of technology, for example, less-tillage

Large farms are not only more profitable

- The disparity between large and smaller farms has been growing over time.
- Will the traditional one-family family farm soon be a thing of the past?
  - The family farm will go on but it will be an extended family
- Farming will become increasingly bimodal

EOS implications: equity

- It takes so much to get started today!
- Internal profits (reinvest profits)
- Vertical accumulation
  - Family wealth across generations
  - Diverging goals of heirs and forebears
- Horizontal accumulation
  - Family or non-family contemporaneous equity
  - Minority shareholders have poor protection
- Successful farms will overcome the equity hurdles

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
- Remember, we never saw the rapid consolidation in poultry, swine, and dairy coming either

What does rapid consolidation in crop production mean?

- Demand for equity, especially in farm land
- Increase in farming profits
  - An extra increase in ag rents
  - An extra increase in land values
  - Remember that land is the residual claimant

Trends in ag – technology

Technology

- Definition: The application of science to industrial or commercial objectives
- Broadly, agricultural technologies are those processes or machines that impact agriculture
  - Lower cost, or
  - Increase revenue
- Requires an investment; so, the natural question is will it pay?

Technology: Will it pay?

- How much is the investment?
- How fast is the payback or return on investment?
- How confident am I that this will happen?

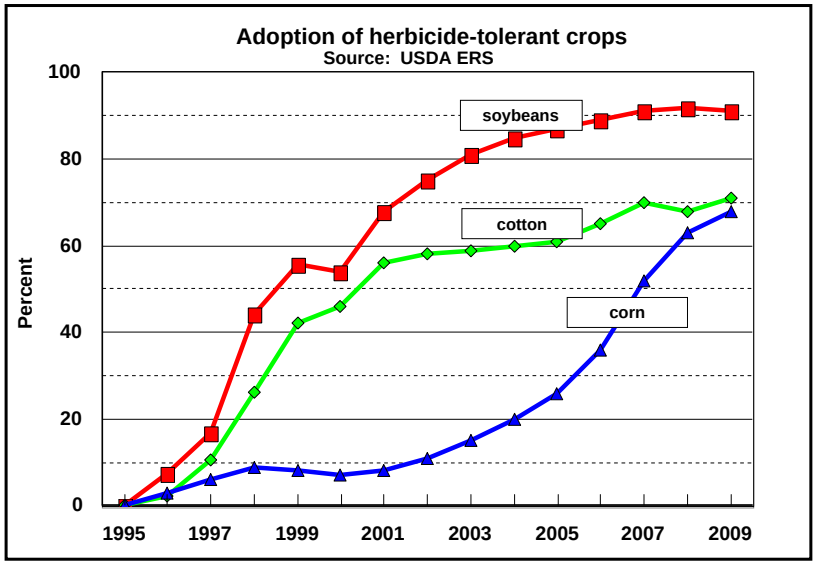
If the profit materializes …

- I'd like to apply the technology to more units of production (often, acres)
- So, I bid up rent or land values
  - Just a bit if I'm the only one using the technology
  - A whole bunch if many are using the technology
- Even only a handful of viable adopters in an area can dramatically drive up rents

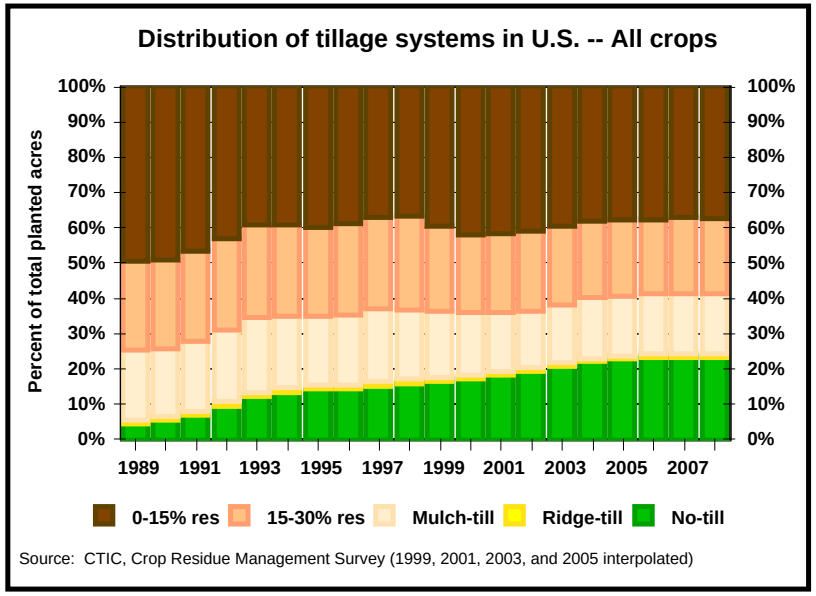
Ag is replete with new technologies

- GMO crops
- Enhanced fertilizers
- Automated machinery
- Robotics
- Communications

Some technologies are rapidly adopted…

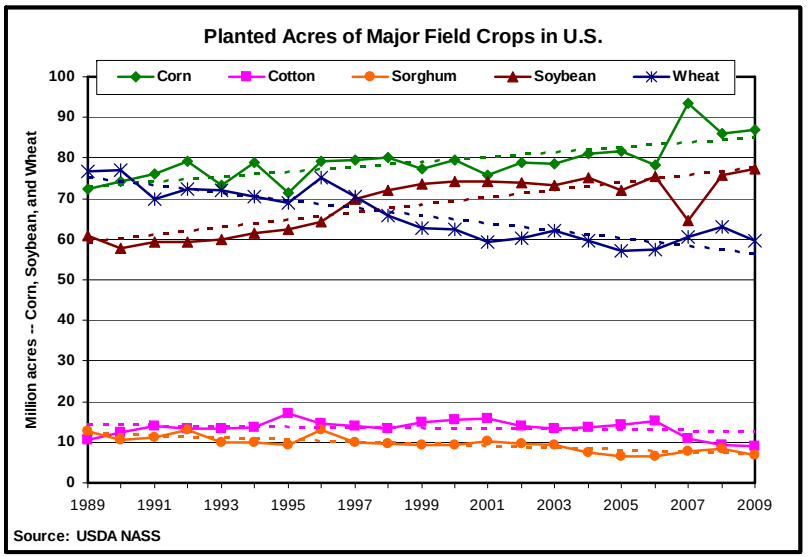


Other technologies are slower to be adopted…



Source: CTIC, Crop Residue Management Survey (1999, 2001, 2003, and 2005 interpolated)

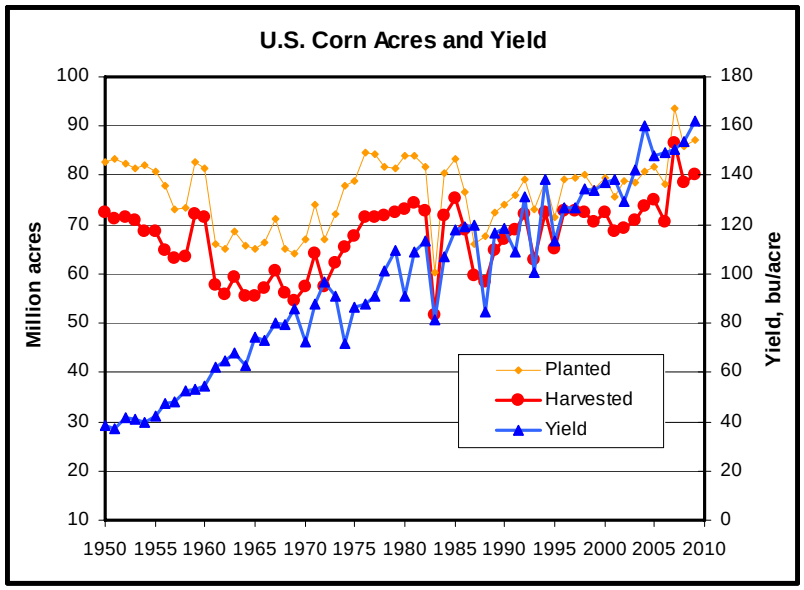
Crop rotation is changing…



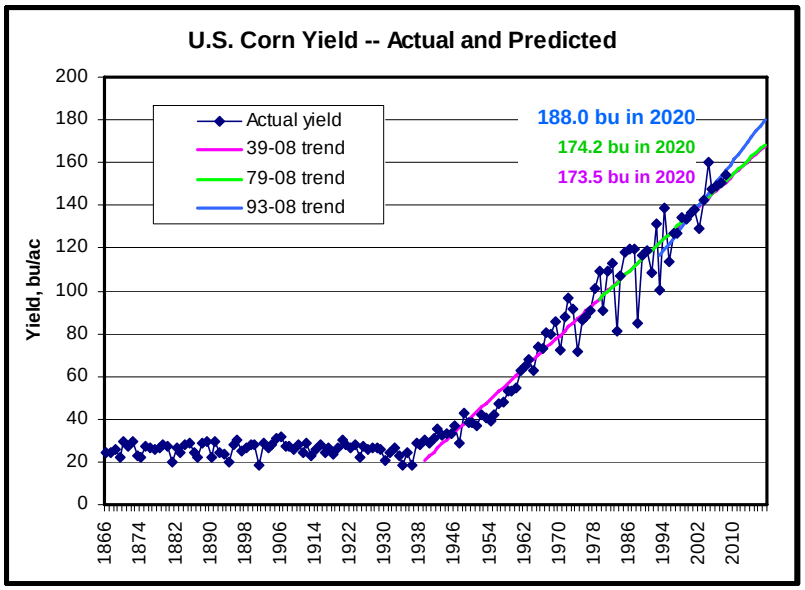
Source: USDA NASS

Annual growth rates: corn 1.0%, cotton -1.3%, sorghum -2.2%, soybean 1.1%, wheat -1.1%

What's going on with corn?



What does the future hold for corn?



Technology and farm size

- Large farms adopt technology more quickly
  - Because of investment (economies of size)
- If technologies come out ever faster, then farms will get larger ever faster
- Rapid growth in farm size will be the norm

- Once again:
  - An extra increase in ag rents
  - An extra increase in land values
  - Remember that land is the residual claimant

Icings on the cake beyond ag

- Generally, we focus on ag and take a conservative view on non-ag forces, say 1% growth on non-ag. But, there are many potential non-ag icings on the cake:
  - Minerals
  - Recreation (e.g., lease hunting)
  - Biofuels
  - Carbon credits
  - Water sales
  - Wind

- Each has potential to increase non-ag growth or directly enhance annual income.

Questions ???

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