

Risk Management Tools: Comparing Farmland Returns to Stock Market Investments

File C2-79

The purpose of this Information File is to compare how an investment in land would compare to an investment in the stock market over time.

The reader should gain an understanding of:

- The historical returns to land over time
- The historical returns to stocks over time
- The factors that drive land values
- And identify and utilize resources that are available

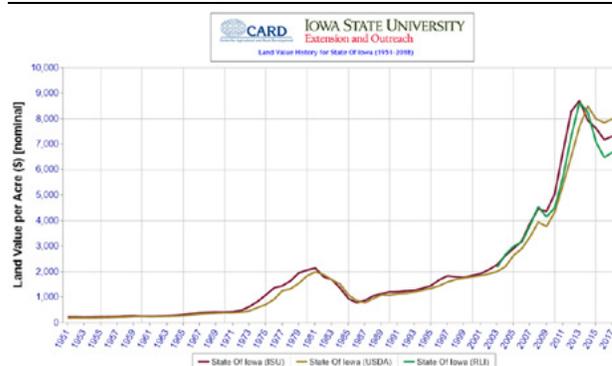
Related papers on this topic include:

- [Comparing the stock market and Iowa land values: A question of timing](#) by Wendong Zhang and Michael Duffy, www.extension.iastate.edu/agdm/newsletters/nl2019/jul19.pdf
- [The Current Farm Downturn versus the 1920s and 1980s Farm Crises: An Economic and Regulatory Comparison](#) by Wendong Zhang and Kristine Tidgren, www2.econ.iastate.edu/faculty/zhang/publications/peer-reviewed-articles/Zhang_Tidgren_2018_AFR_Farm_Downturn.pdf, and
- [Who Owns, Rents, and Buys Farmland Today](#) by Wendong Zhang and LeeAnn Moss, www.card.iastate.edu/products/presentations/files/zhang_201809_acrevalue_farmland_ownership_webinar.pdf

When comparing returns to land and stocks one looks at two different values. The first is the value of the underlying asset. The second is the annual returns which in the case of land would be the annual rents in the case where crops such as corn, cotton, soybeans and wheat are raised. With stocks one looks at the annual returns that come in the form of dividends declared. Dividends may be paid out in cash and reinvested, as is done in these examples, or some companies reinvest the dividends back into the stocks or mutual funds, generally without a fee.

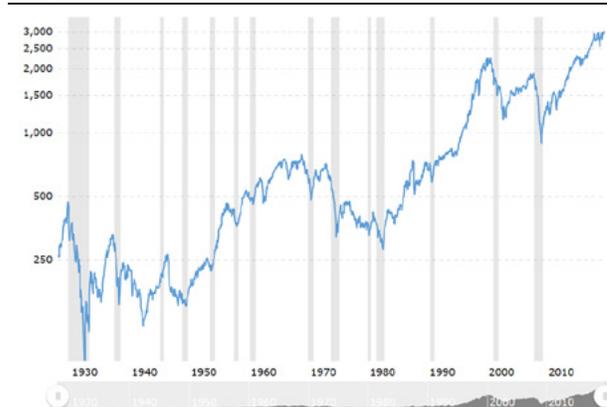
There is a lot of historical data on land values on the [CARD website](http://www.card.iastate.edu/farmland/), including historical data on the Iowa State University Land Value Survey, the USDA Survey, the REALTORS Land Value Survey and the Federal Reserve Bank of Chicago Survey. The chart below shows a comparison of the ISU Land Value Survey taken annually since 1941, with the USDA and RLI surveys.

Figure 1. Comparison of ISU Land Value Survey, with USDA and RLI surveys



Looking long term at the S&P 500 (S&P 500 is a stock market index that tracks the stocks of 500 largest capitalized US companies) it appears that it has had more volatility.

Figure 2. S&P 500



Source: <https://finance.yahoo.com>

Written February 2020

Activity

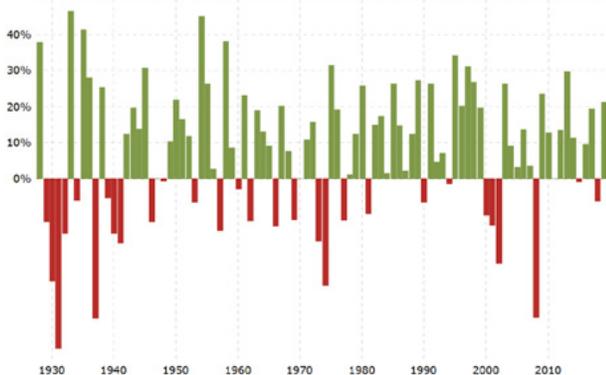
Go to the [CARD website](http://www.card.iastate.edu/farmland/), www.card.iastate.edu/farmland/ and look up the value of land in Hardin County, Iowa (or any other county) in 2007 and 2017. If you go to the “[archives](http://www.card.iastate.edu/farmland/isu-survey/archive/)” www.card.iastate.edu/farmland/isu-survey/archive/, you can get the county data.

Hardin County 2007 average land value was estimated at \$4,482. The 2017 land value estimate was \$8,133, a significant increase in value.

The [Ag Decision Maker website](http://www.extension.iastate.edu/agdm/), www.extension.iastate.edu/agdm/, has a several publications on [leasing](http://www.extension.iastate.edu/agdm/wdleasing.html), www.extension.iastate.edu/agdm/wdleasing.html and [land values](http://www.extension.iastate.edu/agdm/wdvalues.html), www.extension.iastate.edu/agdm/wdvalues.html.

One way to look at volatility is to look at the change in the S&P 500 on an annual basis as Figure 3 shows.

Figure 3. Annual Change for the S&P 500



Source: www.macrotrends.net/2526/sp-500-historical-annual-returns

Keep in mind that there are two returns to compare: the annual change in the underlying investment (as illustrated by the three charts above) and then the annual income stream in the form of rents or dividends. Not all of the stocks in the S&P 500 pay dividends. Many of the “tech” companies don’t.

Annual Returns

The annual returns come in the form of rents or dividends. There is a significant range in the rents on farmland based on many factors, such as the soil productivity, the profitability, access to markets, field size, and field shape, to mention a few. Even within the same location you can see a range of rents.

Activity

Consider the information in Table 1 (next page). This information is updated annually on the [AgDM website](http://www.extension.iastate.edu/agdm/wholefarm/pdf/c2-09.pdf), www.extension.iastate.edu/agdm/wholefarm/pdf/c2-09.pdf. Look at the “rent as a percentage of value” for cropland.

The table shows how the “gross rents” have changed over time as a percentage of cropland and pasture land values. In 2000, crop rents were 5.9% of the land value. In 2010 crop rents declined to 4%. In 2019, land rents have declined by 50% as a “percentage of value” compared to 1994, even though rents more than doubled in that time period.

Rents had increased overall but land values have increased faster than rents. The “gross rents” were before management fees, property taxes and other expenses were deducted.

Also, when you look at the returns as “rent as a percentage of value” for pasture as compared with cropland you see that cropland has consistently had higher returns. One could speculate that returns to beef cow herds is a factor or perhaps even differences in the tax code or recreational use of land for hunting might all be factors.

Table 1. Estimated Farmland Rental Rates – Iowa¹

Year	Cropland				Pasture			
	Cash Rent, \$/acre	Change in Rent, Percent	Land Value, \$/acre	Rent as % of value	Cash Rent, \$/acre	Change in Rent, Percent	Land Value, \$/acre	Rent as % of value
1994	98.60	--	1,517	6.5%	26.40	--	480	5.5%
1995	99.60	1.0%	1,581	6.3%	28.10	6.4%	450	6.2%
1996	105.00	5.4%	1,810	5.8%	28.90	2.8%	575	5.0%
1997	110.00	4.8%	1,700	6.5%	31.10	7.6%	615	5.1%
1998	113.00	2.7%	1,860	6.1%	34.00	9.3%	665	5.1%
1999	112.00	-0.9%	1,900	5.9%	31.00	-8.8%	680	4.6%
2000	115.00	2.7%	1,940	5.9%	29.00	-6.5%	700	4.1%
2001	117.00	1.7%	1,980	5.9%	30.00	3.4%	730	4.1%
2002	120.00	2.6%	2,040	5.9%	30.50	1.7%	760	4.0%
2003	122.00	1.7%	2,120	5.8%	31.00	1.6%	800	3.9%
2004	126.00	3.3%	2,310	5.5%	32.50	4.8%	880	3.7%
2005	131.00	4.0%	2,760	4.7%	36.00	10.8%	1,070	3.4%
2006	133.00	1.5%	3,100	4.3%	38.00	5.6%	1,400	2.7%
2007	150.00	12.8%	3,600	4.2%	39.00	2.6%	1,780	2.2%
2008	170.00	13.3%	4,260	4.0%	42.00	7.7%	2,070	2.0%
2009	175.00	2.9%	3,980	4.4%	43.00	2.4%	1,850	2.3%
2010	176.00	0.6%	4,450	4.0%	40.00	-7.0%	2,030	2.0%
2011	196.00	11.4%	5,600	3.5%	46.00	15.0%	2,520	1.8%
2012	235.00	19.9%	6,810	3.5%	46.00	0.0%	2,800	1.6%
2013	255.00	8.5%	8,000	3.2%	49.00	6.5%	3,220	1.5%
2014	260.00	2.0%	8,560	3.0%	50.00	2.0%	3,330	1.5%
2015	250.00	-3.8%	7,860	3.2%	50.00	0.0%	3,260	1.5%
2016	235.00	-6.0%	7,510	3.1%	52.00	4.0%	3,190	1.6%
2017	231.00	-1.7%	7,440	3.1%	54.00	3.8%	2,850	1.9%
2018	231.00	0.0%	7,290	3.2%	54.00	0.0%	2,790	1.9%
2019	230.00	-0.4%	7,260	3.2%	59.00	9.3%	2,720	2.2%

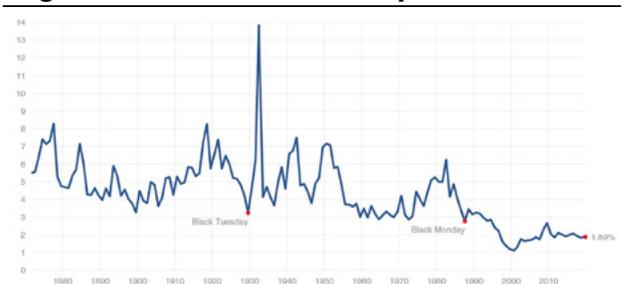
¹Prepared from data collected by the USDA, National Agricultural Statistics Service. Source: AgDM File C2-09

One of the factors in land value is the “opportunity cost” of money. One way to look at “opportunity cost” is to look at the Federal Funds Rate as illustrated in Figure 4. The Federal Funds rate peaked out in 1981 with a monthly rate of 18.38%. The 1994 prime rate was 4.2% and the “rent gross” return was 6.5% as shown in Table 1. By 2018, the Federal Fund Rate had decreased to 1.83% and the “gross rent” percentage had declined to 3.2% for cropland.

Figure 4. Federal funds rate



Figure 5. S&P 500 dividend yield



You can see several peaks in the dividend yields over time, such as the 1930s. Remember that these peaks are usually caused by a significant price drop in the stocks which means that even if they were to pay smaller dividends it would be an increase in the percent dividend yield. If you compare that with the drop in land values in the 1980s shown in Figure 1, you would also have seen an increase in the “rent as percent return on value” as the land prices declined faster than rents.

The federal government can impact the short-term interest rates but has little control over long-term interest rates. Both land values and stocks (due to the cost to companies of borrowing capital) are impacted by interest rates. As Figure 6 shows, the 30-year mortgage interest rates have substantially declined over the last 15 years. Declining interest rates stimulates land and stock prices. However, going forward there is little opportunity to drive interest rates down much farther because they are at historical lows.

For additional information review the USDA Economic Research Service web page, [Farmland Values, Land Ownership, and Returns to Farmland, 2000-2016](http://www.ers.usda.gov/webdocs/publications/87524/err-245.pdf?v=0), www.ers.usda.gov/webdocs/publications/87524/err-245.pdf?v=0

Figure 6. Thirty-year mortgage interest rates, 2000-2016, in inflation-adjusted terms

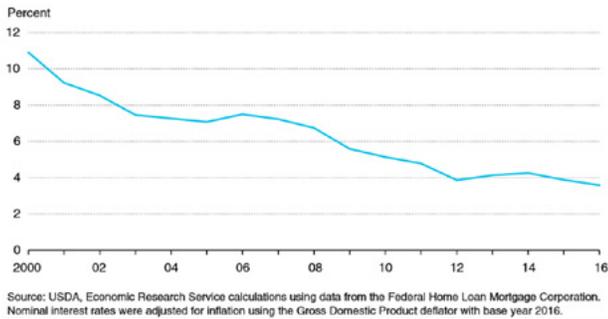


Figure 7 shows a high correlation between 10-year treasury notes and crop capitalization rates.

Figure 7. Cropland capitalization rates (rent-to-value ratios) and 10-year constant maturity US Treasury note yields

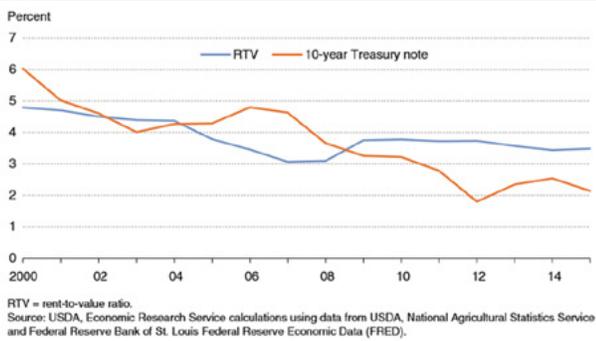
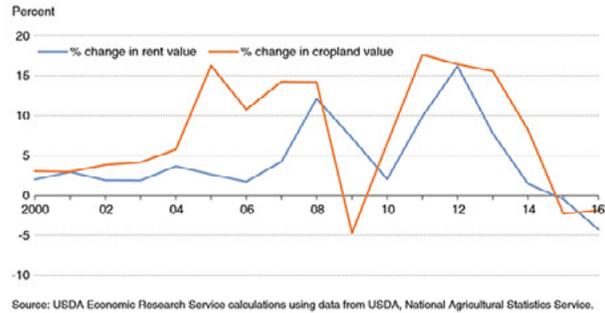


Figure 8 shows a high correlation between cropland values and cropland rents.

Figure 8. Changes in cropland value and cropland rent in the Corn Belt, 2000-2016



Research by Dr. Wendong Zhang and Dr. Mike Duffy shows a comparison between stock values and land values starting at a range of different time periods. Figure 9, for example, shows investing in the year 1950.

Zhang and Duffy’s assumptions includes that the net land rent or the dividend earned in any year will be reinvested in the land or the stock market. This will increase the number of units held. The average Iowa farmland rent in 1951 was \$12.37 per acre. Average farmland property taxes in 1951 were calculated to be \$2.31 per acre. Subtracting taxes, a 7% of gross rent management fee and a 6% of gross rent charge for insurance and maintenance, the net return per acre in 1951 was \$8.45.

The \$1,000 investment in 6.21 acres of Iowa farmland would generate a total of \$52.47 in terms of net rent for the investor (\$8.45 * 6.21 acres). In 1951, the average land value was \$188 per acre. If the entire net return were invested back into land, .28 acres could have been purchased (\$52.47/\$188 = .28). So, at the end of 1951 the investor would have 6.49 acres worth \$1,220 (\$1,220 = (6.21+.28)*188). This process is repeated each year in the analysis.

The June 1950 S&P was \$18.74. This means 53.36 shares could have been purchased for \$1,000. The June 1951 dividend was \$1.56 per share. This means an additional 4.11 shares and value of \$1,233 at the end of 1951.

Figure 9. Value of \$1,000 invested in 1950 in Iowa farmland or the S&P 500

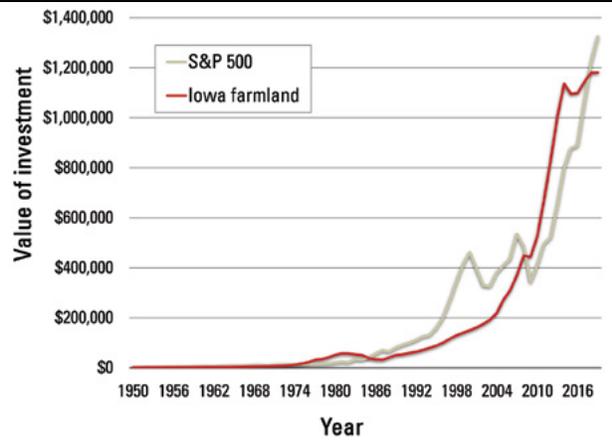
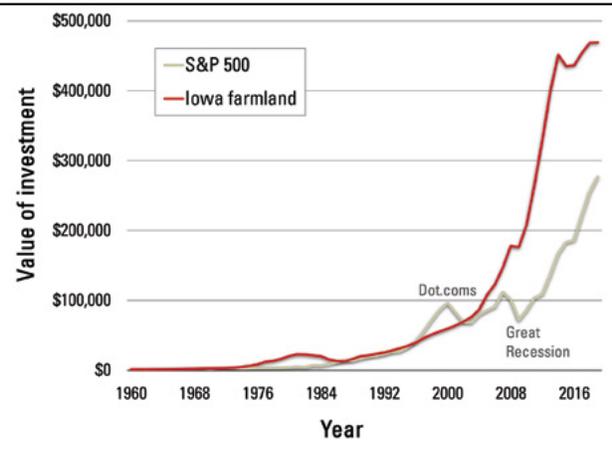


Figure 9 shows the return to \$1,000 invested in 1950. At that time, \$1,000 would have purchased 6.21 acres or 53.36 shares of the S&P. Using the assumptions discussed previously, an investor in June 2019 would have 149.14 acres worth \$1,180,916. Alternatively, they would have 451.65 shares of the Standard & Poor worth \$1,324,444. In other words, the value of the S&P investment would be 12.2% above the value of the land investment in 2019.

Based on using the same methodology the returns from investing in the S&P and farmland are shown for the year 1960 in Figure 10.

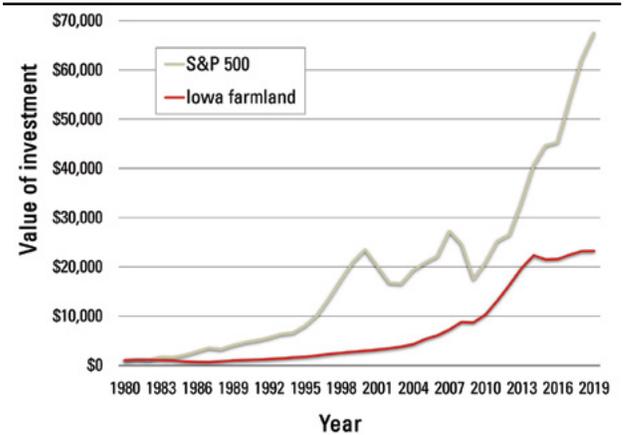
Figure 10. Value of \$1,000 invested in 1960 in Iowa farmland or the S&P 500



There have been periods since 1960 when the returns to the stock market have been higher. However, for the most part, land has shown higher returns over the past 50 years except during the 1980s farm crisis. Figure 10 shows the burst of the dot.com bubble in the early 2000s and the recent Great Recession in S&P as well as the dramatic increase in Iowa land values since the mid-2000s.

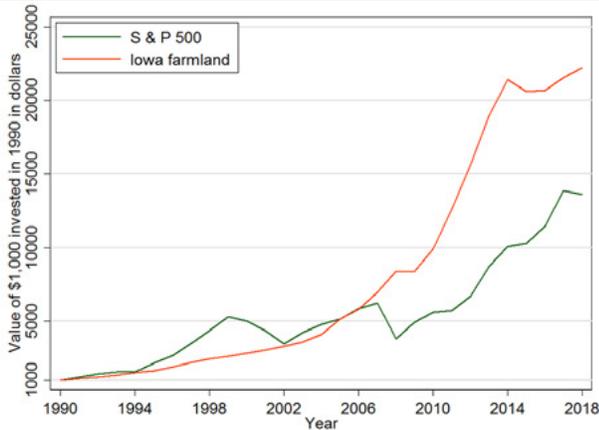
Based on using the same methodology the returns from investing in the S & P and farmland are shown for the year 1980 in Figure 11. Iowa farmland and rents declined through the 1980s giving the S&P 500 a large advantage in this time frame.

Figure 11. Value of \$1,000 invested in 1980 in Iowa farmland or the S&P 500



Based on using the same methodology the returns from investing in the S&P and farmland are shown for the year 1990 in Figure 13. With lower land values at the start of 1990, land values rebounded and so did rents. Then around 2005 we saw the passage of the Federal Renewable Fuels Act which resulted in a significant increase in corn demand due to corn being used to make ethanol and grain prices rallied.

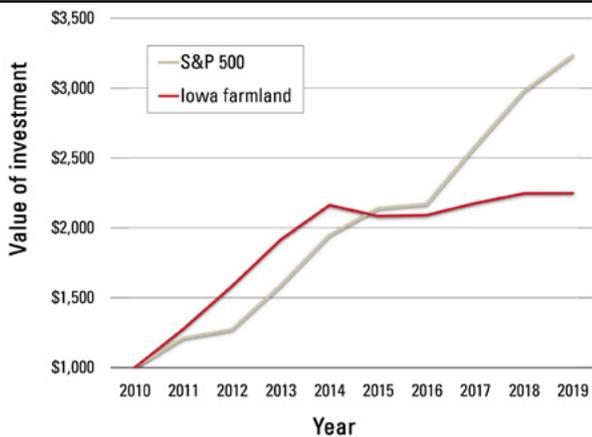
Figure 13. Value of \$1,000 invested in 1990 in Iowa farmland or the S&P 500



The higher grain prices were then capitalized into higher land rents and land values.

Based on using the same methodology the returns from investing in the S&P and farmland are shown for the year 2010 in Figure 14.

Figure 14. Value of \$1,000 invested in 2010 in Iowa farmland or the S&P 500



By 2014 the demand for additional corn for ethanol production had pretty well disappeared. The Renewable Fuels Act had a cap on how much ethanol needed to be produced from corn and the cap had been reached. Along with several years of record production both in the US and globally, the world had excessive grain inventories and grain prices substantially retraced. This resulted in lower rents as shown above in Figure 8 and a decrease in land values.

The S&P 500 was still benefiting from lower interest rates, new technology, global manufacturing and consumer spending.

What the future holds?

The S&P was first set back by the “Great Depression,” then the “Dot.com” crises in the stock market in the late 90’s and then again by the “Great Recession” in 2008.

Agriculture has gone through three time periods, World War I, World War II, and the export-led boom of the 1970s, which some have referred to as the “golden eras in agriculture.”

The value of land is determined by its income-earning potential. The actual returns will be influenced by many factors over the next several years such as interest rates, oil prices, ethanol prices, crop yields, costs of production, general economic recovery, alternative biomass sources, trade wars and a host of other factors. As Graph 6 shows interest rates are below long-term averages and an increase in interest rates would pressure land values lower.

The most recent “Golden Era” was driven in part by the demand for corn for ethanol production. Today ethanol consumes roughly 40% of the US corn production (1/3 comes back as feed in the form of “distiller grains”). The projections for growth in ethanol demand in the US with the current 10% blend rate will remain flat according to Table 2. If there isn’t any change in blending rates there is little reason to think that there will be any new growth in ethanol production unless it is a result of exports.

Table A5. World liquids consumption by Region, Reference Case

million barrels per day

Region	2018	2020	2025	2030	2035	2040	2045	2050	Average annual percent change, 2018-2050
OECD									
OECD Americas	25.2	25.2	24.5	23.9	23.7	23.9	24.4	25.2	0.0
United States	20.4	20.4	19.8	19.4	19.1	19.2	19.6	20.2	0.0
Canada	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	-0.1
Mexico and Chile	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.7	0.4
OECD Europe	14.5	14.6	14.0	13.4	12.8	12.5	12.4	12.4	-0.5
OECD Asia	7.7	7.5	7.3	7.3	7.3	7.3	7.5	7.7	0.0
Japan	3.8	3.6	3.3	3.2	3.1	3.0	3.0	3.0	-0.7
South Korea	2.5	2.5	2.6	2.6	2.7	2.8	2.9	3.0	0.5
Australia and New Zealand	1.4	1.4	1.4	1.5	1.5	1.6	1.7	1.8	0.8
Total OECD	47.4	47.2	45.8	44.6	43.8	43.8	44.4	45.3	-0.1
Non-OECD									
Non-OECD Europe and Eurasia	5.7	5.9	5.8	5.8	5.7	5.7	5.8	5.8	0.1
Russia	3.8	3.9	3.8	3.7	3.6	3.6	3.6	3.5	-0.2
Other Europe/Eurasia	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	0.6
Non-OECD Asia	27.5	29.1	31.5	33.8	36.0	38.5	41.0	43.3	1.4
China	13.9	14.8	15.8	16.4	16.6	16.7	16.8	16.7	0.6
India	4.8	5.2	6.0	7.1	8.2	9.4	10.5	11.4	2.8
Other Asia	8.8	9.2	9.7	10.3	11.1	12.3	13.7	15.1	1.7
Middle East	8.5	8.7	9.0	9.4	9.8	10.0	10.3	10.8	0.8
Africa	4.4	4.6	5.1	5.5	6.0	6.7	7.5	8.5	2.1
Non-OECD Americas	6.5	6.5	6.7	6.8	6.9	7.2	7.4	7.7	0.5
Brazil	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.6	0.5
Other Non-OECD Americas	3.5	3.4	3.5	3.5	3.5	3.7	3.9	4.1	0.5
Total Non-OECD	52.6	54.9	58.2	61.2	64.5	68.0	72.1	76.1	1.2
Total World	99.9	102.2	104.0	105.8	108.2	111.8	116.4	121.5	0.6

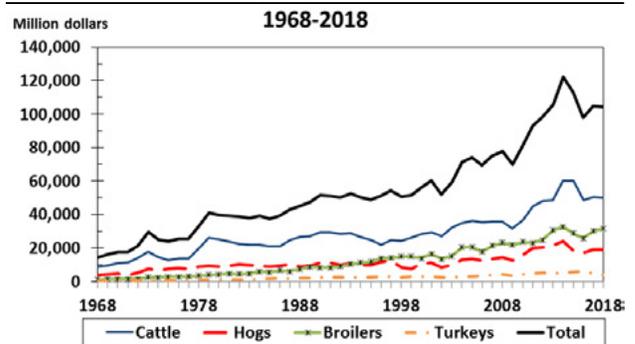
Totals may not equal sum of components as a result of independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2019), run r_190808_161601, and

Annual Energy Outlook 2019, (Washington, DC: January 2019), www.eia.gov/aeo

Historically, in the US, 40% of the corn is fed to livestock. US livestock production has shown steady growth in recent years and is predicted to continue to grow. Figure 15 shows the increase in value of US meat production. Continued expansion of the livestock industry will continue the increase in demand for corn, soybean meal and other feed ingredients.

Figure 15. Meat animals, value of production

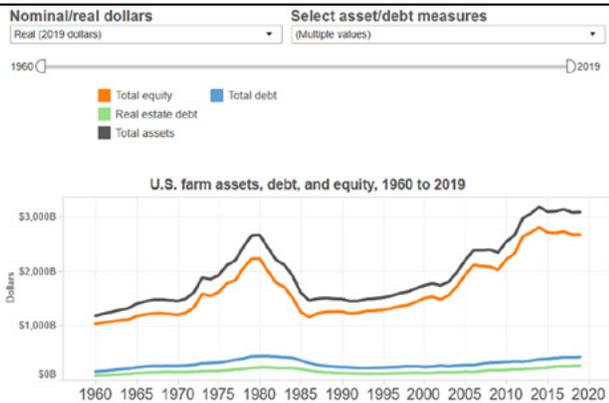


USDA-NASS
June 25, 2019

Source: www.nass.usda.gov/Charts_and_Maps/Meat_Animals_PDI_valprd.php

US farm real estate debt peaked in 1981 in terms of “real” dollars at \$221 billion with total assets of \$431 billion. In 2019, real estate debt is estimated to be \$251 billion in “real” dollars with total assets of \$416 billion dollars. In terms of “real” dollars, debt has increased while total assets have declined slightly. If interest rates increased significantly, farms with debt would experience increased cash flow demands to service the current debt. This would limit their ability to purchase land and would also force more land to be placed on the market, pressuring land values downward.

Figure 16. US farm assets, debt and equity, 1960-2019



Source: www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/charts-and-maps-of-us-farm-balance-sheet-data/

Summary

The returns to land and stocks are a combination of the current returns (rents or dividends) and the value of the underlying asset (land or stocks). The value of an asset is the combination of the two over time. Sometimes land and stocks can be impacted by the same factor such as interest rates or they may be independent of each other, such as farm profitability. Both assets experience cycles and both have had positive returns in the long run.

Land ownership often has a sentimental value tied to it as well. And it is something that one can see and touch more so than a stock certificate. Even if the price drops substantially, it will generate some income stream.

Timing of investments has a major impact on the overall returns. Buying low and selling high is still a good strategy. However, timing is everything and jumping in and out of markets has costs and certainly increases risks. So as one old farmer told me, “If you have to choose between lucky or smart – go with lucky.”

Watch the [accompanying video](https://vimeo.com/378646286), <https://vimeo.com/378646286>, for further information on **comparing an investment in farmland to the stock market**.

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Women in Ag Program,

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