



Center for  
Farmland Research  
at the University of Illinois

## The Relationship Between Inflation and Farmland Returns

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### **Abstract:**

This study examines the relationship between inflation and U.S. farmland investment returns amid evolving monetary policy, inflation regimes, and market volatility. Using data from 1970–2024 across 32 major agricultural states and the NCREIF Farmland Index, the analysis compares farmland performance with inflation and other major asset classes over varying holding periods. Findings confirm that farmland returns are positively correlated with inflation and largely uncorrelated or negatively correlated with equities, reinforcing its value as a diversification asset. Although capitalization rates and income yields have declined, farmland has consistently delivered positive real returns across a wide range of economic environments. The correlation between farmland returns and inflation strengthens over longer holding periods, demonstrating its durable inflation-hedging capacity. Despite structural shifts in Federal Reserve policy and macroeconomic conditions, farmland continues to exhibit low volatility, stable appreciation-driven returns, and resilience as a long-term store of value.

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## **Introduction**

Farmland investment returns have been the subject of inquiry by academics and institutional investors for decades both to understand the determinants of return, and impacts of farmland holdings in the context of a portfolio of other investments. The conventional narrative around farmland as a financial asset is that the returns are positively correlated with inflation, have low or negative correlation with equities, and have strong diversifying portfolio benefits in well-diversified holdings due to the relative lack of response to short-term broad market movements or episodic crises. The risk-adjusted returns to farmland have also been relatively high when evaluated in portfolio models, but farmland is a complex asset to acquire, manage and transact due to thin markets and asset heterogeneity. Relatively high acquisition and disposition costs, the composition of returns with annual income cycles, and relatively high appreciation relative to current income tend to result in long holding periods as well. Finally, the thesis around the long-term growth in total caloric demands from higher populations, improved quality diets, and shifting proportions of annual cropland used for renewable energy feedstocks provides strong support for longer-term investment strategies within farmland investments.

Against the long term empirical performance and arguments in favor of farmland investment returns is the fact that current rental income rates (often expressed as capitalization or “cap” rates when expressed as a fraction of current value) have been driven below three percent across much of the annual cropland production regions of the US, and current incomes and prospects for near term future cropland incomes are low due to crop prices and concerns about shifting government program payments and the impacts on market access from potentially high and volatile tariff programs being promoted by the Trump administration. The drop in implied capitalization rates begs the question about the reliability of appreciation to maintain total returns acceptable to compete with other assets, or whether a reduction in asset values is required to reestablish equilibrium price-return relationships.

Against the conventional wisdom regarding farmland returns, the elevated macro-market volatility from the past two decades has raised questions about changes in the very nature of the type of inflation being experienced, and thus if there have been

structural changes in the relationship between farmland returns and the “new” forms of monetary-based inflation. The consequences of the Federal Reserve’s activities and its balance sheet expansion were amplified during both the housing crisis and the covid-19 pandemic through quantitative easing and stimulus support, and then through reversals through historically abrupt interest rate increases by the Federal Reserve after evidence of monetary-expansion inflation was more evident. It seems fair to say that the messaging from the Federal Reserve, particularly following its 2020 adoption of “average inflation targeting” and subsequent 2022–2024 policy discussions regarding the possibility of higher long-run inflation tolerance, has been met with considerable political pressure for lower managed interest rates amid elevated inflation uncertainty (Federal Reserve Board, 2020; December 2023).<sup>1 2</sup>

During these recent historic episodes, agricultural commodity markets were also disrupted by the Ukraine War, trade/tariff disputes in the first Trump presidency, realignments in consumer goods supply channels following the coronavirus shutdown, global changes in production patterns for livestock, and currency effects registering in strength-of-dollar impacts on exports. On the flip side, producers’ incomes were supported by federal programs including Market Facilitation Program payments, as well as by indirect and direct payments from programs stemming from coronavirus related stimulus, and in many cases, farmers’ incomes were actually higher than might have been expected without the noted events that would have otherwise been individually viewed as negatives. Additional federal *ad hoc* payments have been made to producers to support lower cash incomes in the past two years, and the OBBBA contained substantially positive support provisions through crop insurance subsidies and other favorable tax provisions, but also removed some prospects for continued support of green energy programs that reduced the demand for conservation practice payments.

Given these evolving dynamics, it is timely to conduct a direct empirical assessment of the relationship between farmland investments and inflation, and to evaluate whether shifts in

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<sup>1</sup> Federal Reserve. 2020. *Statement on Longer-Run Goals and Monetary Policy Strategy*. Board of Governors of the Federal Reserve System, Washington, D.C., August 27, 2020.

<sup>2</sup> Federal Open Market Committee (FOMC). 2023. *Minutes of the Federal Open Market Committee Meeting*, July 25–26, 2023. Board of Governors of the Federal Reserve System, Washington, D.C.

inflation regimes have altered that relationship. Such analysis also requires placing farmland performance in context with other major asset classes to gauge its relative responsiveness to inflation and its role across different investment horizons.

### Historic inflation and interest rate index relatives

Figure 1 below provides one of the most commonly represented depictions of Bureau of Labor Statistics CPI as a measure of inflation along with the 10-year Treasury Constant Maturity (CMT-10) interest rate overlayed on a time scale with periods of recession shaded in grey. Historical patterns suggest that there is a reasonably strong correlation between nominal interest rate movements and inflation (about 67% from 1970 to present, with weakest statistical relationships centered in the 1980s and over the immediately preceding 5.5 years). Importantly, the same general patterns occur with alternate measures of inflation, the Producer Price Index, and measures of inflation expectations including the widely-used University of Michigan inflation expectation series. The CMT-10 is used herein as it is the most commonly used index of a risk-free capitalization-rate reference around which relative credit spread and duration differences can be built to represent different asset cases and time periods.



Figure 1. CPI and CMT-10 Treasury rates 4/1963-8/2025

Historic recessions tend to include reductions in inflation rates and concomitant declines in nominal interest rates though often at a slightly lower pace as real rates tend to increase during expansions. However, the monetary accommodations that began in

2020 included holding interest rates low while distributing large volumes of M-1 related currency. The interest rates were held at target levels through what were previously infrequently-used direct interventions by the Federal Reserve in corporate debt and in assets other than Treasury securities along with regular policy decisions. The CMT-10 nominal rate was held below 1% from March 2020 around the start of the coronavirus containment period, and thereafter by two rarely used off-cycle rate cuts to a target rate bounded by zero until May of 2022. Thereafter, the Fed went through a historically abrupt series of interest rate increases to a value of 5.5% in its efforts to “cool” the economy with quarter point rate reductions in September, November and December 2024 and held until present. There is broad consensus that there will be moderate rate reductions in the fall of 2025 however.

Taking a longer perspective though, history can be reasonably divided into periods of increasing inflation through 1980-81 with a precipitous fall through 1985-86, followed by reasonably stable inflation rates averaging somewhat about 3% until the housing crisis in 2008, and averaging about 1.5% (inclusive of 2009). With strong upticks from 2021 to present. Nominal interest rates follow suit, but with a slower decline in the 1980s, and a declining real rate spread steadily shrinking throughout the same period. The exception in the historic relationship occurs from 2020-23 when high inflation, and low managed interest rates resulted in a period with negative real rates. Each of these epochs was triggered by different sets of causal events, and thus provide a wide set of cases against which farmland performance can be assessed.

## **Defining Returns to Farmland Investments**

To evaluate the relationship of farmland returns to various measures of inflation and to other proxies for aggregate economic activity, a basic understanding farmland returns is first important. Farmland is a relatively large asset class but with multiple definitions and limited directly observable data on long-term returns. USDA estimates the aggregate size of the US Ag sector balance sheet to be about \$4.4 trillion with about 84% of the total in real estate (USDA, 2024). The National Council of Real Estate Investment Fiduciaries (NCREIF) has grown to around \$16 billion and represents a broad mix of

professionally managed properties that are accounted and reported under common conventions, but with a history limited to 1991 to present. This period is long enough for meaningful statistical analysis, and in many cases the data can be disaggregated by region, property type, and management type, but meaningful differences in inflationary regimes often require a longer period of analysis covering periods of higher and more variable inflation than has been experienced in the past 34 years. Moreover, NCREIF returns represent a broader group than only the members and tend to be viewed as the most reliable indexing system for evaluating professionally managed returns to investments in producing farmland.

To provide as broad an analysis as possible, much of the analysis uses a set of farmland returns data at the state level and in various agricultural regions throughout the US from 1970 to present based on USDA data maintained at the TIAA Center for Farmland Research at the University of Illinois. In simplest form, annual returns as used herein are defined as rental income plus appreciation less estimated property taxes, divided by initial value. All series presented are converted to geometric annual returns for consistency. Importantly, the returns to annual farmland actively managed in the NCREIF membership funds have outperformed the USDA aggregate data by about 1.5-2% percent per year, and thus performance based on USDA data will generally represent a conservative measure of the level of returns to farmland investments actively managed by professional investors with return-seeking capital motivations. Returns derived from the USDA data will also be somewhat smoother than returns derived from actual funds with less diverse properties and less total scale.

To begin, the USDA data are used to create a representative measure of diversified agricultural farmland returns by aggregating the top 32 states as ranked by value of agricultural production into an aggregate return series referred to as the “US Ag 32 State” returns series.<sup>3</sup> This approach allows an examination to be extended back into the 1970s, and which can later be compared to the available NCREIF data in the latter time intervals. Individual state returns are also examined as proxies for types of

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<sup>3</sup> This series and any other combinations of interest can be constructed using the tool available at: <https://farmdoc.illinois.edu/decision-tools/farmland-values-and-returns-by-state-through-time>

agriculture and regional cases of interest.

As shown in figure 2, the farmland returns series displays some remarkable characteristics. First, the only period of meaningful loss occurred in the early 1980s in the period generally referred to as the “farm crisis”. That period represented the veritable “perfect storm” for agricultural producers with foreign crises culminating in a grain embargo, oil market turmoil, and with fixed interest rates on farm mortgage loans peaking at nearly 18% following inflation that peaked at over 10%. Farmland had been appreciating rapidly and when rates began falling was caught in a credit-induced crisis. Importantly, there are few similarities in either the macro market, or the farm financial economy that make that period even remotely similar to any other in modern history. The only other negative annual return recorded was in 2009, largely thought to be sympathetic response to broad market uncertainty emanating from the housing crisis. It should be noted that the final three years of data have particularly unique submarket experiences with regions in the corn belt experiencing 25%+ appreciation over a broad range of corn and soybean production regions, but with asset value reductions across many permanent crop portfolios.

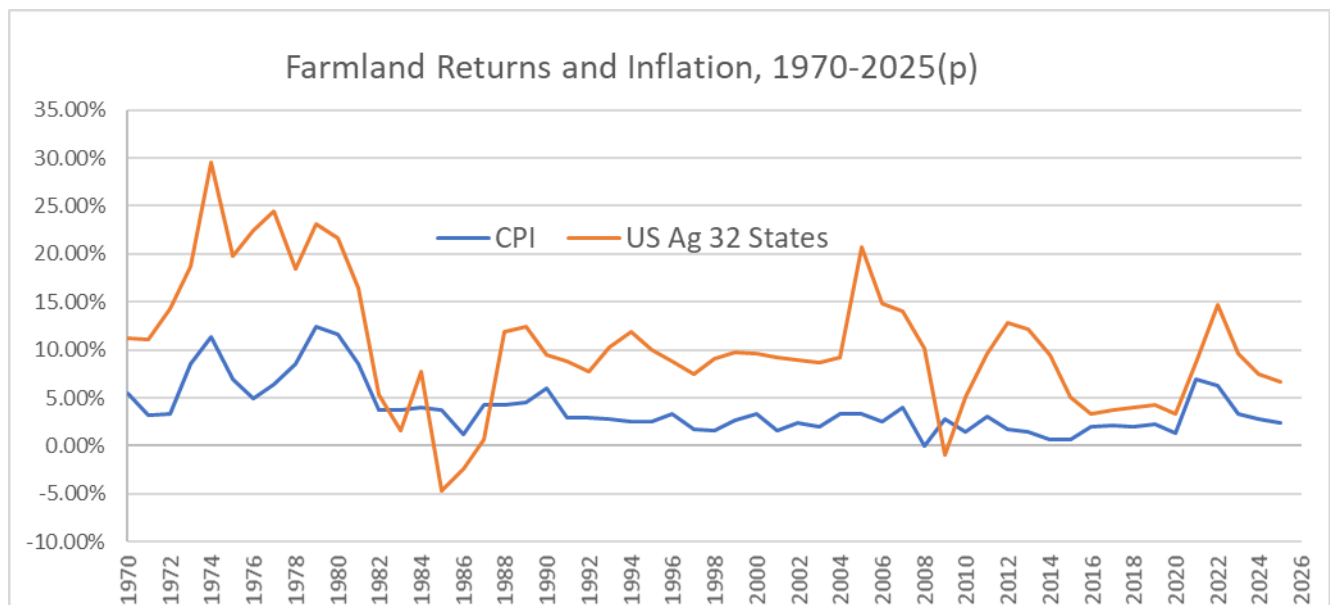


Figure 2. Farmland Returns and Inflation 1970-2025p (source: BLS, USDA, University of Illinois, preliminary 2025 figures will be updated when final data are available)

Figure 3 provides related information where each ten-year period is averaged and spreads to CMT and/or inflation are provided. In this case, the sample period is limited to 1991 to present so that the NCREIF Total Farmland returns (including both rowcrop and permanent crop data) can also be included. This frame of reference provides a sense of the effectiveness of farmland as an inflation hedge over meaningful periods of time and across several different inflationary regimes. It is worth remarking that the high returns to farmland during the period with the most rapid expansion in the money supply from 2021-23 correspond with the highest inflationary period but with a spread that was in line with the post housing crisis period.

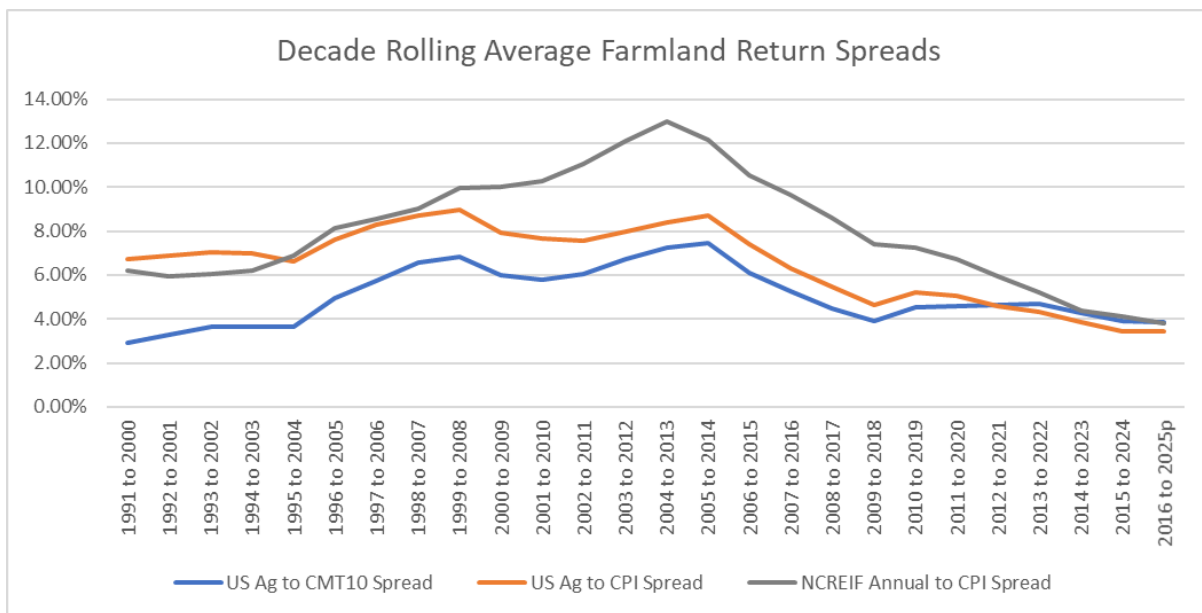


Figure 3. Farmland Return Spreads to inflation. (source: BLS, USDA, University of Illinois)

Table 1 summarizes the information in the graph above into decades allowing a bit more direct comparison to the generally described epochs of inflation by decade as well. In the 1970s, farmland’s price boom driven by price inflation was the most important feature of returns. In the 1980’s the income returns were still positive to farmland, but the capital losses were greater than current income in two specific years (1985 and 1986 with total returns of -5.8% and -3.1% respectively). All other years in the 50+ year period show total positive returns except 2009. Regional losses during the early 1980s

were concentrated in the Midwest and much larger. Again, the results shown are for a broadly diversified portfolio across 32 agriculturally important states. Individual state-level returns have similar patterns but greater volatility in both peak returns and downturns. It is also important to recognize that most of the variation of returns is due to appreciation; and that annual rental income is a very smooth component of total returns on a relative basis.

Table 1. Farmland Returns relative to CPI-Inflation by decade

Decade	Farmland to CPI Spread
1970 to 1979	12.2%
1980 to 1989	2.1%
1990 to 1999	6.4%
2000 to 2009	7.9%
2010 to 2019	5.2%
2016 to 2025p	3.4%
<b>1970 to 2025(p)</b>	<b>6.5%</b>

Focusing further on inflation regimes, it could be argued that the Federal Reserve (Fed) underwent regime shifts of their own with a few key historic decisions that largely defined separate periods of inflation management. First, the end of the gold standard in 1971 is associated with the beginning of an inflationary period that continued until at least 1979 when Fed Chairman Volcker announced policies targeting money supply controls to end inflation. The 1980s included additional activism by the Fed to control inflation and balance employment targets, but without transparency on actions or targets.

In 1994 under Alan Greenspan, the Fed adopted a policy to eliminate “surprise actions” and publish guidance and promote monetary targets and interest rate stability. The ensuing decade and a half of “normal” Fed actions was unexpectedly ended by the housing crisis of 2008, and the massive balance sheet expansion by the Fed to stem widespread corporate and banking sector defaults. The relatively low short-term rates and nearly constant and low inflation lasted until early 2022 when the Fed reversed its stance and began raising rates in an effort to slow the economy.

Thereafter, Chairman Powell indicated in various ways that the Fed would be moving even further toward a data-dependent regime for setting future rate targets as the new concerns are primarily over the stickiness of wage inflation, and whether inflation will continue to taper without further rate hikes. Finally, under the second Trump administration, the messaging has become more complicated with inflation expectations more dependent on impacts of uncertain tariffs, but with traditional indicators that inflation is tapering and unemployment in a condition that would historically be interpreted as favoring rate reductions. As of September, the market expectations are skewed heavily toward a quarter point rate cut with a better than 50% chance of further cuts later in 2025.

It is thus also interesting to examine whether there are periods of differential reaction to inflation that exist in historic data at least and to see what guidance that might offer to anticipate reactions should inflation recur or accelerate in the future. Figure 4 below shows the same 50-year history of annual farmland returns and inflation as above but converted to a spread relationship as farmland returns minus inflation to emphasize the effectiveness of offsetting inflationary effects and stabilizing real returns.

Since the early 1990s, the relationship has been remarkably stable, even when returns and inflation were both driven to roughly zero at the height of the housing crisis in 2009. The graphic might also suggest a regime effect that has a spread that is proportional to interest rates (which are strongly correlated with inflation as shown). An explanation is that the relative gap of earnings spreads over treasuries or some other constant term zero risk index should reflect duration and credit risk differences. At lower rates, the price multiple effect becomes more pronounced and tighter nominal spreads reflect the same relative multiple difference that should be paid for future income.

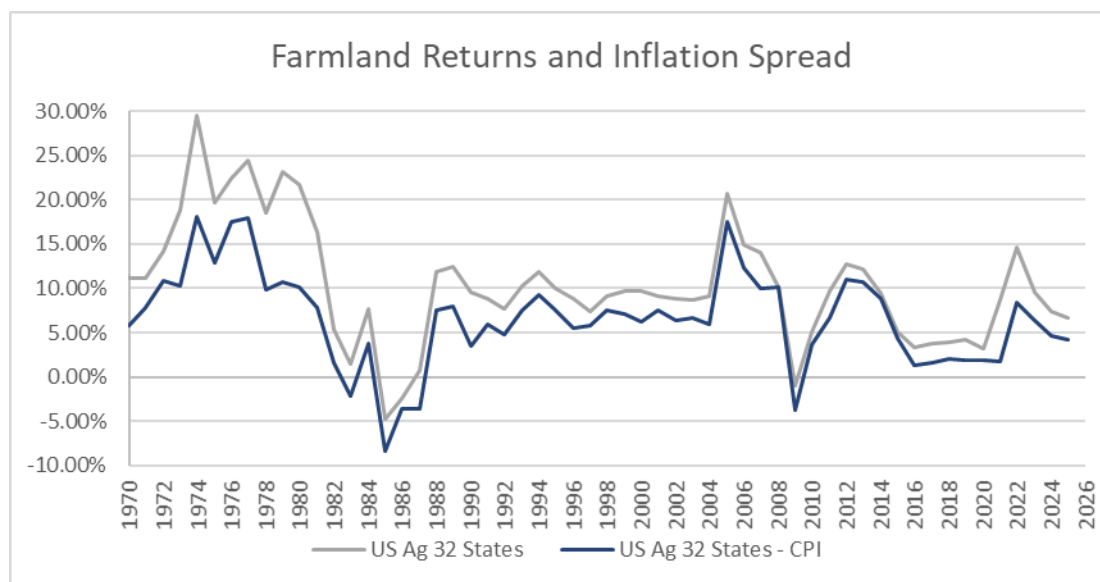


Figure 4. Farmland Returns and Spread over annual inflation (source: BLS, author calculations)

Additionally, credit spreads on farmland investments did not expand relatively as much as for other asset classes during the rapid rate declines in Treasury rates during the early parts of the covid-19 pandemic. In other words, it appears that agricultural investments were viewed as relatively less affected by the macro shocks that resulted in widening spreads for virtually all other investments. Farmland has relatively few idiosyncratic loss or massive gain events like equities tend to have in response to broad market events.

It is also important to consider the relative performance and reaction of farmland to inflation and capitalization rate changes across other asset classes. To do so, table 2 below provides standardized annual returns and risk measures across a few representative equity indexes, fixed income, real asset, and inflation related asset groups from 1970 to 2024 (the last full year available for many of the assets). The column labelled US Ag 32 Sates Correlation contains the correlation of returns of each of the other assets with the first row asset – in this case farmland. The maximum annual gain and largest single annual declines are shown in the final two columns.

Table 2. Asset Return Characteristics

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	US Ag 32 States Correlation	Minimum Return	Maximum Return
	----- 1970 - 2024-----					
<b>US Ag 32 States</b>	10.5%	6.8%	0.65	1.00	-4.7%	29.5%
S&P500	7.3%	16.6%	2.27	-0.25	-48.6%	29.3%
NYSE	6.5%	15.1%	2.32	-0.24	-56.3%	29.7%
EAFE	5.8%	19.8%	3.43	-0.20	-59.9%	51.2%
MSCIUSA	7.2%	16.9%	2.35	-0.27	-48.7%	29.8%
AAA	7.2%	2.8%	0.38	0.10	2.5%	14.2%
BAA	8.2%	3.0%	0.36	0.08	3.4%	16.1%
TCM10Y	6.0%	3.1%	0.51	0.16	0.9%	13.9%
Mort30F	7.7%	3.2%	0.41	0.12	3.0%	16.7%
Equity REITS	10.3%	17.5%	1.69	-0.08	-47.4%	38.9%
CompositeREITS	8.6%	20.1%	2.34	-0.14	-54.9%	39.9%
Gold	7.5%	20.2%	2.69	0.29	-32.2%	78.4%
FedFunds	4.9%	3.8%	0.78	0.32	0.1%	16.4%
PPI	3.8%	5.2%	1.38	0.61	-7.1%	19.0%
CPI	3.9%	2.8%	0.71	0.67	0.0%	12.4%

*(sources: US Ag 32 – Center calculation from USDA; Equity indexes from St. Louis Federal Reserve Bank FRED data server; EAFE and MSCI from Morgan Stanley; Interest rate series from H.15 Federal Reserve; REIT data from NAREIT; Goldhub.com; and BLS)*

Importantly, these data cover at least three periods viewed as having elementally different inflation characteristics, with the most recent period having somewhat unique causes. Note that this long sample period puts farmland in a particularly positive light with among the highest overall returns and lowest coefficient of variation outside of the fixed income group. Shorter and more recent periods often have subgroups in the equity group with higher overall returns but generally with higher risk measures as well. Over the combined inflation regime periods, the results conform with most general descriptions that farmland investment returns have low or negative correlation with equities, around zero correlation with fixed income assets and positive correlation with inflation measures with a .67 correlation over that 55-year sample period (included are PPI and Gold for reference as well as these are often also touted as inflation protection positions).

An alternate comparison is provided below using NCREIF data from 1991 to present (longest period available with NCREIF data) to provide a sense of the returns relative to the periods that included the 1970s and 1980s, and to highlight the relationship between the USDA aggregate returns which averaged 8.91% over that period and the NCREIF returns which averaged 10.2% per year over that period. (Table 3) The patterns are qualitatively similar, though exclusion of the periods of highest inflation and most rapid deceleration in inflation do mute the strength of the relationship with inflation.

Table 3. Asset Return Characteristics

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	NCREIF Annual Cropland Correlation	Minimum Return	Maximum Return
	----- 1991 - 2024 -----					
<b>NCREIF Annual Cropland</b>	10.2%	4.7%	0.46	1.00	4.2%	23.6%
S&P500	8.1%	17.2%	2.13	-0.06	-48.6%	29.3%
NYSE	6.5%	16.3%	2.50	-0.07	-56.3%	29.7%
EAFE	3.2%	18.6%	5.88	0.05	-59.9%	30.2%
MSCIUSA	8.2%	17.7%	2.17	-0.05	-48.7%	29.8%
AAA	5.5%	1.7%	0.30	-0.11	2.5%	8.8%
BAA	6.5%	1.6%	0.25	-0.10	3.4%	9.8%
TCM10Y	4.1%	1.8%	0.44	-0.05	0.9%	7.9%
Mort30F	5.9%	1.7%	0.29	-0.05	3.0%	9.2%
Equity REITS	10.2%	18.4%	1.81	-0.10	-47.4%	34.6%
Composite REITS	9.7%	18.6%	1.92	-0.13	-47.5%	33.7%
Gold	5.1%	13.7%	2.68	0.07	-32.2%	33.0%
FedFunds	2.6%	2.2%	0.82	0.02	0.1%	6.2%
PPI	2.6%	4.8%	1.89	0.34	-7.1%	18.5%
CPI	2.5%	1.4%	0.54	0.25	0.0%	6.9%

Farmland as with most real estate investments remains a relatively complicated asset to acquire, manage and dispose, and thus tends to be held over longer periods of time to dilute the transactions costs, and to take advantage of longer-term tax advantages that typically exist with appreciating assets. To assess the impact of holding period effects in relation to inflation and rate spreads, hypothetical holding periods were constructed of from 1- to 10-years and returns recast both as rolling average geometric, and as non- overlapping interval returns.

Figure 5 below shows the correlation of US 32 Ag States farmland returns with various asset groupings (also on 3-year geometric average bases), along with the total US aggregate to help scale the possible interval to 1.0 as the maximum. In general terms, if two series are statistically integrated or stationary relative to each other, a moving average relationship becomes more stable by averaging sequential observations. In the case of farmland and inflation, the strength of the calculated correlation increases due to averaging out some periodic “noise” in the data series and displaying a strong long-run average co-movement tendency, but potentially obscures lags.

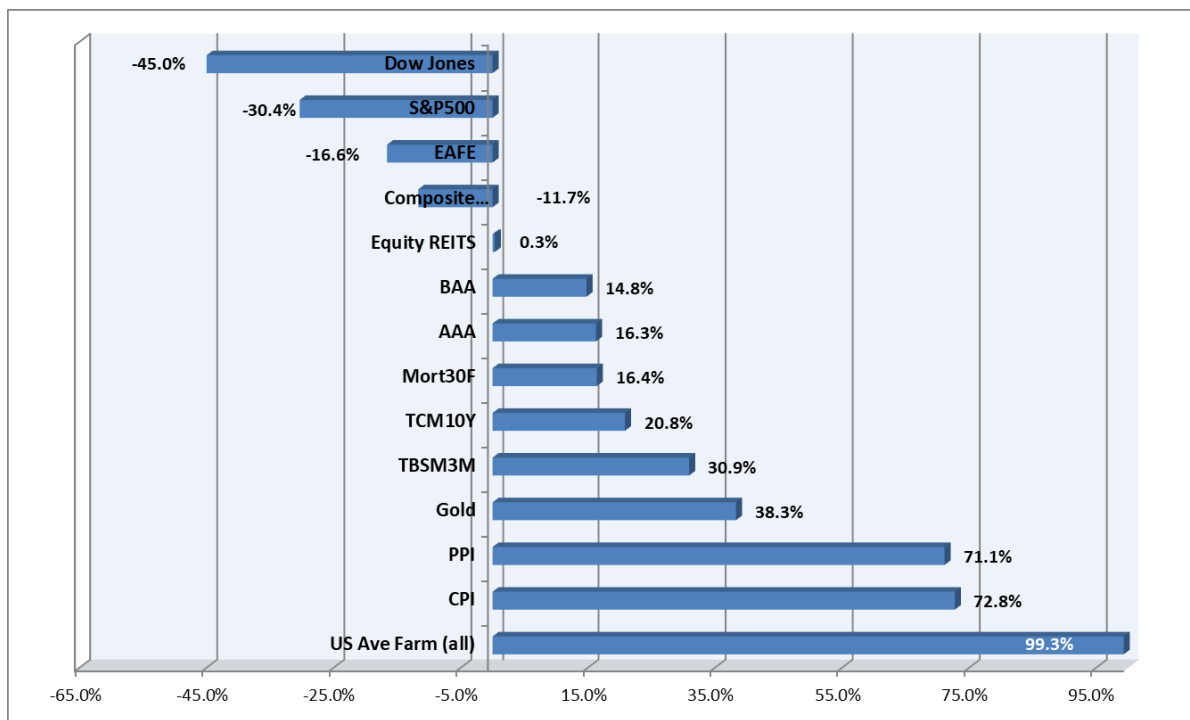


Figure 5. Three-year rolling geometric correlations with US 32 State Farmland returns, 1970-2024 (source: TIAA Center calculations available at: <https://farmdoc.illinois.edu/decision-tools/farmland-correlation-with-other-assets-by-holding-interval> )

This analysis was then repeated with rolling geometric returns from 1 to 10 years. The results are provided below in table 4 for selected set of assets. As shown, the calculated correlations are reasonably indifferent to interval length of the holding period, but the strength of the positive relationship to inflation increases with length of holding period, and the strength of the negative relationship to equity returns increases with holding period as well. It is important to recognize that these are for rolling averages in overlapping intervals and tend to actually be conservative relative to the results from non-overlapping interval correlations calculated in the same holding periods.

Table 4. US Ag 32 State Correlation of returns by Rolling Period Interval across asset classes

Roll Length	PPI	CPI	Gold	TCM10Y	AAA	BAA	Composite			Dow
							REITS	EAFE	S&P500	Jones
1	55.7%	66.6%	26.4%	21.2%	16.3%	13.8%	-13.8%	-21.0%	-27.2%	-34.8%
2	66.0%	71.7%	30.4%	20.8%	15.9%	13.9%	-12.8%	-17.8%	-27.1%	-38.0%
3	71.1%	72.8%	38.3%	20.8%	16.3%	14.8%	-11.7%	-16.6%	-30.4%	-45.0%
4	76.0%	73.6%	46.3%	21.7%	17.6%	16.5%	-13.2%	-18.7%	-37.7%	-53.2%
5	79.2%	74.1%	54.0%	23.0%	19.3%	18.5%	-13.2%	-20.2%	-42.9%	-57.4%
6	80.4%	73.6%	59.8%	24.6%	21.2%	20.7%	-10.6%	-19.9%	-48.7%	-62.7%
7	81.5%	72.9%	63.2%	26.4%	23.3%	23.1%	-10.9%	-19.4%	-54.0%	-66.4%
8	81.1%	72.2%	64.0%	28.5%	25.8%	25.7%	-12.0%	-16.6%	-56.5%	-67.9%
9	80.8%	71.5%	62.1%	31.1%	28.7%	28.8%	-12.1%	-12.4%	-55.5%	-66.6%
10	80.1%	70.7%	59.1%	33.9%	31.9%	32.2%	-9.5%	-8.0%	-53.5%	-65.5%

## **Summary and concluding observations**

There is strong continued interest in agricultural assets as inflation hedging investments in the face of uncertainty about future inflation and the complexity of the interactions between the Federal Reserve actions and resulting macroeconomic aggregates. The results of this empirical assessment confirm the received wisdom that was observed more than 200 years earlier with Ricardian theory of rent and the conclusion that land as the most fixed factor of production serves as the residual claimant of economic rents, and thus the store of real asset values in periods of inflation. More directly, farmland investment returns are shown to be positively correlated with inflation across a broad set of different economic regimes and different time periods, and negatively correlated with returns to equities. These results confirm the diversification benefits to farmland investments in a mixed asset portfolio and also highlight the relative safety of the returns to farmland investments.

Other conditions affecting farmland returns are important to examine in response to contemporary political and market conditions – and episodic income effects still result from weather and supply shocks, or governmental policy changes. Compared to other broad asset classes, the variability of returns to farmland investments is generally lower, and the long-term stability of the relationships to other asset classes is fairly stable. Given the length of time and the number of differing economic environments in which farmland investments have proven to maintain their positive correlations with inflation and negative or low correlation with equities, it is expected that these relationships will continue to hold in the large into the future as well.