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Inflation Risks and Timberland Investments

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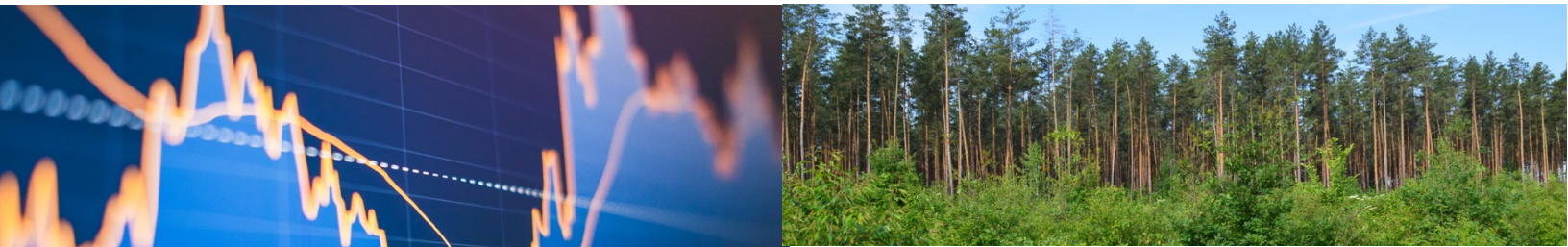


Introduction

Following the COVID-19 pandemic, annual inflation in the United States peaked at 9.0% in June 2022 after averaging 2.12% over the preceding 10 years. The 9% rate was a 40-year high. Since then, aggressive monetary tightening by the U.S. Federal Reserve has pushed the inflation rate to under 2.8% by the close of 2024. Based on bond market data at that time, investors are assuming long-term inflation will settle below 2.5% over the next two to 10 years. It appears that the inflation beast has gone back into hibernation.

But has it? New as well as unknowable risks are on the horizon that could push inflation rates higher again. Thus, investors need to consider defensive strategies that can help protect their portfolios from ever-persistent inflation risks. High on the list: adding investments in real assets such as timberland.

In this paper, we provide a three-step framework for thinking about timberland as an inflationary hedge. First, we highlight actual risks that can lead to another inflationary cycle. Next, the case is made that unexpected shifts in inflation rates can do significant damage to investor portfolios' purchasing power. Third, we argue that certain types of assets, including timberland, can serve as an effective hedge against inflation. Adding them into an investment allocation can help insulate a portfolio against unexpected and harmful surges in prices.



Inflation Risks

Defining Inflation

Let us begin by defining what inflation means and what can cause it. Inflation is the overall rise in the prices of goods and services. It is measured through commonly accepted price indexes such as the Consumer Price Index (CPI), the Price Index for Personal Consumption Expenditures (PCE), and the Gross Domestic Product Price Deflator. The CPI is the most widely reported metric for inflation and the one this paper will use.

Inflation occurs when *too much money chases too few goods and services*. This can occur from either too much demand or not enough supply, or both. If people want to buy goods or receive services, but businesses and workers cannot keep up, we will have *demand-pull inflation*. On the other hand, if there is a shortage of key materials or services which results in a rising cost in the supply chain, then we have what is known as *cost-push inflation*.

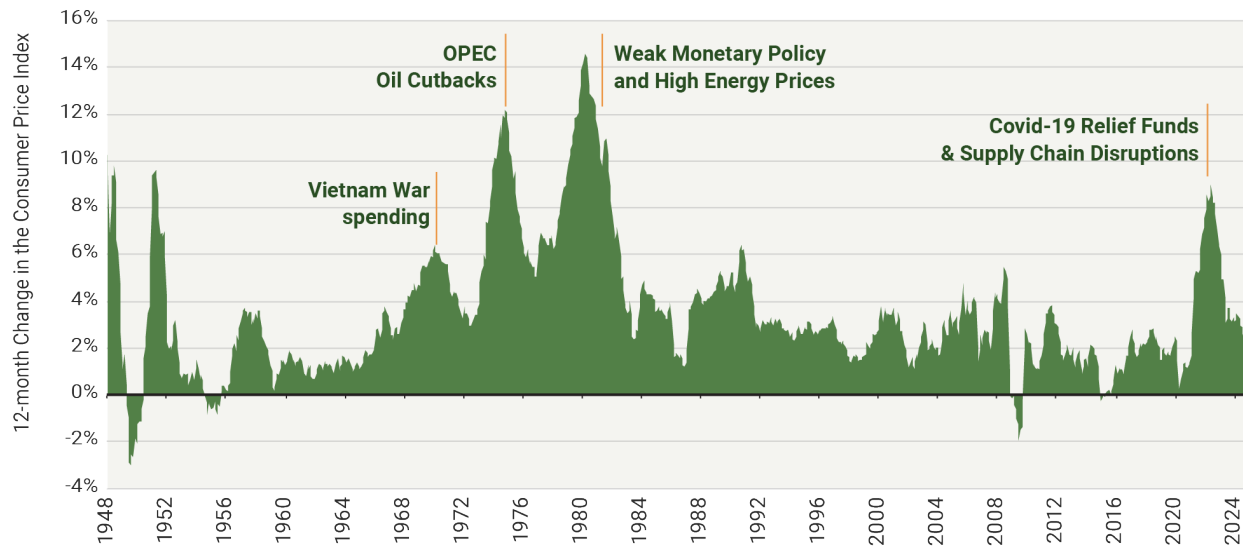


A Short History of Inflation

The United States has experienced several incidences of both demand-pull and cost-push inflation since World War II (see Figure 1). The 1960s saw demand-pull inflation from the combination of a tax cut and heavy defense spending related to the Vietnam War. In contrast, cost-push inflation was caused by an energy shortage in the mid-1970s. OPEC¹ curbed production by its member countries, thereby causing energy prices to escalate. As a key input, increasing energy prices were quickly transmitted across the U.S. economy.

Figure 1.

United States Inflation Rate Using the Consumer Price Index



Source: U.S. Bureau of Labor Statistics.

While energy prices were a big factor, demand-side factors also played a large role in the latter half of the 1970s. The U.S. Federal Reserve (“the Fed”) kept an accommodative monetary policy in hopes of boosting employment after the U.S. fell into a recession from the OPEC oil embargos. However, the Fed probably held interest rates too low for too long, contributing to an overheated economy. Combined with heavy deficit spending by the government, this led to a second spike of inflation in the same decade.

The most recent inflationary cycle began during the COVID-19 pandemic. This was both supply-side and demand-side driven. Global supply chains and production were disrupted by pandemic lockdowns and restrictions. However, demand increased as the U.S. government injected an extraordinary level of stimulus and relief funds to businesses and households. In a three-year period from 2020 through 2022, expenditures by the U.S. federal government totaled \$27 trillion, a \$9 trillion or near 50% jump from the spending three years prior to the pandemic (2017-2019). This new spending could not be absorbed by the U.S. economy without causing prices to climb.

¹ OPEC is the Organization of the Petroleum Exporting Countries



Looking back at these periods of high inflation, we observe that surges in the price level came from many different sources. More importantly, these causes of inflation are difficult to anticipate or predict. Inflation oftentimes is caused by an external shock, such as a global pandemic. Changes in geopolitics or government policy such as taxes, tariffs, and wars can also lead to a surge in prices. It is inflation's high level of uncertainty and potential harmful portfolio impact that makes it such an important risk for investors to consider and take steps to mitigate.

Future Risk Factors

Inflation risks have arguably heightened, not diminished, when looking today at the U.S. economic environment and the proposed policies of the new administration. Consider the following:

- **Stricter Immigration Enforcement:** The current administration has adopted a policy of strong enforcement against undocumented immigrants, including restricted entry across the border and increased deportations. The crackdown against illegal immigration could tighten labor markets, sending wages higher. Several important industries rely heavily on immigrant labor, including construction, agriculture, hospitality, food service, and meat processing. A labor shortage in those sectors could quickly transmit higher prices to other, connected parts of the economy.
- **Large Government Deficits:** The deficit of the U.S. federal government is already at elevated levels of 120% of GDP as of the third quarter of 2024. Absent any changes in spending, the deficit will expand further. According to the Committee for a Responsible Federal Budget, a non-partisan, non-profit organization, the federal deficit could widen by an additional \$7.5 trillion over the next decade if many of the proposed policies of the Trump Administration come to pass.² Deficits, if not controlled, can spur inflation rates higher. (See call out box, “Are Large Deficits Inflationary?”)

Are Large Deficits Inflationary?

Heavy government deficits do not necessarily result in higher inflation. As a case in point, Japan faced disinflation (very low inflation) and even deflation (reverse inflation) during the “Lost Decades” of the 1990s and 2000s despite racking up one of the heaviest debt levels among the fully industrialized nations.

Nevertheless, large government deficits can result in higher inflation if (1) the deficit is the result of a surge in government spending that outpaces the ability of the economy to absorb it (such as the U.S. government response during the COVID-19 pandemic); or (2) the government cannot fully cover their spending with revenue from taxes or the issuance of new bonds. This can occur when the government is politically limited in raising taxes and cannot sustain the interest payments of its existing debt. Deficits that are not covered by bonds must rely on increasing the supply of money into the economy (i.e., “printing money”), which results in faster rates of inflation.

² Richard Rubin, *Wall Street Journal*. “Trump’s Plan Boosts Budget Deficits by \$7.5 Trillion, Double Harris’s Proposal.” (October 7, 2024)



- **Tariffs and Trade Restrictions:** The current administration wishes to impose a program of trade barriers and tariffs with the goal of promoting domestic manufacturing and encouraging trading partners to address other U.S. goals such as illegal drug and immigration border control. The potential resulting trade war could drive cost-push inflation, akin to the oil supply shocks of the 1970s.
- **Geopolitical Events:** Geopolitical tensions have only increased in recent years and are likely to remain high. Recent events include the Houthi rebel attacks on maritime shipping in the Red Sea, the Russian-Ukraine War, and the Israeli-Palestinian conflict. A future geopolitical event can cause higher inflation if it disrupts the trade of key components or commodities. For instance, if China were to attack or blockade Taiwan, it would cut off the leading source of advanced semiconductors. Computer chips are crucial for many industries including aviation, manufacturing, data processing, and automotive.

As evidenced by history, inflation cannot be forecasted with accuracy. Price surges can come from anywhere. When it hits, inflation can have measurable negative effects on an investor's portfolio.

Portfolio Harm of Unforeseen Long-Term Inflation

Inflation is not inherently bad. When it is predictable and stays within a narrow band, businesses and individuals can plan for it. What is harmful is when inflation is volatile and unpredictable. Unexpected surges in inflation hurt savers (like investors, lessors, and creditors) but benefit borrowers (like lessees and debtors). Investors are threatened by inflation because their future liabilities, obligations and payouts will likely scale with inflation, but their portfolio's income and asset values may not.

Not all forms of inflation risk, however, are equal. When developing strategies to hedge against inflation, investors should focus on long-term inflation risks, not short-term. There can be a fair amount of month-to-month, quarter-to-quarter, or even year-to-year variability with inflation rates. Short-term inflation matters less when an investor's portfolio goals extend to a decade or longer. What is relevant is a sustained erosion of purchasing power when inflation unexpectedly stays elevated over the long-run – at least three years (see call out box, "Inflation Hedge for the Long-Run").

Inflation Hedge for the Long-Run

When evaluating an asset's potential to perform well in a high-inflation environment, it is best to view it over a long duration, such as three to 10 years. Short-term metrics for inflation hedging such as monthly, quarterly or annual correlation values carry little utility. That is because many good inflation hedges, like timberland, react with a lag against rising prices. Wood products have long supply chains where price signals take time to feed back to the resource level. Short-run correlation statistics often miss that lag effect and underrepresent an inflation hedge's true value to a long-term investor.



Adding Inflation Hedges to a Portfolio

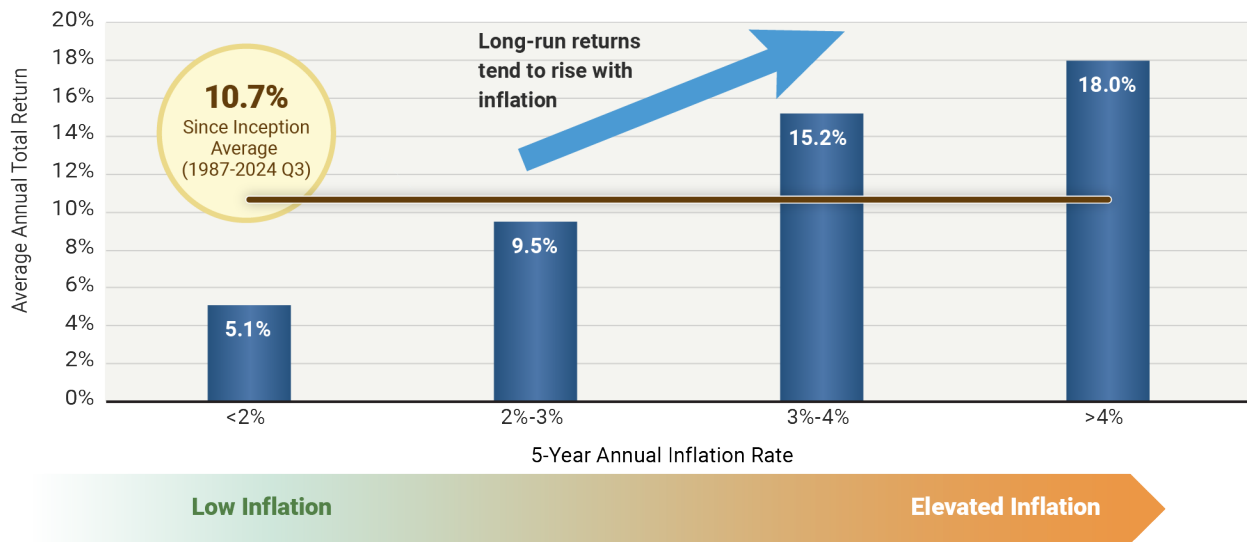
Investors have a variety of strategies to help insulate their portfolios against unwanted erosion of purchasing power. An investor, for example, can acquire derivatives that pay out when interest rates rise. Since interest rates often rise in response to higher inflation, this can serve as a type of inflation hedge. Another strategy is to buy bonds that scale their coupon payments and principle to a price index such as the CPI. A classic example is U.S. Treasury Inflation-Protected Securities (TIPS). A third option, which we will discuss in depth, is to invest in assets that have a known history for tracking inflation.

Inflation Positive, Neutral and Negative Assets

Many assets that were believed to be good inflation hedges actually are not. Despite being touted as one, gold is a poor inflation hedge.³ Neither are stocks or commercial real estate investments good hedges. In contrast, timberland is among one of the few proven hedges. This is illustrated in three charts, Figures 2-4. These graphs show the average 5-year returns of timberland, stocks, and real estate, respectively, across different inflation environments. Since inception, U.S. timberland investments, averaged a 10.7% return as measured by the National Council of Real Estate Fiduciaries' (NCREIF) Timberland Property Index. What is more interesting is that those returns tend to scale up with rising inflation rates (Figure 2). When 5-year inflation rates reached 3% to 4%, timberland returns exceeded its baseline average. Inflation above 4% can push timberland returns even higher.

Figure 2.

Average Performance of Timberland Across Different Inflation Environments Over 5-Year Periods



Sources: NCREIF (Timberland Property Index), U.S. Bureau of Labor Statistics (Consumer Price Index)

³ A linear regression between 5-year returns of gold and CPI inflation from 1987 through 2024q3 showed no statistically significant link between gold and inflation on a long-term basis. See Figure 4 and the Appendix for further details.



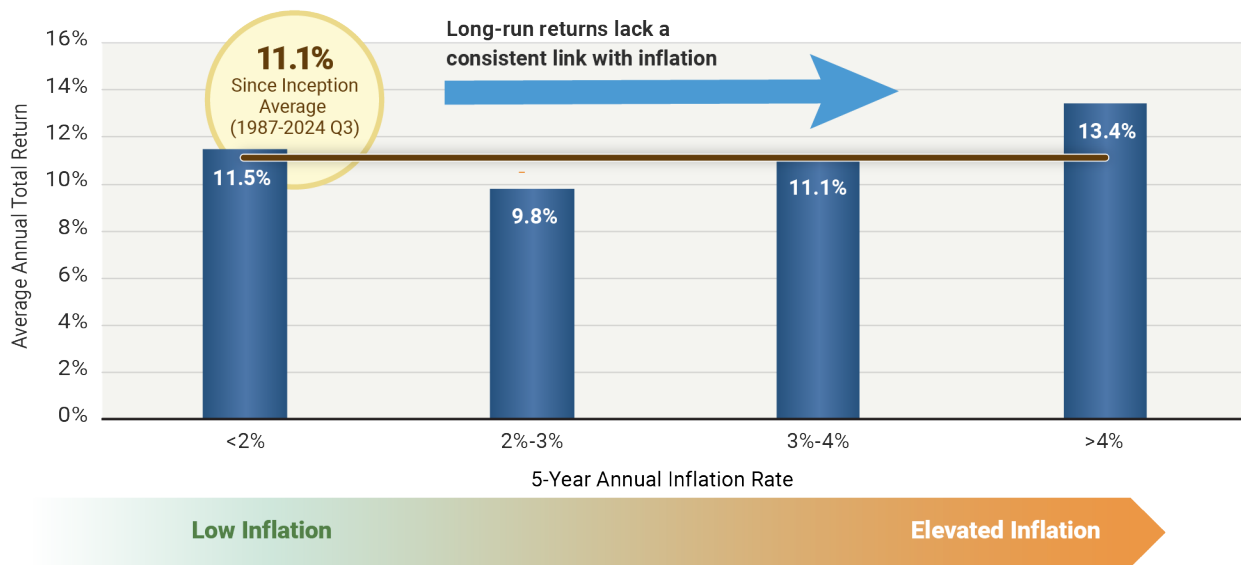
Timberland’s history of higher returns in high-inflationary periods is due to the fact that wood products are utilized across all parts of the economy. That integration means shifts in prices in any part of the economy will likely be transmitted back to the timber resource. Wood is not just used in building homes. It is used in retail as packaging in the form of corrugated cardboard boxes and paper shopping bags. Yarn and some types of textiles (like Rayon) are made of a special type of pulp that is produced from trees. Diapers use fluff pulp that is also made of wood. The list goes on.

In addition, timber largely is a domestic market. Harvested logs are large and bulky; it is therefore uneconomical to ship them long distances. Log markets, therefore, are commonly tied to the nearby mills in local wood markets, which then primarily feed into domestic markets. This contrasts to the markets for other commodities like oil, wheat, coffee, or copper where prices are set on a global level and are affected by global supply and demand factors, which is why such commodities have a mixed record tracking domestic inflation.

Timberland’s positive link to inflation stands in contrast to publicly traded equities. Stocks historically do not perform any better or worse as price levels accelerate or decelerate (Figure 3). A possible reason for this is that inflation can have both a positive and a negative effect on stocks. On the positive side, inflation raises the pricing power of many businesses, which can help generate higher revenues. On the downside, inflation pushes interest rates higher, which raises a firm’s cost of capital (i.e., the cost to borrow money or raise equity). It also raises the cost of wages, materials, and equipment, which hurts profit margins. Thus, inflation can both help and harm businesses; its net effect on stocks is therefore mixed.

Figure 3.

Average Performance of Standard & Poor’s 500 (Large Cap Stocks) Across Different Inflation Environments Over 5-Year Periods



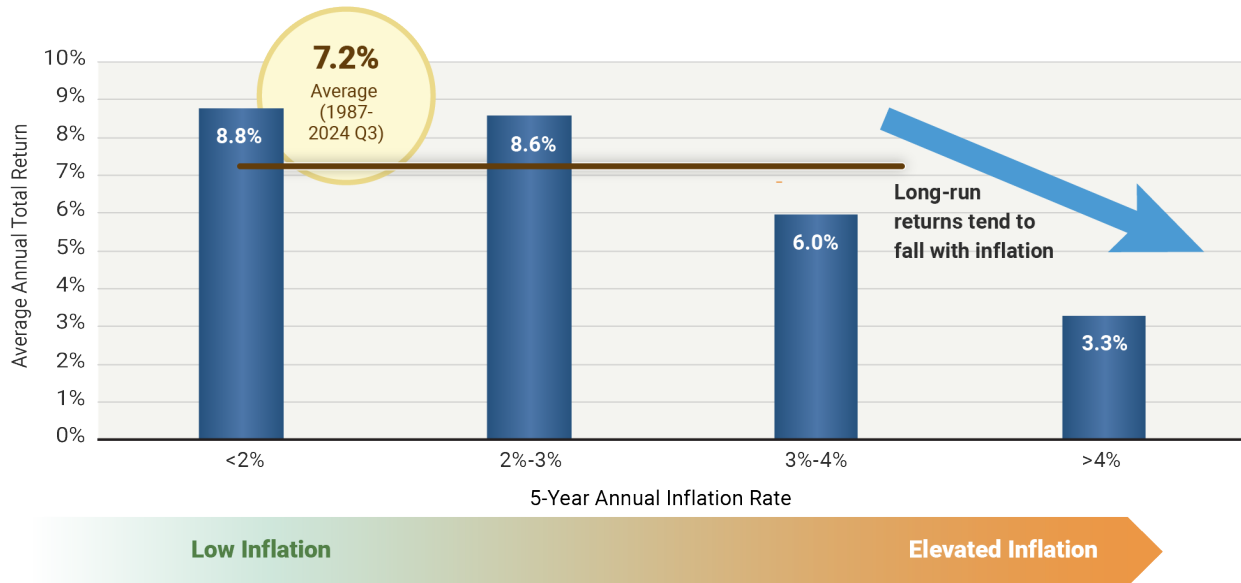
Sources: NCREIT (National Property Index), U.S. Bureau of Labor Statistics (Consumer Price Index)



While stocks have a mixed record against inflation, real estate investments have a negative association with inflation. High inflation rates historically push commercial real estate returns lower (Figure 4). This is unsurprising given that the commercial real estate sector is sensitive to interest rates. Rising inflation hurts a real estate owner’s ability to roll over debt due to higher interest rates. In addition, higher inflation can push up discount rates and capitalization rates, which in turn, can deflate real estate values.

Figure 4.

Average Performance of Commercial Real Estate Across Different Inflation Environments Over 5-Year Periods



Sources: Standard & Poor’s, U.S. Bureau of Labor Statistics (Consumer Price Index)

Inflation Hedging Survey of Assets Classes

Timberland, stocks, and real estate are examples of asset classes whose returns react (a) positively, (b) neutrally, and (c) negatively, respectively, to inflation. If we broaden our survey across more asset classes, we observe that positive inflation hedging is a relatively rare feature (Figure 5). The majority of asset classes are unresponsive to inflation. Only four can act as a moderate to strong inflation hedge. Along with timberland, crude oil, hedge funds⁴, and intermediate term government bonds⁵ have historically tracked rising price levels. On the other end of the scale, agriculture and real estate – as previously discussed – react negatively to inflation.

This suggests that care should be given when selecting an asset allocation strategy that offers inflation protection.

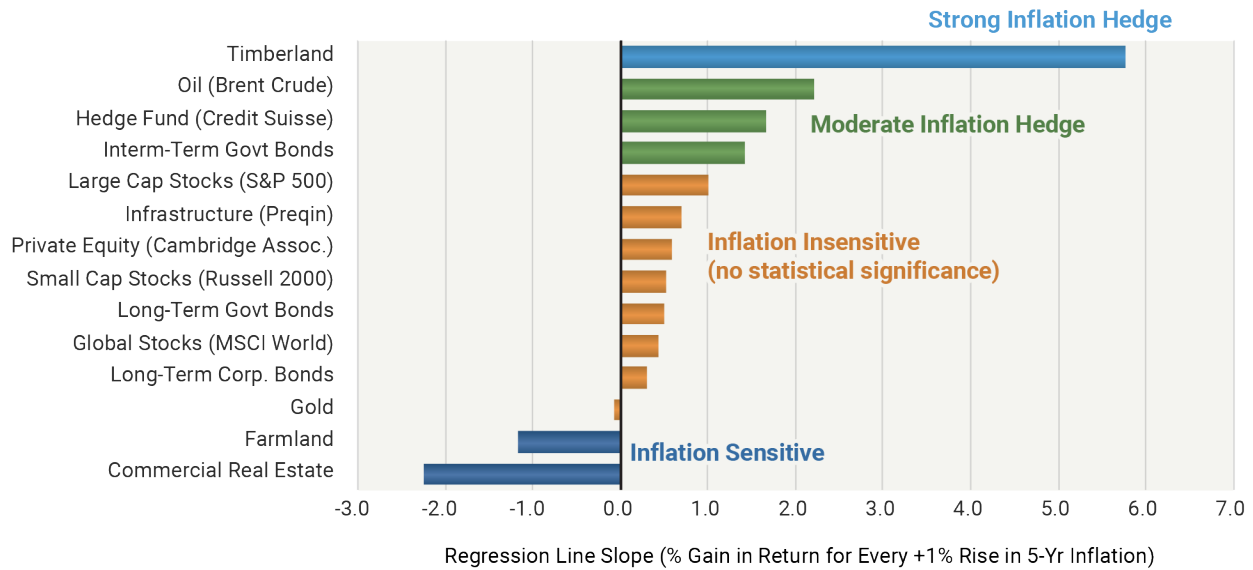
⁴ Represented by the *Credit Suisse Hedge Fund Index*

⁵ Represented by the *Bloomberg US 5-10 Year Treasury Bond Index*



Figure 5.

**Association of Asset Class Returns with 5-Year U.S. CPI Inflation
Based on Slope of Linear Regression Between Return and Inflation**



Note: The benchmarks indices used to represent each asset class are detailed in the Appendix. A full visual representation of each regression analysis is also featured in the Appendix.

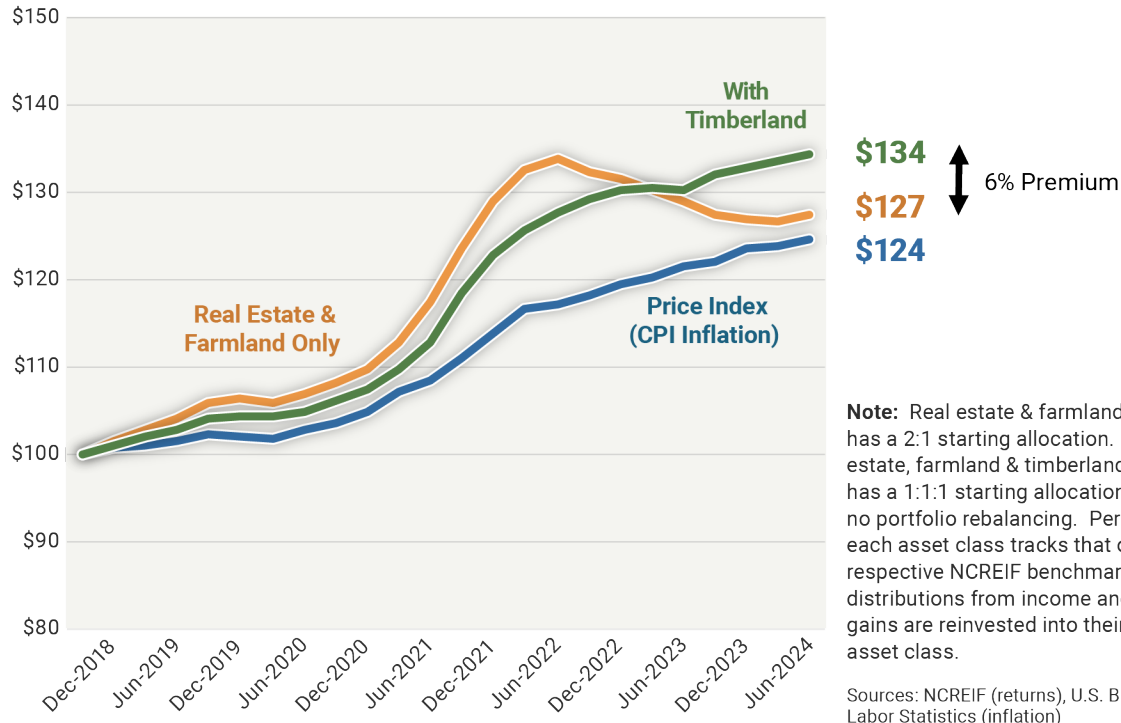
Inflation Hedging with Timberland in a Real Assets Portfolio

The best way to gauge the value of investing in an inflation hedge is to test it against a real-world event. A good recent example is the global COVID pandemic of 2020 that set off the most recent inflationary cycle. The test is to compare a real assets portfolio with and without an inflation hedge – which in this case will be timberland. The base case is to have a \$100 portfolio with two thirds invested in commercial real estate investment (66.7%) and one third invested in agricultural investments (33.3%) at the end of 2018, a year before the global outbreak of the COVID-19 virus. Returns both in income and realized capital gains get reinvested back into the same asset class. The test-case portfolio adds timberland to serve as an inflation hedge. The allocation is spread evenly with real estate, farmland and timberland each receiving a one-third (33.3%) starting allocation.



Figure 6.

Result of \$100 Invested in Each of Two Real Assets Portfolios on 12/31/2018



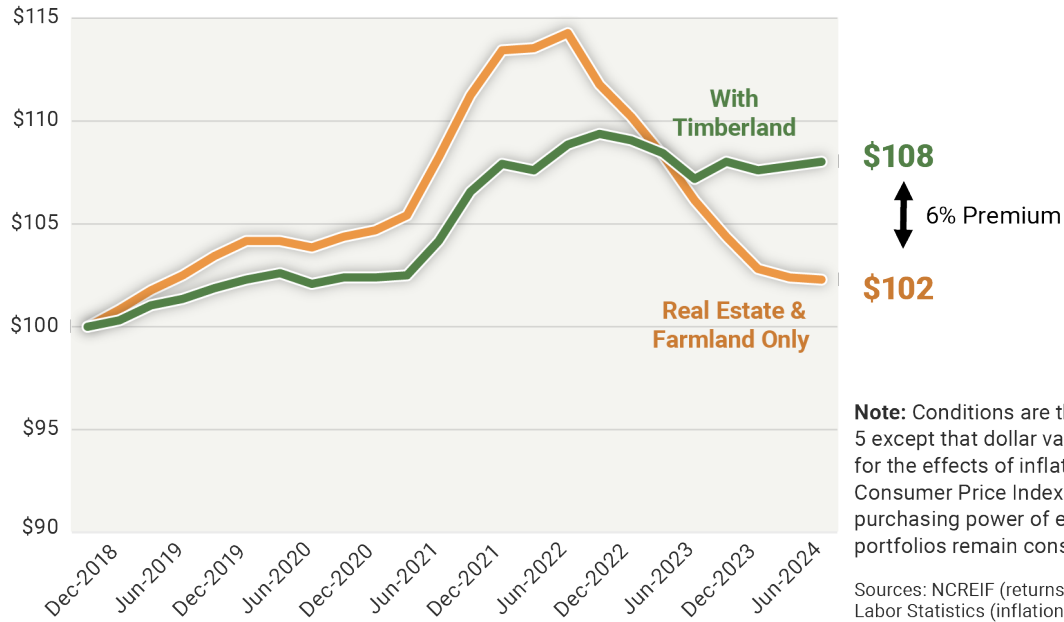
We note that the recent inflation cycle created from the COVID pandemic caused a significant loss of purchasing power in the United States as well as many parts of the world. A \$100 basket of goods in the U.S. in December 2018 would cost \$124 in September 2024. As shown in Figure 6, a real assets portfolio of only real estate and farmland would have earned an investor \$124 for every \$100 invested at the start of 2019. While returns initially rose at the initial surge of inflation, performance retreated in 2022 and 2023 as high rates of inflation caused the Federal Reserve to quickly raise interest rates – thereby hurting valuations for many real estate and farmland investments. In comparison, adding timberland would have provided \$134 over the same period, a 6% premium over the baseline portfolio. Returns for this hedged portfolio stayed consistently ahead of inflation.

Figure 7 takes the same scenario but strips out the effects of inflation. From that perspective, a real assets portfolio of only real estate and farmland provided the investor just 2% more purchasing power between 2019 and 2024 Q3. Adding timberland with a 33.3% allocation adds an additional 6% in total purchasing power, a meaningful gain.



Figure 7.

Result of \$100 Invested in Each of Two Real Assets Portfolios on 12/31/2018 and Adjusted for Inflation



The value of timberland as an inflation hedge extends beyond the recent pandemic. In fact, its value extends back to the 1990’s, when timberland and farmland emerged as an accepted asset class among institutional investors. Table 1 shows that since 1991, a real assets portfolio with a one-third allocation to timberland, on average, provided 50 basis points greater *real*⁶ (inflation-adjusted) returns than one that held only real estate and agricultural investments that returned 6.04%. Alongside a competitive portfolio return, timberland also offered lower risk, as evidenced by a higher Sharpe Ratio.⁷ We see no reason why timberland’s value as inflation hedge should change in the future.

⁶ When used for returns, the term “real” reflects the inflation adjustment to keep the purchasing power steady. A 10% real return, for illustration, means you can buy 10% more of the same basket of goods.

⁷ The Sharpe Ratio is a convenient quantitative measure of reward relative to the borne risk of an investment strategy. It is calculated as (average return – risk free return) / (standard deviation of returns).

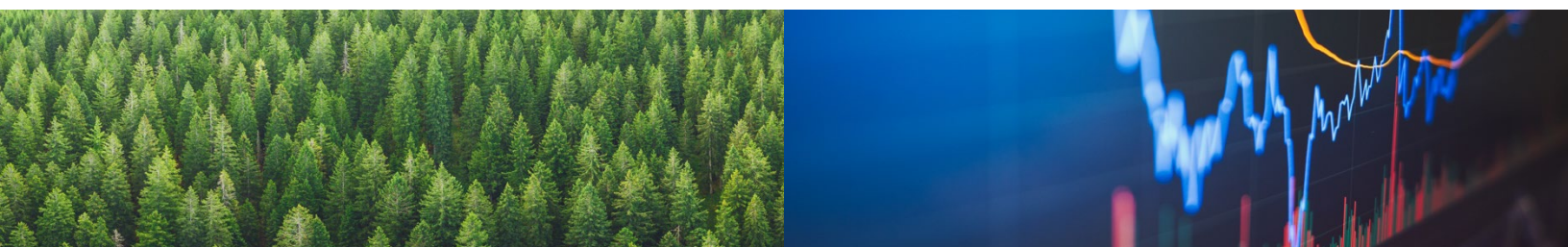


Table 1.

**Real (Inflation Adjusted) Performance of Two Real Asset Portfolios
One With Timberland, One Without Timberland Since 1991**

Real Assets Portfolio	Average Real Return (Inflation Adjusted)	Standard Deviation	Sharpe Ratio
No Timberland 2:1 ratio of real estate farmland	6.04%	6.60%	0.92
With Timberland 1:1:1 ratio of real estate farmland timberland	6.54%	5.21%	1.26

Note: Performance metrics are calculated from full, calendar-year returns from the NCREIF Property Index (real estate), NCREIF Farmland Index, and the NCREIF Timberland Property Index. Portfolio allocations are constant each year. Returns are adjusted for inflation as measured by the U.S. Consumer Price Index. The time period begins in 1991, the inception of the farmland index – the shortest of the three real assets indices featured. The Shape Ratio calculation assumes a risk-free return of 90-day U.S. Treasury Bills after adjusting for the effects of inflation, which is -0.04% between 1991 and 2023.



Summary and Recommendations

Periods of elevated inflation can harm investors in two ways. First, they are often difficult to anticipate. Second, fast-rising prices can create a hazard that the portfolio would fall short of an investor’s future cash flow needs. To reduce such threats an investor can add proven inflation hedges to their portfolios. Timberland is one tested form of hedging. Since 1987, timberland returns generally responded positively with inflation over the long term (e.g., 5-year periods).

For many investors, it may not be practical to make wholesale changes to a portfolio strategy just to make it more inflation-proof. For them, a better approach is to adjust the mix within each asset category. For instance, one could add TIPS and floating-rate bonds in their fixed income allocation. Hedge funds and interest rate swaps can be added to the alternatives portfolio. As discussed in this paper, timberland can be added to an existing real assets portfolio. The inclusion of timberland complements, for example, a portfolio’s real estate and farmland investments. Combined, these different assets can better ensure an investor’s portfolio sustains its purchasing power over unanticipated ups and downs in the price level.



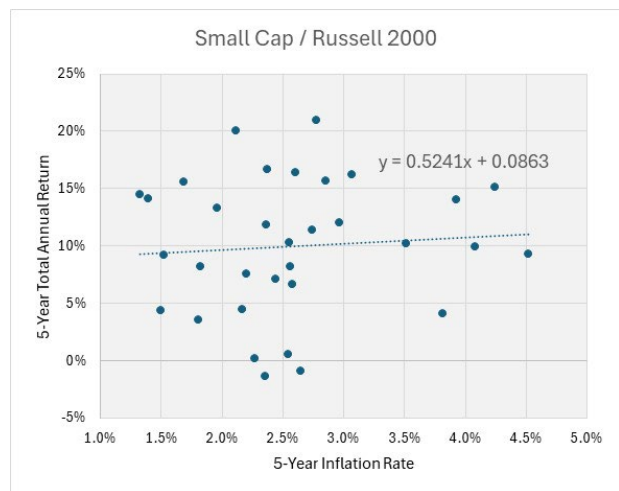
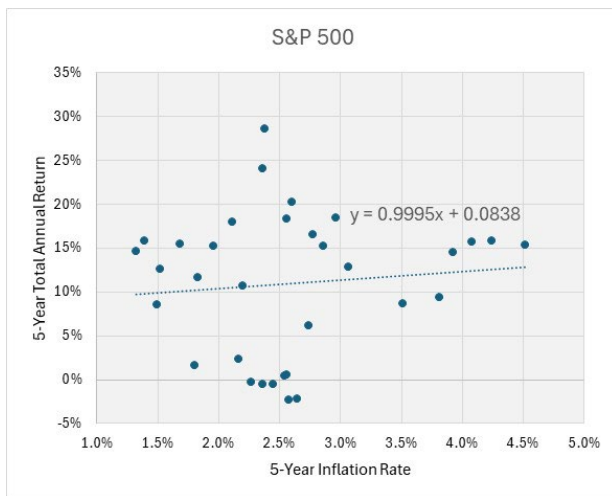
Appendix

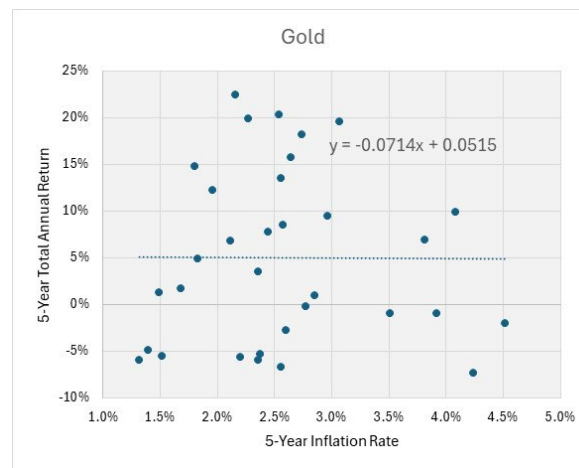
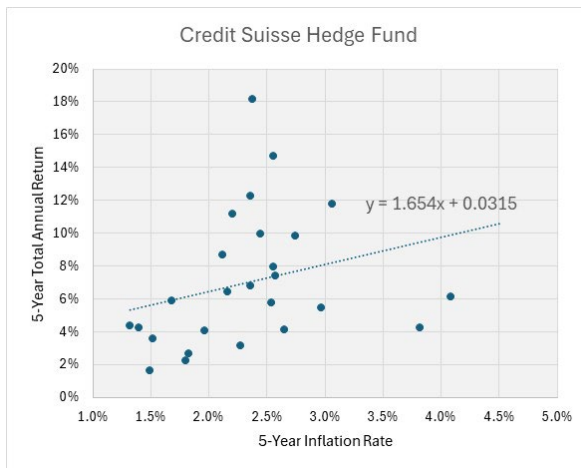
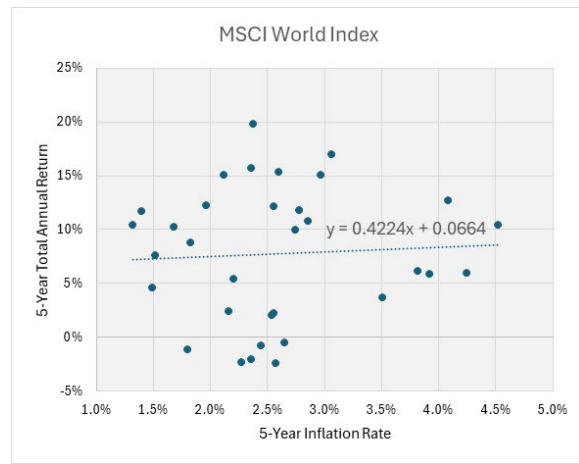
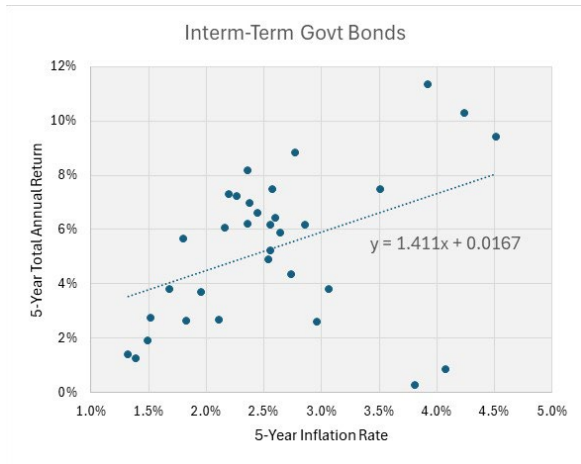
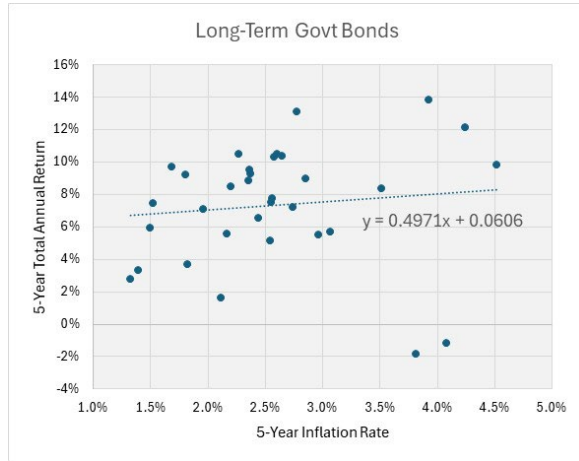
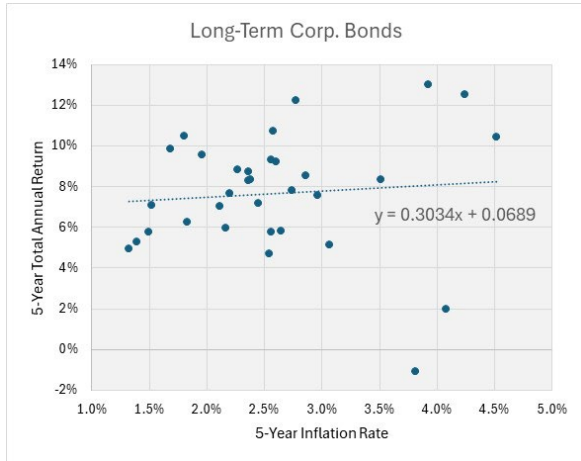
Benchmark Indices Used in Figure 4

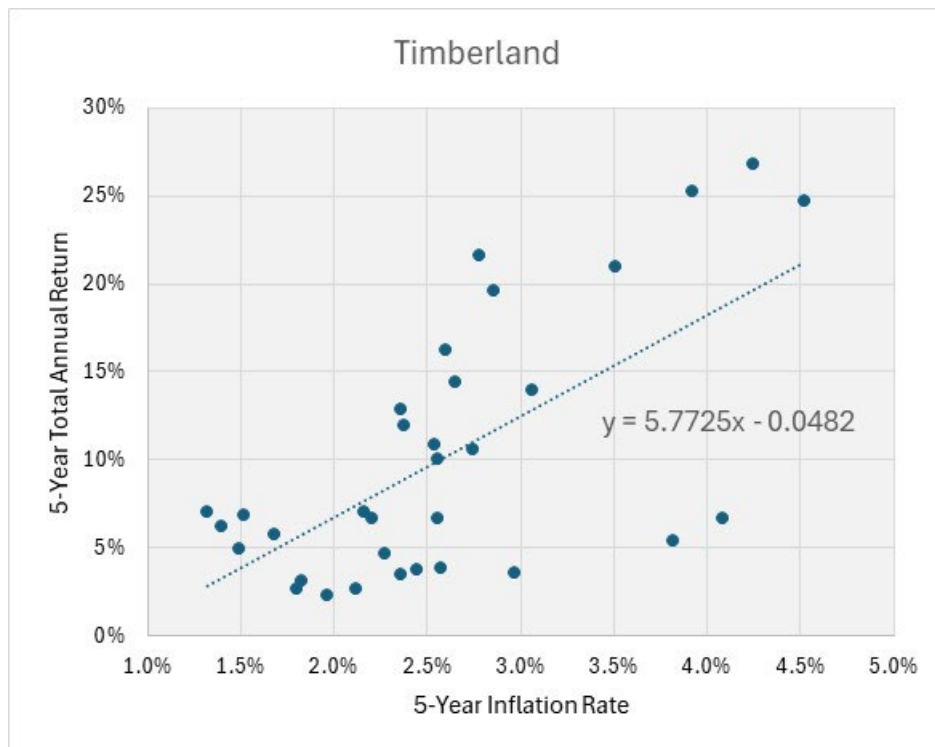
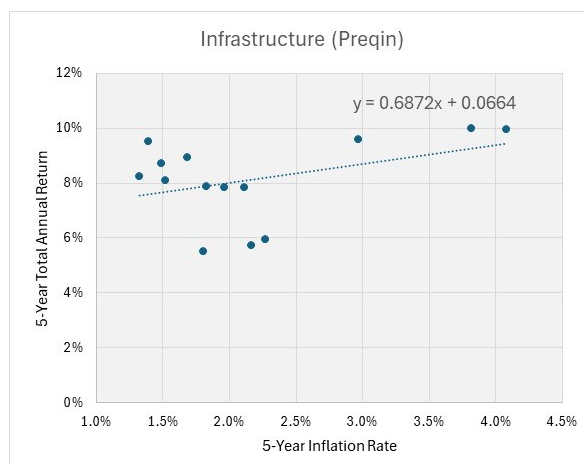
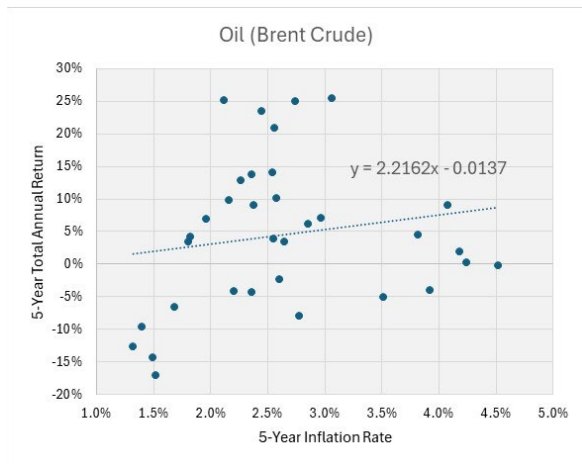
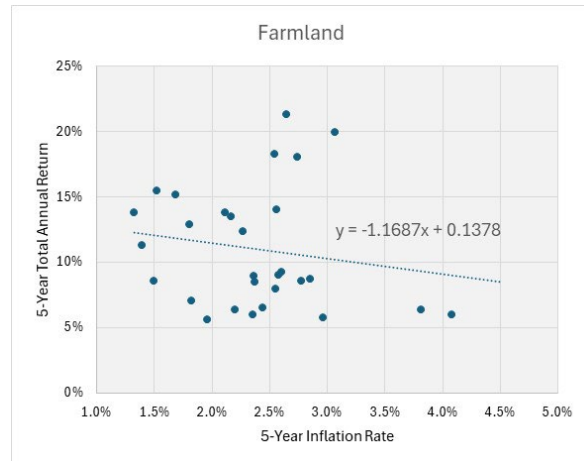
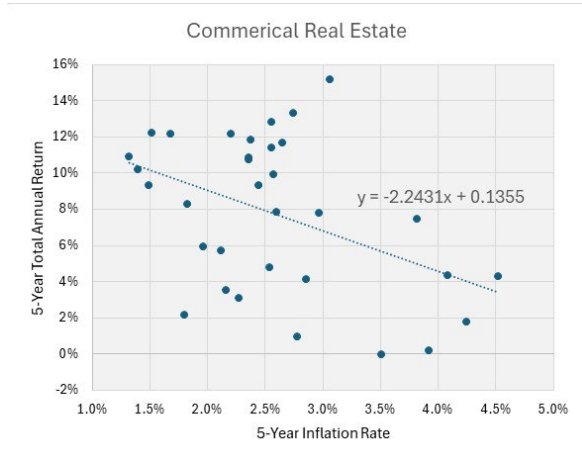
<u>Asset Class</u>	<u>Benchmark</u>
Commercial Real Estate	NCREIF National Property Index
Farmland / Agriculture	NCREIF Farmland Index
Hedge Funds	Credit Suisse Hedge Fund Index
Infrastructure	Preqin – Infrastructure (North America)
Intermediate-Term Government Bonds	Bloomberg US 5-10 Year Treasury Bond Index
Large Cap Stocks	Standard & Poor’s 500 Index
Long-Term Corporate Bonds	Bloomberg US 10+ Year Corporate Bond Index
Long-Term Government Bonds	Bloomberg US Long Treasury Bond Index
Oil	Brent Crude (Europe Spot Price USD/barrel)
Private Equity	Cambridge Associate Private Equity Index
Global Stocks	MSCI World Index
Gold	London Bullion Market Association (LBMA)
Small Cap Stocks	Russell 2000
Timberland	NCREIF Timberland Property Index

Regression of 5-Year Return of Benchmark Indices Against Inflation

- Used rolling 5 whole-year (calendar) returns against annualized inflation rates of that same period covering the time span of 1987 through 2023.
- Coverage began in 1987 because it is the inception year of the Timberland Property Index. For consistency in the regression analysis, all other asset classes feature the same 1987-2023 period. Exceptions are the Credit Suisse Hedge Fund Index (which began in 1994), the Farmland Index (which began in 1991) and Preqin’s Infrastructure Index (which began in 2006)









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