Mesirow

The most effective portfolio inflation hedges

Implications for asset allocation and glide path construction

Executive summary

- Financial assets, in general, perform very poorly in high inflation environments, with negative inflation-adjusted (real) returns being the norm.

- Among fixed income assets, Treasury Inflation Protected Securities (TIPS) do a decent job of mitigating the negative effects of inflation, which may or may not translate into positive real returns. In terms of fixed income, the optimal inflation-hedging strategy is mostly defensive in nature. It entails including TIPS in the fixed income bucket and shortening the duration of the mix. This is particularly important with short-dated horizon funds in glide path construction.

- When limited only to financial assets, the energy equity sector provides the best potential inflation hedge, with positive inflation-adjusted return potential. When the asset class set is expanded to real (physical) assets, however, it provides the best overall option to hedge against inflation and provide positive real returns. This provides an offensive opportunity to enhance and protect upside return and is appropriate in an asset mix or glide path with higher equity allocations. It can also be appropriate when utilized in carve-outs in near-dated horizon glide path funds in scenarios where inflation expectations are higher than the long-term average.

- Among real assets, commodities perform better than real estate as an inflation hedge, but real estate can provide lowly correlated second-order inflation protection. Gold, which is often used by investors as a standard option to hedge inflation, can be effective, but better alternatives exist.

- The best empirical inflation hedge is a broad-based commodity fund, which provides statistically significant positive real returns with an impressive "hit ratio" (percentage of returns that beat inflation) during high inflation periods. Commodity or natural resource funds are widely available and a good proxy for broad-based commodity indices.

- REITS are also widely available but less effective than direct real estate funds in terms of their inflation-hedging ability.

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Introduction

Different asset classes respond differently to inflation. At the highest level, there are two broad categories of assets, namely financial assets and real assets (sometimes referred to as physical assets). Financial asset values and pricing are derived from underlying money payments, such as dividends or interest payments, or else, some metrics that model such money payments in the future. Financial assets include stocks, bonds and bills, as well as options and futures on those instruments. In contrast, real assets derive their value from the ownership of some underlying physical good, such as industrial metals, precious metals, agricultural commodity goods, crude oil, natural gas, lumber, real estate, etc. Financial assets represent ownership of a series of future cash flows, that varies by asset based on the average maturity of the cash flows — or duration, more formally. In contrast, real assets generally represent ownership of a physical good, either today or in the near future.

Sustained high inflation leads to high interest rates, which are the primary tool used by central banks for managing inflation expectations, through inflation targeting. Persistent rising inflation generally leads to rising interest rates. A series of future cash flows is negatively impacted by those higher interest rates, as the future cash flows are discounted back to the present. A future dollar is worth less and less the further out in time that it is. If inflation and interest rates are higher, then the present value is lower. Inflation is generally a negative for financial asset values.

Physical goods, in contrast, do not have any future cash flows and no discounting mechanism is involved. Moreover, they represent a major component of measured inflation to begin with. As such, they generally have a positive relationship with inflation, in contrast to financial assets. Commodity goods are raw inputs for finished goods and rising material input prices eventually leads to higher consumer goods prices. Moreover, rising goods prices eventually lead to expectations of higher future goods prices and demands for higher wages to purchase more expensive goods, which is the primary cost input for many goods producers. Additionally, wages are the dominant cost input for services, which make up the majority of US Gross Domestic Product. This phenomenon is known as a price-wage spiral, and it became a real problem with runaway inflation in the 1970s. Higher prices lead to higher wages which lead to higher prices in a negative feedback loop. That is why central banks will key in on wage inflation and long-term inflation expectations in an effort to prevent such a spiral.

For the first time in many decades, the US and the wider global economy is faced with uncomfortably high inflation that spans both goods and wages, and which has led to rising long-term inflation expectations and the danger of a negative feedback loop that could spiral. The central banks have taken notice and the markets have priced in an extended series of increases in lending rates. Figure 1 on the next page shows annual inflation back to 1970, represented by the Ibbotson Associates US Inflation data series. Figure 2 shows five-year inflation expectations as derived from the pricing of constant maturity TIPS versus a comparable Treasury bond. Inflation has been consistently high for more than a year now and inflation expectations have also risen substantially. Although not shown, there has also been substantial wage inflation over the same time frame.

With inflation have come rising rates, and financial assets have responded accordingly. Most financial assets have experienced negative returns over the past three to six months, as concerns about future inflation and interest rates have become paramount. Over the same time frame, many real assets have witnessed substantially positive returns. While these observations can confirm relationships about returns and inflation in general terms of expected direction, they don't convey much in the way of magnitude.

What can historical data from other inflationary periods tell us about the best empirical inflation hedges? What is the most effective way to diversify a portfolio in the advent of a sustained high inflation regime, and the accompanying decline in purchasing power?
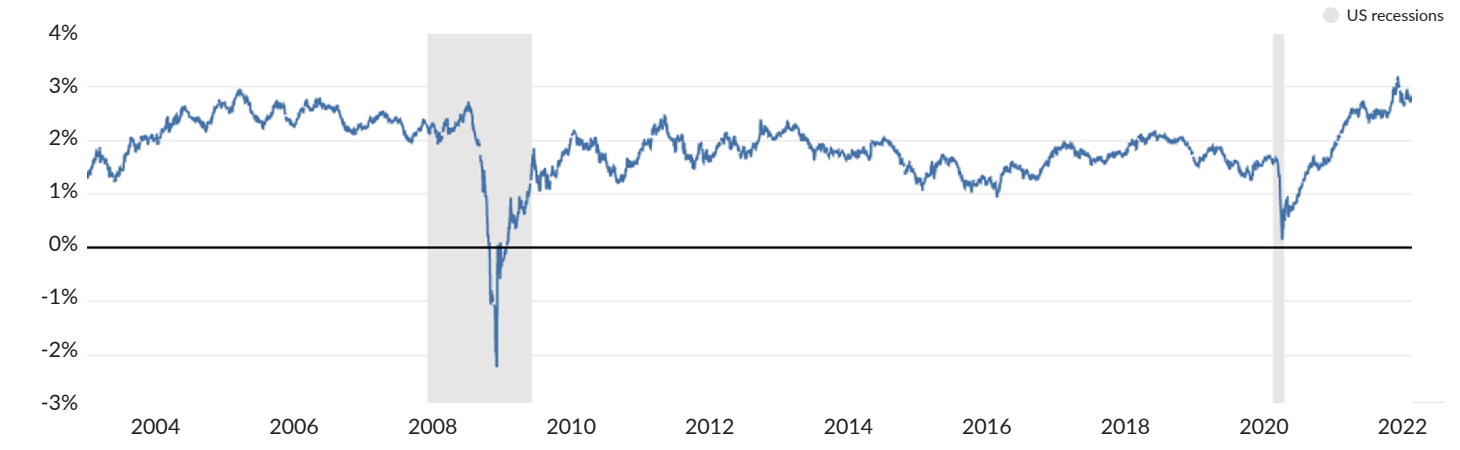

For the first time in many decades, the US and the wider global economy is faced with uncomfortably high inflation that spans both goods and wages.

FIGURE 1: **ANNUAL US INFLATION**
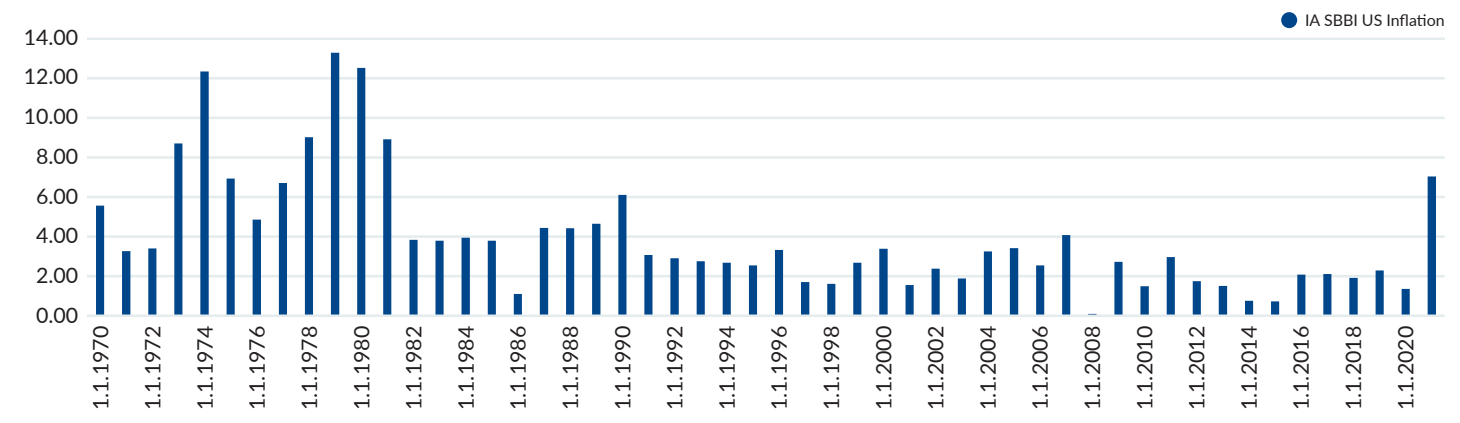
Source: Morningstar Direct Data and Mesirow Calculations. Data as of 12.31.2021.

FIGURE 2: **5-YEAR BREAKEVEN INFLATION RATE**

Source: Federal Reserve Bank of St. Louis. Data as of 3.31.2022.

Statistical measures: Definition and interpretation

To measure the empirical relationship between asset returns and inflation, there are many potential statistical measures, including correlation, beta, excess returns, hit ratios, tracking error, information ratios and t-stats.

Correlation measures the relationship between two return series in terms of strength of that association and whether it is positive or negative. For instance, when correlation is squared (also known as "R-squared"), it tells us the percentage of variation for the asset series that is explained by inflation. It really doesn't tell us anything, however, about the magnitude in return movement relative to inflation.

Beta could tell us about the potential magnitude in return movement, but it really is only meaningful if the correlation is high *AND* the volatility of the asset and inflation are similar. Individual stocks might be more or less volatile than the overall market, but the correlations are usually substantially

positive, and volatilities are generally similar in scaling. In those instances, beta has a meaningful interpretation. Beta really is a relationship of relative volatility and return movements. It is the linkage of return and volatility under the Capital Asset Pricing Model (CAPM), and the Security Market Line (SML) in particular, that allows the presumption that the return and risk are linearly connected.

One way of specifying the measure for two asset return series x and y is that Beta = Correlation (x,y) * Standard Deviation (x) / Standard Deviation (y). In other words, it is correlation scaled by relative volatility. If a stock has a 0.8 beta, for instance, then we expect it to have 80% of the level of market volatility and also 80% of the market return in excess of the risk-free rate. Betas can theoretically be employed with anything, which is a deviation from the classic SML approach. In those cases, however, one has to be careful of interpretation and simple presumptions of linearity.

In the specific case of inflation, the volatilities of most assets are of a completely different order of magnitude. Correlation could be relatively low, but the relative volatility is huge, leading to very large beta. For instance, Brent Crude Oil had a monthly correlation with inflation of 0.29 from November 1997 to March 2022 on a monthly basis, which is meaningfully positive. The relative volatility, however, was an annualized monthly standard deviation of 37.7% for Brent Crude Oil versus 1.3% for inflation. This leads to a beta measure of 8.6! The beta in this case clearly says something about the relative volatility, but what about return? The implication is that because it is 8.6 times as volatile, the return in a linear risk and return model scales along with the volatility. If inflation were to come in at 8% with a 1% risk-free rate, would we really expect a consistent return of over 60% (the beta multiplied by the excess of inflation over the risk free rate) for Crude Oil? Probably not...

We heavily discount the usefulness of the beta measure with respect to inflation, even though it is frequently employed, because of the serious issues of relative volatility differences and the subsequent impact on the interpretation of beta. Beta is appropriate for meaningfully positive or negative correlations and similar volatilities. If the volatilities are extremely different, then the correlation has to be extremely high (positive or negative), similar in concept to the measure of duration for bond price sensitivity to interest rates.

Excess Returns in this context are the inflation-adjusted (real) returns for the various assets. They are extremely useful for conveying both direction and magnitude differences for those assets relative to inflation, and are easily interpreted and intuitive. This measure is equally useful in conditional analysis, which in this case means breaking out and analyzing asset returns in high inflation periods versus the broader data set.

Tracking Error, Information Ratios and t-stats: Tracking error is the standard deviation of excess returns, so that it is a measure of deviation around a benchmark, which in this case is inflation. Most of the assets have extremely high tracking errors. The Information Ratio is the excess return divided by the Tracking Error, which is essentially a benchmark-relative risk-adjusted return akin to the Sharpe Ratio. If the Tracking Error is high, then the excess return must be very high to generate a statistically significant Information Ratio. The t-stat tells us the statistical significance of Excess Return. It represents the Information Ratio * Sq Root (N) observations.

There are few assets with statistically significant positive or negative returns relative to inflation, but where they do exist, they convey strong confidence in the result.

Hit Ratio is the batting average for monthly or annual periods relative to inflation. It is the percentage of observations where the return beats inflation, which can be a very useful measure both in overall analysis and in the conditional, high inflation period analysis.

We employ all of these types of statistical measures to varying degrees, whereas numerous analytical pieces to date have chosen to focus solely on correlation and beta. Such analyses are limited in scope and their ability to draw useful conclusions—worse, they can result in misleading, or even erroneous, conclusions in some cases. In particular, we find that the conditional analysis is critical to understanding differential asset performance in high inflation periods.

Data series availability and commentary

We utilize data series to represent an array of financial and real asset classes that are also widely available in Morningstar Direct. We also analyzed US equity sector return data to assess sector performance variation. Unfortunately, very few real asset data series have sufficient history to include the high inflation era of the 1970s, and the equity sector data availability starts only in 1996. While we perform annual return data analysis for different time frames corresponding with the availability of data on different asset classes, we focus on the monthly data results. This monthly data emphasis allows for more observations for the conditional, high inflation analysis that enables us to evaluate more assets for inflation-hedging ability.

In our analysis, we employ a variety of statistical measures to understand differential asset performance in high inflation periods.

Annual data analysis

The data available back to 1970 is very limited. This set includes a variety of different fixed income duration assets, including high yield bonds, as well as domestic and international equity proxies. Among real assets, however, only gold and silver precious metals are included in this longest-lived data group.

Looking at annual data from 1970 to 2021 shown in Figure 3 for the full data set, average inflation was 3.92%, which includes the high inflation years, primarily from the 1970s, along with the largely disinflationary era thereafter. The high inflation years (defined as above 4.0%) are shown in Figure 4 for the period from 1970 to 2021, of which there are a total of 16 observations.

This full data set gives us some indication from the correlation data about which assets are positively related to inflation. The shorter duration fixed income is positively related, while the longer-term fixed income is negatively related to inflation. Strong correlations are found in the real assets, as the gold price annual correlation is 0.46, but this is lower than the values for 30-day T-bills (0.65) and the 1-year Constant Maturity US Treasury (0.48).

For the full-time period of 50+ years, which represents a very long investment horizon, all of these assets provide compensation for inflation and provide positive inflation-adjusted returns. Those assets with negative inflation correlations provide the highest real returns, like long-dated and high yield bonds and equities. Over very long horizons, inflation is not a paramount concern.

FIGURE 3: ANNUAL TIME PERIOD USED FOR LONGEST-LIVED SERIES 1970–2021

		Return	Standard Deviation
IA SBBI US Inflation		3.92%	3.00%

	Annual Correlation	Excess (Real) Return	Standard Deviation
GOVT BONDS			
IA SBBI US 30 Day TBill TR USD	**0.6549**	0.55%	3.47%
IA SBBI US 1 Yr Trsy Const Mat TR USD	**0.4773**	1.91%	4.12%
IA SBBI US IT Govt TR USD	-0.0467	2.93%	6.48%
IA SBBI US LT Govt TR USD	-0.2776	**4.18%**	11.78%
HIGH YIELD BONDS			
IA Barclays US HY Corporate Bonds	-0.1778	4.75%	13.75%
EQUITIES			
S&P 500 TR USD(1936)	-0.0944	7.13%	16.87%
MSCI EAFE NR USD	-0.0651	4.79%	21.16%
COMMODITIES			
LBMA Gold Price AM USD	0.4617	3.96%	27.23%
LBMA Silver Price USD	0.3667	1.12%	65.56%

Source: Morningstar Direct Data and Mesirow Calculations.

FIGURE 4: HIGH INFLATION YEARS
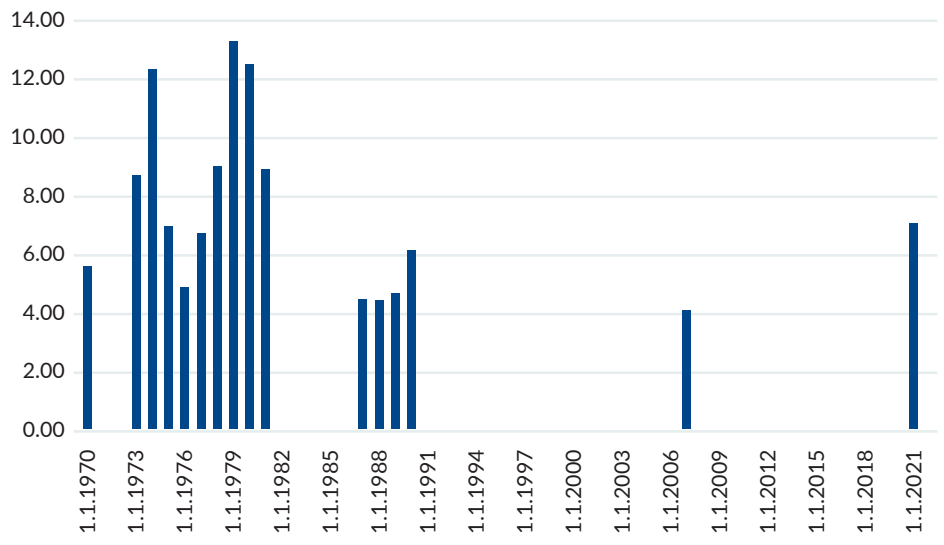
Source: Morningstar Direct Data and Mesirow Calculations. Data as of 12.31.2021.

The annual return data relationships shown in Figure 5 are somewhat different. This time frame covers the period over which most of the asset data that we are interested in evaluating is available. The caveat is that the time period from 1998 to 2021 was largely a low inflation era. There are only two years that represent inflation above 4% in those 24 years. So, the behavior of the assets in terms of correlation with inflation in the more recent data is bounded to mostly low inflation relationships. The average inflation over this time frame was 2.31%.

The overall scale and signs of correlations are different than the full data set. Equity assets, including all sectors, now have a positive correlation with inflation. T-bills and the 1-year Constant Maturity Treasury are much weaker or negative. Most likely this is due in large part to central bank policies that decoupled monetary policy from inflation movements with quantitative easing approaches during the Great Financial Crisis and thereafter, until today. High inflation was not the concern of this larger era; rather, low economic growth, unemployment and deflation.

Long-term bonds are still consistently negative in correlation, but other assets behaved differently than during the era that included consistently high inflation to balance the data out. What is useful in this construct is the relative correlation observations. We can still assess the relative behavior among the various financial and real assets with inflation.

FIGURE 5: ANNUAL TIME PERIOD USED THAT COVERS MOST DATA SERIES 1998–2021

	Return	Standard Deviation
IA SBBI US Inflation	2.31%	1.37%

	Annual Correlation	Excess (Real) Return	Standard Deviation
GOVT BONDS			
IA SBBI US 30 Day TBill TR USD	0.1228	-0.53%	1.96%
IA SBBI US 1 Yr Trsy Const Mat TR USD	-0.0312	-0.25%	2.39%
IA SBBI US IT Govt TR USD	-0.2636	2.07%	5.00%
IA SBBI US LT Govt TR USD	-0.2423	**4.19%**	11.55%
INFLATION-LINKED GOVT BONDS			
Bloomberg Gbl Infl Linked US TIPS TR USD	**0.3479**	3.25%	5.87%
HIGH YIELD BONDS			
IA Barclays US HY Corporate Bonds	0.1405	**4.33%**	14.91%
EQUITIES			
S&P 500 TR USD(1936)	0.2119	**6.56%**	17.68%
MSCI EAFE NR USD	0.2584	**3.06%**	19.86%
EQUITY SECTORS			
Russell 1000 Ind/Bsc Mtrls TR USD	**0.3770**	**4.17%**	19.96%
Russell 1000 Ind/Cons Dis TR USD	0.0535	**5.28%**	20.40%
Russell 1000 Ind/Cons Stp TR USD	**0.3313**	**3.71%**	12.07%
Russell 1000 Ind/Energy TR USD	**0.7510**	2.98%	22.07%
Russell 1000 Ind/Fncls TR USD	**0.3010**	2.82%	20.03%
Russell 1000 Ind/HC TR USD	0.2810	**4.84%**	15.55%
Russell 1000 Ind/Industrials TR USD	0.2512	**4.71%**	18.09%
Russell 1000 Ind/Tech TR USD	0.2420	**6.98%**	30.10%
Russell 1000 Ind/Utilities TR USD	0.3253	0.92%	13.38%
COMMODITIES			
LBMA Gold Price AM USD	0.1366	**5.66%**	14.52%
LBMA Silver Price USD	**0.3667**	**3.47%**	28.05%
S&P GSCI Precious Metal TR	0.1368	**5.08%**	14.74%
S&P GSCI Industrial Metal TR USD	**0.4085**	2.47%	29.92%
Oil Price Brent Crude PR	**0.5618**	**4.47%**	44.56%
S&P GSCI Agrcl&Livestock TR	**0.5225**	-5.69%	13.50%
S&P GSCI Enhanced Commodity TR USD	**0.7552**	2.24%	26.65%
REAL ESTATE			
NCREIF Property	**0.3495**	**6.88%**	7.97%

Source: Morningstar Direct Data and Mesirow Calculations.

Among equity sectors, the Energy sector has roughly double the correlation of any other equity sector, and curiously, higher than Brent Crude Oil, which could be spurious. The data on real assets is generally encouraging with most correlations above 0.3. The highest positive relationship overall is for the broad-based commodity index proxy, which is the GSCI Enhanced Commodity index.

Although the duration of the iShares TIPS Bond ETF and its volatility profile places it somewhere between IT and LT government bond proxies, the correlation with inflation is relatively high at roughly 0.35, while government bond index proxies are substantially negative.

The Russell REIT sector is available starting in 2004. This data is shown in Figure 6. It is notable that the REIT sector is not particularly correlated with inflation when utilizing annual data and appears dissimilar to direct real estate in that respect.

While the relatively low inflation data is part of the complete data set, it is particularly useful to isolate on the behavior of assets during the high inflation periods if the goal is to assess inflation hedges and asset returns during such regimes. Figure 7 highlights this conditional analysis approach. Unfortunately, this is only meaningful for the 1970 to 2021 period with annual frequency data. There are only two data points for the other later time frames previously assessed, which doesn't allow for standard deviation or hit ratio calculations or much confidence in excess return averages.

FIGURE 6: ANNUAL TIME PERIOD USED FOR SHORTEST-LIVED DATA SERIES 2004–2021

	Return	Standard Deviation
IA SBBI US Inflation	2.33%	1.55%

	Annual Correlation	Excess (Real) Return	Standard Deviation
REAL ESTATE			
NCREIF Property	**0.3821**	**6.46%**	9.04%
Russell 1000 Sec/RE Invst&Srvcs TR USD	0.0980	**5.23%**	34.60%

Source: Morningstar Direct Data and Mesirow Calculations.

FIGURE 7: ANNUAL DATA CONDITIONAL HIGH INFLATION ANALYSIS 1998–2021
High Inflation Years: 16

	Return	Standard Deviation
IA SBBI US Inflation	7.43%	3.16

	Annual Correlation	Excess (Real) Return	Standard Deviation	Hit Ratio
GOVT BONDS				
IA SBBI US 30 Day TBill TR USD	**0.5234**	-0.38%	2.73%	50.00%
IA SBBI US 1 Yr Trsy Const Mat TR USD	**0.2778**	0.11%	2.93%	**56.25%**
IA SBBI US IT Govt TR USD	**-0.3686**	-0.74%	4.45%	50.00%
IA SBBI US LT Govt TR USD	**-0.5571**	**-3.19%**	7.18%	**43.75%**
HIGH YIELD BONDS				
IA Barclays US HY Corporate Bonds	**-0.4029**	**-3.23%**	9.63%	**43.75%**
EQUITIES				
S&P 500 TR USD(1936)	-0.1648	0.67%	18.29%	**56.25%**
MSCI EAFE NR USD	-0.1857	-1.19%	19.62%	**56.25%**
COMMODITIES				
LBMA Gold Price AM USD	**0.5861**	**6.72%**	43.23%	50.00%
LBMA Silver Price USD	**0.4789**	**-0.56%**	115.78%	**43.75%**

Source: Morningstar Direct Data and Mesirow Calculations.

The annual data indicate that high inflation is very damaging to financial assets.

Annual data conditional analysis

In terms of correlations in the conditional analysis versus the full data set, the bond and equity correlations are lower, but the positive and negative signs of the unconditional analysis are preserved, while the precious metal correlations are higher. Most importantly, it is evident that the high inflation years have a dramatic impact on the financial asset inflation-adjusted returns. The average inflation during these years was 7.43%, which is similar to the inflation reading for 2021 and potentially in 2022, as well.

Whereas, the long-term 50+ year data set showed compensation for inflation overall, it is evident that the 16 years where high inflation did occur led to flat or negative real returns for most assets. Positive nominal returns are not as meaningful when the purchasing power of money is sharply eroded. Equities treaded water providing no substantial risk premium in real money terms even though they outperformed inflation in the majority of years, while long-duration nominal bonds and high yield bonds performed the worst in excess return and hit ratio terms.

While gold provided a substantial average excess return over inflation, silver did not. The hit ratio was not impressive, however, as gold outperformed inflation only in 8 of the 16 high inflation years. The 1-Year Constant Maturity Government Bond was able to adjust yield and keep up with inflation in general with a roughly 56% hit ratio.

The data in Figure 8 show that none of this performance reaches the level of either positive or negative statistical significance. The critical t-stat for one tail is +/- 1.65 at 95% confidence. While gold provides a substantial excess return, the tracking error is so high that our confidence in its ability to consistently hedge against high inflation is limited. The most significant t-stat is for long-term government bonds, which is negative.

FIGURE 8: ANNUAL CONDITIONAL STATISTICAL SIGNIFICANCE

1970–2021

High Inflation Years

	Tracking Error	IR	t-Stat
GOVT BONDS			
	2.61%	-0.14	-0.5755
	3.57%	0.03	0.1226
	6.54%	-0.11	-0.4520
	9.45%	-0.34	-1.3489
HIGH YIELD BONDS			
	11.28%	-0.29	-1.1445
EQUITIES			
	19.06%	0.03	0.1399
	20.44%	-0.06	-0.2330
COMMODITIES			
	41.46%	0.16	0.6484
	114.31%	0.00	-0.0195

Source: Morningstar Direct Data and Mesirow Calculations.

Statistical significance is nice to have, but we can still draw some meaningful conclusions in the absence of such with the other data available. After all, the vast majority of investment decisions are made without the benefit of statistical certainty.

Monthly data analysis

We can conclude from the annual data that high inflation is very damaging to financial assets. While they are able to provide nominal returns, generally they are unable to provide a premium over inflation to compensate for the decrease in the purchasing power of money. They can't keep up with inflation to produce substantial real returns. Long-duration bonds are the most at risk to high inflation. Unfortunately, the annual time frame of analysis limits our ability to evaluate a wider array of assets, including real assets, in the conditional analysis that proves the most enlightening. Fortunately, we do have the ability to evaluate monthly frequency data to facilitate this type of analysis.

Monthly data will result in more muted correlations overall and there is some serial correlation in the return data of short duration bonds, which dampens the monthly annualized standard deviation measure. We are aware of these elements going into the monthly data framework. While this creates issues for some types of analyses, these problems are not overly problematic for our particular comparative analysis. To analyze most asset classes concurrently with monthly data, our initial time period analysis starts in November 1997 and ends in March 2022.

FIGURE 9: MONTHLY TIME PERIOD USED THAT COVERS MOST DATA SERIES
NOVEMBER 1997 – MARCH 2022

			Return	Standard Deviation
IA SBBI US Inflation			2.34%	1.27%

	Monthly Correlation	Rolling 12 Month Correlation	Excess (Real Return)	Standard Deviation
GOVT BONDS				
IA SBBI US 30 Day TBill TR USD	0.0627	0.2253	-0.55%	0.56%
IA SBBI US 1 Yr Trsy Const Mat TR USD	-0.0680	0.1029	-0.15%	0.88%
IA SBBI US IT Govt TR USD	-0.1783	-0.1544	1.96%	4.03%
IA SBBI US LT Govt TR USD	-0.2320	-0.2571	**4.04%**	10.52%
INFLATION-LINKED GOVT BONDS				
Bloomberg Gbl Infl Linked US TIPS TR USD	0.0748	0.2902	**3.09%**	5.36%
HIGH YIELD BONDS				
IA Barclays US HY Corporate Bonds	0.0991	0.0314	**4.12%**	8.95%
EQUITIES				
S&P 500 TR USD(1936)	0.0244	0.1895	**6.31%**	15.26%
MSCI EAFE NR USD	0.0399	0.2865	2.66%	16.48%
EQUITY SECTORS				
Russell 1000 Ind/Bsc Mtrls TR USD	0.0358	**0.3087**	**5.16%**	21.10%
Russell 1000 Ind/Cons Dis TR USD	-0.0155	-0.0024	**7.61%**	18.48%
Russell 1000 Ind/Cons Stp TR USD	-0.0067	0.1385	**6.90%**	13.07%
Russell 1000 Ind/Energy TR USD	0.1323	**0.6707**	**4.08%**	24.24%
Russell 1000 Ind/Fncls TR USD	0.0470	0.2363	**5.01%**	20.17%
Russell 1000 Ind/HC TR USD	-0.0260	0.0335	**7.74%**	14.46%
Russell 1000 Ind/Industrials TR USD	0.0024	0.2514	**6.01%**	18.74%
Russell 1000 Ind/Tech TR USD	0.0279	0.0981	**8.76%**	25.13%
Russell 1000 Ind/Utilities TR USD	-0.0213	0.0881	**4.15%**	14.69%
COMMODITIES				
LBMA Gold Price AM USD	0.0662	0.2014	**5.40%**	16.57%
LBMA Silver Price USD	0.1125	0.2168	**4.55%**	30.02%
S&P GSCI Precious Metal TR	0.0476	0.2168	**4.96%**	17.15%
S&P GSCI Industrial Metal TR USD	0.2144	**0.4597**	2.40%	20.06%
Oil Price Brent Crude PR	0.2947	**0.6644**	4.66%	37.69%
S&P GSCI Agrcl&Livestock TR	0.0832	**0.5616**	-5.45%	15.14%
S&P GSCI Enhanced Commodity TR USD	**0.3688**	**0.8006**	2.41%	21.41%
REAL ESTATE				
NCREIF Property	0.0270	**0.4306**	**7.05%**	10.34%

Source: Morningstar Direct Data and Mesirow Calculations.

It is evident that the monthly annualized standard deviation is meaningfully lower relative to the comparable annual data analysis shown in Figure 5 for assets like 30-day T-bills and 1-year Government T-bonds. Other assets are marginally lower, but it is not particularly noticeable. The monthly correlations are all muted, but a column of rolling 12-month correlations (where data is overlapping of course) can be used to acclimate relative to the scaling shown in Figure 5 for the annual data.

On monthly basis the only inflation correlation that crosses our previous arbitrary threshold of 0.3 is the broad-based commodity asset. On a rolling 12-month basis, most commodity assets, real estate and the Basic Materials and Energy equity sectors also qualify. As with the annual data, most of the assets produced positive inflation-adjusted returns for the mostly low inflation era of 1997 forward. In other words, the monthly data looks good and leads to similar conclusions with respect to correlation with inflation and rank ordering as the annual data. The same conclusions may be drawn with respect to TIPS as an inflation hedge versus other fixed income assets. Interestingly, the rolling 12-month correlations look more reasonable for short-term bonds relative to the annual correlations.

Figure 10 shows the monthly data for January 2004 to March 2022 that covers the REIT equity sector. This monthly analysis is more favorable for REITs. They do not look as good as direct real estate, but at least are positively related to inflation at a measurable level.

FIGURE 10: MONTHLY TIME PERIOD USED FOR SHORTEST-LIVED DATA SERIES

JANUARY 2004 – MARCH 2022

	Return	Standard Deviation
IA SBBI US Inflation	2.40%	1.37%

	Monthly Correlation	Rolling 12 Month Correlation	Excess (Real) Return	Standard Deviation
REAL ESTATE				
NCREIF Property	0.0359	**0.4621**	**6.29%**	9.60%
Russell 1000 Sec/RE Invst&Srvcs TR USD	0.1165	0.2034	**4.08%**	32.40%

Source: Morningstar Direct Data and Mesirow Calculations.

Monthly data conditional analysis

While the 1998 to 2021 time frame with annual data only yielded two data points of high inflation (i.e., greater than 4%), which was insufficient for statistical analysis, the monthly data offers more data. We define high inflation observations as those months with a monthly inflation reading that when annualized would be equal to or greater than 4.0%. We added the additional qualifier that the rolling 12-month inflation reading for that data point had to be 3.0% or higher. One monthly reading that is high, while in the context of low trailing inflation overall could be spurious and unlikely to be interpreted by the markets as "high inflation" in asset pricing behavior. These screens in tandem generate thirty-eight high inflation months from November 1997 to March 2022. These months are shown in Figure 11.

FIGURE 11: HIGH INFLATION MONTHS
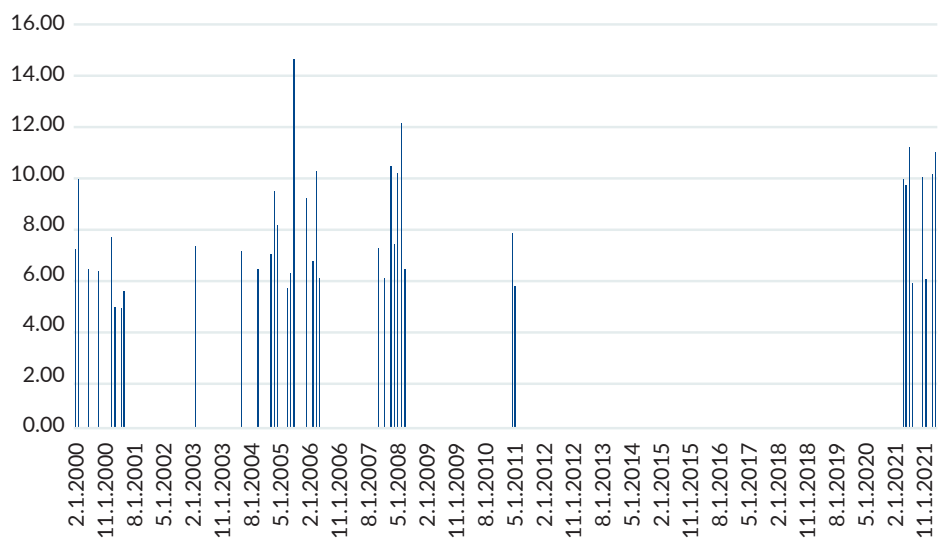
Source: Morningstar Direct Data and Mesirow Calculations. Data as of 3.31.2022.

The data in Figure 12 show the conditional analysis results, which are very informative. As with the annual return data, it is evident that financial assets suffer in individual months where inflation is high enough to be concerning. Because the high inflation months are non-sequential, there is no appropriate way to approximate the rolling-12 month returns to facilitate a longer horizon scaling of the correlations as we did with the full data set monthly analysis. AS noted earlier, the correlations are "muted," but can be compared to the monthly correlations in Figure 9. The relative relationships are similar to what was observed in moving from the full annual data set to the conditional annual data set. Namely, that the correlation relationship with inflation becomes more defined.

In fact, the bifurcation of positive and negative inflation-adjusted monthly annualized returns is quite remarkable. Most real assets produce double digit excess returns annualized in high inflation months. Gold, crude oil and the broad-based commodity index all have hit ratios above 60%. Among the equity sectors, the Energy segment really stands out as an inflation hedge. While the correlation is even higher than for crude oil, the excess return and hit ratio are lower.

Real estate does not provide positive real return in this analysis, but it could be said to largely keep pace with inflation. It should be noted that the NCREIF data is quarterly, rather than monthly, and so we do not provide monthly hit ratio data. In the months without a return (i.e., not quarter end) the return is registered as 0.0%, and therefore, the correlation and excess return data are of a lower quality than the other data series.

FIGURE 12: MONTHLY DATA CONDITIONAL HIGH INFLATION ANALYSIS

NOVEMBER 1997 – MARCH 2022
High Inflation Months: 38

	Return	Standard Deviation
IA SBBI US Inflation	8.22%	0.66%

	Monthly Correlation	Excess (Real) Return	Standard Deviation	Hit Ratio
GOVT BONDS				
IA SBBI US 30 Day TBill TR USD	-0.1924	**-5.65%**	0.58%	**0.00%**
IA SBBI US 1 Yr Trsy Const Mat TR USD	**-0.3244**	**-5.18%**	1.29%	**21.05%**
IA SBBI US IT Govt TR USD	-0.1744	**-4.22%**	4.56%	**39.47%**
IA SBBI US LT Govt TR USD	-0.1070	**-4.17%**	8.47%	44.74%
INFLATION-LINKED BONDS				
Bloomberg Gbl Infl Linked US TIPS TR USD	-0.0918	2.18%	5.64%	**57.89%**
HIGH YIELD BONDS				
IA Barclays US HY Corporate Bonds	-0.2275	**-5.30%**	7.05%	**39.47%**
EQUITIES				
S&P 500 TR USD(1936)	0.0822	**-4.98%**	8.22%	52.63%
MSCI EAFE NR USD	0.1392	**-7.82%**	14.75%	50.00%
EQUITY SECTORS				
Russell 1000 Ind/Bsc Mtrls TR USD	0.0502	**-9.87%**	19.31%	47.37%
Russell 1000 Ind/Cons Dis TR USD	-0.0573	**-6.50%**	18.43%	**42.11%**
Russell 1000 Ind/Cons Stp TR USD	-0.0430	**-5.89%**	11.05%	52.63%
Russell 1000 Ind/Energy TR USD	**0.3491**	14.53%	25.79%	**57.89%**
Russell 1000 Ind/Fncls TR USD	0.0067	**-11.13%**	19.34%	**39.47%**
Russell 1000 Ind/HC TR USD	-0.1442	-1.87%	14.20%	**55.26%**
Russell 1000 Ind/Industrials TR USD	-0.0432	-4.32%	15.77%	52.63%
Russell 1000 Ind/Tech TR USD	0.0887	-3.76%	31.04%	47.37%
Russell 1000 Ind/Utilities TR USD	0.1061	-3.87%	13.29%	52.63%
COMMODITIES				
LBMA Gold Price AM USD	0.1378	**16.57%**	16.06%	**63.16%**
LBMA Silver Price USD	0.1825	**17.94%**	30.64%	55.26%
S&P GSCI Precious Metal TR	0.1513	**11.49%**	17.45%	55.26%
S&P GSCI Industrial Metal TR USD	0.1151	**13.58%**	20.94%	**57.89%**
Oil Price Brent Crude PR	0.1440	**28.33%**	34.00%	**65.79%**
S&P GSCI Agrcl&Livestock TR	0.2708	**-8.68%**	16.00%	**42.11%**
S&P GSCI Enhanced Commodity TR USD	**0.3109**	29.66%	21.14%	**65.79%**
REAL ESTATE				
NCREIF Property	**0.3791**	-0.88%	11.16%	N/A

Source: Morningstar Direct Data and Mesirow Calculations.

TIPS do provide positive inflation-adjusted excess returns in our analysis, which is in sharp contrast to similar duration nominal bonds. While the principal is inflation-protected, the duration profile can still result in negative real returns in an inflationary, rising rate environment in some instances.

Figure 13 shows the statistical significance of the data in Figure 12. Once again, these numbers are largely driven by the high tracking errors relative to inflation for most assets. The T-bills and 1-Yr T-bond are statistically significant for negative performance mostly because the tracking errors are low, while the negative excess returns are substantial.

The broad-based commodity asset is statistically significant on the positive side, which is remarkable given the high tracking error. As with the annual data, this appears to be the most effective and consistent overall inflation hedge.

Asset allocation and Glide path implications

Most investors think in terms of broad asset class buckets, such as stocks and bonds and cash, when constructing a portfolio asset mix. Time horizon glide paths are often constructed in a similar manner, with higher equity for long-dated portfolios and more bonds and then cash as the time horizon shortens. Sometimes real assets are included as an additional bucket, but it is not the norm. These broad asset class buckets largely exist due to different return potential and volatility characteristics, as well as the different roles they play during asset accumulation phases versus asset decumulation phases.

FIGURE 13: MONTHLY CONDITIONAL STATISTICAL SIGNIFICANCE

	Tracking Error	IR	t-Stat
GOVT BONDS			
IA SBBI US 30 Day TBill TR USD	0.98%	-1.67	-10.14
IA SBBI US 1 Yr Trsy Const Mat TR USD	1.64%	-0.91	-5.53
IA SBBI US IT Govt TR USD	4.74%	-0.26	-1.56
IA SBBI US LT Govt TR USD	8.58%	-0.14	-0.85
INFLATION-LINKED BONDS			
Bloomberg Gbl Infl Linked US TIPS TR USD	5.69%	0.11	0.67
HIGH YIELD BONDS			
IA Barclays US HY Corporate Bonds	7.24%	-0.21	-1.29
EQUITIES			
S&P 500 TR USD(1936)	14.18%	-0.10	-0.62
MSCI EAFE NR USD	14.69%	-0.15	-0.94
EQUITY SECTORS			
Russell 1000 Ind/Bsc Mtrls TR USD	19.27%	-0.15	-0.90
Russell 1000 Ind/Cons Dis TR USD	18.49%	-0.10	-0.62
Russell 1000 Ind/Cons Stp TR USD	11.11%	-0.15	-0.93
Russell 1000 Ind/Energy TR USD	25.56%	0.16	1.00
Russell 1000 Ind/Fncls TR USD	19.35%	-0.17	-1.01
Russell 1000 Ind/HC TR USD	14.31%	-0.04	-0.23
Russell 1000 Ind/Industrials TR USD	15.83%	-0.08	-0.48
Russell 1000 Ind/Tech TR USD	31.00%	-0.03	-0.21
Russell 1000 Ind/Utilities TR USD	13.26%	-0.08	-0.51
COMMODITIES			
LBMA Gold Price AM USD	15.96%	0.30	1.82
LBMA Silver Price USD	30.52%	0.17	1.03
S&P GSCI Precious Metal TR	17.35%	0.19	1.16
S&P GSCI Industrial Metal TR USD	20.86%	0.19	1.14
Oil Price Brent Crude PR	33.89%	0.24	1.47
S&P GSCI Agrcl&Livestock TR	15.80%	-0.16	-0.96
S&P GSCI Enhanced Commodity TR USD	20.93%	0.41	2.49
REAL ESTATE			
NCREIF Property	10.93%	-0.02	-0.14

Source: Morningstar Direct Data and Mesirow Calculations. Same time period as Figure 12 to which it refers.

From our analysis, we can draw the conclusion that all of these broad buckets, as financial assets, are negatively impacted by high inflation and the accompanying rise in interest rates. There are differential reactions of different segments within those broad asset buckets, as well. The likelihood of entering a persistent high inflation regime is uncomfortably large right now. Our analysis provides some timely assistance in insulating asset mixes and glide paths against inflation risk and the loss of investor purchasing power.

In a higher fixed income asset mix that also applies to shorter horizon glide path portfolios, the strategy with the most potential impact is largely defensive in nature. Shortening fixed income duration is part of the standard playbook with glide paths, but substantial TIPS allocations can be just as effective. These strategies will not necessarily provide positive inflation-adjusted returns, but they will help to decrease negative inflation-adjusted returns and preserve purchasing power.

In higher equity asset mixes that include longer-dated horizon glide path portfolios, the biggest impact can come from the addition of real assets into the mix. Commodity-related assets are the most meaningful, but direct real estate can be useful as well on a second-order basis, due to relatively low correlations with other assets. This addition of inflation-hedging assets can be considered offensive in nature in that it provides for more consistent asset accumulation across more potential capital market scenarios during the accumulation phase. In more active or dynamic approaches, this carve-out from equity could also be appropriate in shorter dated portfolios if intermediate to long-term inflation expectations are particularly high. Such an approach could help to preserve the purchasing power of assets, particularly in "through retirement" glide paths.

About Mesirow

Mesirow is an independent, employee-owned financial services firm founded in 1937. Headquartered in Chicago, with locations around the world, we serve clients through a personal, custom approach to reaching financial goals and acting as a force for social good. With capabilities spanning Global Investment Management, Capital Markets & Investment Banking, and Advisory Services, we invest in what matters: our clients, our communities and our culture.

Mesirow Fiduciary Solutions helps the retirement plan community achieve their intended investment objectives through our institutional 3(21) and 3(38) fiduciary partnership services, fiduciary technology and reporting, and customized default solutions.

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