White Paper | January 2020

NEUBERGER | BERMAN

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Mitigating Inflation Risk at Lower Opportunity Cost

Inflation-mitigating portfolios have often proven costly during times of low or falling inflation. When so many commentators argue that an era of structurally low inflation is at hand, it is tempting to give up on trying to mitigate its potentially damaging effect.

We believe that is a risky position to adopt. The inflation regime of the 1970s and 1980s was very different from that of the 1990s and 2000s, and the inflation regime of the 2010s forward may be different again. Some current structural trends are inflationary and some are deflationary, and it is difficult to discern which will be the more powerful. Forecasting inflation has always been a challenge, and that challenge may be getting harder. It may pay to prepare for higher or more volatile inflation.

We show that building an inflation-mitigating portfolio that does not drag on returns when inflation is low or falling involves diversifying between assets that respond differently to different kinds of inflation, as well as exhibiting different risk-return characteristics. But we also believe that tactical allocation between those assets, and between a combination of real and traditional assets, can be beneficial as investors move between different economic environments. In addition, we show that inflation-mitigating portfolios need not be "one-size-fits-all": we believe they should be tailored to the specific drivers of inflation to which the investor is exposed.

Executive Summary

- Forecasting inflation has always been difficult and prone to error.
- Some current structural trends are inflationary and some are deflationary, and it is difficult to discern which will be the more powerful over the coming years.
- We think this makes a strong case for preparing an inflation-mitigating allocation.
- Traditional approaches to this have often resulted in allocations that drag substantially on return during periods of low or falling inflation, particularly since the 1990s.
- Diversifying between asset classes that are sensitive to different inflation dynamics, and that offer different risk-return characteristics and different compositions of income and capital appreciation, can help to mitigate this opportunity cost.
- This diverse set of assets exhibits very different performance depending on which inflation-growth environment we are in:
  - Rising inflation and rising growth
  - Rising inflation and falling growth
  - Falling inflation and rising growth
  - Falling inflation and falling growth
- That helps to mitigate opportunity cost in itself, but it also suggests to us that tactical allocation, between different inflation-sensitive assets and between inflation-sensitive and traditional assets, in the form of a fully integrated portfolio, is a necessary corollary to diversification.
- In addition, we note the importance of building an inflation-mitigating portfolio that is tailored toward the specific drivers of inflation to which the investor is exposed.
- We show a case study of an inflation index tailored for a healthcare provider and the performance of a hypothetical portfolio tailored to mitigate the inflation tracked by that index.
- We conclude that there are three steps that investors should consider when they are building portfolios to withstand inflation risk:
  - First, if possible they should be clear about what kind of inflation they are exposed to. What costs, expenses and liabilities do they have?
  - Second, it is beneficial to diversify among assets that are being held to mitigate inflation risk. Each has its own risk-return characteristics and each responds differently to different kinds of inflation.
  - Third, and for the same reason, it can be beneficial to allocate tactically to individual traditional and inflation-sensitive assets as we pass between the four different inflation-growth environments.

It is surprising how difficult it is to forecast the rate of inflation.

For investors tasked with planning for financial outcomes sometimes decades into the future, this ought to be a matter of great concern: small changes in the long-run average rate of inflation can have large effects on those outcomes. Increasingly, however, we hear market practitioners saying that they do not need to worry about inflation at all, either because they believe we have entered a new era of structurally low inflation or because the cost of preparing for it in the past has proven too great.

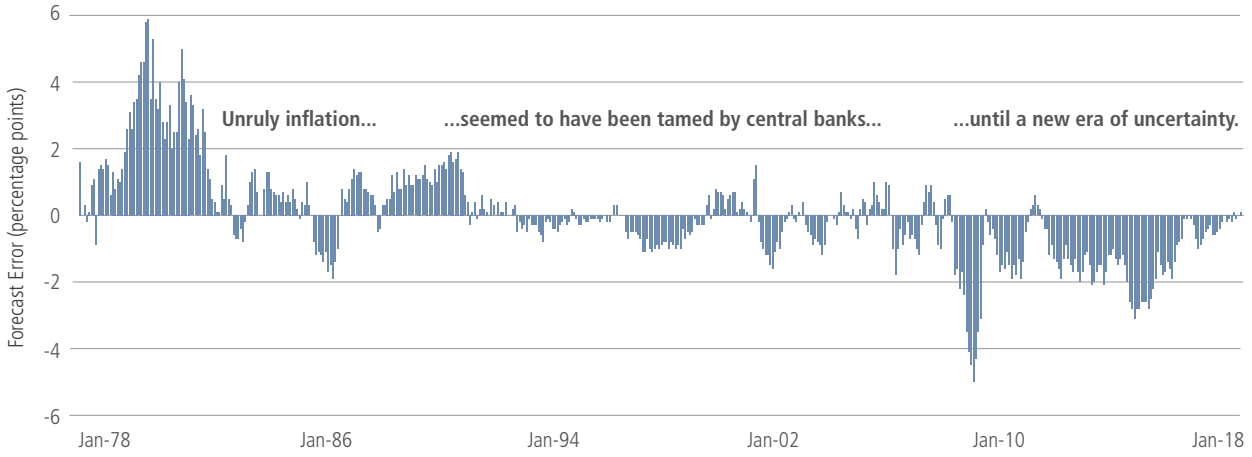
We think these are risky views to adopt. Inflation may well turn out to be structurally lower than in the past, but our forecasting difficulties should make us more cautious about that assumption, not less. And while it is true that traditional "inflation-hedging" investments can drag on performance when inflation is subdued, in this paper we suggest some ways to prepare for higher inflation while seeking to control those opportunity costs.

Forecasting Inflation Has Always Been Difficult, and It May Get Harder Still

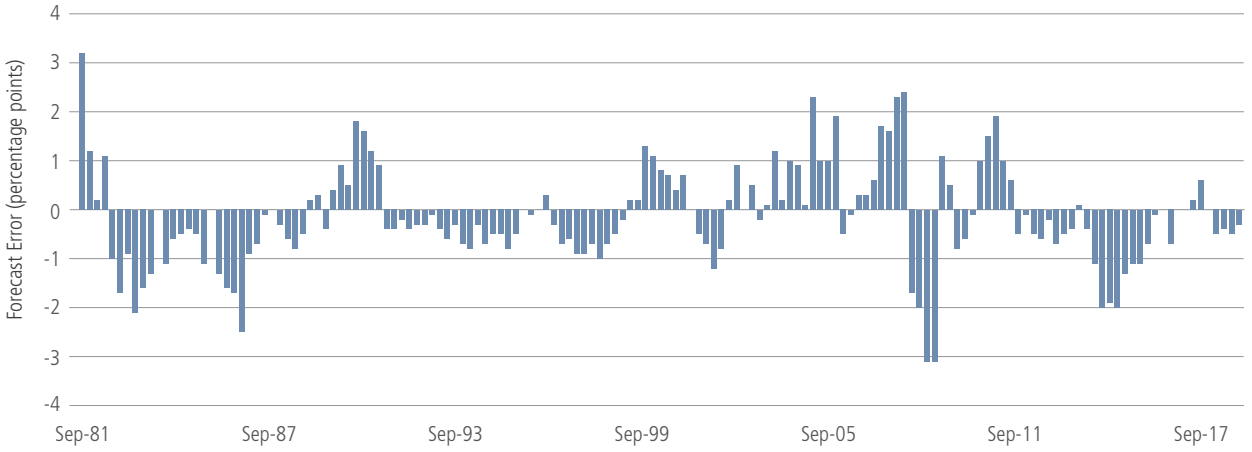
Figure 1 shows the extent to which two different forward-looking estimates of inflation have gotten it wrong over the past 40 years. We see similar results from comparable ex-ante forecasting models—they sometimes make better forecasts in different periods, but they all get it wrong to a meaningful extent.

FIGURE 1. INFLATION CAN BE DIFFICULT TO FORECAST

University of Michigan 1-Year Inflation Expectation vs. Realized U.S. CPI



Survey of Professional Forecasters 1 Year Ahead Inflation vs. Realized U.S. CPI



Source: Bloomberg. The University of Michigan 1-Year Inflation Expectation represents the median expected price change over the next 12 months from surveys of U.S. consumers. The Federal Reserve Bank of Philadelphia 1-Year Inflation Expectation represents the median expected price change over the next 12 months from surveys of professional forecasters.

It's not surprising that the unruly inflation of the 1970s and early 1980s was difficult to predict. During this period, inflation-related shocks often rippled out from commodity and energy crises, labor unrest and problems in manufacturing supply chains that look crude next to today's just-in-time, cross-border arrangements.

The success of central banks in taming that unruliness, led by the U.S. Federal Reserve, ushered in a 20-year period of much lower inflation volatility. But, as figure 1 shows, the global financial crisis opened up a new period of inflation forecasting errors to which most models have yet to adapt.

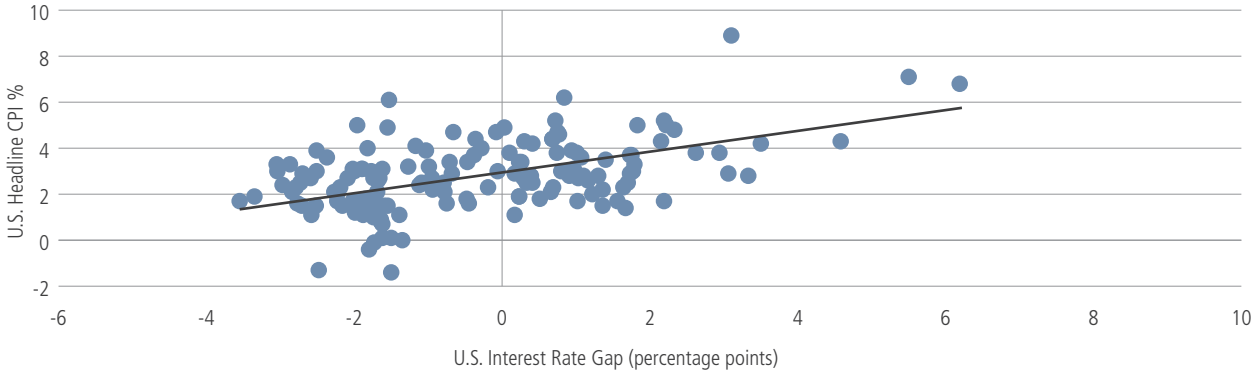
We think this unpredictability is likely to persist.

In figure 2, we show how a simple, in-sample three-factor model can explain much of the dynamic of inflation over the past few decades. The first factor is monetary policy: we show the correlation of the gap between the Fed Funds Rate and the estimated neutral interest rate with the realized rate of inflation. The second factor is commodity prices: we show the relationships between the year-on-year change in crude oil prices and inflation. The third factor is the level of slack in the economy: here we look at the correlation of inflation with the output gap, or the difference between actual GDP growth and the GDP growth that could potentially be generated if the capital and labor available to the economy were working at full capacity.

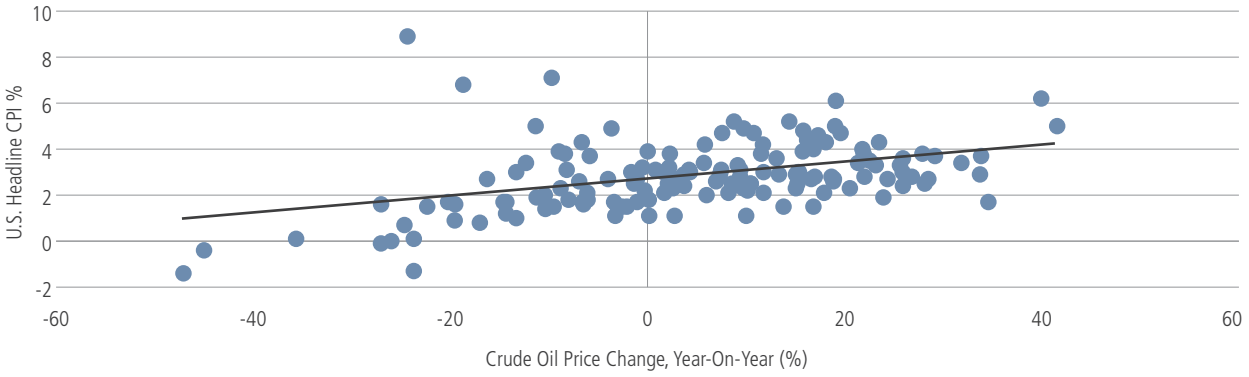
The upward-sloping distribution of the data in the first three charts in figure 2 indicates strong historical relationships. When we create a model of future inflation from these three factors and compare it to subsequently realized inflation, as shown in the final chart, we can see that it makes sometimes large forecast errors like any other model, but it describes the basic ebb and flow of inflation fairly accurately.

FIGURE 2. WHAT HAS CAUSED INFLATION OVER THE PAST 40 YEARS?

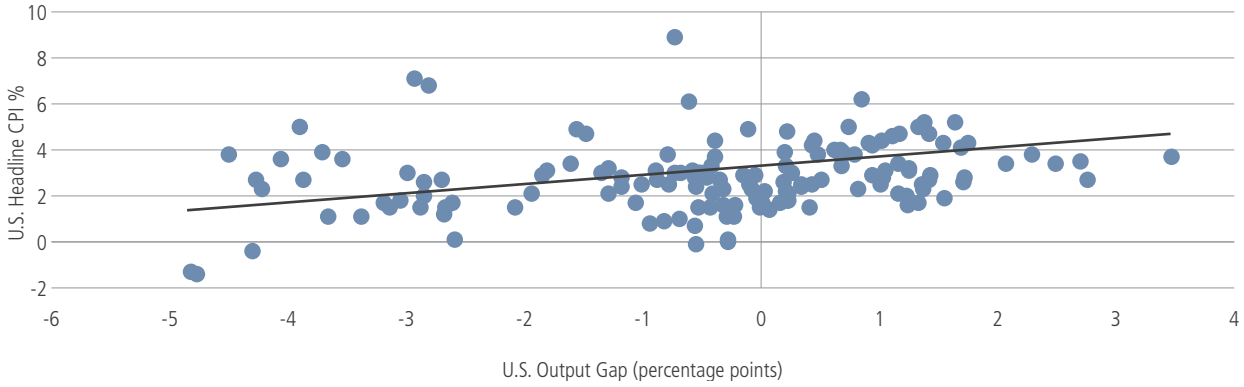
Monetary policy: U.S. CPI vs. the difference between the Fed Funds Rate and the estimated neutral rate



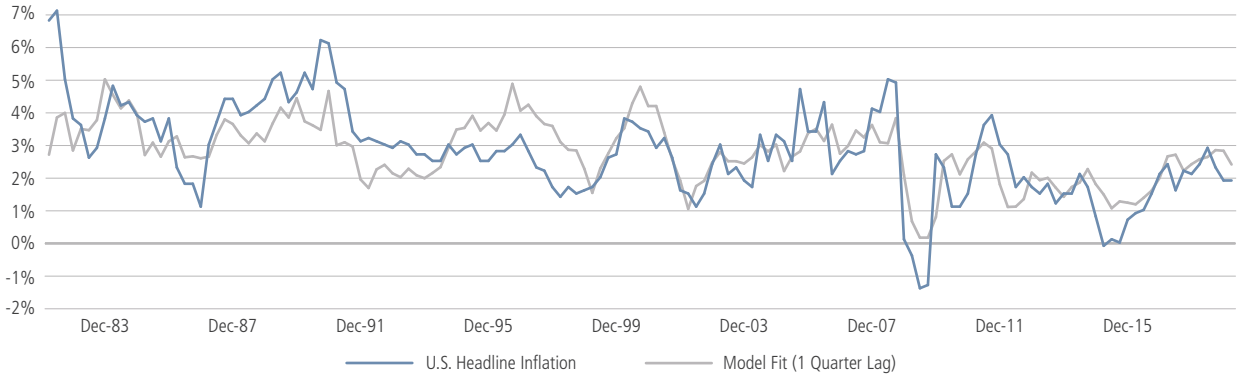
Commodity prices: U.S. CPI vs. year-on-year change in crude oil prices



Economic slack: U.S. CPI vs. U.S. output gap



Realized U.S. CPI vs. three-factor model, lagged by 3 months



Source: Bloomberg, Neuberger Berman. The neutral rate of interest is calculated using the model provided by Thomas Laubach and John Williams in "Measuring the Natural Rate of Interest," *Review of Economics and Statistics* 85, no.4 (November 2003).

As we have discussed elsewhere,[1] there are reasons to believe that the predictive power of these three factors for inflation may be weaker.

Since the early 1980s, the major central banks have been run with inflation stability explicit in their mandates. We should not be surprised that the clearest upward sloping line in figure 2 is the one for monetary policy.

But look back at figure 1. One of the biggest inflation forecast errors of the past 40 years came in the aftermath of the global financial crisis. Central banks slashed interest rates and embarked on vast amounts of quantitative easing: the models predicted that monetary policy of such unprecedented scope would result in much higher inflation. Surprisingly though, central banks have struggled even to keep inflation as high as their targets.

Central banks may not be able to sway their domestic inflation rates as they once did in the face of powerful trends such as globalizing labor forces and supply chains, technological innovation and secular stagnation. Fiscal policy may now be as big a determinant of inflation as monetary policy, and fiscal policy is not generally run with an inflation target in mind. A lesson the financial crisis may have taught the central bankers themselves is that financial stability is more important than inflation stability. Whatever the explanation, it is clear that the relationship between monetary policy and inflation has changed.

The same can be said for commodity prices. As the world becomes less dependent upon coal and oil for its energy, we should expect the relationship between these commodities and inflation to become weaker. We have already seen this in the U.S., where, according to the U.S. Energy Information Administration, the new accessibility of domestic shale oil and gas has reduced the value of net oil imports by almost 75% in the past decade, leading to much lower and less volatile U.S. energy inflation.

Finally, we also see radically changing dynamics when we look at the relationship between economic slack and inflation.

Most strikingly, the worldwide decline in unemployment over the past five years has not fed into rising inflation, as would previously have been expected.

Again, there are many potential reasons why that might be. Aging economies are increasingly driven by the consumption of retired people, who are not subject to the risk of unemployment or fluctuating incomes. Online shopping and smartphones makes it much easier to find competitive prices. The "sharing economy" has uncovered a whole new layer of economic slack, such as unused homes and cars: as this slack is put to work, it becomes harder to raise the price of hotel rooms and taxicabs. Most importantly, globalization has exerted downward pressure on the price of both manufactured goods and labor.

Will these disinflationary forces persist? It is difficult to tell. Population aging, technological advances and the sharing economy all appear to be trends that are just starting up. Globalization, on the other hand, appears to have stalled over the past decade and may even be set to reverse.

Ultimately, we think it is reasonable to conclude that inflation forecasting models will continue to make sometimes substantial errors of degree. They may also struggle to capture the basic ebb and flow of consumer prices until the underlying driving forces become clearer.

Diversify Inflation-Sensitive Assets—And Also Allocate Tactically

This degree of uncertainty makes a strong case for preparing portfolios that can withstand periods of unexpected inflation, in our view. The usual approach is to select the more inflation-sensitive subsets of the traditional asset classes and then blend them.

Emerging markets, the materials sector and the energy sector have been the most inflation-sensitive parts of the global equity market. In fixed income, emerging markets local currency bonds, high yield bonds, bank loans and Treasury Inflation Protected Securities (TIPS) have generally posted their strongest performance when inflation is rising. In commodities, energy and industrial metals have been more inflation-sensitive than precious metals. Among alternative real assets, private equity has performed well in inflationary environments, and farmland not so well.

Blending the most inflation-sensitive asset classes can be beneficial because each has its own risk-return characteristics and each responds differently to different kinds of inflation. TIPs are an excellent inflation hedge when held to maturity, but their total returns can be disappointing in the absence of a long period of higher-than-expected inflation, and their duration can result in short-term

[1] Thanos Bardas, Jon Jonsson, "Inflation: Slain Dragon or Sleeping Giant?" (Dec 2017), at https://www.nb.com/global/insights/inflation-slain-dragon-or-sleeping-giant

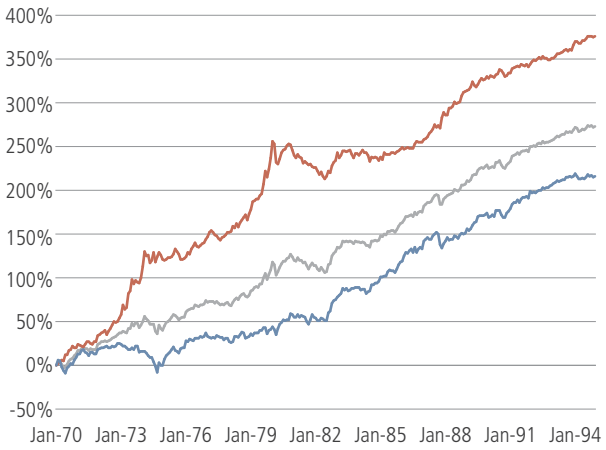
underperformance even in an inflationary environment. Commodities can generate strong returns during short-term inflation spikes, but they can also be very volatile and have tended to exhibit poor long-term performance. Asset classes such as real estate investment trusts (REITs) and energy and emerging markets equities can add some inflation sensitivity while also keeping up when the equity market as a whole is performing strongly.

Nonetheless, it is important to acknowledge that even a blended real asset portfolio can impose substantial opportunity cost in the event of persistently low inflation.

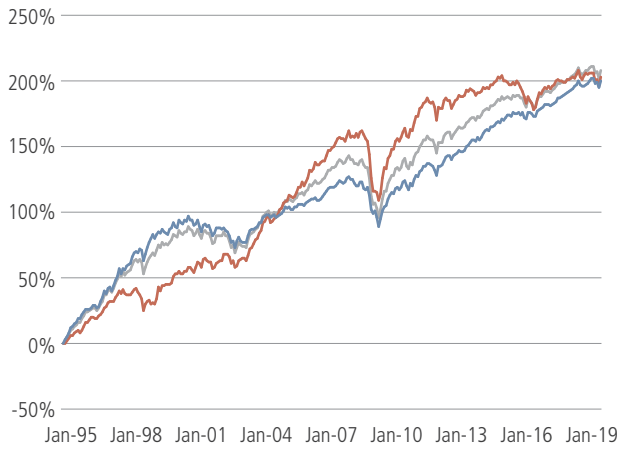
In figure 3, we have put together a hypothetical portfolio equally weighted to 12 inflation-sensitive asset classes and shown how it would have performed, relative to the traditional 60/40 blend, between 1970 and 1994 and between 1995 and 2018.

FIGURE 3. A REAL ASSET PORTFOLIO IN TWO DISTINCT INFLATION REGIMES

Cumulative nominal total returns 1970 – 1994



Cumulative nominal total returns 1995 – 2018

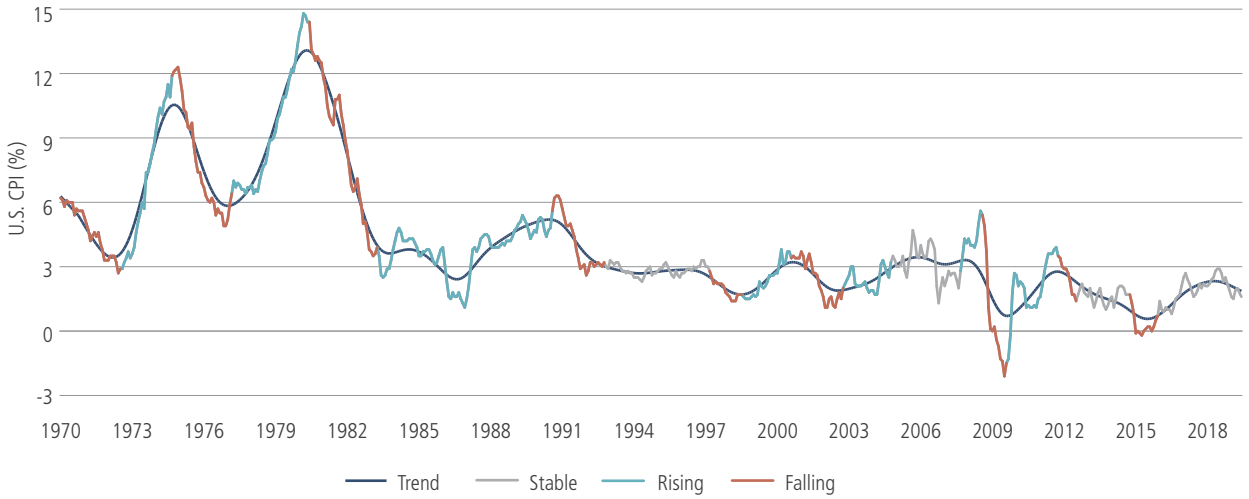


60/40 Traditional Portfolio Return — Diversified Real Asset Strategy Return — Blended Portfolio Return

Annualized nominal and real total returns

			60/40 Traditional	Diversified Real Asset	Blended Portfolio
Jan 1970 – Dec 1994	Falling Inflation	Nominal Return	13.91%	7.01%	11.84%
		Real Returns (vs. CPI)	8.83%	1.95%	6.77%
	Stable Inflation	Nominal Return	6.00%	12.27%	8.42%
		Real Returns (vs. CPI)	3.55%	9.80%	5.97%
	Rising Inflation	Nominal Return	5.76%	20.62%	10.76%
		Real Returns (vs. CPI)	-0.55%	14.20%	4.42%
Jan 1994 – Dec 2018	Falling Inflation	Nominal Return	2.79%	-3.05%	0.26%
		Real Returns (vs. CPI)	1.82%	-4.06%	-0.72%
	Stable Inflation	Nominal Return	11.10%	10.86%	11.74%
		Real Returns (vs. CPI)	8.70%	8.44%	9.33%
	Rising Inflation	Nominal Return	8.86%	14.01%	11.00%
		Real Returns (vs. CPI)	6.04%	11.19%	8.18%

Inflation regimes, 1970 – 2018



Source: Bloomberg, Neuberger Berman.

Hypothetical Backtested Performance Disclosures.

The hypothetical performance results included in this material are for backtested model portfolios and are shown for illustrative purposes only. Neuberger Berman calculated the hypothetical results by running a model portfolio on a backtested basis using the methodology described herein. The results do not represent the performance of any Neuberger Berman managed account or product and do not reflect the fees and expenses associated with managing a portfolio. If such fees and expense were reflected, returns referenced would be lower. The model portfolio may not be appropriate for any investor. There may be material differences between the hypothetical backtested performance results and actual results achieved by actual accounts. Backtested model performance is hypothetical and does not represent the performance of actual accounts. Hypothetical performance has certain inherent limitations. Unlike actual investment performance, hypothetical results do not represent actual trading and accordingly the performance results may have under- or over-compensated for the impact, if any, that certain economic or other market factors, such as lack of liquidity or price fluctuations, might have had on the investment decision-making process or results if assets were actually being managed. Hypothetical performance may also not accurately reflect the impact, if any, of other material economic and market factors, or the impact of financial risk and the ability to withstand losses. Hypothetical performance results are also subject to the fact that they are generally designed with the benefit of hindsight. As a result, the backtested models theoretically may be changed from time to time to obtain more favorable performance results. In addition, the results are based, in part, on hypothetical assumptions. Certain of the assumptions have been made for modeling purposes and may not have been realized in the actual management of accounts. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the hypothetical results have been stated or fully considered. Changes in the model assumptions may have a material impact on the hypothetical returns presented. There are frequently material differences between hypothetical performance results and actual results achieved by any investment strategy. Neuberger Berman did not manage any accounts in this manner reflected in the models during the backtested time periods shown. **The following assumptions were used in calculating the hypothetical backtested performance presented above.** The 60/40 Traditional Portfolio assumes a weighting of 60% S&P 500 Index and 40% Bloomberg Barclays U.S. Aggregate Index. The Diversified Real Asset Portfolio assumes equal weighting of 8% in materials equity (S&P 500 Materials TR), energy equity (S&P 500 Energy TR), emerging markets equity (MSCI Emerging Markets Index), inflation linked bonds (Bloomberg Barclays U.S. TIPS Index), leveraged loans (Credit Suisse Leveraged Loan Index), raw commodities (Bloomberg Commodity Index TR), precious metals (S&P GSCI Precious Metals TR), industrial metals (S&P GSCI Industrial Metals TR), REITs (FTSE EPRA NAREIT All Equity REIT Index TR), private equity (LPX50 Listed Private Equity Index TR), MLPs (Alerian MLP Index TR) and infrastructure (Alerian MLP Infrastructure Index TR). The Blended Portfolio assumes a weighting of 45% S&P 500 Index, 20% Bloomberg Barclays U.S. Aggregate Index and the remainder equally weighted in the components of the Diversified Real Asset Portfolio. Hypothetical portfolios are assumed to be rebalanced monthly. "Falling Inflation" and "Rising Inflation" are defined as a falling or rising rate of change of inflation with respect to the trend (i.e., the rate of change of the trend function is negative or positive). "Stable Inflation" is defined as a rate of change of the trend function that is close to zero. Not all of the 12 real asset classes were available for investment at the beginning of the period; they were added to the equally weighted hypothetical portfolio as soon as historical data became available.

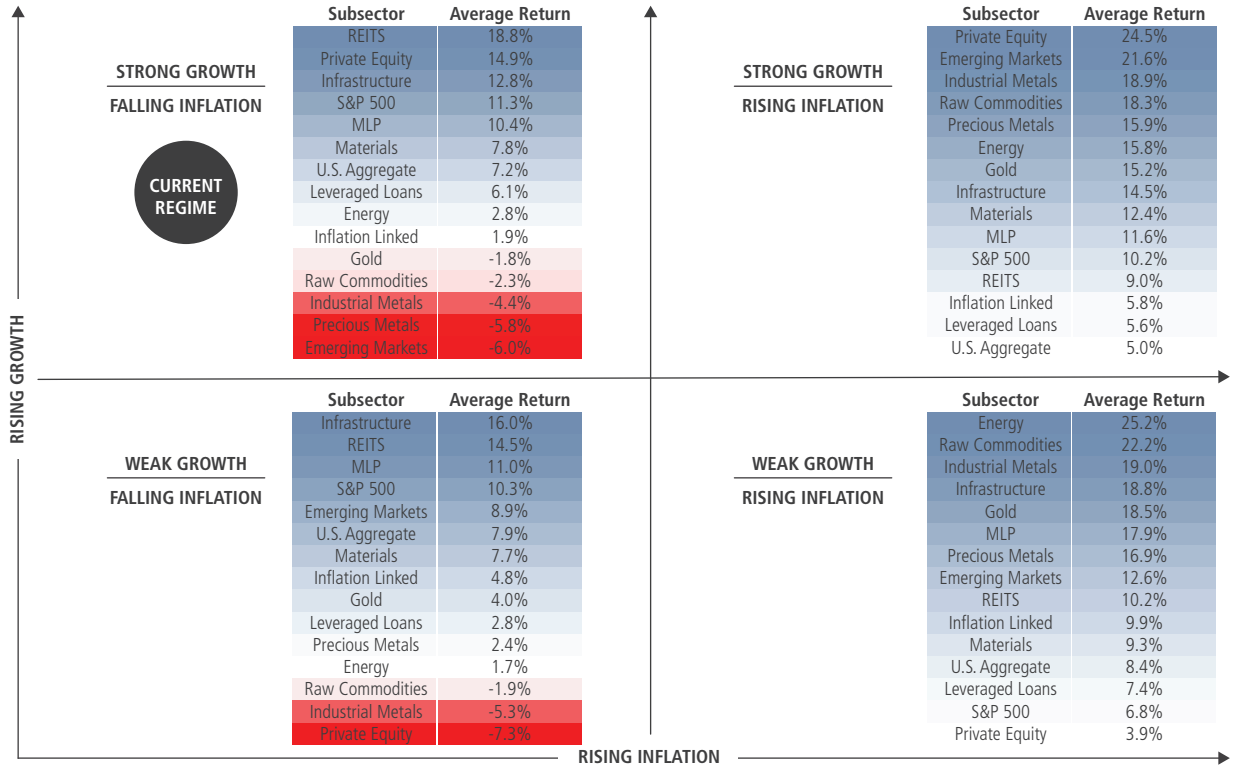
It is immediately clear that the "real asset" portfolio generated very good real returns when inflation was rising in the earlier period. In the later period, also, real returns were good during times of rising inflation. During times of stable inflation, real returns were positive in both periods.

More unexpectedly, during times of falling inflation the real asset portfolio generated six percentage points more annualized real return in the earlier period than the more recent period, when it would have imposed substantial costs. It underperformed the 60/40 blend by seven percentage points between 1970 and 1994, but at least it generated a positive return.

This provides a stark illustration of how different the inflation dynamic of the 1970s and 1980s was from that of the 1990s and 2000s. Unless we believe that we are heading back to something that looks like the 1970s economy, dominated by heavy industry, infrastructure, construction, manufacturing, raw materials and a lack of integration, this evidence suggests that we not only need to consider good diversification within our inflation-sensitive, real-asset portfolios, but that we also need to consider allocating to its component parts more tactically, as different inflationary forces exert their influence on different asset classes. Otherwise we could find them exerting a substantial drag on portfolio performance during times of subdued inflation.

Figure 4 reinforces this point. It shows how a range of traditional and real assets performed, between 1970 and 2018, through four different economic environments: strong growth and falling inflation; strong growth and rising inflation; weak growth and falling inflation; and weak growth and rising inflation. The current environment of strong growth and falling inflation is marked as the top-left quadrant.

FIGURE 4. A BLENDED PORTFOLIO OF TRADITIONAL AND REAL ASSETS COULD BE TACTICALLY ADJUSTED TO DIFFERENT INFLATION AND GROWTH REGIMES



Subsector	Average Return
REITS	18.8%
Private Equity	14.9%
Infrastructure	12.8%
S&P 500	11.3%
MLP	10.4%
Materials	7.8%
U.S. Aggregate	7.2%
Leveraged Loans	6.1%
Energy	2.8%
Inflation Linked	1.9%
Gold	-1.8%
Raw Commodities	-2.3%
Industrial Metals	-4.4%
Precious Metals	-5.8%
Emerging Markets	-6.0%

Subsector	Average Return
Private Equity	24.5%
Emerging Markets	21.6%
Industrial Metals	18.9%
Raw Commodities	18.3%
Precious Metals	15.9%
Energy	15.8%
Gold	15.2%
Infrastructure	14.5%
Materials	12.4%
MLP	11.6%
S&P 500	10.2%
REITS	9.0%
Inflation Linked	5.8%
Leveraged Loans	5.6%
U.S. Aggregate	5.0%

Subsector	Average Return
Infrastructure	16.0%
REITS	14.5%
MLP	11.0%
S&P 500	10.3%
Emerging Markets	8.9%
U.S. Aggregate	7.9%
Materials	7.7%
Inflation Linked	4.8%
Gold	4.0%
Leveraged Loans	2.8%
Precious Metals	2.4%
Energy	1.7%
Raw Commodities	-1.9%
Industrial Metals	-5.3%
Private Equity	-7.3%

Subsector	Average Return
Energy	25.2%
Raw Commodities	22.2%
Industrial Metals	19.0%
Infrastructure	18.8%
Gold	18.5%
MLP	17.9%
Precious Metals	16.9%
Emerging Markets	12.6%
REITS	10.2%
Inflation Linked	9.9%
Materials	9.3%
U.S. Aggregate	8.4%
Leveraged Loans	7.4%
S&P 500	6.8%
Private Equity	3.9%

Source: Neuberger Berman, Bloomberg. "Strong Growth" and "Weak Growth" are defined as a falling or rising rate of change of U.S. GDP with respect to the trend (i.e., the rate of change of the trend function is negative or positive). "Falling Inflation" and "Rising Inflation" are defined as a falling or rising rate of change of inflation with respect to the trend (i.e., the rate of change of the trend function is negative or positive). "Stable Inflation" is defined as a rate of change of the trend function that is close to zero. Returns shown are the average of the annualized returns recorded across all incidences of each regime, from January 1970 to December 2018. Indices used are shown in the note to figure 3. For illustrative purposes only. **Past performance is no guarantee of future results.**

The first thing to note are the asset classes that perform either very well or fairly well through the entire cycle. Infrastructure has been the best performer during weak growth and low inflation, but its real-asset exposure and relatively high income ensures that it never falls more than halfway down our league table. The same might be said, to a lesser degree, for MLPs.

The relative performance of all other asset classes has fluctuated substantially through the cycle. In some cases this is because they experience extremes of positive or negative returns (such as private equity or emerging markets). In other cases, modest positive returns get overshadowed during periods of strong growth or rising inflation (such as TIPs, REITs, leveraged loans or Treasuries).

The fact that the performance of different real assets diverges through the cycle suggests that a successful approach to mitigating inflation risk would not simply vary the share of the real-asset and traditional-asset sleeves in the portfolio, but integrate the inflation-sensitive asset classes into the tactical asset allocation process for the portfolio as a whole.

What Kind of Inflation Are We Trying to Mitigate?

So far, our analysis has begged an important question: Exactly what kind of inflation are we trying to mitigate with our investment portfolio?

A consumer price index records the price change of a "basket" of goods and services chosen to reflect what the average person buys. But we all buy different things and therefore experience different inflation. Similarly, while the liabilities of a pension plan may be linked to a standardized consumer price index, the liabilities and expenses incurred in other parts of a corporation's business are likely to be idiosyncratic. The expenses of a labor-intensive business will be subject to very different inflationary forces than the expenses of a capital-intensive business, for example.

That is why we think, wherever possible, it is advisable to create an inflation benchmark tailored to each investor, or at least to its sector, before designing a portfolio solution.

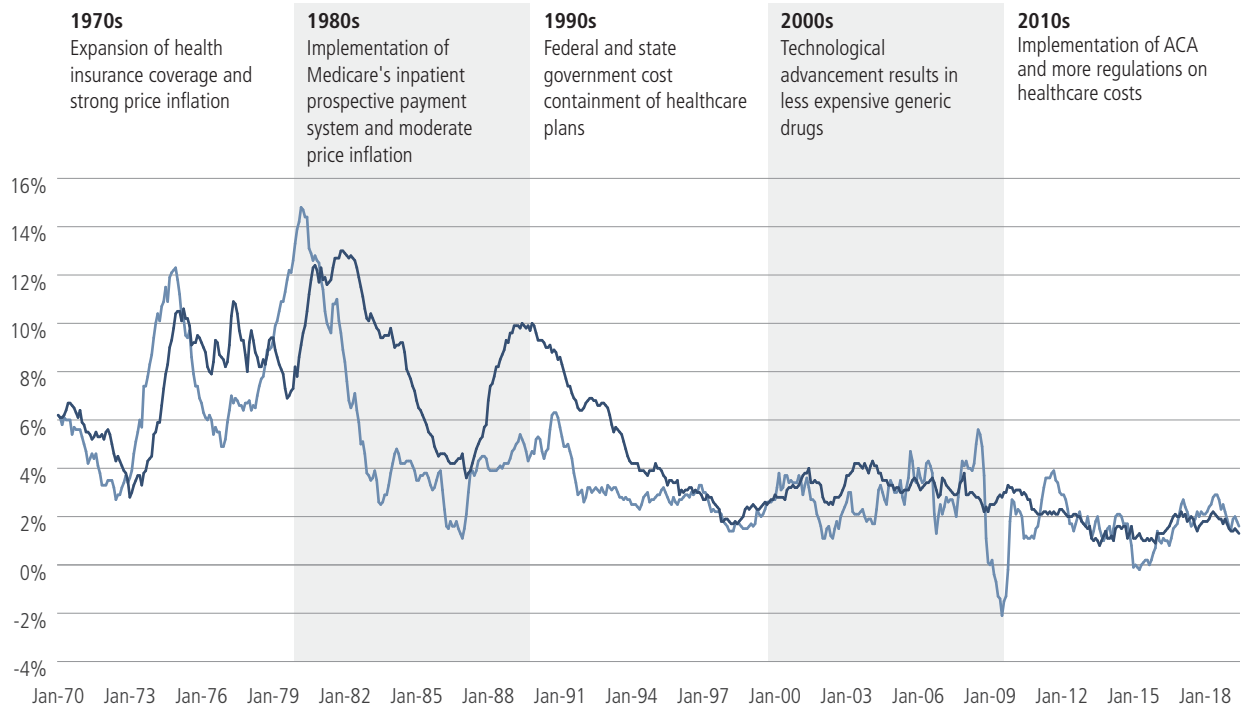
Here we will use an example of a healthcare business to illustrate the point. Regulators require healthcare providers to hold six months' worth of cash on their balance sheets, which makes them very sensitive to short-term inflation. But what kind of inflation has the most impact? Fluctuations in the price of medicines are important. But, as the index we built for a healthcare business shows, by far the biggest exposure is to changes in labor costs: payments to physicians, dentists, care-workers and other healthcare professionals, as well as indirect labor costs passed on by hospitals and nursing homes (figure 5). The behavior of this tailored index has been quite different from that of the U.S. Consumer Price Index.

It would be possible to build a similar index for a company in a different sector.

FIGURE 5. OUR HEALTHCARE INFLATION INDEX HAS BEHAVED DIFFERENTLY THAN CPI
Components of a tailored healthcare business inflation index

NB Custom Health Care Index	100%	Index Source (CPI or PCE)
Pharmaceutical and Other Medical Products	16%	
Pharmaceutical Products	16%	PCE
Prescription Drugs	13%	PCE
Nonprescription Drugs	3%	PCE
Other Medical Products	0%	PCE
Medical Equipment and Supplies	0%	CPI
Outpatient Services	36%	
Physicians' Services	19%	PCE
Dental Services	4%	PCE
Paramedical Services	12%	PCE
Home Health Care	4%	PCE
Medical Laboratories	1%	PCE
Other Professional Medical Services	7%	PCE
Specialty Outpatient Care Facilities, Health and Allied Services	5%	PCE
All Other Professional Medical Services	2%	PCE
Hospital and Nursing Home Services	41%	
Hospitals	35%	PCE
Nonprofit Hospital Services to Households	24%	PCE
Proprietary Hospitals	4%	PCE
Government Hospitals	7%	PCE
Nursing Homes	6%	PCE
Nonprofit Nursing Home Services to Households	2%	PCE
Proprietary and Government Nursing Homes	4%	PCE
Net Health Insurance	7%	
Medical Care and Hospitalization	6%	PCE
Income Loss	0%	PCE
Workers Compensation	1%	PCE

Healthcare Inflation Index vs. CPI



Source: Neuberger Berman, Bloomberg. For illustrative purposes only.

What happens when we test our equally weighted portfolio of inflation-sensitive real assets against this healthcare inflation index?

Figure 6 shows the table of nominal and real returns, relative to both CPI and our healthcare inflation index, through the two major inflation regimes of the past 40 years. The results are fairly similar against both inflation indices during rising and stable inflation environments in both periods—although the portfolio generally performed worse relative to the healthcare index. During falling inflation environments, however, real returns against our healthcare inflation index were negative in both periods, and substantially negative in the later period.

FIGURE 6. OUR REAL ASSET PORTFOLIO PERFORMED LESS WELL RELATIVE TO OUR HEALTHCARE INFLATION INDEX

			60/40 Traditional	Diversified Real Asset	Blended Portfolio
Jan 1970 – Dec 1994	Falling Inflation	Nominal Return	13.91%	7.01%	11.84%
		Real Returns (vs. CPI)	8.83%	1.95%	6.77%
		Real Returns (vs. HC Index)	5.95%	-0.90%	3.89%
	Stable Inflation	Nominal Return	6.00%	12.27%	8.42%
		Real Returns (vs. CPI)	3.55%	9.80%	5.97%
		Real Returns (vs. HC Index)	1.88%	8.12%	4.29%
	Rising Inflation	Nominal Return	5.76%	20.62%	10.76%
		Real Returns (vs. CPI)	-0.55%	14.20%	4.42%
		Real Returns (vs. HC Index)	-1.36%	13.41%	3.61%
Jan 1994 – Dec 2018	Falling Inflation	Nominal Return	2.79%	-3.05%	0.26%
		Real Returns (vs. CPI)	1.82%	-4.06%	-0.72%
		Real Returns (vs. HC Index)	0.42%	-5.41%	-2.10%
	Stable Inflation	Nominal Return	11.10%	10.86%	11.74%
		Real Returns (vs. CPI)	8.70%	8.44%	9.33%
		Real Returns (vs. HC Index)	8.77%	8.53%	9.41%
	Rising Inflation	Nominal Return	8.86%	14.01%	11.00%
		Real Returns (vs. CPI)	6.04%	11.19%	8.18%
		Real Returns (vs. HC Index)	5.98%	11.11%	8.11%

Source: Bloomberg, Neuberger Berman. For detailed information about the hypothetical backtested portfolios, including material assumptions used in calculating hypothetical performance and risk information, see the note to figure 3.

That drag on performance shown in our hypothetical illustration during periods of subdued inflation makes a strong case for tailoring the portfolio to mitigate against healthcare inflation, specifically.

To do that, we included S&P 500 Biotechnology Select Industry equities in our hypothetical equally weighted portfolio of inflation-sensitive real assets in order to gain exposure to corporate earnings that correspond to important costs faced by healthcare providers.

In figure 7, we show the real returns of this customized hypothetical portfolio, as well as the original, default hypothetical real asset portfolio, relative to our healthcare inflation index, between 1970 and 1994 and between 1994 and 2018.

FIGURE 7. A CUSTOMIZED HEALTHCARE REAL ASSET PORTFOLIO PERFORMED BETTER AGAINST OUR HEALTHCARE INFLATION INDEX

			60/40 Traditional	Customized Healthcare Diversified Real Asset Strategy	Customized Healthcare Blended Portfolio	Default Diversified Real Asset	Default Blended Portfolio	Difference Between Healthcare and Default Real Asset Portfolios	Difference Between Healthcare and Default Blended Portfolios
Jan 1970 – Dec 1994	Falling Inflation	Nominal Return	13.91%	6.69%	11.73%	7.01%	11.84%		
		Real Returns (vs. HC Index)	5.95%	-1.18%	3.79%	-0.90%	3.89%	**-0.28%**	**-0.10%**
	Stable Inflation	Nominal Return	6.00%	11.16%	8.03%	12.27%	8.42%		
		Real Returns (vs. HC Index)	1.88%	7.30%	4.00%	8.12%	4.29%	**-0.82%**	**-0.29%**
	Rising Inflation	Nominal Return	5.76%	20.72%	10.80%	20.62%	10.76%		
		Real Returns (vs. HC Index)	-1.36%	13.41%	3.61%	13.41%	3.61%	**0.00%**	**0.00%**
Jan 1994 – Dec 2018	Falling Inflation	Nominal Return	2.79%	-2.73%	0.38%	-3.05%	0.26%		
		Real Returns (vs. HC Index)	0.42%	-4.61%	-1.82%	-5.41%	-2.10%	**0.80%**	**0.28%**
	Stable Inflation	Nominal Return	11.10%	11.74%	12.04%	10.86%	11.74%		
		Real Returns (vs. HC Index)	8.77%	8.93%	9.55%	8.53%	9.41%	**0.40%**	**0.14%**
	Rising Inflation	Nominal Return	8.86%	15.38%	11.48%	14.01%	11.00%		
		Real Returns (vs. HC Index)	5.98%	12.29%	8.52%	11.11%	8.11%	**1.18%**	**0.41%**

Source: Bloomberg, Neuberger Berman.

Hypothetical Backtested Performance Disclosures

The hypothetical performance results included in this material are for backtested model portfolios and are shown for illustrative purposes only. Neuberger Berman calculated the hypothetical results by running a model portfolio on a backtested basis using the methodology described herein. The results do not represent the performance of any Neuberger Berman managed account or product and do not reflect the fees and expenses associated with managing a portfolio. If such fees and expense were reflected, returns referenced would be lower. The model portfolio may not be appropriate for any investor. There may be material differences between the hypothetical backtested performance results and actual results achieved by actual accounts. Backtested model performance is hypothetical and does not represent the performance of actual accounts. Hypothetical performance has certain inherent limitations. Unlike actual investment performance, hypothetical results do not represent actual trading and accordingly the performance results may have under- or over-compensated for the impact, if any, that certain economic or other market factors, such as lack of liquidity or price fluctuations, might have had on the investment decision-making process or results if assets were actually being managed. Hypothetical performance may also not accurately reflect the impact, if any, of other material economic and market factors, or the impact of financial risk and the ability to withstand losses. Hypothetical performance results are also subject to the fact that they are generally designed with the benefit of hindsight. As a result, the backtested models theoretically may be changed from time to time to obtain more favorable performance results. In addition, the results are based, in part, on hypothetical assumptions. Certain of the assumptions have been made for modeling purposes and may not have been realized in the actual management of accounts. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the hypothetical results have been stated or fully considered. Changes in the model assumptions may have a material impact on the hypothetical returns presented. There are frequently material differences between hypothetical performance results and actual results achieved by any investment strategy. Neuberger Berman did not manage any accounts in this manner reflected in the models during the backtested time periods shown.

We see that our customized portfolio actually performed less well against our healthcare inflation index during periods of stable or falling inflation in the earlier period. That is not really unexpected: the healthcare needs of the U.S. population were very different in the 1970s and 1980s than they are today, and therefore the healthcare costs were also different.

The increasing accessibility and sophistication of treatments, as well as an aging population, helps to explain both the higher earnings of biotechnology companies and a greater share of the healthcare industry's costs during the later period. That is why we see a meaningful improvement in results from our customized portfolio between 1994 and 2018. Here, moving from the default real asset portfolio to the customized portfolio results in better real returns relative to the healthcare inflation index across all inflation regimes. During times of rising inflation, the improvement in real return is a full 118 basis points, annualized.

We think that clearly illustrates the case for exploring a customized inflation index, and a customized inflation-mitigating portfolio, whichever sector the investor's business is in. We would still argue that tactical allocation through the inflation and growth cycle has the potential to improve results, but even a static tailored portfolio would have performed better than a default solution.

Conclusion: Don't Neglect Inflation Risk, But Try to Manage the Costs of Mitigation

Given the experience of recent years and some of the economic and demographic trends currently in evidence, it can be tempting to assume that higher-than-expected inflation is now a negligible risk.

On the contrary, we believe it is quite likely that we are moving into a new era during which inflation dynamics could be unpredictable and tricky to model. Failing to mitigate its impact on portfolios and liabilities could be risky.

We think there are three steps that investors should consider when they are building portfolios to withstand inflation risk:

First, if possible they should be clear about what kind of inflation they are exposed to. What costs, expenses and liabilities do they have? These may be very different from the costs that make up their domestic consumer price index, and those differences may require a different set of assets to mitigate their impact.

Second, it is beneficial to diversify among assets that are being held to mitigate inflation risk. Each has its own risk-return characteristics and each responds differently to different kinds of inflation. Some will be more sensitive to rising inflation but will impose a greater cost drag during periods of low or falling inflation; others offer more resilient returns during low or falling inflation in exchange for less sensitivity to rising inflation.

Third, and for the same reason, it can be beneficial to allocate tactically to individual traditional and inflation-sensitive assets as we pass between the four major economic environments of strong growth and low inflation, strong growth and rising inflation, weak growth and falling inflation, and weak growth and rising inflation.

We believe that investors that follow these three principles are more likely to mitigate the worst effects of unexpected inflation, as well as much of the opportunity cost associated with crude inflation-protection strategies.

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