AllianceBernstein

Deflating Inflation

Redefining the Inflation-Resistant Portfolio

- What assets provide the best defense against inflation?
- How much and what type of inflation protection should an investor seek?
- How to assess the inflationary landscape and when to implement an inflation protection strategy

April 2010

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Key Research Conclusions

Most investment portfolios are not designed with inflation risk explicitly in mind. As a result, many investors are often dangerously susceptible to an unexpected rise in inflation, which can present one of the most pernicious environments for traditional portfolios. What's worse, at the same time that many investors' assets are hit by an inflationary spike, their liabilities or living costs tend to rise. Such a double whammy can leave investors in a deep hole.

There's a good deal of confusion and disagreement about how best to protect against inflation, both in terms of what assets hedge inflation most effectively and how to incorporate them in a portfolio. This paper provides a framework for analyzing the inflation-hedging decision. Our research shows that:

- While many different assets could potentially hedge against inflation, their effectiveness varies, as do their reliability and their cost-effectiveness.

- Arbitrarily incorporating inflation hedges could markedly shift the otherwise carefully constructed risk/return profile of a portfolio. We found that a suite of real investments—which effectively serve as complements to one's existing "nominal" asset allocation—provides the most efficient means of hedging against inflation risk without detracting from the portfolio's other goals.

- Finally, because each investor's liabilities and portfolio objectives are different, there is no single inflation protection formula that is "right" for all investors. The key factors driving the appropriate amount and type of inflation protection are the investor's risk tolerance and overall vulnerability to adverse inflation surprises.

Incorporating inflation protection will likely cost a little bit over time (in terms of forgone returns), but in the event of an unexpected inflationary shock, it should provide valuable protection by reducing the large loss in purchasing power that a traditional stock/bond mix is likely to suffer. ■

Introduction

Inflation Protection…Why Bother?

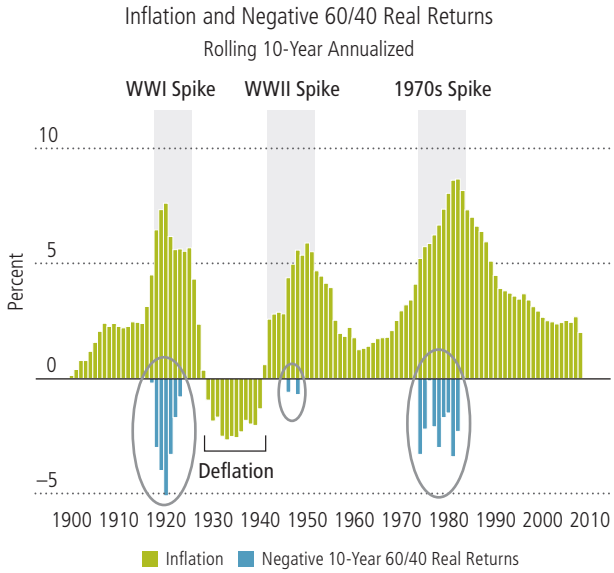
Philosopher and poet George Santayana famously remarked, "Those who cannot remember the past are condemned to repeat it." While he almost certainly didn't have inflation in mind when he made this assertion, investors should find the aphorism no less relevant. Indeed, although inflation shocks haven't been a dominant feature of the developed world landscape in nearly a generation, the historical record warns us that when they have struck, they've done so with terrible force, leaving ruined investment portfolios in their wake. Put simply, the history of inflationary episodes is a past that no investor should hope to repeat.

The recurring pattern in *Display 1* gauges the devastation wrought by such episodes. The circled blue bars indicate all the 10-year periods in the US from 1900 to the present when a hypothetical well-diversified portfolio—comprising 60% stocks (represented by the S&P 500) and 40% bonds (represented by 10-year Treasuries)—generated *negative* inflation-adjusted (or "real") returns. The green bars represent rolling 10-year annualized rates of inflation, and the shaded gray areas at the top designate inflation spikes—periods when there was a three-percentage-point increase (or more) in the rate of inflation over the prior 10 years. The spikes in inflation coincide with the decade-long collapses in real portfolio performance.

Perhaps surprisingly, even during the Great Depression (the highlighted deflationary era during the 1930s), investors fared better at generating positive inflation-adjusted returns than they did during periods of escalating inflation. To be sure, portfolio values plummeted during the Depression, but so did prices for almost everything else, leaving the real purchasing power of a traditional 60/40 portfolio (as defined above) relatively intact. By contrast, during the three inflationary periods over the last 100 years, the real value of a diversified portfolio dropped sharply.

Display 1

Inflation Spikes Decimate Traditional Stock/Bond Portfolios



This is a hypothetical example and is not representative of any AllianceBernstein product. Individuals cannot invest directly in an index.
The portfolio comprises 60% stocks and 40% bonds; stocks are represented by the S&P 500 (with a Global Financial Data extension) and bonds by 10-year Treasuries.
Inflation is measured by US CPI, US City Average, all items, not seasonally adjusted.
Source: Global Financial Data (GFD), US Bureau of Labor Statistics (BLS), and AllianceBernstein

What's more, the compounding effect of negative real returns, coupled with the fact that many investors need to tap their portfolios to support their spending (which itself is typically linked to inflation), can cause a massive loss in portfolio purchasing power over time. For example, in the US by the early 1980s—when the 10-year rate of inflation reached 9%—a 60/40 portfolio would have experienced a real return of –3.5% on an annualized

Display 2

Inflation Causes Massive Decline in Real Portfolio Value

	US 1972–1982	UK 1910–1920	Japan 1946–1956
10-Year Inflation Rate*	9%	11%	23%
60/40 Stock/Bond Real Return*	–3.5%	–9.3%	3.3%
Decline in Real Portfolio Value (After Spending)	**–65%**	**–86%**	**–52%**

This is a hypothetical example and is not representative of any AllianceBernstein product. Individuals cannot invest directly in an index.
**Annualized*
Assumes 60/40 stock/bond allocation, with 4% annual spending rate on initial portfolio value (spending grown with inflation). Inflation is represented by the respective inflation indices of the US, the UK, and Japan. Stocks in the US are represented by the S&P 500 Index; in the UK, by the FTSE All-Share Index; and in Japan, by the Nikko Securities Composite. Bonds are represented by the 10-year government bond indices of the US, the UK, and Japan, respectively.
Source: BLS, GFD, and AllianceBernstein

basis (*Display 2*). Add in a typical spending rate of 4% a year from the portfolio, and almost two-thirds of an investor's real wealth would have vanished by the end of the decade.

In Britain in the decade surrounding World War I, the same rate of spending, combined with inflation at 11%, resulted in even worse portfolio performance: Nearly 90% of the investor's real wealth would have been eaten away. The post–World War II story in Japan is similar: Even modestly positive portfolio real returns failed to overcome the extreme rates of inflation endured during the early years of that decade, and real portfolio value declined by more than half. Simply put, traditional stock/bond portfolios do not adequately defend against the calamity of adverse inflation surprises and can leave investors in a deep hole.

The Current Inflation Fixation

The debate about the direction of future inflation and the damage it can cause a portfolio has become increasingly fraught of late. The massive fiscal and monetary expansions deployed in response to the global financial crisis have prompted many investors to think about how vulnerable they are to an inflation shock and how to protect their portfolios. Many have rushed headlong into assets generally considered to be strong inflation antidotes, such as gold and inflation-protected bonds. Unfortunately, however, there's little consensus and much confusion about how best to protect against inflation risk.

It's important to note that while many different assets could potentially provide some protection against inflation, their ability to do so varies, as do their reliability and their prospective cost, particularly when measured in terms of the expected returns they provide compared with what they're replacing in the portfolio. Also, arbitrarily incorporating one or more of these assets could markedly shift the otherwise carefully constructed risk profile of any portfolio. Finally, because investors' liabilities, risk tolerance, and portfolio objectives differ, there's little reason to believe that a "one size fits all" inflation protection formula could be devised that would be "right" for every single investor.

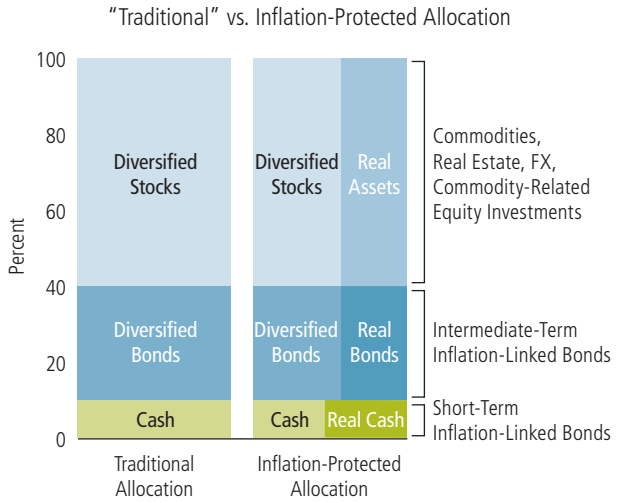
Our goal here is to clear up some of the confusion surrounding these issues. We aim to provide insight into the tools available to protect against inflation risk and how an inflation-hedging strategy might be best implemented in light of one's broader investment objectives.

Incorporating An Inflation Hedge in the Portfolio

One of the key insights emerging from our research is that it is possible to build an effective suite of inflation hedges that can fit seamlessly into a traditional portfolio, without causing undue distortion to its prior risk profile. Because many investors already frame the essential building blocks of their asset allocation construction in terms of cash, bonds, and stocks, a parallel complement of inflation hedges makes holistic portfolio sense. In other words, we believe the same goals of any traditional

Display 3

Real Investments Complement Traditional Counterparts



For illustrative purposes only
Source: AllianceBernstein

allocation (in terms of balancing its risk and return objectives) can be achieved in a corresponding inflation-protected allocation (*Display 3*).

We categorize these inflation hedges in three broad buckets: Real Cash, Real Bonds, and Real Assets. Lower-volatility Real Cash and Real Bond portfolios are represented by short-term and longer-term inflation-linked bonds, respectively, while Real Asset portfolios encompass a variety of higher-risk inflation hedges (including real estate, commodity-related stocks, commodity futures, and foreign currency exposure).[1] This approach can readily be tailored to an investor's existing risk appetite by simply introducing the appropriate amount of inflation-protecting or "real" equivalents into the existing "traditional" allocation. But as we will detail in this study, since each of these hedges has distinctive virtues and shortcomings, most investors will want to fine-tune their inflation-hedging strategy to reflect their own unique needs.

The second major conclusion stemming from our research is that adding inflation protection to a traditional asset allocation is unlikely to improve expected returns. Inflation protection does have a cost in terms of forgone returns. But, the protection it is designed to provide—reducing the loss in purchasing power that a traditional stock/bond mix would likely suffer—is valuable should an inflationary shock occur.

With this "hedging" perspective in mind, we detail in the following pages a framework whereby investors can:

- Assess which financial assets may most effectively protect against inflation, either alone or in combination;
- Determine the type and amount of inflation protection needed, as well as the least intrusive way to embed it in the portfolio; and
- Evaluate the current inflationary landscape and determine when might be the right time to implement an inflation protection strategy. ■

Chapter Highlights

- Most investors need some form of inflation protection; the proper type and amount depend on their circumstances.
- While inflation hedges will cost a little in performance on average, they will help protect the portfolio against the devastation that inflation can bring.

[1]Note that the Real Assets category is also appropriate for investors with allocations to certain "alternative" investments. We see some illiquid real investments (such as direct real estate) as viable substitutes for liquid real investments (such as REITs) for investors willing to assume liquidity risk.

How to Hedge Inflation

What Assets Provide the Best Defense?

It's not an easy matter to determine which assets provide the best defense against inflation. In part, this is because long-term performance records across different inflationary cycles do not exist for many asset classes.[2] We've been able to overcome some of these limitations by building our own, proprietary historical data series for commodity returns, and by constructing a hypothetical return series for inflation-linked bonds stretching back more than a century (see sidebars on pages 8 and 14). But even apart from the dearth of data available in conventional investment databases, we should expect most inflation hedges to vary significantly in their effectiveness across time and across different inflationary episodes. Therefore, to build an effective portfolio of inflation hedges, it's critical to understand the key drivers of each asset and its fundamental response to changes in inflation.

We identified three key factors that help us determine the effectiveness of any prospective inflation hedge:

- Its *sensitivity* to inflation
- Its *reliability* as a hedge
- Its *cost-effectiveness*

We measure an asset's inflation sensitivity by quantifying the average impact of an increase in the inflation rate on the asset's total return. We call this measure an asset's "inflation beta." All else equal, the higher an asset's inflation beta, the stronger its appeal as an inflation hedge. But in addition to its beta, we need to consider the reliability of any prospective hedge, since having a high inflation beta is of limited value if the protective benefit works only some of the time. Finally, inflation hedges come with a cost (measured primarily by the expected return sacrifice relative to a traditional investment with similar volatility). Minimizing that cost should be part of any sensible inflation-hedging strategy.

Inflation Sensitivity

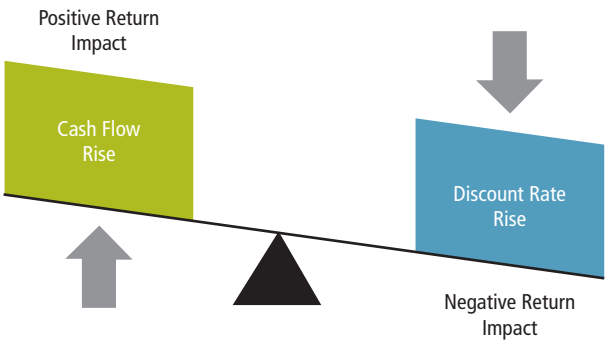
There are generally two opposing forces that drive an asset's sensitivity to inflation, or inflation beta. On one hand, inflation can have a positive impact on an asset's value when rising prices also result in rising cash flows (*Display 4, left, following page*). For example, the revenues of many commodity-related companies "pass through" inflation relatively efficiently. To the extent the costs such companies face react less strongly to an inflation surprise, they should be able to pass those rising prices through to the bottom line.

But rising inflation also damages asset values because it is a proxy for rising inflation expectations, a key driver of the discount rate used to gauge the present value of future cash flows. Higher discount rates cause the market to devalue an asset, because future cash flows are worth less in today's money (*Display 4, right, following page*). The further out in time any fixed cash flows extend, the greater the asset's sensitivity to

[2]*For example, inflation-linked bonds are a recent innovation. In the US, Treasury Inflation-Protected Securities, or TIPS, were first offered in the late 1990s; inflation-indexed "Linkers" in the UK date back to the early 1980s.*

Display 4

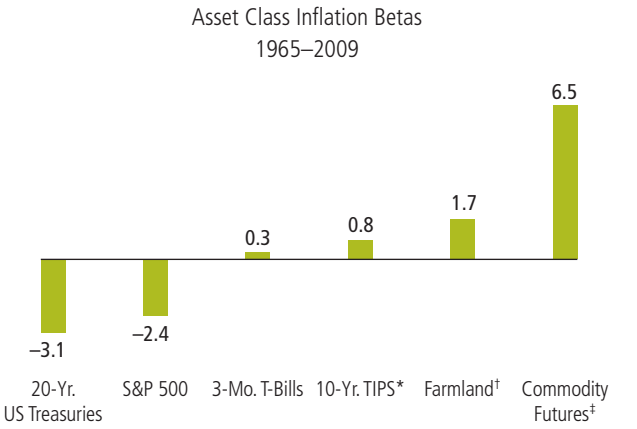
Rising Inflation Has a Dual Impact on Asset Returns



For illustrative purposes only
Source: AllianceBernstein

Display 5

Inflation Sensitivity Varies by Asset Class



Historical analysis is not a guarantee of future results. Individuals cannot invest directly in an index. Total return beta to one-year inflation rate change in multivariate regression including lagged inflation rate.
** 10-year Treasury Inflation-Protected Securities (TIPS) are calculated from synthetic AllianceBernstein real yields estimated from actual inflation and nominal yield curve variables before 1999 and from Federal Reserve real yields thereafter.*
† Farmland is the national average value per acre as determined by the US Department of Agriculture (USDA).
‡ Commodity futures prior to 1990 are on a US consumption–weighted basis and are sourced from AllianceBernstein series prior to 1970 and from the MJK Commodity Futures Database between 1970 and 1990; they are represented by the Dow Jones-UBS Commodity Futures Index (DJ-UBS) thereafter. All futures returns are fully collateralized by T-bills unless otherwise indicated.
Source: DJ-UBS, Federal Reserve, GFD, London Times, *MJK Associates,* The New York Times, *USDA,* The Wall Street Journal, *and AllianceBernstein*

discount rate fluctuations. It's the net impact of these two phenomena—greater expected cash flows and higher discount rates—that determines an asset's behavior in an environment of rising inflation.

Inflation sensitivity across a range of assets can vary significantly (*Display 5*).[3] In the US, for example, for a given 1% increase in the inflation rate, 20-year nominal bonds fell 3.1 times as much. Stocks, too, tend to be vulnerable to most rising inflation environments: On average, the S&P 500 historically dropped 2.4 times the rise in inflation, and the broad equity indices of many other countries showed a similar sensitivity. This helps explain the dismal performance we saw in the traditional 60% stock/40% bond portfolio during periods of accelerating inflation. There are some assets, however, that have tended to post positive returns in a rising inflation environment, including T-bills, inflation-linked bonds, certain types of real estate, and commodities. But first let's explore equities a bit further, to see just what's driving these returns. (For more information on how various assets may react to accelerating inflation rates, see the Appendix, pages 30–35.)

Taking Stock of Equities in Inflation

Stocks are often considered a relatively robust inflation hedge. But while it's true that diversified equities can overcome inflation over very long horizons, their record as a hedge against accelerating inflation over the short to medium term is poor. This comes as a surprise to many investors, who correctly point out that as long as a company's expenses (the largest component of which are usually "sticky" wages) don't increase at the same pace as its revenues, the wider profit margin will translate into greater cash flows. In fact, S&P 500 data show that equity earnings do tend to grow faster—more than 6% faster than average—in years when inflation accelerates (*Display 6, left*).

[3] Given the availability of data for multiple asset classes and the ability to confirm our conclusions across many different countries, we show results from 1965 to the present in many of the displays that follow. Our longer-term US data were then used to corroborate these indications where applicable.

So companies will see higher cash flows in such an inflationary environment, but the market will generally apply a higher discount rate to those cash flows. Which effect dominates valuations: higher expected cash flows or the higher discount rate? According to the long-term history of the S&P 500 in the US, in years when inflation accelerated, price/earnings multiples tended to drop, on average, by 1.4 points (*Display 6, right*). However, there are exceptions to this. For example, in extremely low or negative inflationary environments, an increase in inflation expectations tends to coincide with an increase in equity prices, resulting in positive inflation betas. This anomaly occurs because as inflation moves from abnormally low levels back toward more normal levels, general economic uncertainty falls—and, with it, risk premia of all types.

But most of the time, and for most stocks, the ability of companies to pass through price increases is more than offset by the negative influence of higher discount rates—which is why diversified equity indices in nearly every country we studied have a negative inflation beta. That said, some equity sectors, such as natural resources and real estate, have historically exhibited less-negative (or even positive) inflation betas than diversified stocks. What these sectors tend to have in common is high capital intensity: They have such high fixed costs that when inflation accelerates, margin expansion often overwhelms the opposing discount rate impact.

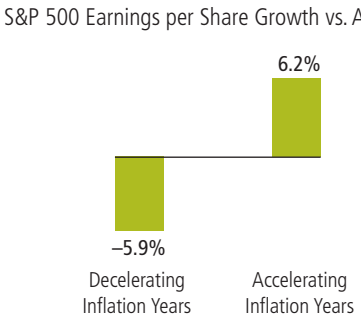
Seeking High Inflation Betas Across an Array of Assets

Nominal bonds also perform poorly in rising inflation environments: Their future cash flows are fixed, so a rising discount rate (due to higher expected inflation) damages the current value of the bond. In general, the longer the bond's maturity, all else equal, the more vulnerable it will be to changes in inflation expectations. Short-maturity bills perform better than their longer-maturity counterparts during rising inflation, because the yields of new bills will discount higher inflation expectations when inflation spikes. In other words, the shorter the maturity of nominal bonds, notes, and bills, the more quickly investors are able to reinvest in new instruments that reflect any changes in inflation expectations.

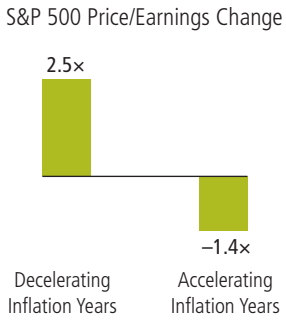
Inflation-linked bonds ("ILBs" for short), such as US TIPS and UK "Linkers," are designed to simply pass through changes in consumer or retail price indices, CPI and RPI, respectively. As measured by our synthetic series, ILBs would have delivered inflation betas of nearly 1.0 over time. The reason we estimate the beta for ILBs at generally slightly below 1.0 is because a rise in inflation sometimes dovetails with a rise in real interest rates, which damages the value of a fixed income investment.[4] Our research suggests that this was the case in the US during the late 1970s and early 1980s, a time of both heightened concern over the country's monetary stability and, in response, tightening central bank policy. We estimate that during this period, the fall in the price of inflation-linked bonds due to higher real

Display 6

Rising Inflation Leads to Higher Earnings…



…but a Higher Discount Rate Hurts Valuations



Historical analysis is not a guarantee of future results. Individuals cannot invest directly in an index.
Average year-over-year growth, 1930–2008
Source: Robert J. Shiller, Irrational Exuberance*, Princeton University Press, 2000; and AllianceBernstein*

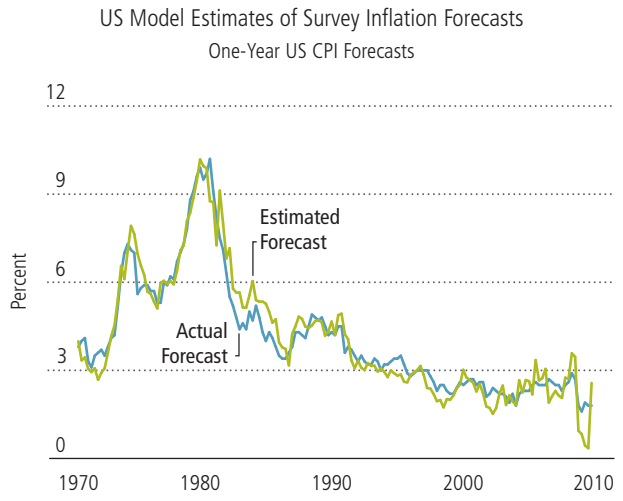
[4]*Also, inflation-linked bonds in most countries have a short contractual lag in passing through actual inflation, which could further weaken the measured inflation beta.*

Re-Creating the History of Inflation-Linked Bonds

Although inflation-linked bonds (ILBs) form a crucial component of most inflation protection strategies, the historical record necessary to judge how ILBs may behave in disparate economic environments does not exist. The United Kingdom was the first to issue such bonds—called Linkers—in the early 1980s, followed by Sweden, Canada, and Australia; eventually the US issued Treasury Inflation-Protected Securities—TIPS—in the late 1990s. Because inflation has been comparatively stable during this relatively brief period, we decided to construct a synthetic ILB return series extending back to the 1890s* to gain better perspective on how these instruments might have performed in different inflationary environments.

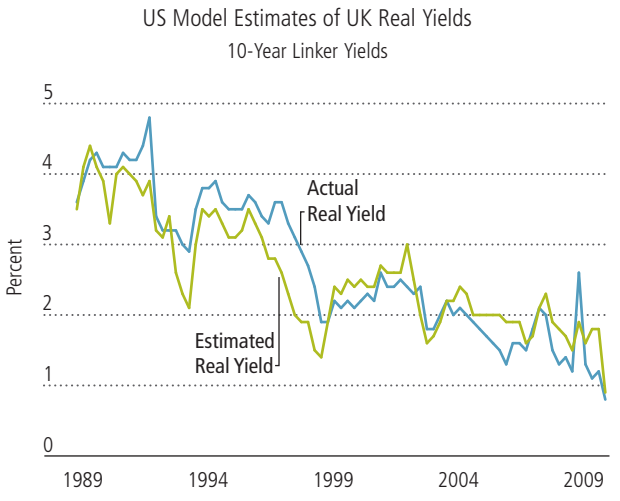
The key to creating a synthetic ILB series is to understand how inflation expectations are formed. Nominal government bond yields can be decomposed into a real yield, expected inflation, and an inflation risk premium earned for bearing the uncertainty around whether actual inflation will meet expectations. If inflation expectations are known, then the real yields that ILBs offer can be estimated by subtracting inflation expectations and the estimated inflation risk premium from nominal yields. Fortunately, because inflation expectations are a function of historical experience—like most expectations, they are largely backward-looking—they can be reliably estimated historically.

US Inflation Expectations



Historical analysis is not a guarantee of future results. Estimate based on actual US inflation and yield curve variables.
Source: Federal Reserve and AllianceBernstein

UK Real Yields



Historical analysis is not a guarantee of future results. Estimate based on actual UK inflation and yield curve variables.
Source: Bank of England, Federal Reserve, and AllianceBernstein

**Due to the paucity of reliable long-term non–US capital markets data, our analysis throughout takes a largely US investor perspective. Where possible, we have conducted analyses from different country perspectives. The conclusions herein should be relevant to most countries around the globe.*

The display on the left of the facing page shows how accurately one-year consensus inflation expectations can be estimated with nothing but backward-looking knowledge of actual inflation. The blue line shows surveyed consensus expectations, while the green line shows an estimate of expectations based on weightings to various measures of actual trailing inflation. Because actual inflation data can be sourced going back to the 1800s, we can estimate where expectations likely were at any point in time, and, with that, where real yields were.† To gauge the validity of this approach, we applied our US-based weightings to UK data and compared the resulting estimates of UK real yields to actual UK real yields, as shown in the display on the right of the facing page. The close fit suggested that our synthetic real yield series was robust enough to calculate ILB returns for implementation in our asset allocation work.

In addition, using this much longer, synthetically constructed time series of inflation expectations, we were able to explore a number of long-unsolved investment questions—such as whether expectations drive actual inflation. We found that the impact of inflation expectations on actual inflation likely varied with the level of inflation. Anecdotal evidence from Japan suggests that consumers put off purchases when there are expectations of future deflation, resulting in a weaker economy and a self-fulfilling prophecy of more deflation. Our research on US inflation indicates that in high-inflation environments (CPI greater than 5%), the pass-through of inflation expectations to actual inflation is twice as large as it is in low-inflation environments (CPI between 0% and 5%). ■

†A structural break in how inflation expectations in the US were set occurred between World War II and the 1970s with the transition away from a gold standard. Including various nominal yield curve variables allowed us to adjust for this break and extend our series back to the gold standard era.

interest rates would likely have offset some of the positive benefits of the contractual inflation accrual, thereby diminishing returns. The relationship between inflation and real yields is therefore a key question in determining the efficacy of inflation-protected bonds as an inflation hedge. Although inflation-protected bonds could produce negative returns in the event of a large spike in both real yields and inflation, they would still outperform traditional bonds, which would do even worse. (For more on inflation-linked bonds, see the Appendix, pages 31–32.)

Some investments—what we term "real assets"—have empirical and expected inflation betas greater than 1.0. For example, some real estate assets throw off cash flows tightly linked to inflation and so tend to have high inflation betas.[5] The cash-flow sensitivity of real estate stems from both the proportion of value tied up in land (i.e., the proportion of costs that are fixed) and the sensitivity of "rents" to inflation. Generally speaking, the higher the proportion of land in a real estate asset's value, the higher its inflation beta. And for most types of residential and commercial properties, rents take the form of fixed lease payments—so in general, the shorter the lease term, the greater the inflation sensitivity. Agricultural properties such as farmland also serve as good inflation hedges because their "rents" (in the form of farm product and timber prices) vary directly with inflation-sensitive agricultural commodity prices.

The investment that ranks best by far in terms of inflation beta is commodity futures. A broadly diversified basket of commodity futures exhibited an inflation beta of 6.5 from 1965 to the present. (This is from a US investor's point of view; it would differ from the perspective of investors in other countries. See the Appendix, pages 33–34, for more information.) That's because commodity futures returns tend to embed a high sensitivity to shorter-term supply-and-demand economics. An overheating economy often goes hand in hand with both rising inflation and price and inventory pressures in the commodities markets, leading to higher futures returns. Some have taken this idea further, suggesting that commodities may well be the preferred

[5]In our real estate research, we relied on the NAREIT Equity REIT Index since 1971 and a REIT proxy prior to that time comprising non-REIT real estate stocks and a building cost index. The current global public real estate equity market is composed of roughly half REITs and half non-REIT real estate companies.

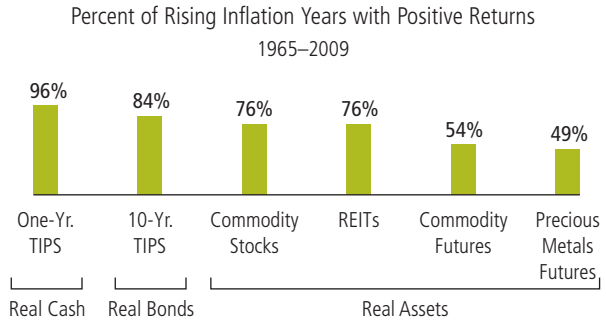
"all-weather" inflation hedge. However, the performance of commodity futures can be unreliable, and their opportunity costs can be high.

The Reliability of Inflation-Hedging Assets

While an inflation beta provides some indication of the direction and magnitude of an asset's historical inflation sensitivity, it does not capture the consistency of the inflation hedge. *Display 7* shows the percent of rising inflation years since 1965 when various categories of inflation-hedging assets posted positive returns. We estimate that Real Cash (short-maturity ILBs) and Real Bonds (longer-maturity ILBs) provide the greatest stability: Even though their inflation sensitivity was lower, it was very reliable. A diversified basket of hedges from the equity sector—a category that includes both real estate and commodity-related stocks—was less reliable, but still delivered positive returns during periods of rising inflation over three-fourths of the time. Then there's the highest-inflation beta groups, such as commodity and precious metals futures, which had reliability akin to a coin flip—when they worked, they worked exceptionally well, but they failed nearly as often.

Display 7

The Reliability of Inflation Hedges Varies



Historical analysis is not a guarantee of future results. Individuals cannot invest directly in an index. TIPS are calculated from synthetic AllianceBernstein real yields estimated from actual inflation and nominal yield curve variables before 1999, and they are sourced from Federal Reserve real yields thereafter; commodity stocks and precious metals futures are sourced from the Ken French Data Library; and REITs are represented by the NAREIT Index. Commodity futures prior to 1990 are on a US consumption–weighted basis and are sourced from the AllianceBernstein series prior to 1970 and from the MJK Commodity Futures Database between 1970 and 1990; they are represented by DJ-UBS thereafter. Commodity futures and precious metals futures are fully collateralized by three-month T-bills.
Source: BLS, Commodity Research Bureau (CRB), DJ-UBS, Federal Reserve, Ken French, GFD, International Monetary Fund (IMF), London Times, *MJK Associates, NAREIT, National Bureau of Economic Research (NBER),* The New York Times, *USDA, US Geological Survey (USGS),* The Wall Street Journal, *and AllianceBernstein*

Clearly, there appears to be a trade-off: the greater the inflation sensitivity, the lower the reliability. What drives this uncertainty? Why does reliability tend to be lower for higher-volatility assets, and can we do anything about it?

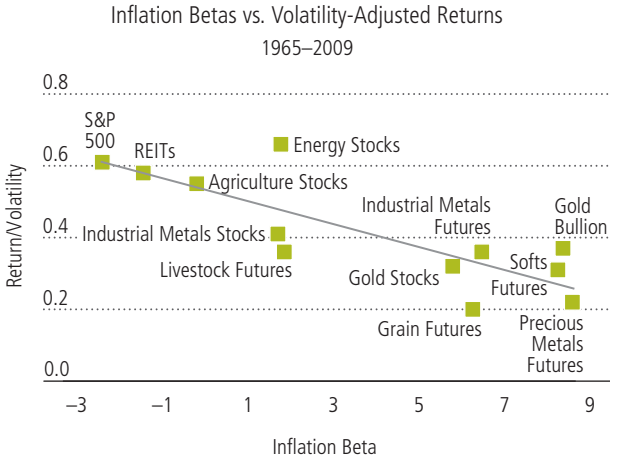
The Role of Risk (and Return) for Real Assets

One reason that Real Asset inflation hedges aren't always reliable is that many factors beyond changes in inflation expectations drive their returns. Predicting these factors can be difficult, and this inherent uncertainty is reflected in an asset's level of volatility. While higher volatility can enhance inflation beta (assuming a positive relationship between asset returns and inflation surprises), it tends to reduce the reliability of the hedge.

Display 8 shows the trade-off between inflation beta and risk-adjusted returns. REITs and several commodity-related equity sectors (energy, agriculture, and metals stocks) occupy the upper left of the display, indicating that historically they have provided better risk-adjusted returns, but with small and sometimes even

Display 8

Real Assets: The Trade-Off Between Inflation Sensitivity and Volatility-Adjusted Returns



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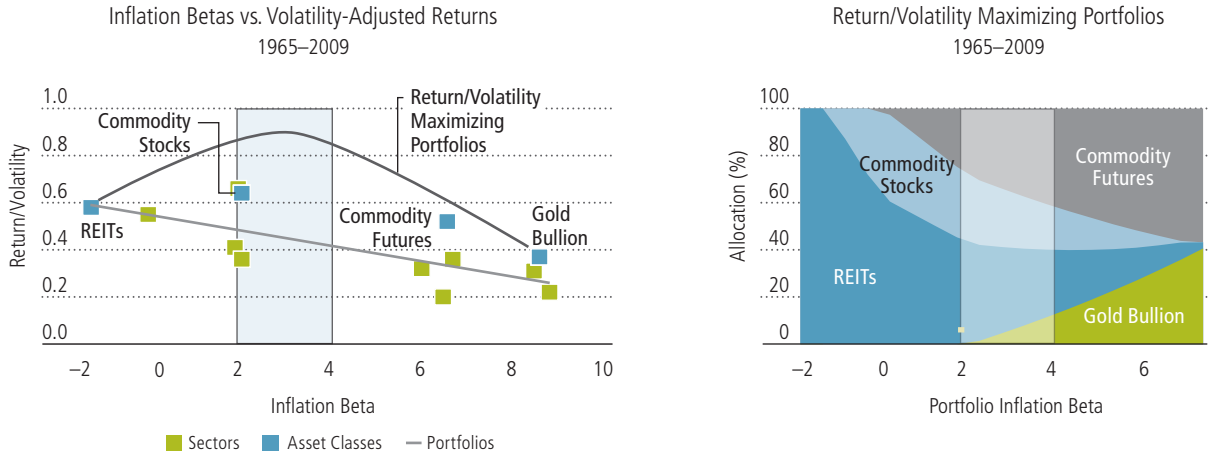
Source: BLS, Ken French, GFD, London FX, London Times, *NAREIT,* The New York Times, The Wall Street Journal, *and AllianceBernstein*

Display 9

Blending Real Assets Improves Risk-Adjusted Returns…but the Best Mix of Real Assets Depends on the Desired Inflation Beta



Historical analysis is not a guarantee of future results. The blending of real assets does not eliminate the risk of loss in a portfolio. Commodity futures prior to 1990 are on a US consumption–weighted basis and are sourced from the AllianceBernstein series prior to 1970 and from the MJK Commodity Futures Database between 1970 and 1990; they are represented by DJ-UBS thereafter. Commodity-related stocks and futures are sourced from the Ken French Data Library. Gold bullion is represented by London FX, and REITs by the NAREIT Index.
Source: BLS, Ken French, GFD, London FX, London Times, *NAREIT,* The New York Times, The Wall Street Journal, *and AllianceBernstein*

negative inflation betas (though still higher than diversified equities). Commodity futures and precious metals, at the lower right, provide a very pronounced response to any increase in the rate of inflation—with historical inflation betas approaching 10—but with a much less attractive risk/return profile. In short, for assets with higher inflation betas, you have to pay a higher cost (in the form of lower risk-adjusted returns).

Fortunately, the risk-adjusted return for any desired inflation beta can be improved by combining various real assets. Our research shows that by judiciously blending these higher-volatility assets in a diversified portfolio of inflation hedges, we can moderate the fundamental trade-off and build a Real Asset portfolio that has high inflation sensitivity, reliability, and risk-adjusted returns. The chart on the left in *Display 9* replicates the previous display but shows the benefit of grouping the individual hedges into their representative asset classes (the labeled blue squares), with REITs at one end, gold at the other, and commodity stocks and commodity futures in between.[6] The black line arching above the blue squares represents different combinations of the four asset classes that historically maximized the risk-adjusted return for any given inflation beta.

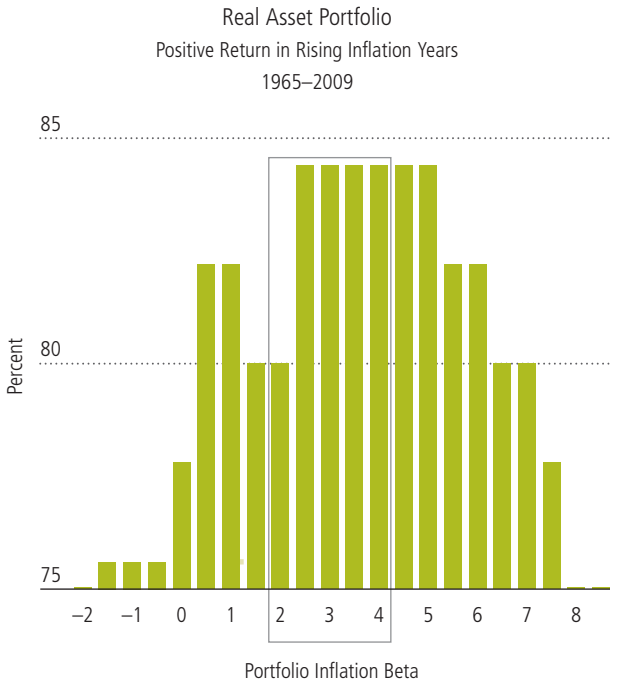
The chart on the right in *Display 9* shows the mix of assets that underlie that black line. Going with REITs exclusively would have delivered a high risk-adjusted return at the expense of providing a slightly negative inflation beta. Conversely, during this period, gold would have maximized the inflation beta but would have led an investor to suffer rather poor risk-adjusted returns. The highlighted segments represent the range of allocations that cluster around the highest available risk-adjusted return, with an inflation beta between 2 and 4.

Together, these charts show that volatility-adjusted returns for real assets were historically maximized—and a respectable inflation beta achieved—with portfolios falling within the highlighted area. Our research therefore suggests that while tactical tilts toward a specific real asset may sometimes be

[6]*Commodity stocks are weighted by market capitalization, and commodity futures are weighted by global production, according to the DJ-UBS methodology from 1990 on; prior to 1990, we use US consumption weights. All futures returns are fully collateralized by T-bills unless otherwise indicated.*

Display 10

Real Asset Reliability Peaks with Greater Diversification



Historical analysis is not a guarantee of future results. Commodity futures are represented by AllianceBernstein prior to 1970, by the MJK Commodity Futures Database between 1970 and 1990, and by DJ-UBS thereafter; commodity-related stocks and gold bullion by the Ken French Data Library; and REITs by the NAREIT Index. Source: BLS, Ken French, London Times, *NAREIT,* The New York Times, The Wall Street Journal, *and AllianceBernstein*

appropriate, a strategic Real Asset portfolio should include a well-diversified mix of real estate equities, commodity stocks, and commodity futures, with, possibly, a small allocation to gold.

In addition, a well-diversified Real Asset portfolio substantially mitigates the compromise between inflation beta and reliability. *Display 10* shows the percentage of rising inflation years since 1965 when the optimal real asset combinations posted positive returns. Reliability peaks with precisely the portfolios containing the most balanced blend of real assets, with almost 85% reliability—a degree of reliability similar to that of a Real Bond portfolio.

All Inflations Are Not Equal: Global vs. Local Inflation Hedges

For most investors, it's both natural and sensible to focus on the path of inflation in one's home country, as most of us meet the bulk of our spending needs by purchasing goods and services domestically. While inflationary events in developed nations are by and large global phenomena, inflation at home is sometimes a product of local or country-specific factors. Therefore, an asset's tendency to be more responsive to a domestic or a global inflation shock is an important variable that contributes further uncertainty regarding the performance of inflation hedges.

For example, most commodity prices respond to global supply-and-demand pressures. It follows that commodity inflation betas relate almost entirely to changes in global, rather than domestic-only, inflation.[7] When changes in the domestic inflation rate correlate highly with changes in global inflation, commodities can be expected to deliver their characteristically high inflation beta. But to the extent that domestic inflation shocks are *not* synchronized with the globe, commodities will perform less well as a hedge against home-country inflation. For a stark example, a diversified basket of global commodities hedged back to the local currency would not have provided much of an inflation hedge to an investor in Zimbabwe (which recently experienced hyperinflation). Similarly, global real estate equities and commodity equities are driven primarily by global inflation and, if fully hedged to domestic currency, can leave a portfolio vulnerable to a domestic-only inflation shock.

By contrast, foreign currency is likely to hedge inflation best when domestic inflation shocks deviate significantly from global trends. Currency forwards—the returns of which are implicitly embedded in *unhedged* foreign investments via short-term interest rates—price in the expected inflation differential between two countries. If both domestic and foreign inflation jump by the same amount, then the forward price should not be expected to move. But if domestic inflation surprises by more than foreign inflation, then—all else equal—the domestic currency will tend to weaken to maintain the relative purchasing power of the currencies. This weakening provides investors with positive returns to foreign currency exposure, thus serving as a hedge against domestic inflation spikes.

[7]*This assumes commodity futures exposures are hedged into domestic currency to separate asset returns from returns associated with foreign currency exposure.*

The best way to address the uncertainty around inflation betas created by an asset's sensitivity to global versus domestic-only inflation is to incorporate additional exposures in the mix. Maintaining some foreign currency exposure in a Real Asset portfolio and collateralizing the commodity futures positions with domestic bills or, where feasible, inflation-linked bonds may help balance the inflation exposures of the portfolio, bolstering the reliability of its inflation beta.

Factoring In the Cost of Inflation Protection

Like most hedges, inflation protection does not come free of charge. Although our three buckets of inflation-hedging assets contain no greater direct costs than any traditional portfolio—they all consist of liquid, investable assets or investment services—they do have an implicit cost: forgone return potential.

In the fixed income space, for example, the expected return give-up for inflation-linked bonds relative to their nominal counterparts can be substantial. First, because inflation-protected returns inherently have less risk, nominal bonds should offer a risk premium to attract investors. But because inflation-linked bonds are less liquid than their nominal counterparts, ILBs need to offer investors a liquidity premium. We estimate the net cost of the inflation risk premium of nominal bonds after adjusting for the liquidity premium on ILBs to be between 25 and 50 basis points over the long run. And in the context of bond returns, that is a meaningful sacrifice.

Further, since most tax-exempt investors will source their ILB allocation from their existing diversified bond portfolios rather than from a pure government bond portfolio, an allocation to pure government-issued ILBs would entail the forfeiture of the additional returns and diversification benefits offered by non-government securities. The inflation protection offered by pure government ILBs is therefore quite expensive for most investors. However, a Real Bond portfolio that blends the characteristics of ILBs and multi-sector bonds can greatly reduce this opportunity cost.[8]

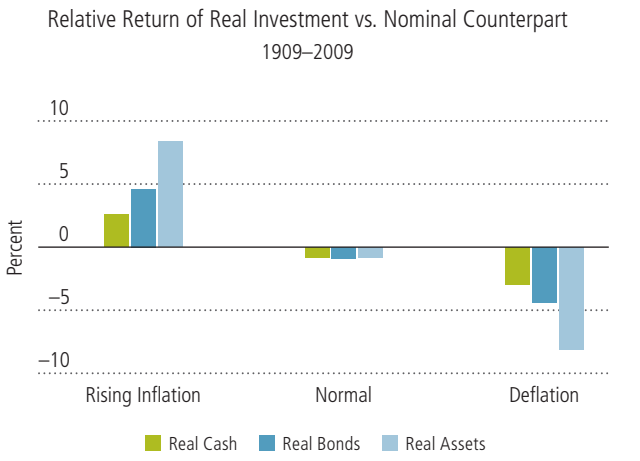
As we saw in the previous section, most investments with higher inflation betas also have lower risk-adjusted returns. While a diversified Real Asset portfolio of higher-risk, inflation-sensitive assets can improve this trade-off relative to any *single* inflation hedge, investors should still expect a Real Asset portfolio to forfeit risk-adjusted return relative to a similarly volatile portfolio of diversified equities.

One way to dimension the cost of insuring against inflation is to compare the historical reduction in returns an investor would have experienced between owning "traditional" versus "real" investments. *Display 11* shows the relative performance of the

(continued on page 16)

Display 11

Inflation Protection Suite Has Cost and Deflationary Downside



Historical analysis is not a guarantee of future results. Rising Inflation references 10-year periods when inflation was 3% (or more) higher than the prior 10 years; Deflation includes the 10-year periods with price declines; and Normal includes all other periods. Real Cash represents the relative return of AllianceBernstein one-year synthetic TIPS versus T-bills; Real Bonds represents the relative return of AllianceBernstein five-year synthetic TIPS versus five-year Treasuries; and Real Assets represents the relative return of a real asset portfolio (comprising one-third US commodity stocks, one-third US REITs, and one-third commodity futures fully collateralized by 10-year TIPS) versus the S&P 500. (All futures are US consumption–weighted; commodity stocks are market capitalization–weighted.) Commodity futures prior to 1990 are sourced from the AllianceBernstein series prior to 1970 and from the MJK Commodity Futures Database between 1970 and 1990; they are represented by DJ-UBS thereafter.
Source: BLS, CRB, Ken French, GFD, London Times, The New York Times, *USDA,* The Wall Street Journal, *and AllianceBernstein*

[8]*Another, less efficient alternative would be to alter the characteristics of the investor's remaining investment in nominal fixed income assets to compensate for the increased exposure to the government sector coming from ILBs.*

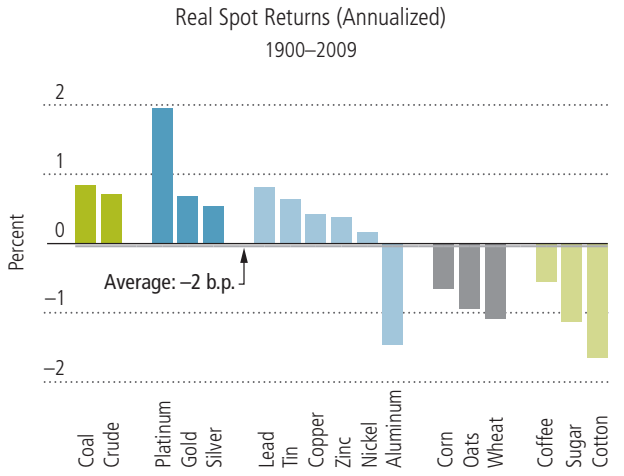
Back to the Futures: A Long-Term History of Commodity Returns

The long-cycle nature of commodity fundamentals combined with the short history of commodity futures prices makes empirical analysis of these instruments difficult. Published commodity futures data go back to the 1970s, and since that time we have witnessed only two major commodity cycles, one global inflation cycle, and no global deflation cycles. Basing strategic allocation decisions on such limited history struck us as imprudent, so we built a proprietary database of US and UK commodity futures returns and commodity inventories* extending back to the 1890s. What we found reaffirmed some of the positive attributes of commodity futures but also suggested caution in extrapolating historical commodity performance.

Published spot commodity prices date back at least to the 1800s and confirm that on average, commodity prices appreciate in line with broad inflation measures, as shown in the display to the left below. Futures returns, however, incorporate an additional source of risk and return in the form of "roll return": the difference between the spot price and futures price of a commodity at any point in time. This roll return turns out to be a major driver of commodity futures returns. As demonstrated in the display to the right below, commodity futures with higher roll return (like gasoline) also have higher futures returns.

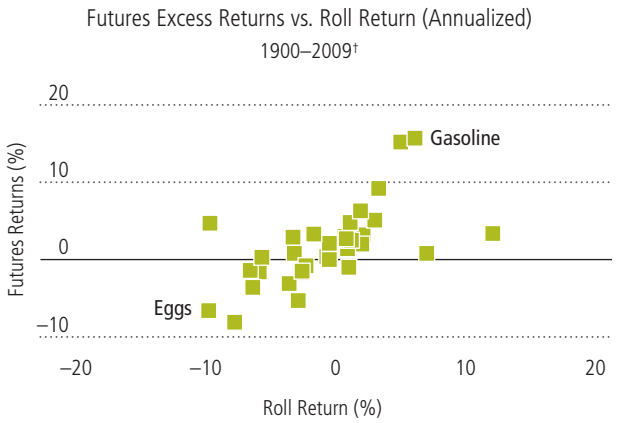
For a US consumption-weighted basket of commodity futures, roll return contributed 2% per year to returns from 1900 through 2009, according to our estimates. The spot and roll returns for commodities also responded well to the World War I and World War II inflation cycles, just as they did in the 1970s cycle. (See the Appendix, pages 33–35, for more information.) These positive findings, however, were counterbalanced by some cautionary notes: Commodities can cease trading or their value may be manipulated by government interference.

Spot Commodity Returns Have Been In Line with Inflation



Historical analysis is not a guarantee of future results. Agricultural commodities are sourced from CRB, IMF, NBER, and USDA; energy by CRB, Energy Information Administration (EIA), IMF, and NBER; and metals by CRB, IMF, NBER, and USGS.
Source: BLS, CRB, DJ-UBS, EIA, Federal Reserve (Philadelphia and St. Louis), IMF, London Times, *MJK Associates, NBER,* The New York Times, *USDA, USGS,* The Wall Street Journal, *and AllianceBernstein*

Roll Return Tends to Drive Futures Returns



†*Or life of contract*
Source: London Times, *MJK Associates,* The New York Times, The Wall Street Journal, *and AllianceBernstein*

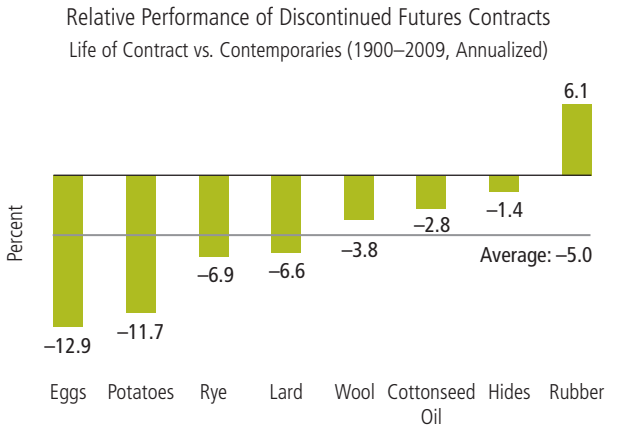
**Historical analysis is not a guarantee of future results. We collected inventory data in order to empirically test the theory that inventory dynamics are an important driver of commodity futures returns.*

Survivorship Bias: When a Commodity No Longer Trades

Because commodity futures returns depend in large part on roll returns, any structural decline in the relationship between spot and futures prices is a cause for concern. In the historical record, eight major commodity futures‡ ceased active trading after structural shifts reduced the risk of stockouts and hence the need for a risk premium provided by roll return. Lard demand, for example, terminally declined following the adoption of vegetable oils during World War II. Similarly, egg supplies became more reliable following World War II, when technology made year-round production possible. On average, these deceased contracts underperformed their contemporaries by a roll-induced 500 basis points per year over their lives, as seen in the display to the right.

Could a structural change impact the required risk premium of a major commodity today? Natural gas—which is the second-largest weighting (over 10%) in the Dow Jones-UBS Commodity Index℠—faces a number of potential structural challenges to its supply-demand dynamics. Thanks to liquid natural gas and the broad implementation of "hydraulic fracturing" drilling technologies, recent estimates put supply at levels sufficient for at least another 100 years, contributing to record-low roll returns. More disconcerting, however, is the possibility that passive, long-only investment flows into commodity futures over the past couple of years have permanently lowered the risk premium required across all commodity futures. In particular, the longer-term behavior of roll return in relation to inventories suggests that the risk premium embedded in energy futures has fundamentally diminished. Due to this prospective decline in roll return, we have reduced the historical return from roll by 200 basis points in all of our analyses.

Commodity Futures Risk Catastrophic Underperformance



Historical analysis is not a guarantee of future results.
Source: MJK Associates, The New York Times, The Wall Street Journal, *and AllianceBernstein*

Government Interference

The longer historical record highlights another cause for concern: Commodity investors have often had to contend with government interference during times of sharply rising prices. In both the World War I and World War II commodity booms, the US government implemented price controls that essentially halted trading for most commodity futures. Interestingly, while the controls always took the form of price ceilings for imported commodities such as sugar, they occasionally took the form of price floors for domestically produced commodities such as wheat. The political rhetoric directed at oil "speculators" since 2008, when the price of (mostly imported) crude hit $140 a barrel, suggests that the risk of political interference remains alive and well. Clearly, the potential for such untimely interference reduces the reliability of commodity futures as an inflation hedge. ■

‡*Cottonseed oil: 1917–1967; eggs: 1950–1980; hides: 1932–1967; lard: 1900–1962; potatoes: 1950–1987; rubber: 1929–1965; rye: 1922–1970; wool: 1944–1974*

(continued from page 13)

different hypothetical inflation-hedging portfolios compared with their traditional counterparts over time. While on average each category of inflation protection would have outperformed during episodes of rising inflation, each would likewise have detracted from performance in normal times (i.e., periods characterized by low or declining inflation). And "normal," by definition, means most of the time, so this could add up to a significant cost over long time horizons. And as the set of bars on the right shows, this protection comes with a potential downside: In a deflationary environment, inflation hedges can detract significantly from a portfolio's overall return.

Finally, taxable investors should consider the possibility of additional "tax drag" from investing in real investments. Most US taxable investors will source an inflation-linked bond allocation from a federally tax-exempt municipal bond portfolio. US TIPS, however, are fully subject to federal taxes, which can make an ILB allocation cost-prohibitive to a taxable investor.[9] Fortunately, by overlaying a municipal bond portfolio with "inflation swaps," taxable US investors can obtain the inflation sensitivity of TIPS with tax efficiency approaching that of traditional municipals.[10]

Taxable investors also face tax costs when investing in Real Assets. Most forms of commercial and multifamily real estate, for example, throw off large amounts of potentially taxable income. Similarly, in the US, commodity futures face 60% long-term and 40% short-term capital gains tax treatment on any realized gain. And physical gold gets treated as a "collectible," subject to a 28% tax on realized gains. If a taxable investor faces the full brunt of these taxes, then the inflation protection afforded by Real Assets may not warrant the associated return give-up relative to a more traditional (and possibly more tax-efficient) portfolio.

Display 12

Finding the Best Combination of Inflation-Hedging Characteristics

Portfolio	Constituents	Inflation Sensitivity	Reliability	Cost-Effectiveness	For More Details See Page(s)
Real Cash	Short-Term TIPS				31–32
Real Bonds	Intermediate TIPS				31–32
Real Assets	Portfolio of Real Assets				32–35
Individual Real Assets	REITs				32
	Farmland				32
	Timber				32
	Commodity Stocks				33
	Commodity Futures				33–34
	Gold				34–35

High ● ◕ ◑ ◔ ○ Low

Source: AllianceBernstein

[9]Both the coupon and the inflation uplift that gets added to the principal of US TIPS are taxable as ordinary income.
[10]On the maturity date of an "inflation swap," the parties will exchange the difference between the actual percentage change in the reference inflation index over the life of the swap and a fixed percentage that was agreed upon at trade inception (this fixed percentage is the "break-even" inflation rate for the swap and is influenced by inflation expectations over the life of the swap) multiplied by the notional amount of the swap. Since no gain is expected at initiation of the swap (i.e., no payments will take place if actual inflation equals the break-even inflation), typically any gain or loss realized at maturity (or at an earlier termination date) is treated as a long-term capital gain or loss.

Inflation-Hedging Scorecard: Which Assets Have Which Strengths

Display 12 provides a summary of the inflation sensitivity, reliability, and cost-effectiveness of the major prospective inflation hedges.

In the Real Cash category, short-term inflation-linked bonds provide extremely high reliability and cost-effectiveness, with modest inflation sensitivity. The same is true for intermediate- to longer-term ILBs in the Real Bonds category.

Among higher-risk, higher-return real investments, several themes emerge. Commodity futures and gold have the strongest inflation beta, but they come up short on reliability. Also, they carry substantial opportunity costs; gold in particular has exhibited returns over the long term in line with inflation itself, meaning its real returns have been near zero over time.

Real estate equities and commodity stocks sacrifice less return relative to their traditional counterparts—in this case, diversified equities—and score fairly well in terms of reliability. Finally, farmland and timber have attractive sensitivity and reliability, but they are somewhat less cost-effective and less liquid. A Real Asset portfolio with a diversified mix of commodity futures and commodity and real estate stocks, as well as foreign exchange exposure (to protect against the threat of a domestic-only versus global inflation shock) and perhaps a small amount of gold, provides a far better balance of sensitivity, reliability, and cost-effectiveness than any of the individual components alone.

So far, we've shown which investments should provide the best protection against inflation and illustrated some of their other characteristics. Now it's time to ask how much and what type of inflation protection investors should have, and how the inflation hedges assessed here may be best incorporated into their portfolios. ■

Chapter Highlights

- Three key factors determine the effectiveness of an inflation hedge: inflation sensitivity, reliability, and cost-effectiveness.
- Investors can take advantage of less risky inflation hedges to create Real Cash and Real Bond portfolios.
- Investors may overcome some of the shortcomings of riskier inflation hedges by combining them into a Real Asset portfolio.
- The cost of inflation protection consists of the expected return give-up versus traditional investments.

Getting Real

Incorporating Inflation Protection in the Portfolio

Given the trade-offs inherent in the sensitivity, reliability, and cost-effectiveness of inflation hedges, the amount and type of inflation protection investors choose will differ according to each investor's unique situation and preferences.

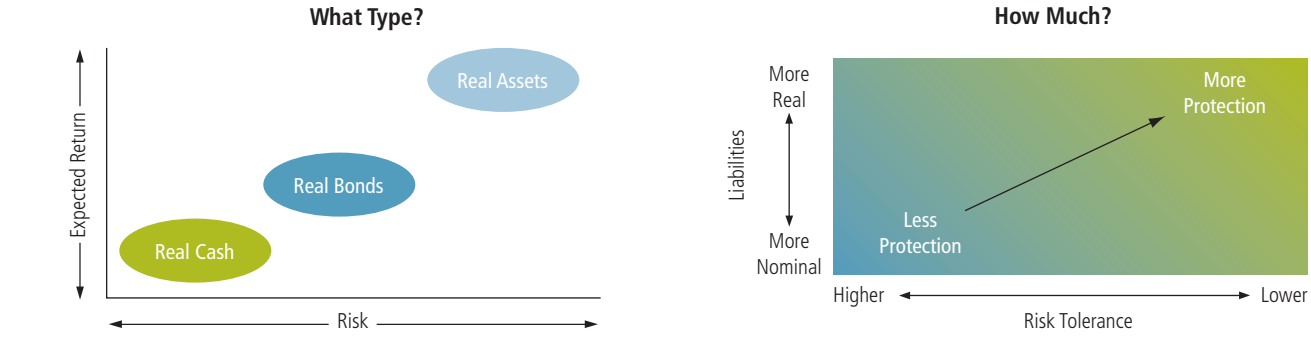
In the previous chapter we showed that inflation hedges fall into three basic categories: Real Cash, Real Bonds, and Real Assets. As the left side of *Display 13* illustrates, each component of this suite of real investments plays a role in the landscape of expected risk and return. Thus, investors can incorporate these inflation hedges in their portfolios in accordance with their existing risk and return goals, similar to the way regular cash, bonds, and stocks form the building blocks of their traditional asset allocations.

When building any asset allocation, risk tolerance drives the mix of asset classes. This is also true of real investments: The lower their appetite for risk, the more return investors would be prepared to sacrifice in order to hedge their inflation-related vulnerability, and the more inflation protection they will want to incorporate in their portfolios (*Display 13, right*). Inflation vulnerability is largely a function of how "real" the investor's liabilities are expected to be. Some liabilities are fixed in nominal terms, such as fixed-rate mortgage payments for an individual, but many liabilities are exposed to inflation risk. Inflation linkages can be explicit, such as the inflation-indexed benefits associated with some pension funds. However, liabilities can also have implicit inflation sensitivity, such as the future budget expenditures of a foundation or the lifestyle spending needs of an individual. In sum, the more an investor's liabilities rise with inflation, the greater the exposure to an inflation shock, and the more protection will likely be needed.

However, investors' vulnerability to inflation doesn't end with their liabilities: A true measure of that vulnerability is driven by their holistic balance sheets. We noted above that many

Display 13

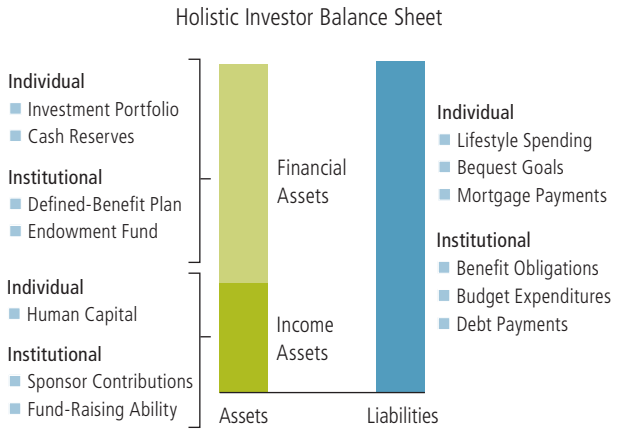
Key Decisions for Buyers of Inflation Protection



Source: AllianceBernstein

Display 14

Investor Balance Sheet Incorporates Inflation-Sensitive Income Assets and Liabilities



For illustrative purposes only
Source: AllianceBernstein

investors will have liabilities explicitly linked to inflation. But an investor's balance sheet also includes assets that are likewise impacted by a rise in inflation. As the left-hand column of *Display 14* shows, a holistic view of any investor's assets should include both traditional financial assets (such as stocks, bonds, and cash in an investment portfolio) and income-related or nonfinancial assets (such as an individual's future wages or an endowment's fund-raising potential). Income-related assets often benefit from rising inflation, so they are a key consideration in the inflation-hedging decision. Because income-related assets tend to provide a natural inflation hedge, investors with fewer such assets will generally need more inflation protection in their "financial asset" portfolio.

Ideally, an investor's assets and liabilities would have offsetting inflation sensitivities, but most do not match up precisely. Some mismatches are good: For example, individuals with assets that significantly exceed their anticipated spending needs have "excess capital." Such investors may be able to effectively self-insure—meaning that their excess capital serves as a cushion for the damage inflation might cause. By contrast, investors who have more inflation-linked liabilities than assets will need more inflation protection. It's the net asset–to-liability mismatch that is the key factor in this analysis.

Our approach to the inflation protection decision has clear parallels with liability-driven investing (LDI).[11] In essence, LDI focuses on optimizing the risk/return trade-off of one's net worth, since an asset portfolio that is poorly matched to the investor's liabilities is itself a source of risk that should be managed. We can use our asset allocation tools to assess this trade-off and derive sensible allocations for a variety of investor types.

How Much Inflation Protection Is Appropriate?

Display 15, *following page*, summarizes our recommendations for a number of representative investors, including individuals, endowments and foundations, and pension plans of various stripes. The key variable driving the range of recommendations for each investor type is risk tolerance. The white squares show the recommended real investment allocation for investors with an average tolerance for risk. The tops of the bars reflect the typical recommendation for investors with higher risk aversion (and, correspondingly, lower return requirements), while the bottoms of the bars indicate the inflation protection exposure for investors who have a relatively high tolerance for risk.

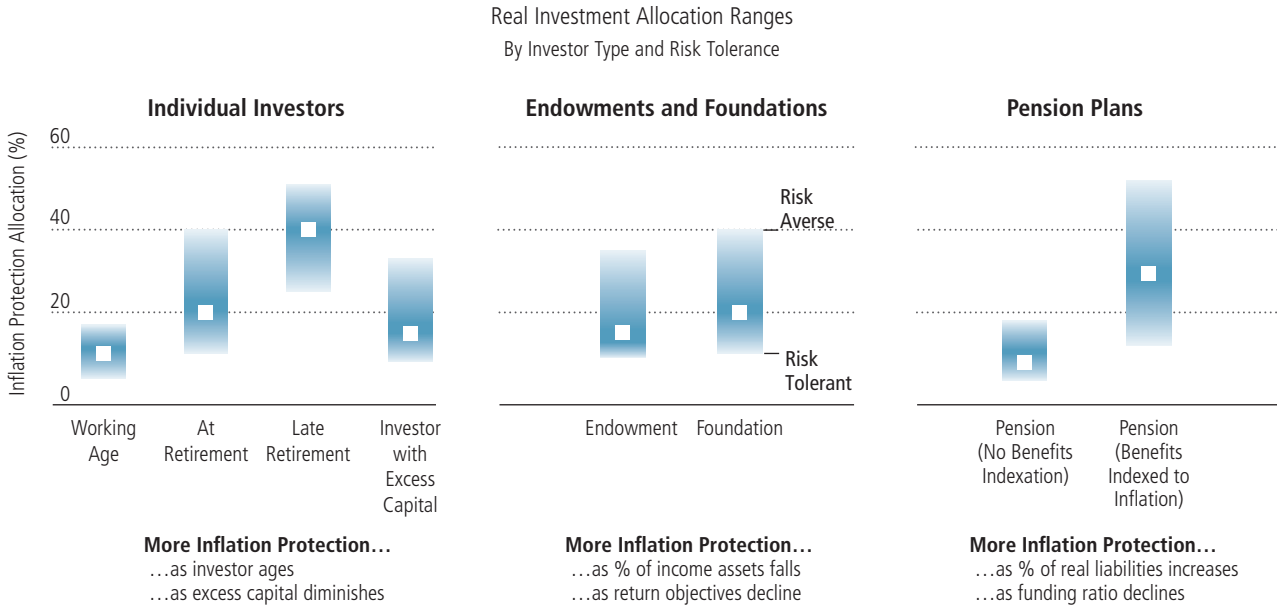
For individual investors, the average allocation to inflation protection rises as the individual ages: 10% for those who are of working age; 20% for those at retirement; and, finally, 40% for investors in late retirement. This increase reflects the diminishing amount of future income remaining as individuals move through their life cycle. However, individuals with significant capital in excess of their lifetime spending needs have a cushion that reduces the need for inflation hedges. We recommend that such investors allocate about 15% to various forms of real investments, regardless of their age.

Endowments and foundations vary in their recommended inflation protection allocations as well. High spending needs (and, correspondingly, high return needs) lead both foundations and endowments to take on less inflation protection than might otherwise be expected given the highly inflation-sensitive nature of their liabilities; we recommend approximately 20% for the

[11] *See William F. Sharpe and Lawrence G. Tint, "Liabilities—A New Approach,"* The Journal of Portfolio Management *(Winter 1990), for a technical overview of related surplus optimization techniques.*

Display 15

Inflation Protection Allocation Varies by Investor Type and Risk Tolerance



These ranges are for illustrative purposes only and are meant as a guide. Asset allocation percentages will change based on individuals' circumstances.
Source: AllianceBernstein

average foundation and about 15% for the average endowment. Differences between the two are largely attributable to the availability of income-related assets. Foundations tend to have relatively low income assets as a percentage of total assets, whereas endowments need less inflation protection because their inflation-linked contributions provide a meaningful hedge.

How much protection pension plans need is heavily dependent on whether or not the majority of benefit obligations are indexed to inflation. Plans with no benefits indexation may require less than 10% exposure to inflation hedges, while plans with indexed benefits have significant inflation-related liabilities and thus need more inflation protection; we recommend an allocation, on average, of about 30% to inflation protection for indexed plans. What's more, as we will discuss in detail below, inflation-indexed plans are further differentiated by funding ratio, with overfunded plans requiring somewhat less protection and underfunded plans somewhat more, holding risk appetite the same.

Note that despite our assumption that most of these representative investors face mainly real liabilities (pension plans without indexed benefits are the primary exception), we don't recommend that any of them—even those with above-average risk aversion—pursue an allocation to inflation hedges much above 50% of their investment portfolio. The reason for this is that investors' risk tolerance—implicit in their existing asset allocation and reflective of their return requirements—plays a large part in how much return they are willing to sacrifice in order to minimize their asset-liability mismatch. In theory, extremely risk-averse investors would simply replace traditional assets with real investments until their assets—including any nonfinancial or income assets—achieve the best possible counterweight or hedge against the risks they face on the liability side of the ledger. In practice, for most investors this is simply too costly a commitment. As such, more risk-tolerant investors will generally hedge less, opting to accept the risks of a mismatch between their assets and liabilities rather than forgo the potential for higher

returns.[12] Practically speaking, this means that for many investors, the total allocation to inflation protection should be fairly small—even for those with a moderate aversion to risk.

What Type of Inflation Protection Is Appropriate?

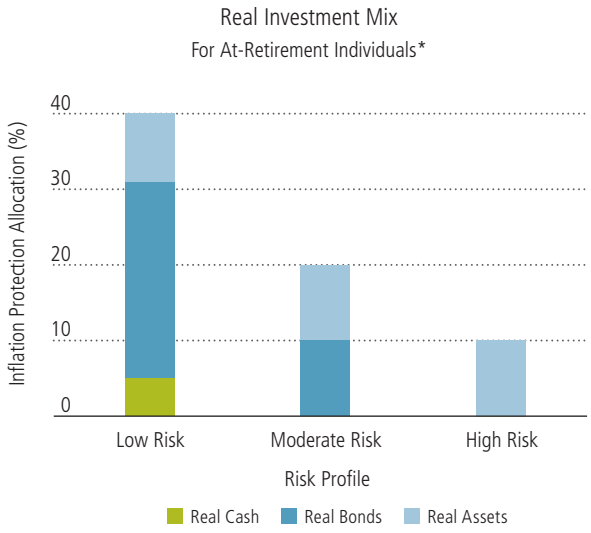
Beyond playing a crucial role in determining the amount of inflation protection that is appropriate for a given investor, risk tolerance also weighs heavily in determining what type of protection—in other words, what mix of Real Cash, Real Bonds, and Real Assets—makes sense.

More risk-averse investors will seek to hedge their liabilities with less regard for cost. This implies not only a higher allocation to inflation protection but also a desire to improve the accuracy of the asset-liability match by incorporating financial assets that closely resemble their liabilities. Because many investors' real liabilities are most similar to inflation-linked bonds (their spending tends to rise with the domestic inflation index, like the cash flows of ILBs), Real Bonds should tend to dominate in risk-averse portfolios.[13] However, more risk-tolerant investors will be less willing to give up return (by sourcing an allocation to inflation-linked bonds from their higher-returning assets) in an attempt to match assets and liabilities. At higher levels of risk tolerance, only Real Assets provide enough diversification benefit and inflation-hedging "bang for the buck" to justify an allocation.

Display 16 brings this dynamic to life, showing how the allocation to Real Cash, Real Bonds, and Real Assets varies according to risk tolerance. Not surprisingly, the most cautious investor in this example, indicated by the bar on the left, has a small portion of assets in Real Cash, about 26% in Real Bonds, and almost 9% in Real Assets (in other words, almost all of the inflation protection consists of inflation-linked bonds). By contrast, the most aggressive investor, at the far right, may hold all of the inflation protection in Real Assets, accounting for just 10% of the investment portfolio. Investors with "normal" risk appetites fall in the middle. Here, the moderate-risk investor (originally allocated approximately 60/40 to equity-like and bond-like investments, respectively) might opt to reallocate the portfolio to include approximately 10% exposure each to Real Bonds and Real Assets.[14]

Display 16

Real Investment Mix Varies with Risk Tolerance



These ranges are for illustrative purposes only and are meant as a guide. Asset allocation percentages will change based on individuals' circumstances.
**Assumes income assets and liabilities are real and that the investor is fully funded (i.e., no excess capital). Low Risk, Moderate Risk, and High Risk categories approximate equity-like risk exposures of 40%, 60%, and 80%, respectively, in this example.*
Source: AllianceBernstein

Thus far we've addressed the role of risk tolerance in establishing both the range of allocations to inflation protection and the proportions of the various inflation-hedging asset categories (Real Cash, Real Bonds, and Real Assets) appropriate for a given investor type. We have also briefly described why our recommended allocation to inflation protection should vary within and across investor types. In the next section, we will look more deeply at the drivers that further differentiate these investors and influence their appetite for inflation-hedging assets.

[12]In the extreme, highly risk-tolerant investors with inflation-sensitive assets and largely nominal liabilities may want to short inflation protection. A drop in inflation will lower the value of their assets and raise the value of the liabilities; they can get paid to offset this risk by shorting real investments.
[13]Investor liabilities are "similar" to a portfolio of inflation-protected bonds only in terms of certain shared factors, such as those that can explain changes in cash flows or returns over time. Any given investor's liabilities will also include a substantial idiosyncratic risk component that can be difficult if not impossible to hedge effectively. Although this does not alter the hedging decision, it does create "basis risk" between inflation-protected bonds and an investor's particular liabilities. In this sense, even a "full hedge" may still fall short of a "perfect hedge."
[14]As we assume throughout, this hypothetical 60/40 characterization does not imply an actual allocation to only stocks and bonds. Rather, it is cited as a proxy for exposures to asset classes that have similar risk profiles. For example, private equity, hedge funds, and illiquid real assets such as real estate and timber would all be counted as equity.

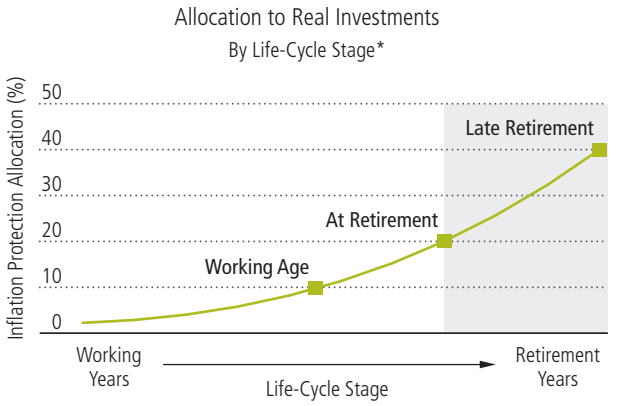
Inflation Protection for Individual Investors

Consider, first, the case of typical individual investors with a moderate risk tolerance as they progress through life. As younger individuals with significant remaining lifetime earning potential, they can reasonably expect their earnings to keep pace with inflation over time. Early in life, the size of their income-related assets as a percentage of their total assets can therefore be quite large. As they age and most of their working years are behind them, the relative size of this "human capital" shrinks—and with it a valuable inflation hedge. Some of this loss is taken up by increases in the value of expected Social Security income and, in the case of homeowners, the value of home equity—both of which we classify as inflation-linked assets. On the whole, however, nonfinancial assets typically fall over time as a percentage of an individual's total assets.

As *Display 17* illustrates, these dynamics suggest that the allocation to inflation-hedging assets will tend to follow a "glide path" for most individual investors, with inflation hedges playing a small but growing role as the typical individual investor ages. The rising green line shows the appropriate level of inflation protection in a portfolio based upon investor age or, more accurately, the investor's stage in the investing life cycle. The points labeled "Working Age," "At Retirement," and "Late Retirement" reflect the individual investor shown in Display 15 (page 20), indicating average allocations of about 10%, 20%, and 40%, respectively.

Display 17

Inflation Protection for a Typical Individual Investor Should Rise over the Investor's Life Cycle



These ranges are for illustrative purposes only and are meant as a guide. Asset allocation percentages will change based on individuals' circumstances.
**Assumes income assets and liabilities are real and that the investor is fully funded (i.e., no excess capital)*
Source: AllianceBernstein

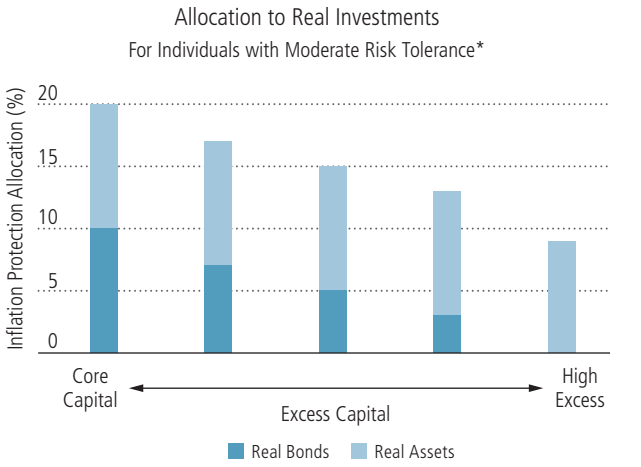
Here, we've shaded the area representing the investor's retirement years to highlight an important consideration. During retirement, investors draw from their investment portfolios at different rates, thus creating the potential for marked variation across retirees in the role played by outside real income assets. For example, investors drawing down their financial assets at a significant rate (and thus increasing the relative size of the inflation-indexed Social Security income assets in their holistic balance sheet) generally should demand less inflation protection, perhaps even falling closer to the "At Retirement" allocation than the "Late Retirement" recommendation.

While the life-cycle drivers above make eminent sense from the perspective of an average investor, for investors with capital in excess of what is required to support their spending needs, a separate set of drivers is likely to determine the appetite for inflation protection. By definition, they have substantial financial assets, so their nonfinancial assets (including Social Security, for example) are a relatively low percentage of the total. This might indicate a need for inflation protection similar to that of retired individuals, whose portfolio wealth also dominates the asset side of their personal balance sheets. What separates the two, however, is that many of these investors spend far less than what their assets could reliably support. In other words, whereas typical investors have only core capital (meaning they effectively rely on every investment dollar they have to support their core spending needs), some investors may have significant excess capital.

Display 18 explores the impact of varying amounts of excess capital on the inflation protection allocation of an individual investor with a moderate risk tolerance. Note the effect of higher levels of excess capital on both the amount and composition of inflation protection. Investors with little excess capital demand more than twice as much inflation protection (with an increasing portion coming from Real Bonds) than their more "self-insured" peers at the opposite end of the spectrum. The reason is that excess capital provides a valuable cushion against

Display 18

Excess Capital Reduces the Need for Inflation Protection



These ranges are for illustrative purposes only and are meant as a guide. Asset allocation percentages will change based on individuals' circumstances.
**Assumes income assets and liabilities are real. Moderate Risk approximates equity-like risk exposure of 60% in this example.*
Source: AllianceBernstein

the adverse impact of an inflation shock on one's net worth, while the vanishingly small margin between assets and liabilities in the case of the core-only investor results in significant net-worth volatility if steps are not taken to hedge this risk. A final consideration of particular importance for all individual investors involves the tax efficiency of inflation hedges. Here, we've assumed inflation protection can be sourced without undue tax consequences vis-à-vis existing asset classes.[15] As mentioned in the prior chapter, to the extent this is not possible, the inflation protection should be curtailed or, in some cases, forgone altogether.

Inflation Protection for Institutional Investors

Like individuals, institutional investors vary widely in their risk tolerances, exposure to inflation-linked liabilities, and broader portfolio objectives and constraints. Endowments and foundations, in particular, provide an interesting comparison and a meaningful departure from the individual-investor advice explored above.

Endowments and foundations both face predominantly real liabilities and generally aspire to fund a stream of inflation-linked cash flows, whether mandatory or discretionary. And their financial assets tend to represent the bulk of total assets, like a post-retirement individual. However, whereas individuals typically expect to draw down their investment portfolios to support spending throughout retirement, foundations and endowments generally aim to preserve the purchasing power of their portfolios over time, even after meeting their payout obligations. With spending rates often around 5% annually, maintaining the real value of the portfolio implies the need for relatively high portfolio returns. As such, these funds should be expected to have a below-average willingness to match their liabilities at the expense of higher expected returns and, correspondingly, a lower allocation to inflation protection than their liability exposures might suggest. Again, referring back to our summary recommendations in Display 15 (page 20), this equates to average endowment and foundation inflation protection allocations of about 15% and 20%, respectively.

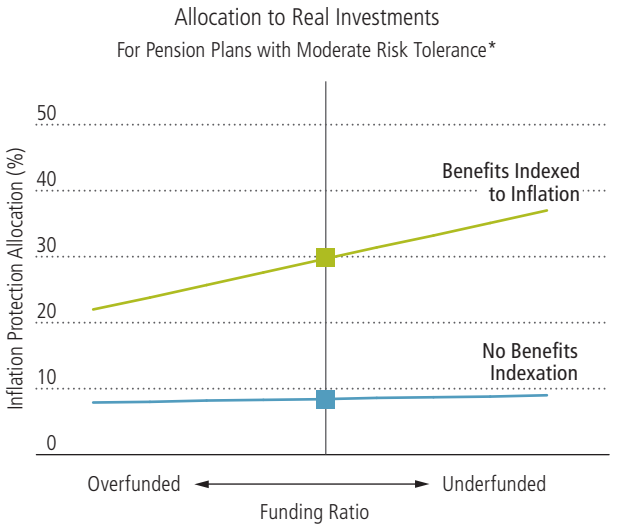
Endowments tend to differ from foundations when it comes to outside, income-related assets: The holistic balance sheet of endowments is likely to include a relatively larger proportion of real income assets—in the form of future gifts and contributions—whereas foundations often have limited assets beyond the investment portfolio. This supports our recommendation that foundations, in general, are likely to require more inflation protection than endowments.

Pension plans present yet another set of investor-specific concerns. Pension funds with a modest risk profile will generally hold a portfolio of assets with risk akin to a 60% stock/40% bond portfolio and generally share an above-average sensitivity to any asset-liability mismatch. However, these funds can differ significantly from one another in their funding ratios and in their exposure to real liabilities. The line slanting upward from left to right in *Display 19*, *following page*, illustrates the levels of inflation protection that may be optimal for pension plans with inflation-indexed benefits at a variety of funding ratios, going from overfunded on the left to underfunded on the right.

[15]In terms of practical implementation, this might require that Real Bonds be taken in the form of municipal bonds overlaid with inflation swaps in a taxable account and/or Real Assets being restricted to tax-deferred accounts.

Display 19

Pension Plan Inflation Protection Varies by Funding Ratio and Exposure to Real Liabilities



These ranges are for illustrative purposes only and are meant as a guide. Asset allocation percentages will change based on individuals' circumstances.
**Assumes income assets are real and that liabilities are 100% real (Benefits Indexation) or 50% real (No Benefits Indexation). Moderate Risk approximates equity-like risk exposure of 60% in this example.*
Source: AllianceBernstein

While significant inflation indexation is rare in the US, where pension benefits are more typically fixed in nominal terms, it is more common in the UK, where indexation of pension obligations is the norm. The blue line at the bottom shows the inflation protection allocation of an otherwise identical plan without inflation-indexed benefits.[16] Our research suggests that pension plans that do not face inflation indexation may ultimately require only modest inflation protection, regardless of their funding ratio.

Readers may be surprised to see that the allocation to lower-returning inflation hedges in the display increases as plans become more underfunded. Some plan fiduciaries might ask: If we're underfunded, why take on a greater allocation to assets with lower returns? Don't we need higher returns to make up for lost ground? And for plans with any nominal liabilities, an increase in inflation expectations (and with it an increase in interest rates) will decrease the overall value of their liabilities, which sounds like a benefit rather than a risk—and they might ask: Why do we need any inflation protection at all?

The answer to both questions centers on our assumption that investors seek to mitigate fluctuations in net worth. Even if rising inflation reduces the value of a fund's liabilities, it may also have a disproportionate, adverse impact on the fund's asset value, thus creating undesirable volatility in the funding ratio. Similarly, when net worth declines or turns negative, even small mismatches between a fund's assets and liabilities can increase risk. All in all, inflation hedges help to provide a better asset-liability match. That said, many investors who are underfunded opt instead to pursue higher-returning "nominal" investments. In our view, such a decision is reasonable for plans with higher risk tolerance, which have correspondingly lower appetites for inflation protection and a higher willingness to accept surplus volatility.[17]

When Sourcing Becomes an Issue

In practice, some investors may face constraints on how they can source their inflation protection. For example, the bond market in some countries may lack inflation-linked bonds, or investment policy may preclude allocation to commodities or other real assets. In such cases investors should generally take more of whatever form of inflation protection is available—but only up to a point.

For example, our moderate-risk "At Retirement" investors in Display 16 (page 21) could conceivably take all of their desired inflation protection in the form of inflation-linked bonds. However, achieving a level of inflation sensitivity similar to what we recommend (10% in Real Bonds and 10% in Real Assets) would actually require them to allocate about 40% to Real Bonds—a complete reallocation of their fixed income exposure to Real Bonds. Few investors would be willing to take such extreme measures for the sake of inflation protection, and most would likely choose to hedge less.

[16]It's important to note that the assumption of no benefits indexation does not imply insulation from inflation risk. Indeed, unless a plan is frozen and is obligated to pay only nominal benefits, inflation risk can still enter the picture via participant salaries, which can be expected to be highly correlated with inflation over time.
[17]Relying on sponsor contributions to cure underfunded status is another option for "at-risk" funds. In our framework, sponsor contributions are an income asset (likely one with "real" characteristics). This should likewise reduce the appetite for taking on inflation protection in the investment portfolio.

An additional constraint on sourcing arises when an investor has an existing allocation to real investments in suboptimal proportions that cannot be easily changed. For example, an investor may have a large illiquid allocation to a real investment such as timber or direct real estate, when ideally he would have a balanced blend of Real Bonds and Real Assets. In such a situation, to the extent the existing allocation provides insufficient inflation protection, any incremental protection should come exclusively from Real Bonds and, possibly, from Real Cash. Again, the allocation decision will depend on the investor's broader objectives and constraints.

Does It Really Make a Difference?

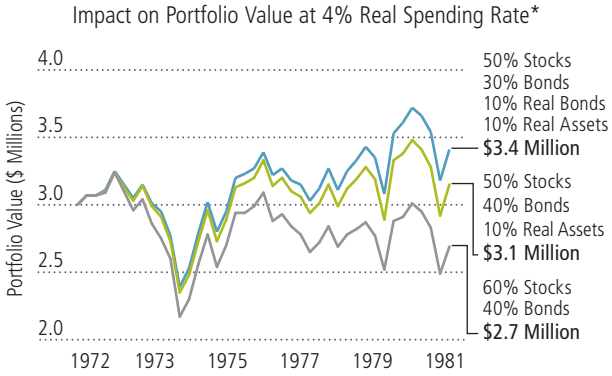
In conclusion, it may seem that typical allocations to inflation protection of 10%–30% of an investment portfolio are unlikely to provide much protection in the event of an inflationary spike. After all, with 70%–90% of the portfolio still invested in vulnerable stocks and traditional bonds, can real investments have anything more than a marginal impact on wealth outcomes? As it turns out, even modest exposures to real investments may have a significant portfolio impact.

Display 20 considers three hypothetical US-based investors who share the same risk tolerance, an initial $3 million portfolio value, and real spending equal to 4% of beginning value. The time period under consideration covers 10 of the most difficult years during the so-called Great Inflation of the 1970s. The gray line at the bottom of the display illustrates changes in the portfolio value of an investor in a traditional 60/40 stock/bond portfolio. The green line shows results for a hypothetical investor opting to allocate 10% from stocks to Real Assets, while the blue line reflects a portfolio allocating an additional 10% of the investor's fixed income allocation to inflation-protected bonds. Over this trying period the "high-protection" investor ends up with a portfolio worth almost 30% more than the similarly volatile traditional portfolio—and this is, again, after supporting a fast-growing stream of cash outlays.

Clearly, the differences in wealth are material. In a twist of the old saying, it appears that with inflation, an ounce of protection is worth a pound of cure. ■

Display 20

Exposure to Real Assets Improves Outcomes During Inflationary Spikes



This is a hypothetical example and is not representative of any AllianceBernstein product. Individuals cannot invest directly in an index.
10-year period, January 1972 through December 1981
**Assumes a hypothetical nontaxable client with real spending of 4% on initial $3 million portfolio*
Source: Federal Reserve, Ken French, GFD, MJK Associates, NAREIT, and AllianceBernstein

Chapter Highlights

- Determining the right amount of inflation protection depends on the investor's tolerance for risk and vulnerability to an inflation shock.
- The greater an investor's reliance on the investment portfolio to hedge inflation risk and the lower the investor's risk tolerance, the larger the allocation to inflation-hedging assets.
- Replacing traditional assets (cash, bonds, and equities) with similar inflation-hedging assets (Real Cash, Real Bonds, and Real Assets) minimizes distortion to the portfolio and to its risk and return objectives.

Monitoring the Temperature of Inflation

When to Implement a Protection Strategy

As we've noted repeatedly, investors should not evaluate inflation protection the way they do typical investment opportunities. Inflation protection is best understood as a hedge against the potential calamity of an unforeseen acceleration in the inflation rate. The best outcome with such a transaction is to pay the cost and never have to experience the disaster scenario you're hedging against. After all, homeowners buy fire insurance hoping that a fire never occurs; the premium is an acceptable expense to buy peace of mind.

Two aspects of inflation make inflation protection appealing. The first, as seen in Display 1 (page 2), is how destructive inflation can be to traditional investments—it can be a portfolio's Achilles' heel. But perhaps equally important is how difficult it is to anticipate. We can be reasonably sure that a spike in inflation will eventually recur—we just can't say when. If one can't predict *when* a disaster will occur, insuring against it is all the more important.

A Danger Foreseen Is More Likely Forestalled

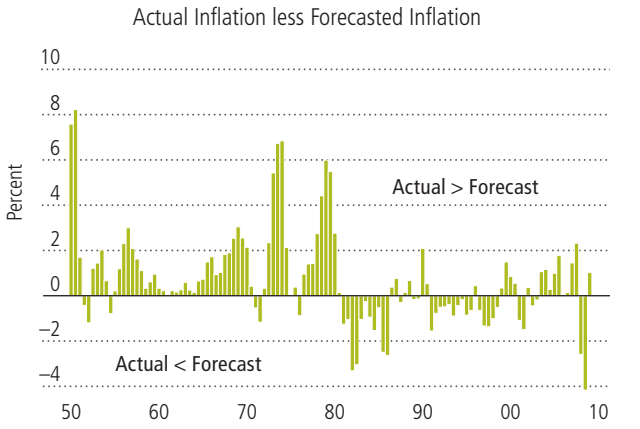
But just how difficult is it to time a future bout of inflation? As it happens, armies of analysts and forecasters study every possible marker to predict inflation, generally with little success. The market itself—often the best "forecaster" available—constantly provides expectations about inflation. But there's an interesting thing about inflation expectations: The market has been as bad as analysts at forecasting inflation.

As with just about any forecast, forward-looking expectations about inflation tend to be grounded in the rearview mirror. They look back at the level of actual inflation over both recent and more distant periods, thereby "anchoring" forward estimates in the past. For example, in periods when the year-over-year change in inflation was high (the 1970s and early 1980s), the difference between expected and actual inflation widened dramatically, as forecasters continued to project the prior year's experience into the future (*Display 21*). The degree of anchoring varies over time and across countries. The more credible a country's monetary policy, the less sensitive expectations will be to recent inflation. But this backward-looking bias inherent in inflation expectations means that significant changes in inflation almost always come as a surprise.

The insidious tendency of inflation to surprise is exacerbated by the irony that the initial effects of inflation are often pleasurable: People and firms believe their incomes have actually risen. They suffer from "money illusion"—the mirage that higher

Display 21

Changes in Inflation Are Mostly Unexpected



Historical analysis is not a guarantee of future results.
Through December 31, 2009
Source: BLS, Philadelphia Federal Reserve, and AllianceBernstein

wages, salaries, and profits signify real gains in purchasing power. By the time they awaken to reality, inflation has secured such a strong hold in wage and price behavior that it can be reversed only with difficulty.

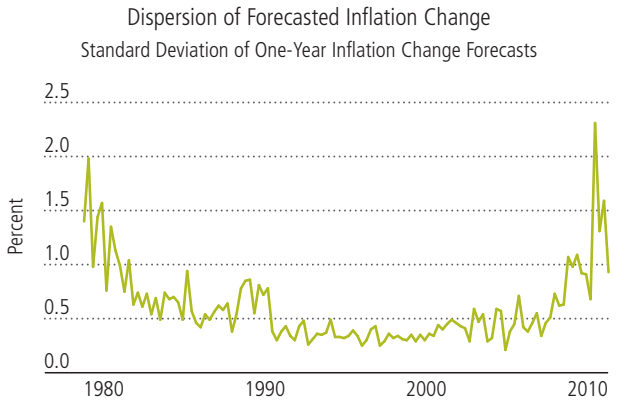
Inflation Uncertainty Is Especially High Now

In "normal" times there's no trustworthy consensus on the direction of future inflation. Today, however, views have become particularly polarized, mainly because of the controversy surrounding the rapid and unusual expansion of so-called base money (currency and reserves created by central banks) as governments in many countries attempt to remedy the ill effects of the recent global financial crisis. At the extreme, some fear these "quantitative easing" programs will lead to an out-of-control explosion of the broader money supply, culminating in runaway inflation.

Meanwhile, with many economies just emerging from recession, consumer prices low, and unemployment high, deflation seems to be the more immediate danger. In fact, it's fair to say that many economies—the US perhaps foremost among them—have never before experienced such significant inflationary and deflationary pressures at the same time. This anomaly has perplexed most economists and has led to sharply divergent forecasts for inflation, as seen in *Display 22*, which shows the standard deviation of the universe of US inflation forecasts by surveyed economists since 1980. Indeed, the range of inflation estimates is now wider than it has been at any point since the early 1980s, when the US last experienced a seismic shift in its monetary policy regime.

Display 22

Inflation Uncertainty Highest Since Early 1980s



Historical analysis and current forecasts are not guarantees of future results.
Cross-sectional standard deviation of one-year inflation change forecasts (Survey of Professional Forecasters); through December 31, 2009
Source: Philadelphia Federal Reserve and AllianceBernstein

What's our view on the prospects for an inflationary episode? Let's consider the monetary argument first. While it is true that persistently rising inflation cannot occur without increasing the money supply, "money printing" by the central bank does not necessarily drive inflation up. While central banks directly control base money supply (reserves that enable banks to lend), they do not control the broader measures of money (actual lending by banks and other credit channels to businesses and individuals). And it is the broader measures of money that tend to drive inflation. While base money creation in excess of underlying real economic growth may lead to inflation, history also shows that such an outcome is in no way guaranteed.

A Tale of Two "'Flations": The US Great Inflation vs. Japan's Deflation

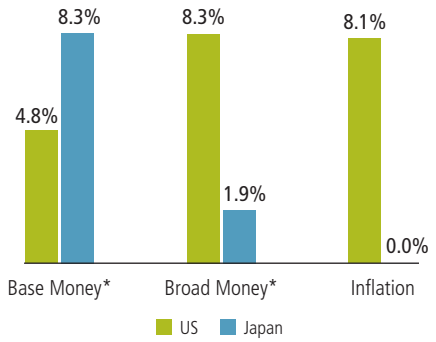
As an example, we need only compare the experience of the US during its "Great Inflation" of the 1970s with Japan's deflationary "Lost Decade," which extended from the early 1990s through the early 2000s. Perhaps surprisingly, during the decade ended in 2003, the rate at which the Bank of Japan printed money exceeded its real economic growth by more than 8% per year—almost twice the Federal Reserve's pace during the 10-year period ending in 1980 (*Display 23, following page*).

If central bank money creation were the key driver, Japan should have endured a "Greater Inflation." Yet, while both the US and Japan experienced shorter-term volatility in their year-over-year inflation rates during these challenging decades, the US ultimately experienced 8% inflation, compared with Japan's 0% inflation. The apparent paradox has a straightforward explanation: In the US, 4.8% growth in excess base money fueled an expansion of the broad money supply 8.3% above underlying economic growth, causing inflation to accelerate. In Japan, despite significant central bank expansion, the broad money supply outpaced the country's growth rate by only 1.9%, and inflation came in even lower.

Underlying the failure of excess base money to translate into broader loan growth in Japan were persistent weaknesses in the

Display 23

A Tale of Two "'Flations": The US Great Inflation vs. Japan's Lost Decade



Historical analysis is not a guarantee of future results.
**Money growth rates reflect excess over 10-year real GDP growth. US data are for the 10-year period ending December 1980; Japan data reflect the 10-year period ending December 2003. US Broad Money reflects M3 aggregate; Japan Broad Money reflects OECD Broad Money aggregate.*
Source: Federal Reserve, GFD, Organisation for Economic Co-operation and Development (OECD), and AllianceBernstein

balance sheets of both financial institutions and prospective borrowers. In the wake of the massive collapse in asset values that followed the bursting of Japan's investment bubble in the late 1980s, banks were left saddled with bad loans and were reluctant to lend, while the corporate sector faced large legacy burdens and lacked either the eagerness or creditworthiness (or both) to borrow. With credit contracting, the broad money supply stagnated.

The US in the 1970s faced no such debt overhang, and despite many economic problems and policy errors, the era can be characterized as having strong credit growth and abundant financial innovation. The 1970s saw the rapid growth of consumer credit, as well as the expansion of the money-market-fund industry. The decade also gave birth to financial futures trading and mortgage securities, and saw the rise of the Eurobond market. All of these innovations allowed the more efficient translation of narrow money growth into broader money and credit expansion.

The contrasting experiences of the US and Japan lead us to conclude that the inflationary implications of excessive central bank money creation—even over horizons of a decade or more—are by no means certain.

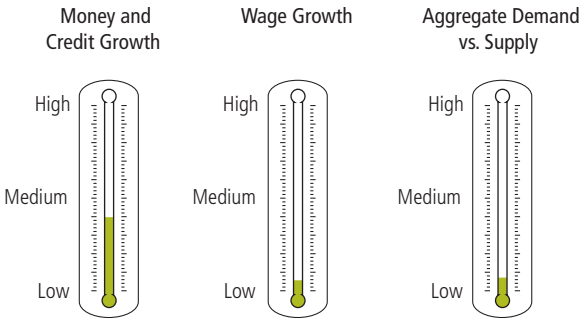
Taking the Current Inflation Temperature

So what should most investors keep an eye on going forward? Clearly, elevated money and credit growth is a warning sign. Another warning sign occurs when the level of aggregate demand begins to bump up against supply constraints. And a third is a rise in wages. None of these factors alone causes inflation, but in combination they are extremely likely to signal inflationary risk (*Display 24*).[18]

What do these factors tell us as of this writing? While narrow measures of money growth are high in the US and some other developed economies, broader measures are moderate and will remain so until banks are more willing to lend *and* consumers and businesses are more eager to borrow. Similarly, with unemployment hovering around 10% and underemployment far greater than that, wages—and more specifically unit labor costs—are unlikely to rise dramatically.[19] It is difficult for consumers to bid up prices and largely unnecessary for firms to

Display 24

Three Key Factors to Watch in the Current Environment



For illustrative purposes only
Source: AllianceBernstein

[18]For more information, see our recent Inflation Fixation *white paper.*
[19]Technically, wage growth alone is not indicative of inflation risk if it is merely a reflection of concurrent productivity growth. Unit labor cost, a measure of growth in compensation relative to that of real output, is a more accurate barometer of wage-related inflationary pressures.

raise prices in the absence of upward wage pressures. Finally, slack in the developed world extends beyond the labor markets into other areas, ranging from vacant real estate to record-low capacity utilization. It is difficult to raise prices while competition, often global in nature, sits on idle capacity.

Complacency Will Hurt You When You Least Expect It

But these factors can shift rapidly, and other factors could enter the equation at any time. Existing capacity may shrink faster than expected due to massive underinvestment or accelerated obsolescence. A commodity shock could hit both aggregate demand (as an implicit tax) and aggregate supply (in the form of higher input prices), leading to stagflation. The markets could lose faith in a country's currency, resulting in dramatically higher import prices. Emerging markets inflation could seep into developed markets inflation through a variety of channels. What's more, any and all of these events could occur suddenly and without warning, so complacency even over the short term appears imprudent.

In the medium term, central banks do have powerful tools to keep money growth within safe territory. But as the old bromide has it, generals are always fighting the last war—and right now the enemies are a sagging global economy and the threat of deflation. How will central bankers assess the prospect of an adverse inflation surprise, and will they retain sufficient independence from policy makers to persist in a fight against inflation? The higher interest rates needed to battle a nascent inflation are bound to be just as unpopular in the future as they were in the early 1980s, when the short-term US policy interest rate rose to a sky-high *22%* before finally choking off spiraling money growth and inflation expectations.

So, while inflation appears subdued globally as of this writing, we can't rule out an inflation shock further down the road. To the extent that the current relative complacency about inflation makes hedges available and affordable, now is as good a time as any to buy inflation protection.

And that's the point behind seeking inflation protection: It's not a question of when. You don't decide to buy insurance for your home because you think a fire is around the corner. Determining when to purchase an inflation hedge is similar: There may be little concern today about an imminent spike in inflation, but who can know when that spike will come? The key is to buy before the fire. ■

Chapter Highlights

- We do not expect any substantial increase in inflation in the near term.
- We can be reasonably sure that a spike in inflation will eventually recur; knowing when is a near impossibility.
- The best result is that disaster (in the form of a sustained rise in inflation) never occurs, and the cost paid turns out to have been a prudent expense.

Appendix

Further Details on How Different Assets Respond to Inflation

Bills

Short-maturity bills have historically performed better than longer-maturity bonds during rising inflation, but "better" does not necessarily mean "well." When inflation expectations jump, outstanding bills lose value instantaneously but still redeem at par, producing a zero inflation beta. However, new bill yields generally discount higher inflation expectations, so the shorter the bill maturity, the more quickly investors capture changes in inflation expectations. In the extreme, one-day bills should offer near-perfect pass-through and produce a one-year inflation beta of around one, which is far better than the negative inflation betas produced by nominal bonds.

In a diversified portfolio context, however, reducing inflation exposure by shortening bond maturity toward zero is not an ideal strategy. Bonds generally help curb the volatility of equities and other high-risk assets in the portfolio, and longer-dated bonds can be particularly valuable in bear markets. As *Display 25* shows, the longer the bond duration, the better the hedge to equity risk in *most* types of equity bear markets (with the exception of inflation-related bear markets). Therefore, reducing duration will reduce portfolio inflation exposure, but at the cost of increasing exposure to most other types of risk.

Nominal Bonds

The impact of rising inflation on nominal bond returns is clearly negative, and the magnitude of the impact is a direct function of the bond's duration. As *Display 26* shows, very short-maturity three-month T-bills posted a modestly positive inflation beta of 0.3. But with bonds having maturities of a year or longer, the inflation beta becomes increasingly negative. Five-year nominal bonds declined in value 1.5 times the increase in inflation, while 20-year bonds declined over three times the rise in inflation.

Display 25

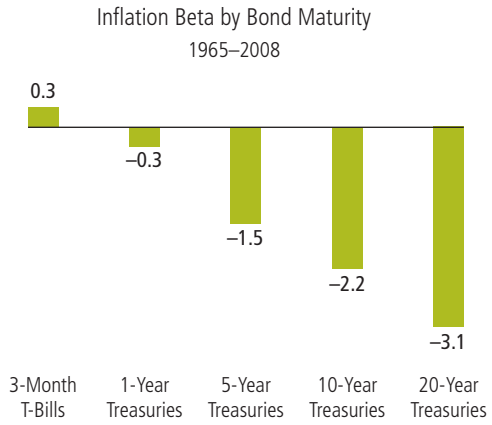
Bonds Usually Hedge Equity Bear Market Risk Better than Bills

		Performance During S&P 500 Peak to Trough*		
	S&P 500 Trough Date	S&P 500	3-Mo. T-Bills	10-Yr. US Treasuries
Deflationary Shocks	Oct 31, 1903	–25.9%	6.0%	1.8%
	Oct 31, 1914	–25.3	10.8	6.9
	Jun 30, 1921	–26.4	9.4	4.3
	Feb 28, 1933	–78.3	5.8	16.4
	Mar 31, 1938	–49.8	0.3	1.3
	Nov 30, 2008	–40.7	1.3	13.0
Inflation Neutral	Nov 30, 1907	–34.1	7.4	0.9
	Mar 31, 1935	–20.7	0.2	10.0
	Jun 30, 1962	–22.2	1.4	3.2
	Jun 30, 1970	–26.9	7.9	–3.1
	Nov 30, 1987	–29.6	1.4	1.6
	Sep 30, 2002	–44.7	6.8	29.2
Inflationary Shocks	Dec 31, 1917	–27.9	5.1	–0.8
	Apr 30, 1942	–30.2	0.3	11.6
	May 31, 1947	–21.4	0.4	1.4
	Sep 30, 1974	–42.6	13.7	0.3
Average	**Deflationary**	**–41.1%**	**5.6%**	**7.3%**
	Neutral	**–29.7%**	**4.2%**	**6.9%**
	Inflationary	**–30.5%**	**4.9%**	**3.1%**

Historical analysis is not a guarantee of future results. Individuals cannot invest directly in an index.
**For equity bear markets since 1900*
Source: Federal Reserve, GFD, and AllianceBernstein

Display 26

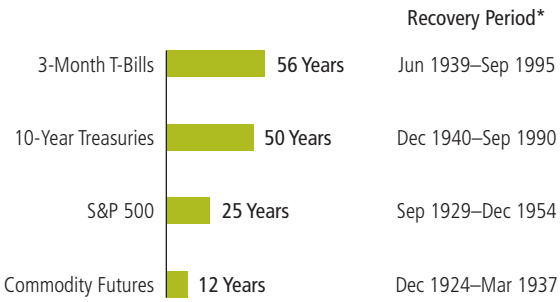
Bond Inflation Beta Worsens as Duration Increases



Historical analysis is not a guarantee of future results.
Source: BLS, Federal Reserve, and AllianceBernstein

Display 27

How Long Did It Take to Regain Peak Purchasing Power?



Historical analysis is not a guarantee of future results.
**Length of time before the purchasing power of a $1 investment was restored to $1. Commodity futures are collateralized by three-month T-bills and are weighted according to DJ-UBS methodology; prior to 1990 they are on a US consumption–weighted basis and are sourced from the AllianceBernstein series prior to 1970 and from the MJK Commodity Futures Database between 1970 and 1990; they are represented by DJ-UBS thereafter.*
Source: BLS, DJ-UBS, Federal Reserve, GFD, London Times, *MJK Associates, NAREIT,* The New York Times, *USGS,* The Wall Street Journal, *and AllianceBernstein*

The picture worsens when we change the definition of inflation risk from year-over-year impact on nominal return to the long-term purchasing power of an investment. *Display 27* highlights the longest periods in the 20th century during which various investments failed to keep pace with inflation. One dollar invested in three-month T-bills or 10-year US Treasuries at the beginning of World War II, for example, did not regain its purchasing power for at least *50 years*. That is twice as long as the period it took for diversified stocks to regain their real value, and four times as long as commodity futures. Part of the reason for this drought was the Federal Reserve's suppression of rates during and immediately after World War II. But, in general, nominal government obligations have historically not offered a high-enough risk premium to overcome the persistent inflation surprises inherent in inflation cycles.

Alternatively, adding credit exposure to a bond portfolio can improve the long-term return, but its effect on the inflation beta is ambiguous. For example, we would expect credit spreads to tighten during rising inflation as fixed obligations become easier to pay off with inflated money. Residential mortgage spreads, on the other hand, should widen as the prepayment option granted to borrowers becomes more valuable with the increase in interest rate volatility associated with rising inflation. Historical data, however, show no clear relationship between spread changes and inflation changes.

Inflation-Linked Bonds (ILBs)

Inflation-linked bonds were created to pass through the change in a specified inflation index, so they should provide an inflation beta to that index of roughly 1.0. While ILBs should clearly play a role in most inflation-hedging programs, it is important to acknowledge that a number of issues make these bonds less than a perfect inflation hedge—the most important of which is the relationship between real yields and inflation. If changes in real yield are positively correlated to inflation changes, then ILBs could *lose* money during rising inflation, as increases in real yields hurt ILB prices.

Unfortunately, the precise relationship between real yields and inflation is difficult to discern and to forecast. While theory suggests there should be little or no relationship between inflation and real yields, the short empirical history in the US and the UK suggests a slight negative relationship, while our longer-term empirical research indicates a slight positive relationship in extremes. Given this conflicting evidence, we expect little or no relationship between real yields and inflation in the long term. However, in the medium term a plausible risk exists that rising inflation could coincide with rising yields.

Continued deficit spending could simultaneously contribute to inflationary pressures while raising the required real yield demanded by investors to hold ever-growing amounts of sovereign debt.

In addition to having the potential to lose money during rising inflation, ILBs bring other vulnerabilities, including deflation exposure, tax inefficiency, and possible manipulation by the producer of the inflation index. First, the deflation floor built into many ILBs protects only newly issued bonds. A seasoned bond that has experienced a rise in the price level from, say, 100 to 110 is left exposed to a decline in the price level back down to 100. As for taxes, both the coupon and inflation accrual of US TIPS are taxable at ordinary income rates—the latter as "phantom income," because it is not paid out until maturity. Finally, governments can and do suppress official inflation numbers to reduce inflation-linked payments. For example, in 2007 in Argentina, when 40% of the country's outstanding debt was in the form of inflation-linked bonds, the government stood accused of manipulating official inflation numbers to below 9% from an independently estimated 25%.

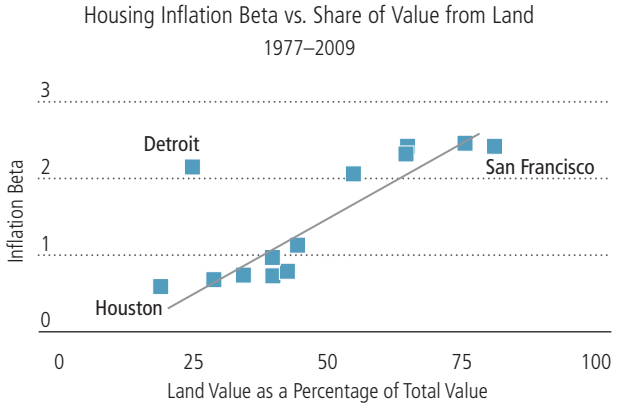
Real Estate

Because the income that real estate assets produce tends to be tightly linked to inflation, their inflation betas are generally considered to be high. The value of a real estate asset derives from both the actual land and the income it throws off. The more value tied up in land—a fixed cost—the greater the asset's inflation beta (*Display 28*). For example, in cities like San Francisco, where the value of land plays a larger role in overall property value, real estate would provide a stronger hedge to inflation relative to cities like Houston, where land value plays a smaller role.

Also, rental income from most residential and commercial properties is fixed by lease agreements, so the shorter the lease term, the more sensitive this income is to inflation, as the leases will reset with the latest inflation changes embedded in them. Some countries (Australia, for example) and some property types (such as retail in certain domiciles) have an explicit link to local inflation indicators built into rental agreements, so they serve as particularly good inflation hedges, provided no oversupply is present.

Display 28

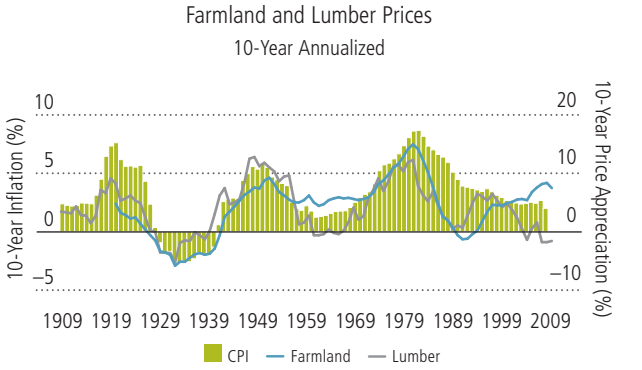
Real Estate Inflation Sensitivity Partially a Function of Land's Share of Value



Historical analysis is not a guarantee of future results.
Source: BLS, Federal Housing Finance Agency, and AllianceBernstein

Display 29

Farmland Appreciation Tracks Inflation



Historical analysis is not a guarantee of future results.
Source: BLS, GFD, NBER, USDA, and AllianceBernstein

Agricultural properties such as farmland and timberland can also provide effective inflation protection, because the income they generate is tied directly to agricultural commodity prices, which are inflation-sensitive. *Display 29* shows a strong relationship between rolling 10-year inflation and the prices of farmland and lumber (a proxy for timber prices). These types of illiquid real investments are viable substitutes for liquid alternatives such as REITs and commodity futures for investors willing to take on liquidity risk.

Equities

The idea that diversified equities are a good inflation hedge is true only for very long time horizons. In fact, diversified equities have usually had negative inflation betas, tending to respond poorly over the short to medium term in the event of adverse inflationary surprises. While corporate profit margins do tend to expand during periods of rising inflation, that alone is insufficient to compensate for the higher discount rate that comes with rising inflation, resulting in negative inflation betas.

Certain types of equities, however, tend to react better to rising inflation than others, because their profit margins are especially sensitive to inflation. The lower the expense sensitivity and the higher the revenue sensitivity to inflation changes, the more margins will expand in reaction to rising inflation.

First, let's consider expense sensitivity. Industries with higher capital intensity (i.e., higher fixed costs, where input prices don't change much in inflation) tend to exhibit better inflation betas than lower capital intensity industries. We broke out the inflation betas of different firms based on their capital intensity and arrayed them in quintiles (*Display 30, left*). While none of the quintiles exhibited a positive correlation to inflation changes, the higher the capital intensity, the less negative the sector's inflation beta.

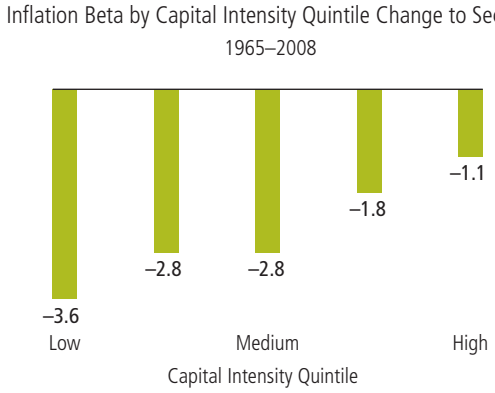
Now for the other element: output prices, or revenues. The corollary to the notion that high fixed costs = higher inflation betas is that highly inflation-sensitive revenues = higher inflation betas. As with capital intensity, we broke out the universe of equities by market capitalization and graphed them in quintiles from smallest to largest (*Display 30, right*). Large-capitalization stocks tended to respond more favorably to rising inflation than small-cap stocks did, presumably due to their greater pricing power and hence more inflation-sensitive revenues. We can see both of these factors at work in certain natural resource sectors, which possess a particularly potent combination of high capital intensity and highly inflation-sensitive revenues, resulting in positive inflation betas for equities in these sectors.

Commodities

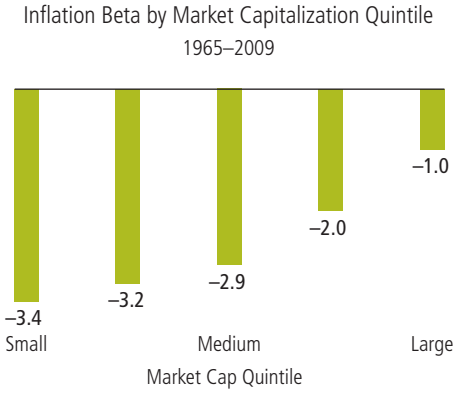
Physical commodities have exhibited and should exhibit strongly positive inflation betas, primarily due to their relatively inelastic supply-and-demand traits. Price appreciation during aggregate demand-related inflations will show up most acutely in goods and services with the least flexible supply-and-demand response. The cost and time required to add capacity in energy, mining, and agriculture (in aggregate) far exceed that for most other goods and services in consumer price indices. Likewise, the ability to substitute away from basic resources is far more constrained than for most later-stage goods.[20]

Display 30

Equity Inflation Beta Related to Capital Intensity…



…and to Market Capitalization



Historical analysis is not a guarantee of future results.
Source: BLS, Bureau of Economic Analysis, Ken French, and AllianceBernstein

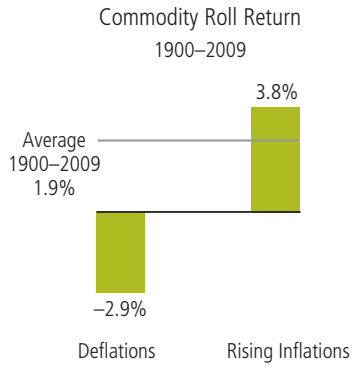
[20]*Price appreciation during less common aggregate supply–related inflation, on the other hand, will show up most acutely in the goods and services at the heart of the supply shock.*

Compared with spot commodity prices, commodity futures prices have exhibited and should exhibit even stronger inflation-hedging characteristics. Levels of contango and backwardation (when futures prices exceed spot prices and when futures prices are below spot prices, respectively) that differentiate spot from futures prices and create roll return are strongly related to inventories. In demand-driven inflations, inventories get drawn down and backwardation rises, producing positive roll return for commodity futures. *Display 31* shows that this roll return added significant return during periods of rising inflation and significantly reduced return during the deflationary Great Depression, when inventories were high.

While commodities and commodity futures hedge against most types of supply and demand–driven global inflations, they are not reliable hedges against the country-specific component of domestic inflations.[21] As *Display 32* illustrates, when changes in the domestic inflation rate correlate highly with changes in global inflation, commodities can be expected to deliver their characteristically high inflation beta. But to the extent that domestic inflation shocks are not synchronized with global trends, commodities are unlikely to perform well as a hedge against home-country inflation. The most likely cause of desynchronized inflation shocks for most countries comes from divergent fiscal and monetary policy. However, structural differences in some economies (such as those heavily dependent on commodity exports) can lead to similar departures from global inflationary trends and, as such, a correspondingly lower commodity futures inflation beta.

Display 31

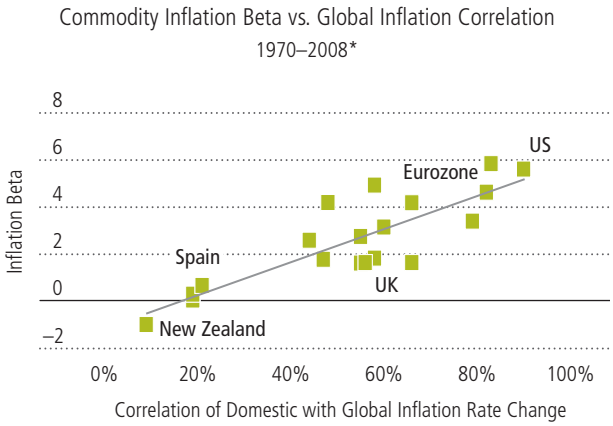
Commodity Roll Added Return and Amplified Inflation Sensitivity



Historical analysis is not a guarantee of future results.
Deflation years: when 10-year rolling rate of CPI inflation is < 0%; rising inflation years: when 10-year rolling rate of CPI inflation is 3%+ > prior 10 years
Source: DJ-UBS, London Times, *MJK Associates,* The New York Times, The Wall Street Journal, *and AllianceBernstein*

Display 32

The Type of Inflation Matters: Global vs. Domestic-Only



Historical analysis is not a guarantee of future results. Commodity futures are represented by USD commodity futures returns hedged into domestic currencies.
** 1970–2008 for all countries except Australia (1977), Finland (1972), Ireland (1987), Italy (1977), Japan (1972), New Zealand (1987), Spain (1974), and Sweden (1974)*
Source: BLS, DJ-UBS, GFD, MJK Associates, Thomson Datastream, and AllianceBernstein

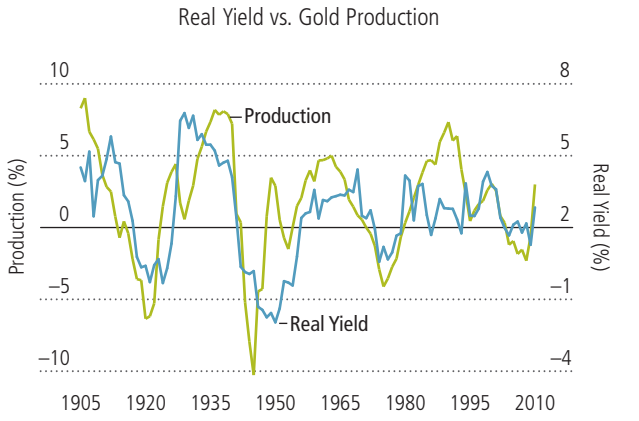
Gold

Gold is an enigma, exhibiting characteristics of both a currency and a commodity, while providing protection against both inflationary and deflationary environments. Gold production (and to a lesser extent silver and other precious metals production) is driven largely by the level of real interest rates (as seen in *Display 33*) and less by prevailing spot prices. Mine operators have the choice of extracting gold today or leaving it in the ground to extract in the future. As real rates rise, the present value of future extraction falls, so the desire to extract today rises. But even when global production is "high," it rarely amounts to even 2% of all aboveground stocks. This price-insensitive supply response means that changes in demand are often met by explosive price responses rather than production responses.

[21] *Assumes commodity futures exposures are hedged into domestic currency to separate asset returns from returns associated with foreign currency exposure*

Display 33

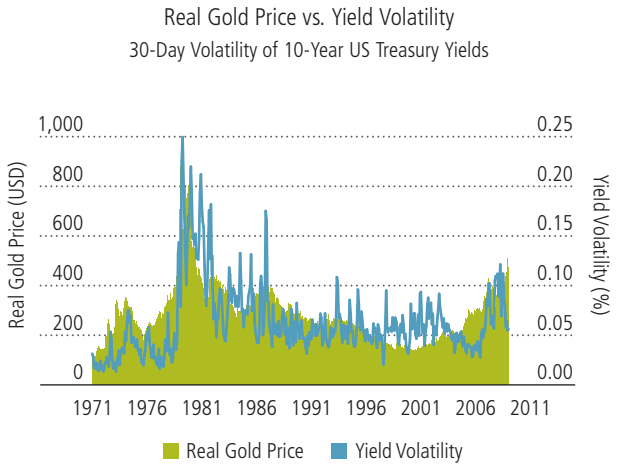
Gold Production Driven by Real Yield



Historical analysis is not a guarantee of future results. Real yield is represented by the AllianceBernstein US 10-year real yield series; and gold production by rolling five-year global production growth.
Source: BLS, Federal Reserve, Goldman Sachs, USGS, and AllianceBernstein

Display 34

Precious Metals Act as a Monetary Disaster Hedge



Historical analysis is not a guarantee of future results.
Source: BLS, Federal Reserve, USGS, and AllianceBernstein

Demand for gold tends to rise with uncertainty around the future of the global—and particularly US—financial system, with gold acting as a currency of last resort. Extreme inflationary and deflationary outlooks heighten uncertainty—so gold, uniquely, provides a hedge against both environments. *Display 34* shows how the real gold price tends to rise in periods of high interest rate volatility, a proxy for monetary uncertainty, and fall in periods of low rate volatility. Investors tend to flock to gold as a disaster hedge, regardless of whether the feared disaster takes the form of a huge inflationary or deflationary shock.

This unique, asymmetric form of hedging, however, comes at a steep cost. The long-term expected price appreciation for gold (as for all commodities) is equal to the expected increase in the marginal cost of production, which, for hundreds of years, has roughly equaled broader measures of inflation. In other words, barring "peak gold"-type arguments, the long-term expected return on a gold investment equals inflation less storage costs—far below the long-term expected returns on stocks or even bonds.

Further, investors should be skeptical of the reliability of gold as the ultimate disaster hedge on two counts. First, in the end-of-the-world scenario, gold held outside the home will be difficult to access. Bankruptcies, broken contracts, and even a breakdown in the rule of law could make paper claims on gold through futures and ETFs worthless and physical gold difficult to claim. Investors who hold the metal for true end-of-the-world scenarios should therefore attempt to minimize the number of counterparties that stand between them and at least a portion of their gold.

Second, even in a less extreme disaster scenario—where the rule of law stands but the global financial system fails—gold may prove an unreliable hedge. Governments have exhibited a remarkable degree of reliability of their own in decreeing the value and functionality of gold during times of economic stress. In the midst of the Great Depression, for example, the US issued an executive order requiring the surrender of all nonindustrial gold at $20.67 an ounce and then decreed a new value of $35 an ounce. While gold does have many positive attributes, practical realities reduce its reliability as a disaster hedge and temper the wisdom of relying solely on this "barbarous relic" for inflation protection. ■

Notes

The data in this paper represent historical index performance and do not represent the investment performance or the actual accounts of any investors. The information shown is based on back-tested performance over the time periods indicated. It is not possible for an individual to invest in an index and the markets may perform better or worse in the future.

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