

Is painless diversification dead?

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Executive summary

Interest rates have collapsed in developed economies in past years, and more recently at home in the United States, which has greatly dampened investors' performance outlook for diversified portfolios. These events have led many investors to question the traditional role of fixed income. In this Topic of Interest white paper, we outline some issues that investors must come to terms with, and we begin to unpick ways of thinking about diversification and preservation of capital in the new market environment.

Introduction

With interest rates dropping to historic lows, investors have been confronted with the reality of a new investing landscape: one where the typical relationships between assets come into question, and where the most basic ideas around diversification and portfolio construction no longer seem to fit with the opportunities available.

Most important is the fundamental question of diversification. Over the last forty years a position in long U.S. Treasury bonds has provided excellent diversification for the risk asset elements of the portfolio, while also providing strong positive returns in their own right (we refer to long U.S. Treasury bonds here in this analysis for simplicity as they are a pure and simple representation of interest rate exposure, while acknowledging that most investors do not simply hold U.S. Treasury bonds). What will replace the role of this allocation in a typical portfolio?

There are two ways to answer this question.



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The first involves predominately quantitative analysis of a range of other asset classes and sub-asset classes, trying to identify other parts of the market which have historically provided good diversification benefits. This approach will, of course, allow the identification of some possible solutions. However, it falls prey to one fundamental flaw: any analysis based on recent history (over the last 40 years) is based on an environment of steadily and significantly falling interest rates that is highly unlikely to pertain over the next few years – or indeed over the next 10 or 40 years. In effect, this approach assumes that the world has changed for long-term government bonds but not for other parts of the capital markets. This assumption seems heroic.

The second answer involves going back to first principles, trying to understand the key characteristics that investors desire from diversifying assets. Should we expect assets that have displayed those characteristics to continue to do so in the new environment? If not, then we should try to adjust our underlying thinking around diversification to fit with the new environment, and we should try to think broadly about how diversification might be achieved in that environment.

We believe the second approach is likely to be more effective than the first. Historical quantitative analysis will always have a place in any discussion, but this type of analysis is likely to be misleading as a guide, unless properly contextualized. This paper, then, is designed to follow the second approach, focusing on the underlying challenges we face, rather than simply running regressions and optimizations “to find the right answer”. We think following these thoughts where they lead will help investors understand how things are likely to look over the next few years. This approach may also help us understand and analyze how some of the most basic parts of the investment landscape have changed, and to see that they are likely to stay changed for the foreseeable future.

And the second approach begins with the most fundamental question of all: what is diversification, and what have investors gained from it over the last forty years?

What is diversification?

The word “diversification” is used by investors to mean two quite different things – and to mean them at the same time. These ideas have become linked over the last 40 years because of market behavior, but there is no reason that should remain the case. Indeed, one of the reasons investors are concerned about the current environment is because this historical linkage has become uncoupled. Both meanings of diversification, however, focus on the behavior of the potentially diversifying asset when the main risk assets (typically U.S. equity markets) are under pressure.

The first meaning of diversification is ***preservation of capital in down markets***. This means something about price and something about available liquidity: during stressed conditions the price quoted in the market for this asset should not only be close to the price paid, but it should also be attainable for large trade sizes. This will mean the investor has a real prospect of turning the asset into liquid funds, either to pay obligations or to reinvest in other assets that are trading at significant discounts.

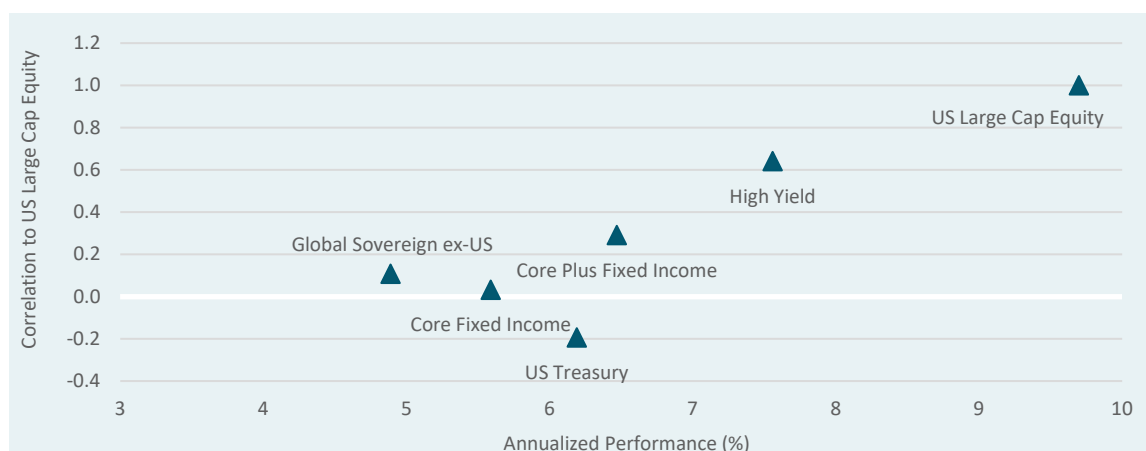
The second meaning of diversification is **inverse performance**. Diversifying assets, under this definition, should provide positive upside in environments where risk assets are dropping in value. Again, this suggests not only that the asset’s price has changed in a positive direction but also that there is enough market liquidity to allow the investor to capture the new price – the price rise in times of crisis is actually available in enough size for the investor to be able to achieve that price when they come to sell.

These two definitions are clearly quite different, but investors have combined them into a single concept over the last 40 years for one simple reason: that over that period the most easily available diversifying asset – the 10- or 30-year U.S. Treasury – has provided both types of diversification. In fact, investors have been paid to have diversification. That painless diversification is the thing that is changing, and the reason for the current paper.

Painless diversification

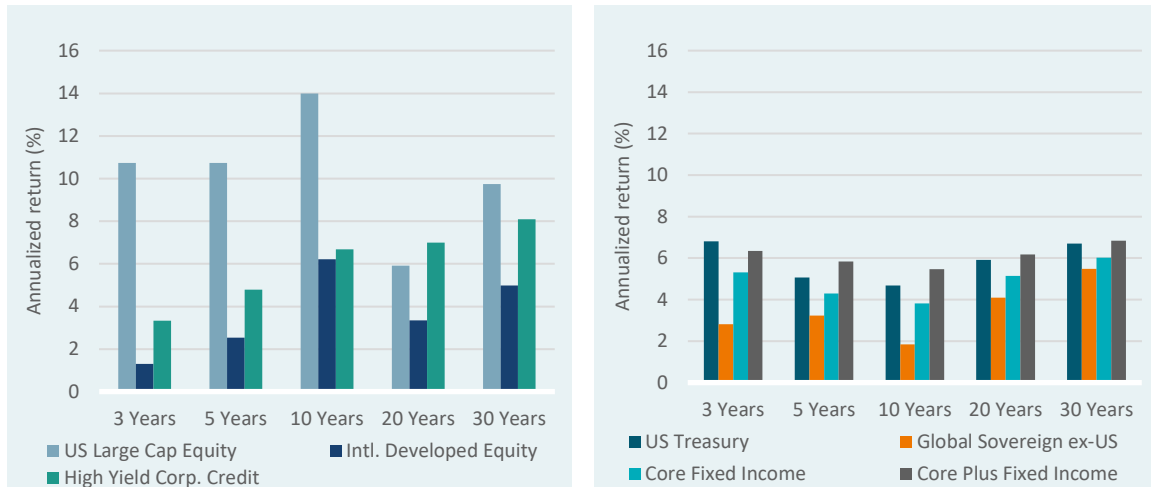
What do we mean by “painless diversification”? The answer is simple: over the last 40 years we have been in a structurally falling interest rate environment, from historically high levels to historically low levels. Investments in the most easily available diversifying asset (long U.S. Treasuries) have benefited in three ways. First, they have benefitted in general from the falling rate environment: because of their nature as a duration-sensitive asset they have increased in value as rates have fallen. Second, they have generally remained liquid during periods of financial stress, and have therefore acted as a source of liquidity as needed³. Third, they have benefited in the very short-term during strained conditions – interest rate cuts by the Federal Reserve aimed at stimulating the economy result in a bump to fixed income values. That combination – available liquidity, and two types of benefits from falling interest rates, both short-term and longer-term – has been incredibly powerful. The first chart below illustrates the historical diversification benefits of diversifying assets (as demonstrated by correlations). The second chart below outlines the historical relative return outcomes for investors in risk and hedging assets.

SAFER DURATION-SENSITIVE ASSETS HAVE HISTORICALLY PROVIDED CORRELATION BENEFITS



Performance data since 1992 (longest common history), US Treasury Index 7-10 year

RELATIVE PERFORMANCE: RISK ASSETS VS DIVERSIFYING ASSETS



Performance as of 10/31/20

This makes the point very clearly. A typical investor has paid relatively little for the diversification benefit they have received by allocating to fixed income. They have been able to access both the benefits of preservation of capital and those of inverse performance. They have also been able to be compensated both because of the general environment of dropping interest rates caused by the benevolent economic environment and by the shorter term dropping of interest rates in times of crisis.

The challenge investors face today is that this behavior is unlikely to continue—or at least the payoff curve is unlikely to be the same. To understand this we need to address the asymmetry of possible outcomes.

Asymmetry of outcomes under constraints

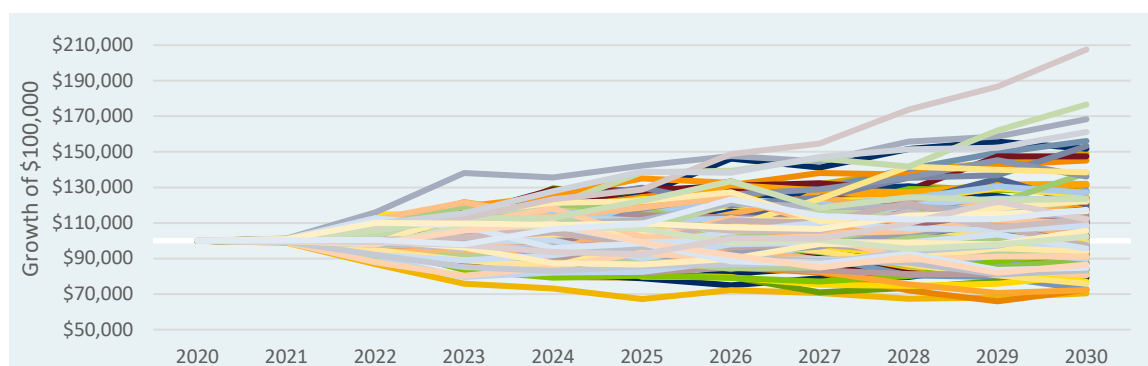
The effect of interest rate changes on fixed income investments² is generally expected to be roughly symmetrical: a fall in rates of 1%, for example, is likely to increase the price of the investment by around the same amount that a 1% rise in rates decreases the price of the investment. Assuming that the market has no particular expectation of the direction of interest rates, then, the likely distribution of outcomes can be expected to be symmetrical: in other words, there are equal probabilities of positive and negative outcomes, and equal probabilities of positive and negative outcomes of equal amounts.

This makes one major assumption though – that interest rates are in fact able to move by an equal amount in both positive and negative directions. If the market is constrained by regulation or structure in one direction, then this changes the distribution of outcomes available to investors, even if the probabilities absent those constraints are equally balanced. The imposition of constraints can change the possible payoffs for the bets being made by the investor – and this changes the risk proposition they are faced with.

A thought experiment can illustrate this. Imagine you have \$100 cash in your pocket, and you are offered a bet on a coin toss with a fair coin. The person offering you the bet gives you 1:1 odds, which seems fair. The problem, though, is that you are about to leave town in the next hour, and the person offering you the bet only has \$10 in their pocket – and you have neither their phone number nor their email address. A theoretically fair bet (50/50 chance of winning, with a payoff of -\$100 if you lose or \$100 if you win) has been turned into something quite different (a 50/50 chance of winning, with a payoff of -\$100 if you lose or +\$10 if you win). The odds are the same, but the outcome you might achieve is quite different.

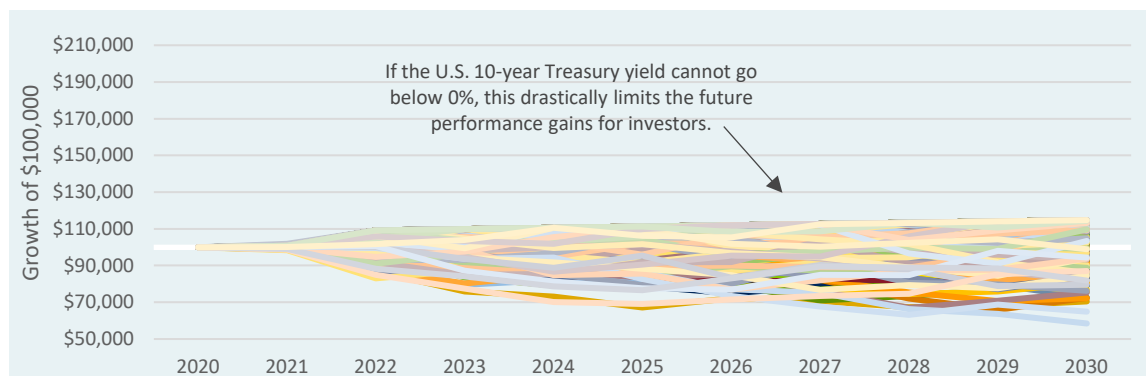
The situation faced by a government bond investor today is identical to this. If interest rates rise by 3% they will suffer significant pain. If interest rates were able to drop by 3% they would in theory benefit by the same amount. Reality is different, however, as investors likely doubt the ability of interest rates to drop by 3% from today's levels (which would bring the U.S. 10-year Treasury yield to *negative* -2.3%!) While rates might drop a little, and might go to 0% or even turn slightly negative, it seems unlikely that investors could receive the benefit of the full 3% drop. As shown below, this skews the outcome significantly and changes the payoff curve. We end up with more painful outcomes than good ones if we assume that the probability of change is equal.

MONTE CARLO ANALYSIS: ASSUMING INTEREST RATES HAVE EQUAL ABILITY TO GO UP OR DOWN



Source: Verus, MPI

MONTE CARLO ANALYSIS: ASSUMING INTEREST RATES CANNOT GO BELOW 0%



Source: Verus, MPI

The first chart above shows a Monte Carlo analysis which assumes interest rates have an *equal probability* of going up or down, and an *equal ability* to go up or down. In the second chart above, we show the same analysis with an *equal probability* of interest rates going up or down, but a *limit that interest rates cannot go below 0%*. If the U.S. 10-year Treasury yield cannot go negative, this significantly limits the upside performance potential of these bonds. In fact, in the second Monte Carlo analysis we find that the *average* annualized return outcome over the next ten years is actually 0.19%. The *average* annualized return outcome of the first chart above (with no interest rate limitation assumptions) was a full 0.54% higher, at 0.73%. That difference in average outcome is significant.

Probable interest rate moves

Things are made more complicated when we introduce the idea of non-symmetrical probability of interest rate moves. So far we have assumed an interest rate rise and fall are equally probable, but that market structures make the full impact of a rate rise more likely to be felt than the full impact of a rate fall. But are rates, in fact, more likely to rise or fall over the next five to ten years, based on today's economic environment?

When we think about this we should be careful not to think of it as a complicated market forecasting exercise, but instead should simply approach it as a rule of thumb exercise—less a forecast of the exact path of interest rates, and more a rough penciling in of possible paths.

When we do this the answer becomes clearer. Interest rates are at historically low levels, and the economy is suffering highly unusual negative stress at the moment. What would be likely to cause the three different scenarios from here: rates rising, staying flat, or falling?

As we can see from the table below, the environments do not feel equally distributed in terms of their probability.

Scenario	Possible economic environments	Likelihood*
Interest rates rise materially	1) Stronger economic rebound and conditions lead to heightened consumer and business sentiment, which lifts interest rates. This could be thought of as a “swift normalization” scenario.	30%
	2) Inflation begins to rise, which naturally pushes interest rates upward, and also puts pressure on the Federal Reserve to raise rates further to battle inflation.	
	3) Markets begin to price concerns over long term deficits into yields, demanding payment for perceived increased risk of default either directly or through future inflation.	
Interest rates stay low for longer	Economic growth continues to be mild, consumer sentiment is moderate, high unemployment persists in certain parts of the economy. Monetary and fiscal policy stays easy to support the slow expansion.	60%
Interest rates go to zero, or slightly negative	1) The economy enters a sharp double-dip recession or depression, pushing rates to zero as confidence and inflation drops.	10%
	2) The Federal Reserve contemplates a negative interest rate policy.	

*Verus estimates

Rates might well stay at these exceptionally low levels for some time, and it is possible we have seen a structural shift towards very low interest rates which might last for the long-term. Moving back to a more “normal” environment would require a very significant rise in rates. A material improvement in the underlying economy from the stressed levels we see today might create an environment where that upward pressure exists. The environment that would drive significantly lower rates, however, seems to be a very dark one – and may be the least likely scenario. Indeed, conditions that might be seen as justifying materially lower rates would be likely to throw a number of presumptions about capital markets on their head, and could potentially cause a range of other instabilities about policy frameworks which might themselves see the creation of a credit risk premium in otherwise historically robust government issued bonds.

What are the expectations today?	Description	Interest rate forecast
Federal Reserve	The Federal Open Market Committee (FOMC) regularly publishes each committee member's expectation for longer-term interest rates	2.5%
30-year U.S. Treasury Yield	Under the "pure expectations" theory, investors may interpret the yield of longer-term government bonds as an indication of where interest rates are headed in the future.	1.6%
Future interest rates as suggested by financial derivatives markets	Derivatives markets reflect the future interest rates which investors are actually pricing. Derivatives pricing may be the most pure reflection of investor expectations.	10-yr U.S. Treasury yield: 1 year in the future = 1.08% 3 years in the future = 1.43% 5 years in the future = 1.70%
"R-star" natural rate of interest. Lauback & Williams (2003)	The Laubach-Williams (2003) model uses data on real GDP, inflation, and the federal funds rate to extract trends in U.S. economic growth and other factors influencing the natural rate of interest.	0.4%

Market data as of 11/17/20

Again, the point here is not to make an interest rate forecast: we do that rarely, and do not feel strongly enough today about the direction of rates to make such a call now. All this table is designed to make us do is to think hard about whether the distribution of likely interest rate moves is truly symmetrical. If not, and if in addition there are structural impediments making materially negative rates unlikely to happen, then investors need to consider whether the risk / return payoffs involved in government bonds are indeed balanced. If not, they seem unlikely to provide similar levels of either preservation of capital or inverse performance diversification than they have in the past.

So what to do?

So what should investors do in the current situation? We believe that there are a number of answers. Any solution requires two key realizations, with the path forward dependent on the success the investor has in embedding those ideas into their planning. Those two realizations are simple:

- Sometimes impossible things are impossible, not just hard. Focusing on trying to create an impossible solution makes it harder to deliver on less attractive but actually achievable solutions.
- Complexity does not, in itself, drive better outcomes.

Once we have dealt with those two realizations we can move on to deal with ways to address each of the two specific types of diversification.

Impossible things are impossible

Any solution to the diversification problem starts with this recognition. As we have discussed above, the environment we have been in over the last 40 years is highly unlikely to repeat itself over the next 40. Thus, the behavior of diversifying assets over that 40 years has been uniquely beneficial. This also means that, rather than wasting time on trying to find an asset class or combination of asset classes that might try to do that we should instead focus on the two roles – preservation of capital, and inverse performance – and try to find assets that will at least meet one of these goals. This may not give us everything we want, but it may still allow us to move towards an outcome that will work. Focusing on replicating the highly unusual may incidentally result in us achieving actively bad results.

Complexity does not solve problems

In the same way that impossible things are impossible, we also need to recognize that adding complexity to solutions does not in itself change the underlying dynamics of the economy or the markets. Current market structure and pricing suggests that both risk-free rates and normal market betas are likely to perform weaker than their averages over the next ten years. Products that fail to recognize that reality and that claim to generate significantly different outcomes through complex structuring need to be looked at with appropriate skepticism.

Solving the diversification conundrum

We can now move on to understand the different ways to approach the challenges of diversification in a low interest rate environment. Each strategy and approach will be touched on and discussed, but as we stated at the start of this paper we should remain skeptical about historical asset class behavior, as this is likely to reflect more the environment we have experienced previously than that which we are about to experience in the future.

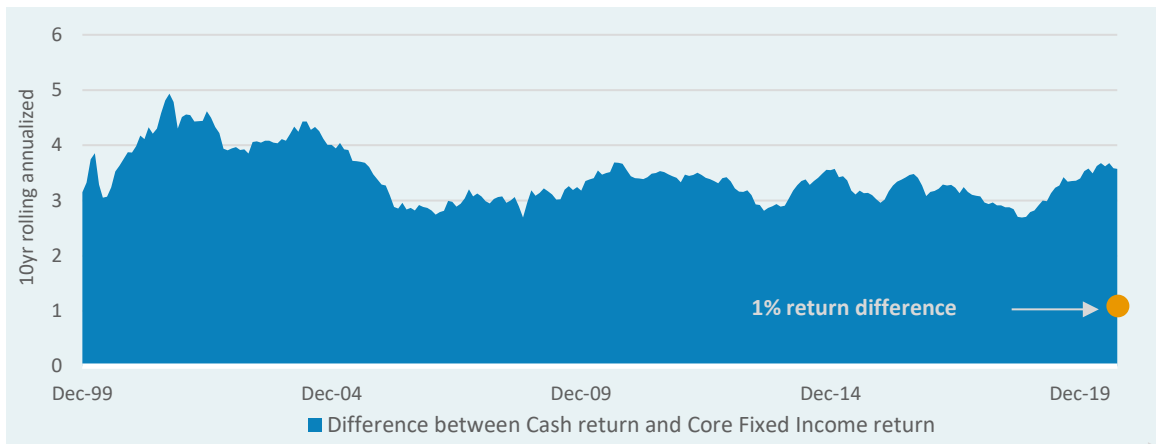
Principal protection approaches

The first of the two types of diversification we are seeking is principal protection. This requires that the exposure we are buying suffers little to no price shock when risk markets are hit, and that the asset remains liquid during that environment. This draws focus to the following ideas:

- Cash: With cash drag effectively zero (as the time premium is de minimis) the prospects for cash in a portfolio to fulfill this role are surprisingly good.
- Very high-quality credit fixed income.

Cash

The traditional argument against holding cash in the portfolio has been that it will reduce the total return of the portfolio. This phenomenon – cash drag – would have had a major impact on portfolio returns over the last 40 years. This effect is illustrated in the chart below.



Source: Verus, MPI – BbgBarc U.S. Aggregate Bond vs. 30-day T-Bill

This relationship has now changed. In an environment where cash offers a return of 0.2%, but core fixed income offers 1.2%, the “cost” of holding cash is very low.

Very high-quality credit fixed income

The second possible candidate in this space fits slightly oddly with a recommendation to hold cash because of the lack of cash drag: high quality credit fixed income. The logic behind this is simple, however. A low interest rate environment primarily affects the duration component of fixed income return – the credit element of total return becomes more important. Accessing even a small uptick in return can therefore help total return. The challenge, however, is that credit risk has a degree of correlation with equity risk, which reduces the diversification benefit that we are looking for. The highest quality credit fixed income, however, may be able to withstand much of that and provides some small protection against that increased correlation. As shown in the charts below, the highest quality portion of corporate bonds have historically demonstrated both greater upside potential during market stress, and also less severe losses during market drawdowns.

ASSET PERFORMANCE DURING U.S. BEAR MARKETS

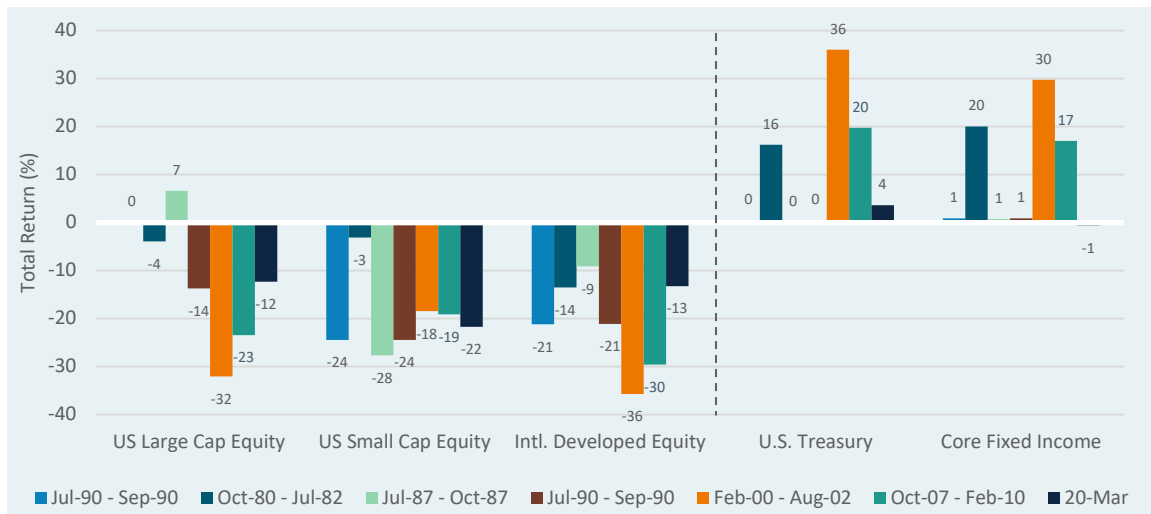


Performance since 1988

Inverse performance approaches

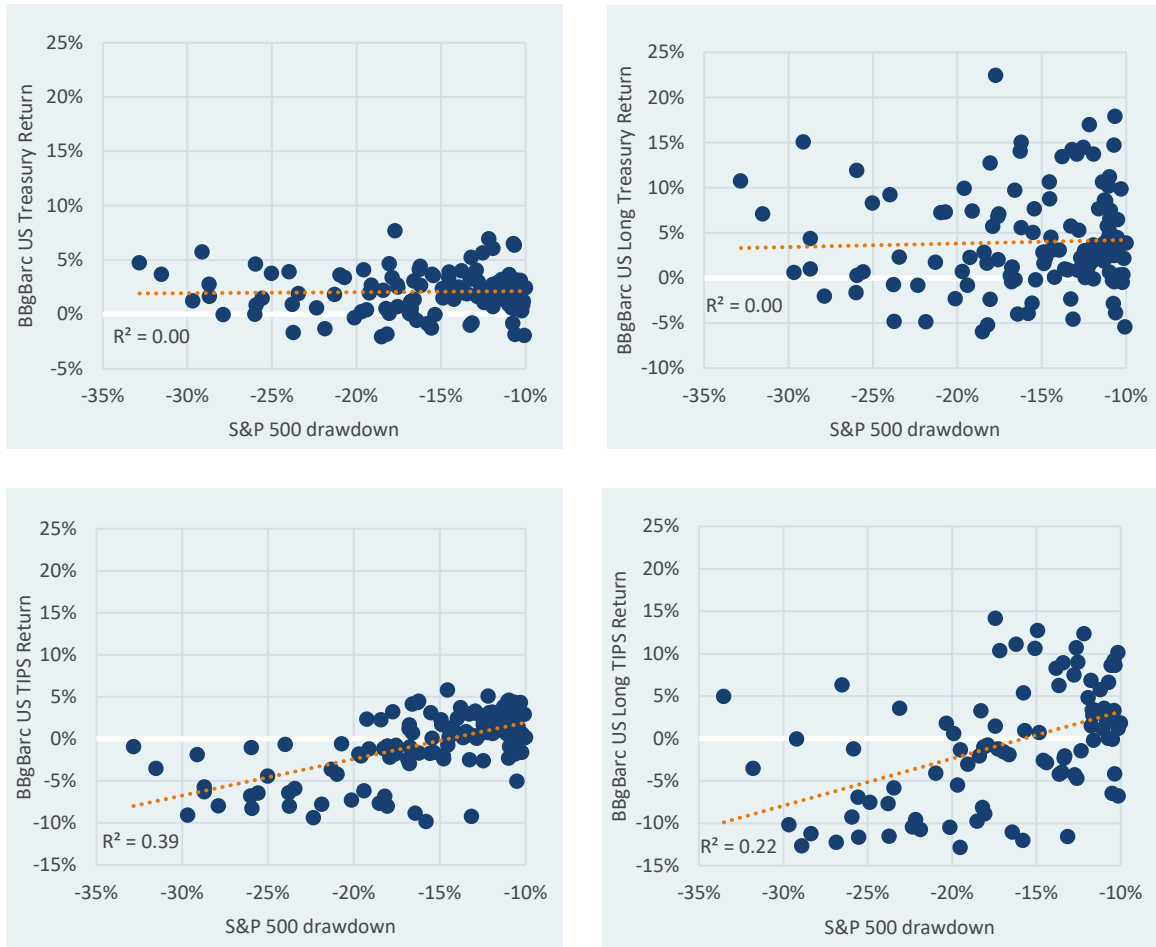
The second of the two types of diversification we are seeking is inverse protection. This requires an asset that performs well when risk assets perform poorly. The traditional approach here has been to buy assets with long duration exposure, due to the assumption that there will be rapid interest rate decreases in a risk-off environment. Historically, the strategy of holding duration in the portfolio has worked well, as we show below. Another asset which often performs well during drawdowns is gold, as investors seek safe-haven assets during these times. However, this attractive quality must be balanced with the fact that gold can experience very large swings in value for seemingly idiosyncratic reasons.

ASSET PERFORMANCE DURING U.S. BEAR MARKETS



Source: Verus, MPI

30-DAY PERIODS WHERE THE S&P 500 DREW DOWN AT LEAST 10%



Source: Verus, MPI – performance since 1998

However, as we have discussed in this paper, the current environment where interest rates are only slightly above zero strongly suggests that investors should not expect this performance in the future. With that assumption effectively neutered, we have to reevaluate what other approaches we might pursue to achieve this goal.

Two alternative approaches to pursue inverse performance include the following:

- Buying a *liquidity* premium
- Buying *volatility*.

Buying a liquidity premium

A benefit that is often overlooked is the benefit of a liquidity premium that an investor receives when holding cash or other assets which tend to maintain their value during times of market stress or crisis. Assets which do not fall meaningfully in value during a crisis can be

sold and used to purchase risk assets at potentially attractive prices. The ability to purchase these assets at a discount has ongoing value, which suggests that investors may expect to receive a benefit (i.e. return) above and beyond the stated yield or spread of these assets over the longer-term.

Buying volatility

Another approach that is more involved is the outright purchase of derivatives (typically *options*) to bolster portfolio performance in times of market stress. This might be thought of as *buying volatility*, and is most often referred to as tail-risk hedging. While this approach may provide an investor with a pretty clear and known payoff for a market drawdown of a given size, its weakness should also be considered. A major weakness to *buying volatility*, or tail-risk hedging, is the ongoing cost. Specifically, under normal derivative market conditions the buyers of options pay a premium price (overpay) and the sellers of derivative market exposure are paid a premium (are overpaid). This market effect might be thought of as: buyers of insurance pay a higher price, and sellers of insurance receive a higher price. In other words, an investor who pursues a long-term tail-risk hedging program will likely experience a notable performance drag on the overall portfolio. Because of this an alternative approach may be attractive: consciously selling insurance in a carefully structured way, and using the premiums received in a way that explicitly covers the expected losses when crashes happen. The important point, whatever side of the trade is being taken by the investor, is the recognition that what they are doing is participating in an insurance market, that pricing insurance is hard, and that one should rarely expect a profit from simply purchasing an insurance contract.

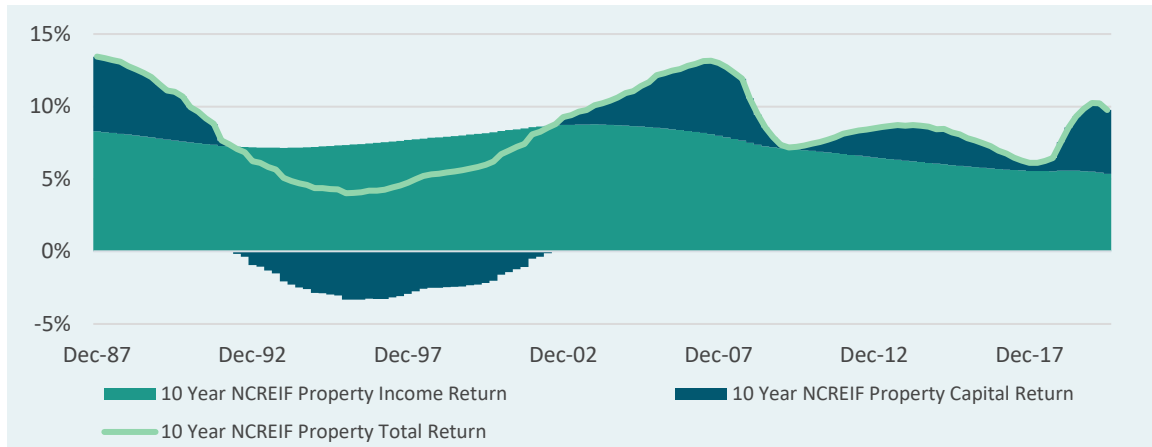
Diversification as difference

Finally, we move on to consider approaches that are somewhat different: those which do not provide diversification explicitly, but which do change the shape of future outcome distributions for the portfolio in a way which is likely to mitigate some of the effects of downside events. We discuss two types of assets in this category: risk-seeking assets with fixed income properties, and truly non-correlated alternatives.

Risk-seeking assets with fixed income properties

As demand for income rises, given the zero-interest rate environment, investors may be more attracted to the income-producing qualities of risk-seeking assets such as real estate or infrastructure. These exposures will not likely provide pure preservation of capital during a market downturn, and are also not likely to provide great liquidity properties. However, prices may zig when risk-asset prices are zagging (correlation less than 1) and these assets may provide higher income and possibly some desirable duration properties. In the chart below we display the strong income component of private real estate.

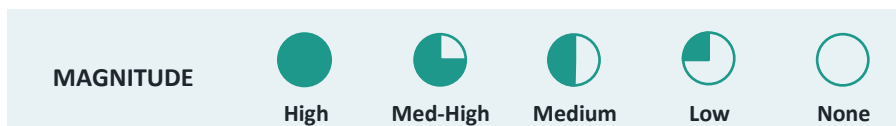
REAL ESTATE RETURN COMPOSITION (TRAILING 10-YEARS)



Source: NCREIF, as of 6/30/20

This introduces an important market theme that we believe the low rate environment will bring to the forefront. For many decades, investors have had the convenience and luxury of being able to separate *risk-seeking* assets and *diversifying* assets into two fairly clean categories: equities and safe fixed income, for example. Each of these two categories played a clear and distinct role. However, there have always existed a variety of assets with different gradations of these two qualities (risk-seeking and diversifying). Real estate and infrastructure are great examples—each can provide a blend of risk-seeking and diversifying properties (as well as income and inflation-hedging). Rather than sitting cleanly in either of the two categories, these might sit somewhere in between, as might even high dividend public equities. And we believe this will be the environment for investors in the future—evaluating asset classes and exposures based on a balance of overall properties that they bring to the portfolio. The table below provides a generalized illustration of the qualities which real estate might offer to the overall portfolio relative to other assets.

	RETURN ROLES				DIVERSIFICATION & VOLATILITY ROLES		
	Benefit from GDP Growth	Earn Risk Premium	Produce Stable Income	Hedge Against Inflation	Low Absolute Volatility	Low Corr. To Other Assets	Reduce Portfolio Volatility
Public Equities	●	◐	◐	◑	○	○	○
Private Equities	●	●	○	◑	○	◐	○
Fixed Income (Treasury)	○	○	●	◐	●	●	●
Public Credit	◑	◑	●	◐	◐	◑	◐
Private Credit	◐	◐	◐	◑	◐	◑	◐
Real Estate	●	◑	◐	●	◐	◑	◑



Source: Verus

Uncorrelated or differentiated alternatives

Other types of assets may provide exposure that moves differently from the rest of the broader portfolio. An exposure that *zigs* when the rest of the portfolio *zags* but that does so in an entirely unconnected way (rather than in a way that is expected to be related but inverse) can reduce overall portfolio volatility and also reduce tail risk in stressed markets if this exposure is not sensitive to the same market undercurrents.

An example of a potentially uncorrelated alternative investment is catastrophe bonds—an insurance product which passes along insurance premiums to investors but generates losses during a specific event such as an earthquake or harsh hurricane season. Catastrophe bonds are higher-yielding fixed income instruments that are issued to raise funds for insurance companies. A primary benefit to investors of this asset class is that downside events (loss events) may be unrelated to the timing of downside events of other asset classes. In other words, the correlation of catastrophe bonds with the broader portfolio may be zero (or very close to it), which is of course a valuable diversification benefit.

Another example is *litigation claims*—a niche strategy employed by hedge funds that offers a potentially truly uncorrelated return stream. In this strategy, hedge funds purchase legal

claims against some company or entity for some fraction of the total value of claims. The hedge fund then files in court for recoupment of those claims, and legal proceedings determine the timing and size of payouts thereafter. Capitalization of legal claims is a common approach for many of the larger hedge funds that focus on distressed or restructuring entities.

Conclusion

Over the past 40 years investors have benefited from “painless diversification” by simply holding U.S. Treasuries, as interest rates steadily dropped (resulting in gains through duration sensitivity), interest rates were higher (providing ongoing positive yield), and interest rates fell during stressed market events (resulting in quick gains from duration assets). With interest rates now at historic lows, investors have been confronted with the reality of a new investing landscape: one where the typical relationships between assets come into question, and where the most basic ideas around diversification and portfolio construction no longer seem to fit with the opportunities available. We believe it is important for investors to recognize two themes: First, no asset class today (or combination of asset classes) is likely going to offer both preservation of capital, and inverse performance. Investors may be well-served by focusing on one rather than both of these objectives, for each of their exposures. Second, we should recognize that adding complexity to solutions does not, in itself, change the underlying dynamics of the economy or the markets. Complex strategies which claim to defy these market dynamics should be looked upon cynically. Finally, we walked through a variety of possible solutions and provided our thoughts on each. The research teams at Verus are continuing to follow market developments and discussing possible solutions with best-in-class asset managers. We look forward to sharing additional thoughts in future publications.

Notes & Disclosures

- 1 *Government bonds have occasionally also experienced illiquidity during times of severe stress, such as the surprising illiquidity of U.S. TIPS during March of 2020. However, these liquidity problems tend to be much less significant than what was witnessed in other public asset classes within each period.*
- 2 *We are using government bonds issued by a trustworthy and creditworthy government for these purposes: if we introduce credit issues into the equation it might complicate this simple model.*

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