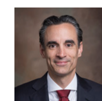
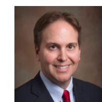
When Diversification Fails

Reexamining portfolio construction amid the coronavirus crisis.

June 2020



Sébastien Page
Head of Global Multi-Asset



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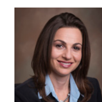
Head of International Fixed Income



Anna Dreyer
Head of Fixed Income Risk and Portfolio Construction Research

KEY INSIGHTS

- As in past episodes of extreme market volatility, correlations across many asset classes spiked higher during the sell-off caused by the coronavirus pandemic.
- As markets and economies recover, investors face the question of when—and how—to increase portfolio exposure to equities and other risk assets.
- U.S. Treasuries, gold, and volatility strategies historically have been effective hedges. However, low yields could limit future rate declines in stressed markets.

One of the most vexing problems in investment management is that the benefits of portfolio diversification can seem to disappear just when they are needed most.

The coronavirus crisis provided a fresh example of this tendency. When global markets sold off in March, return correlations among different asset classes and sectors spiked as investors sold indiscriminately. "There were few places to hide other than U.S. Treasuries, gold, and the U.S. dollar as a safe-haven currency," says Anna Dreyer, head of fixed income risk and portfolio construction research.

"Every time we get into a crisis, people seem surprised when correlations that normally are in the 0%–50% range suddenly jump to the 90%+ range," adds Sébastien Page, head of global multi-asset. "This risk is very much underestimated even by the savviest investors."

As an example, Page cites historical correlations between U.S. and non-U.S. equities. From January 1979 through February 2008 (near the beginning of the global financial crisis), he says, the correlation of returns between the two asset classes was actually negative (-17%) in months when both rallied strongly (i.e., by more than one standard deviation, a statistical measure of variability) from the average for such periods.

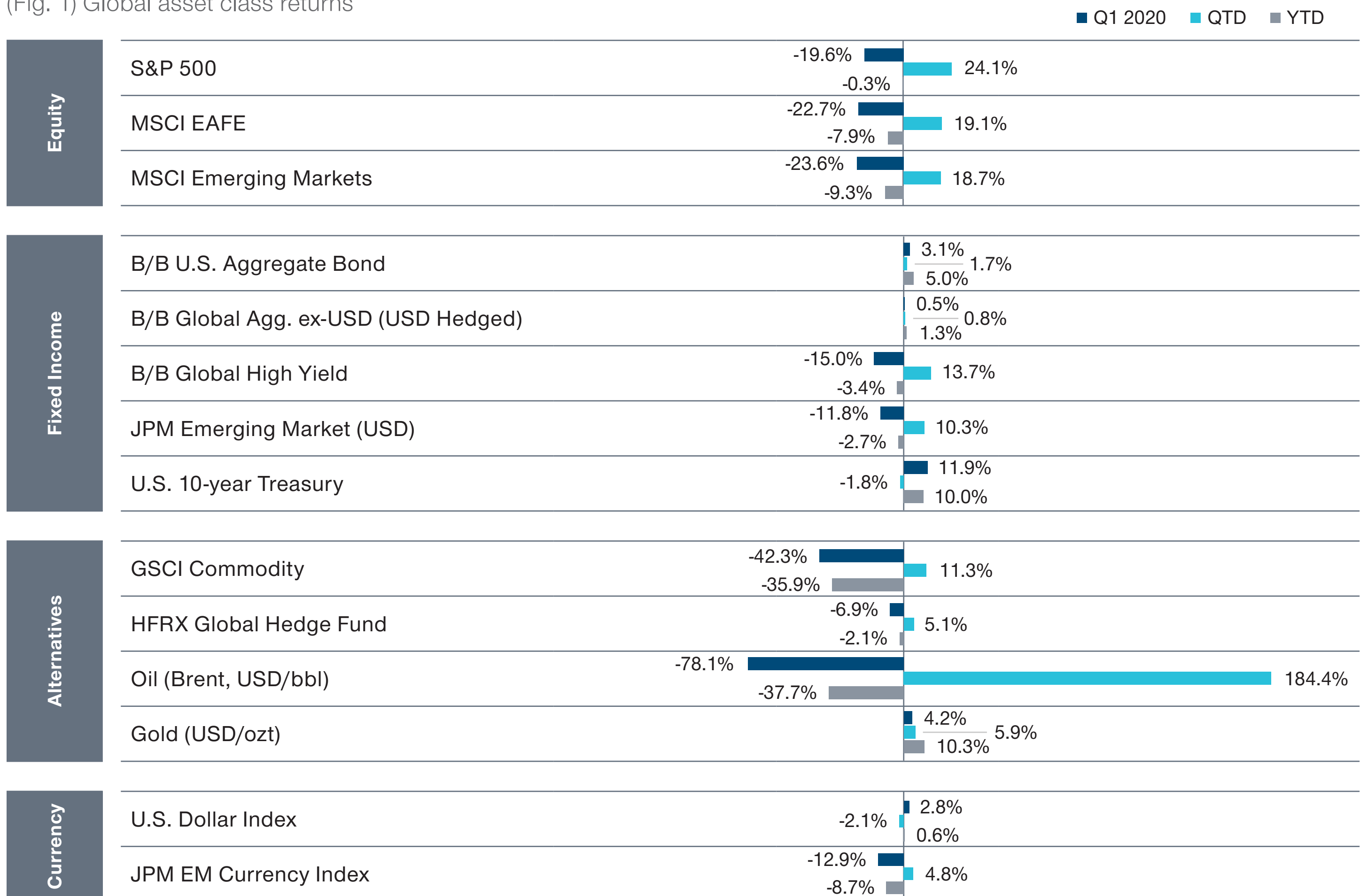
By contrast, in periods where both asset classes suffered losses that were more than one standard deviation from the average, the monthly correlation rose to 76%.

In declines greater than two standard deviations from the average, Page adds, the correlation rose to 93%—demolishing virtually all diversification benefits.[1]

[1] Sources: S&P and MSCI (see Additional Disclosures). Data analysis by T. Rowe Price. Based on correlations of monthly data over rolling 12-month periods for the S&P 500 index versus the MSCI World ex-USA Index.

The Benefits of Diversification Can Disappear When They Are Needed Most

(Fig. 1) Global asset class returns



Past performance is not a reliable indicator of future performance.

As of June 5, 2020.

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Risk assets, including equities, credit, many commodities, and emerging market currencies, all sold off in March, Dreyer noted, suggesting a rise in correlations and supporting the argument that a failure of diversification also applied to the March sell-off.

Beware of "Regime Change"

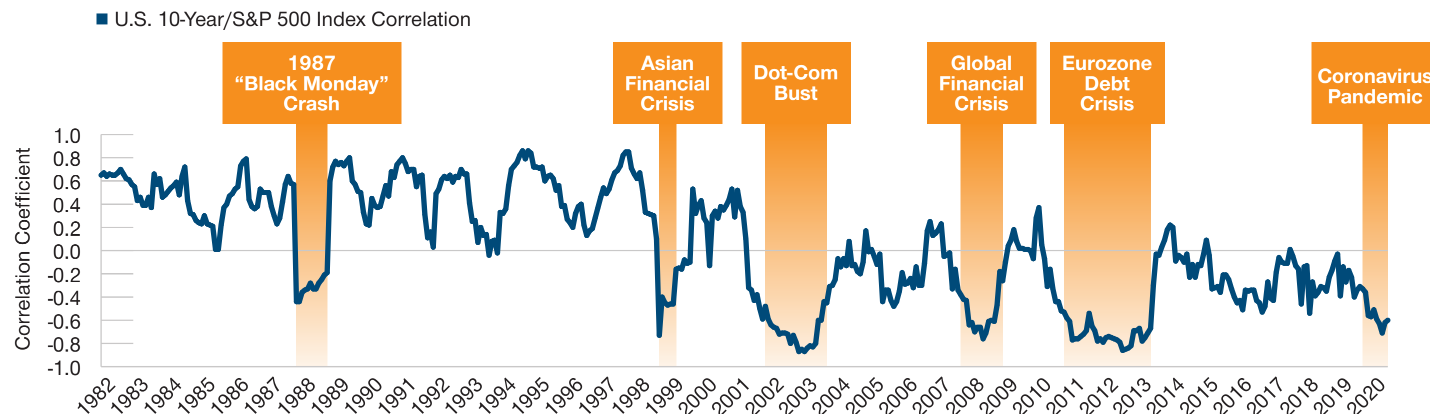
Investors often rely on correlation averages across long historical periods when constructing portfolios, Page notes. But markets and economies both tend to move through distinct periods of calm and turbulence. These correlation "regimes" may last for extended periods.

"Shifts between regimes are hard to predict," Page says. This can leave investors exposed to tail risk—unlikely but extreme events at either end of the probability distribution of potential market outcomes.

Over the past two decades, long-term U.S. Treasuries were one of the relatively few hedges against tail risk that typically performed well amid market volatility, notes Rick de los Reyes, portfolio manager for Macro and Absolute Return Strategies.

U.S. Treasuries Historically Have Been Strong Diversifiers in Market Crises

(Fig. 2) Rolling 12-month correlations of 10-Year Treasury note and S&P 500 Index[1]



January 1, 1981, through May 31, 2020.

Sources: Bloomberg Index Services Limited and Standard & Poor's (see Additional Disclosures). Data analysis by T. Rowe Price.

[1] Based on correlations of monthly returns over rolling 12-month periods for the Bloomberg Barclays U.S. Treasury 10-Year Bellwether Index versus the S&P 500 Index.

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> *Portfolio Manager, Macro and Absolute Return Strategies*

Falling interest rates and positive carry (i.e., a positive differential between short-term and long-term rates) also made U.S. Treasuries an attractive diversifier, de los Reyes adds.

Dreyer notes that it is less clear whether those benefits will be as attractive in the future. During the worst of the March sell-off, the nominal 10-year U.S. Treasury yield fell below 1% for the first time. With Federal Reserve policy rates now close to zero and the Fed showing little interest in taking rates negative, U.S. Treasuries may offer only meager returns going forward, de los Reyes adds. "It looks like U.S. Treasuries likely will be less effective as a hedge against tail risk in the future, which is unfortunate."

U.S. Treasuries and the S&P 500 Index have not always been as negatively correlated as they have been over the last 20 years, Dreyer notes. In the 1970s, for example, the correlation typically was positive.

Arif Husain, head of international fixed income, says he believes longer-duration assets, including U.S. Treasuries, will continue to work as portfolio hedges against market volatility. "When a crisis happens, people will still look for the highest-quality assets," he argues.

However, Husain agrees with de los Reyes that the impact of the coronavirus crisis in driving down yields almost certainly means that from here such assets almost certainly will offer much lower returns than they have historically.

Two other potential hedges historically have performed well in periods of equity and credit market volatility but also have their limitations in more normal periods.

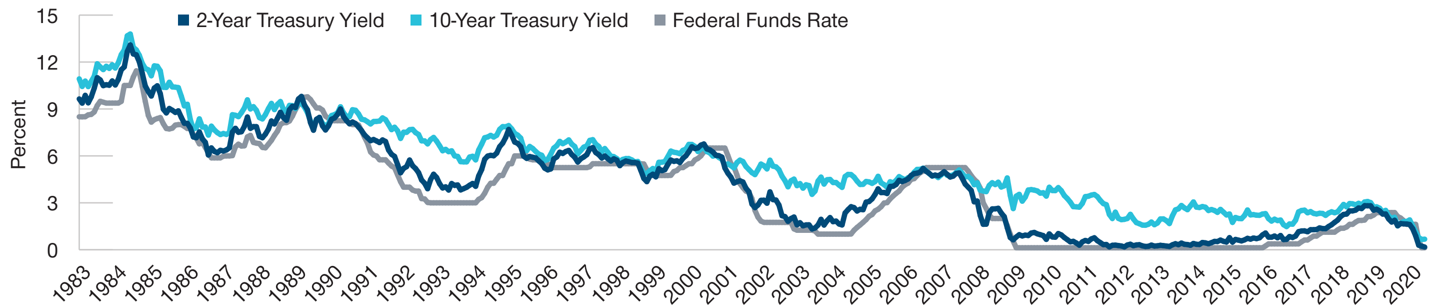
Gold, de los Reyes argues, is potentially an effective long-term hedge, but can be less reliable over shorter-term periods.

Gold prices often have fallen in the early stages of past market crises but typically have rebounded more quickly during recoveries. This also has been the pattern so far during the coronavirus crisis, de los Reyes says.

Another potential hedge against equity volatility, de los Reyes notes, is to go "long" volatility by purchasing put options or shorting stocks (borrowing shares and selling them in the expectation that they will decline in price, allowing the investor to repurchase the shares at a lower price and lock in a profit).

Interest Rates: How Low Can They Go?

(Fig. 3) Federal funds rate versus 2- and 10-year Treasury yields



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January 1983 through May 2020.
Source: Federal Reserve Board/Haver Analytics.

Historically, put options and short positions have been "far and away the best hedges in a crisis," de los Reyes says. However, the costs—such as premiums on options and fees on borrowed shares—can be punitively high in more normal market periods.

Put options may expire worthless, de los Reyes notes, and short positions potentially expose an investor to large losses if a stock's price rises rather than falls.

The Role of Liquidity Risk

Liquidity risk—the possibility that investors may not be able to find buyers for assets they urgently need to sell—can be the primary culprit when diversification benefits disappear during periods of extreme market volatility.

Page uses the analogy of a burning building: To get out of the building, investors need to find a buyer willing to take their place inside the building—not an easy task in the middle of a crisis.

Indeed, in periods of extreme volatility, price declines may be worse for higher-quality assets, because those may be the only ones that can be traded at all. "When investors need liquidity, they sell everything in their portfolio that's liquid," Page says. "So all liquid assets sell off at the same time, no matter what the differences are in their fundamentals."

Waves of indiscriminate selling may cause asset prices to "gap"—change dramatically between one transaction and the next—and push correlations higher across the board, Page notes.

Financial reforms imposed after the global financial crisis may have made liquidity problems worse, especially in corporate credit markets, de los Reyes says.

Higher capital requirements have made broker-dealers less willing to hold relatively risky securities in inventory. As a result, more assets may be offered for sale when markets are declining, "We saw that in February and March of this year, even in the Treasury market," de los Reyes says. "Eventually the Fed had to step in, because no one else wanted to buy."

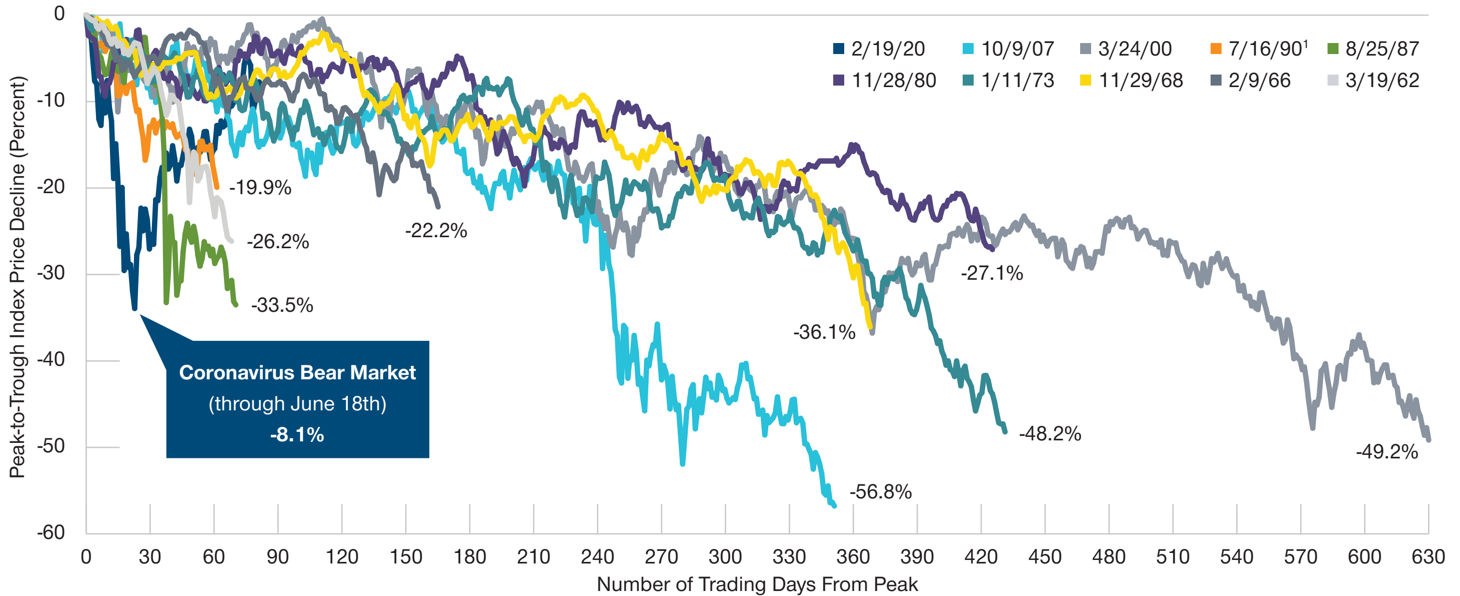
Private Assets and Their Limitations

Many investment consultants and other analysts argue that private equity and other assets that are not traded in public markets have diversification characteristics that potentially make them highly effective hedges against market volatility.

Citing the results of conventional mean/variance optimization (MVO, an analytical tool used in asset allocation), some private-equity advocates contend that the asset class is essentially a "free lunch" that potentially can deliver high

March Sell-Off Was the Most Rapid of the Past 10 Bear Markets

(Fig. 4) S&P 500 bear markets, 1960 to present



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March 19, 1962, through June 18, 2020.

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[1] 7/16/90 included even though sell-off fell just short of -20% bear market threshold.

returns, low volatility, and low correlation to the economic cycle.

But the diversification benefits of private assets are more apparent than real, Page argues. "It's a mirage, at least in part," he says.

Because most private assets are not valued in markets on an ongoing basis, the return and correlation data fed into an MVO analysis may be unreliable, Page says—especially if those returns are based on internal rate-of-return calculations that include unrealistic assumptions about reinvestment rates.

Page says he does believe that diversification across both public and private assets can be useful. However, he argues that private asset allocations need to take into account mark-to-market risk—the possibility that assumed valuations could be inaccurate or stale—even though that risk can be very difficult to estimate.

Stepping Back Into Risk

As markets and economies continue to recover from the coronavirus pandemic, investors will face the question of when—and how—to increase portfolio exposure to equities and other relatively risky asset classes.

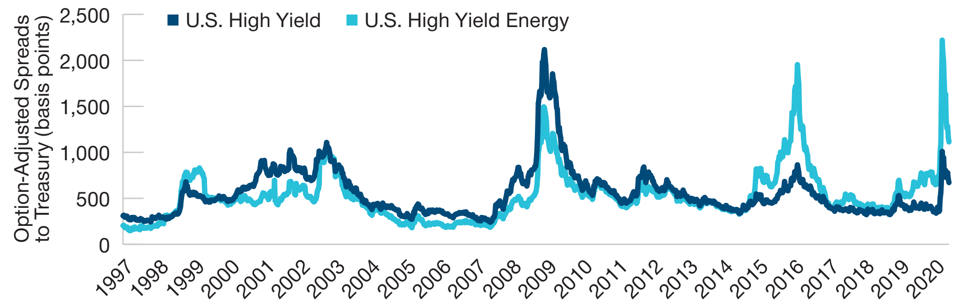
From a strategic perspective, Page argues, investors should remain diversified for the long run. From a tactical perspective, however, they may be able to enhance returns during a downturn and in the early stages of a market recovery by leaning into risk assets.

T. Rowe Price research, he adds, suggests that, historically, it has not been especially important whether investors successfully timed the bottom of a market downturn.

"We looked at 17 equity sell-offs over the last 80+ years prior to the coronavirus crisis, and we found that being as much as one month early or one month late in buying stocks around the absolute bottom

Credit Spreads Widened Sharply

(Fig. 5) U.S. high yield spread history[1]



Past performance is not a reliable indicator of future performance.

January 3, 1997, through May 31, 2020.

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[1] U.S. High Yield = ICE BofA US High Yield Index. U.S. High Yield Energy = ICE BofA US High Yield Energy Index.

> One clear lesson from this crisis is that being a Fed watcher is even more important than in the past.
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> *Portfolio Manager, Macro and Absolute Return Strategies*

still could have added significant value across those 17 sell-offs," Page observers. "The success rate was 100%."[2]

Although the market outlook depends heavily on the course of the pandemic and the strength of the global economic recovery, Page says he believes investors who have added to their positions during the downturn and in the initial stages of the market rebound ultimately will be rewarded this time as well.

That said, Page suggests that investors should use scenario analysis—based on stress correlations, not just longer-term average correlations—in their portfolio construction process.

Keeping a Close Eye on the Fed

As they contemplate potential tactical adjustments in their portfolio allocations, investors also may want to pay close attention to monetary policy, de los Reyes suggests. "One clear lesson from this crisis is that being a Fed watcher is even more important than in the past," he says.

"The Fed's ability to tame volatility should not be underestimated," de los Reyes adds.

However, the Fed can only do so much to improve the outlook for corporate credit, Husain says. While the U.S. central bank has restored liquidity in many markets by purchasing securities to hold on its own balance sheet, such injections by themselves cannot repair the damage done to corporate balance sheets by the crisis.

"[Fed] Chairman [Jerome] Powell has made it very clear that liquidity does not equal solvency," Husain notes. "So I think we will continue to see defaults." For investors, he adds, this means that strong bottom-up fundamental credit research will remain essential to successful security selection.

For professional portfolio managers, the Fed's various buying programs have created potential opportunities in distressed fixed income sectors, according to de los Reyes. Since the start of the crisis, he notes, the Fed has extended its purchases to a progressively broader range of fixed income sectors: first Treasuries, then mortgage-backed and asset-backed securities, then investment-grade corporate bonds, and more recently even high yield bonds.

[2] To identify what constituted a "sell-off event," we used S&P 500 Index price data from January 3, 1928 through January 30, 2020 to calculate the drawdowns from a previous peak and then identified the dates with the largest drawdowns corresponding to each peak. From that, we implemented a 15% maximum drawdown threshold in order to find the historic dates that have had major sell-offs. We then measured subsequent returns over 12 months for stocks in the S&P 500 Index one month before and one month after the absolute bottom.

"Our strategy has been to try to stay one step ahead of the Fed by buying assets at dislocated prices and then potentially benefiting as the Fed stepped in and those markets started to normalize," de los Reyes says.

Disciplined Diversification Can Help

Although asset correlations followed their past historical pattern by spiking toward 100% in the depths of the coronavirus sell-off, the most damaging problem for many investors wasn't that diversification failed during the crisis but that their portfolios weren't sufficiently diversified going into the crisis, Husain contends.

"Too many investors lost the discipline of pure diversification," Husain says. "They switched from Treasuries into things they believed were very similar to Treasuries—like investment-grade credit—only to discover that they weren't that similar during a crisis."

Investors had many opportunities to add diversification and hedge risk before the crisis, Husain says, at a time when many indicators of expected volatility, such as the Chicago Board Options Exchange's Volatility Index, were trading at historically low levels.

"It's painful sacrificing potential returns," Husain says. "But in the real world, diversification is a form of insurance. And the worst time to try to buy insurance is when the building is already on fire."

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