



Why “diversification” isn’t working

Using non-correlated assets to reduce portfolio volatility without sacrificing return

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Many investors have been dissatisfied with the level of volatility in their portfolios, even though they thought they were diversified. In 2008 and 2009 many multiasset class asset allocation strategies experienced significantly higher volatility than investors in the strategies were comfortable with. Most investors understand the principle of diversification — hold a variety of investments in order to increase the likelihood that weakness in one area will be offset by strength in another. However, simply holding multiple investments doesn’t guarantee diversification. If an investor is planning for a major life event, college, retirement, etc., then often they simply cannot afford a major drawdown on their savings. If diversification is to achieve its desired outcome — namely, reduce portfolio volatility — investors must consider three factors when adding a new asset to the portfolio:

- > The asset’s correlation to the existing holdings
- > Its expected return
- > Its expected volatility

In practice, investors often fail to incorporate all three elements into their diversification strategy. Investors will be best served if the new asset has an expected return similar to the existing portfolio, a low degree of volatility

and a low correlation with the overall portfolio. These examples can help explain.

Example 1: Diversifying with similar risk/return assets

Let’s take the example of a traditional 60/40 portfolio (60% S&P 500 Index/40% Barclays Capital U.S. Aggregate Bond Index). From January 1976 to September 2010, the portfolio would have had the following characteristics:

Average return: 10.23%

Average standard deviation: 10.03%

If we want to diversify this portfolio without deviating far from its current risk/return profile, we would only consider a new asset class that has a similar long-term return expectation (10.23%) and a similar standard deviation (10.03%). That means the only thing differentiating the new investment would be its degree of correlation with the existing portfolio.

Our goal in diversifying is to reduce the standard deviation (volatility) of the overall portfolio. As shown in Table 1, this is best achieved when the investor makes a large allocation to a new asset that is negatively correlated to the existing portfolio. Too often investors only make small allocations into asset classes that truly diversify.

Table 1: Standard deviations for the overall portfolio

(Allocations are made to a new asset class with risk/reward characteristics that are similar to the existing portfolio)

Correlation	50% allocation to new asset	25% allocation to new asset	10% allocation to new asset
-1.00	0.00%	5.02%	8.02%
-0.75	3.54%	5.88%	8.29%
-0.50	5.00%	6.63%	8.56%
-0.25	6.12%	7.31%	8.82%
0.00	7.07%	7.93%	9.07%
0.25	7.91%	8.50%	9.32%
0.50	8.66%	9.04%	9.56%
0.75	9.35%	9.55%	9.79%
1.00	10.03%	10.03%	10.03%

When you diversify a portfolio with an asset class that has similar risk/return characteristics, allocation size and correlation are important in reducing overall portfolio volatility.

Adding a small allocation (10% column) to a highly correlated investment (row labeled 1.00) has virtually no effect on expected portfolio volatility; it remains 10.03%. In fact, adding a 10% allocation to an asset with a correlation of 0.50 reduces expected volatility by less than half a percentage point (from 10.03% to 9.56%). Even adding a small allocation to a very negatively correlated asset fails to significantly reduce overall volatility. However, as you make a more significant allocation to an asset class with a low or negative correlation, you cause a more meaningful reduction in portfolio volatility. A 50% allocation to an investment with a correlation of zero decreases expected portfolio volatility by almost one-third. In short, allocation size matters.

Diversification does not assure a profit or protect against loss.

Example 2: Diversifying with lower-risk assets

Suppose we use a similar methodology as above but this time introduce an asset with a roughly 20% lower expected volatility. The standard deviation of the overall portfolio would change as shown in Table 2.

Table 2: Standard deviations for the overall portfolio

(A 50% allocation is made to two new asset classes; one has the same volatility as the existing portfolio and the other has a lower volatility)

Correlation with 60/40 portfolio	50% allocation to new asset with same volatility	Volatility reduction from correlation	50% allocation to new asset with lower volatility (8%)	Further volatility reduction from lowered volatility
-1.00	0.00%	-100.00%	1.01%	INF
-0.75	3.54%	-64.71%	3.32%	-6.21%
-0.50	5.01%	-50.05%	4.59%	-8.38%
-0.25	6.12%	-38.98%	5.57%	-8.99%
0.00	7.07%	-29.51%	6.41%	-9.34%
0.25	7.91%	-21.14%	7.15%	-9.61%
0.50	8.66%	-13.66%	7.82%	-9.70%
0.75	9.35%	-6.78%	8.44%	-9.73%
1.00	10.03%	0.00%	9.02%	-10.12%

When you diversify a portfolio with an asset class that has lower volatility than the existing portfolio, there's more benefit if the new asset class also has a low degree of correlation.

When you add a highly correlated asset class to a portfolio, the portfolio's volatility is only reduced if the new asset class has a lower standard deviation. In Table 2, at correlations above 0.75, the reduction in portfolio volatility comes more from the new asset's lower standard deviation than from its lower correlation. As correlations decrease, the majority of the benefit comes from non-correlation, and the ability to identify a lower volatility asset choice becomes less important. Keep in mind that when you're adding an asset class with lower volatility, you may also be sacrificing return.

What is correlation?

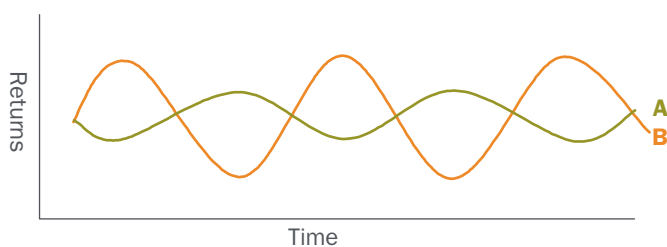
Simply put, correlation measures how two investments move in relation to each other. Positively correlated assets tend to move up or down at the same time, while negatively correlated assets tend to move in opposite directions. Correlations range from -1 to +1. At -1 (perfect negative correlation) the two investments always move in opposite directions. At +1 (perfect positive correlation)

the two investments always move in the same direction. What correlation does not measure, though, is the degree to which the two investments move, as the following two examples illustrate.

Perfect negative correlation

In Exhibit 1, asset class A always rises while asset class B is falling and vice versa. They have perfect negative correlation. However, the magnitudes of the returns differ. Asset class B is a significantly more volatile investment than asset class A. Correlation only measures the relationship of the two returns.

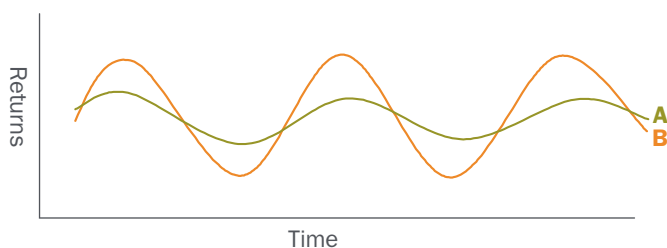
Exhibit 1



Perfect positive correlation

In Exhibit 2, asset class A and asset class B always rise and fall together. They have perfect positive correlation. Again, asset class B is significantly more volatile than asset class A.

Exhibit 2



Correlations in the real world

So far, our discussion has focused on theoretical applications of correlation and the addition of non-correlated assets. In the real world, correlation is influenced by many factors and should not be viewed solely through the lens of historical returns.

For example, stocks and bonds over time have had a relatively low correlation of about 0.24. However, in crisis periods, including 2007–2009, the correlation of stocks and non-government bonds has risen dramatically, as risk appetites in the market have disappeared.

Stocks and bonds share a fundamental element of risk that does not come into play in typical markets. As a result, during crisis times they become more highly correlated to one another. Due to this high correlation, traditional diversification in recent down markets between stocks and bonds has failed to buffer losses when investors needed it most (see Table 3). Note: Correlation measures are based on historical data and may not reflect future performance of the asset class.

Table 3

Month	U.S. Bonds	U.S. Stocks	Balanced 50/50 portfolio
October 2008	-2.4%	-16.8%	-9.6%
October 1979	-6.1%	-6.4%	-6.3%
February 2009	-0.4%	-10.6%	-5.5%
August 1990	-1.3%	-9.0%	-5.2%
September 2008	-1.3%	-8.9%	-5.1%
October 1978	-1.4%	-8.7%	-5.1%
January 2009	-0.9%	-8.4%	-4.7%
September 1986	-1.0%	-8.3%	-4.7%
May 1984	-3.1%	-5.5%	-4.3%
June 2008	-0.1%	-8.4%	-4.3%
January 1990	-1.2%	-6.7%	-4.0%

Source: Morningstar

Past performance does not guarantee future results.

- > Over the past 33 years (396 months), 58 months have resulted in simultaneous negative stock and bond returns.
- > Approximately 15% of the time, stocks and bonds have suffered losses together in the same month.

The months shown represent the 11 most significant simultaneous losses for stocks and bonds over a 396-month, or 33-year, trailing period.

Months highlighted in gray indicate that the losses took place in the past three years. Returns for the 11 greatest simultaneous losses are sorted in order from greatest loss to least loss based on a 50/50 portfolio mix. U.S. stocks are represented by the S&P 500 Index and U.S. Bonds are represented by Barclays Capital U.S. Aggregate Bond Index.

In our view, investors should evaluate correlations quantitatively (by examining historical returns) and qualitatively (by looking at the expected differences and similarities between the assets). The qualitative investigation may help reveal the power of strategies that on a standalone basis seem to offer unattractive risk/reward characteristics.

For instance, suppose you diversified a portfolio by buying relatively safe, dividend-paying stocks and selling short high-beta growth stocks. (Beta is a measure of volatility.) This strategy would likely result in high volatility and offer relatively modest total returns over a long period of time. However, it should be negatively correlated to the overall market. That is, you would expect to earn better returns when the market is flat or down and to lose money when the market is rising sharply. Thus, the strategy could greatly decrease the volatility of the overall portfolio, even though it may be quite volatile in and of itself.

Behaviors in the real world

Investor behavior following market declines can also create a less-than-favorable result. Many investors instinctively move assets into cash after a sharp market downturn. Cash typically has a very low correlation to most other

major asset classes as well as relatively low volatility. Thus, increasing the allocation to cash has the intended effect of dramatically decreasing the expected volatility of the portfolio. However, it can also significantly reduce the portfolio's long-term expected return. In essence, investors wind up trading a short-term volatile path that may meet long-term needs for a straighter path with a near certainty of coming up short.

Effective diversification

Diversification is more than a numbers game of simply adding small allocations to more and more asset classes. Effective diversification requires deliberately identifying new assets with low correlations and making meaningful allocations to those investments.

Furthermore, finding non-correlated assets goes beyond the science of researching historical returns. It also involves evaluating qualitative factors — the sources behind an investment's returns — to assess how the assets behave in different market environments — especially how they behave in difficult environments — NOT just the good times or over 30-year averages. Averages are great — but until you meet someone with 2.4 children then please remember to put them in perspective.

Done correctly, diversifying with non-correlated assets can dramatically decrease a portfolio's expected volatility, as well as the event risks that can cause investors to abandon their long-term investing plans. Investment managers who understand the interplay among volatility, return and correlation will likely be most successful in generating consistent returns.

Diversification does not assure a profit or protect against loss.

Index Definitions

It is not possible to invest directly in an index.

The S&P 500 is an index containing the stocks of 500 large-cap corporations, most of which are American. The index is the most notable of the many indices owned and maintained by Standard & Poor's, a division of McGraw-Hill.

The Barclays Capital Aggregate Bond Index is a market-value-weighted index that tracks the daily price, coupon, paydowns and total return performance of fixed-rate, publicly placed, dollar-denominated and non-convertible investment-grade debt issues with at least \$250 million par amount outstanding and with at least one year to final maturity.

Investment risks

There are risks associated with fixed-income investments, including credit risk, interest rate risk, and prepayment and extension risk. In general, bond prices rise when interest rates fall and vice versa. This effect is more pronounced for longer-term securities.

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