S&P Dow Jones Indices

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Research

Defense Beyond Bonds: Defensive Strategy Indices

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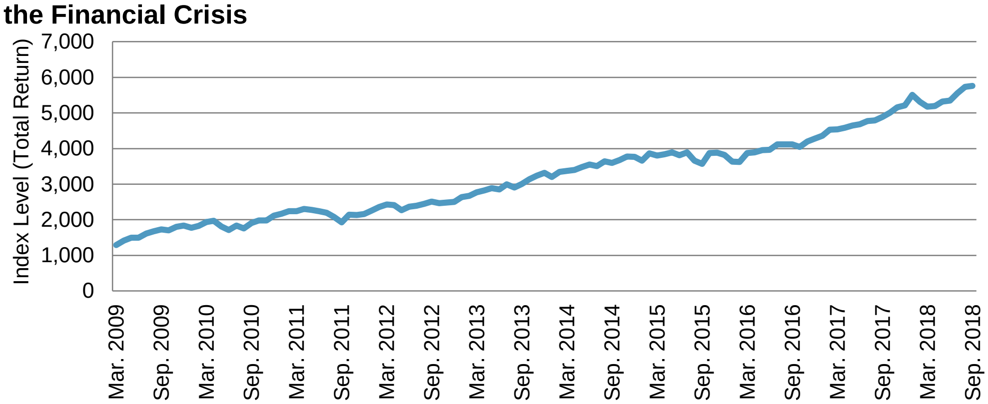
"Bad times have a scientific value. These are occasions a good learner would not miss."
-Ralph Waldo Emerson

EXECUTIVE SUMMARY

- The S&P 500® was up more than 20% in 2017 and entered the 10th year of a bull market cycle in 2018. Since bottoming in 2009 after the global financial crisis, the index has gained more than 300%. Risk mitigation might understandably be at the forefront of investors' awareness, as worries of froth and volatility grow increasingly prominent.
- Bonds have been the conventionally-favored tool for portfolio risk reduction. But bonds have enjoyed a secular bull market since the 1980s and, with interest rates still near record lows, they may be a less appealing asset class now than they have been historically.
- We explore ways of utilizing defensive strategy indices in order to improve the risk/return profile of a traditional 60/40 equity/bond allocation mix.
- Defense need not be limited to long equity strategies. By combining long and short positions in certain factor indices, the result could look strikingly similar to a defensive strategy like low volatility—and offer the same benefits.

Exhibit 1: The S&P 500 Has Gained More Than 300% Since Bottoming During the Financial Crisis



Source: S&P Dow Jones Indices LLC. Data from March 31, 2009, through Sept. 30, 2018. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

IS IT TIME TO BE DEFENSIVE?

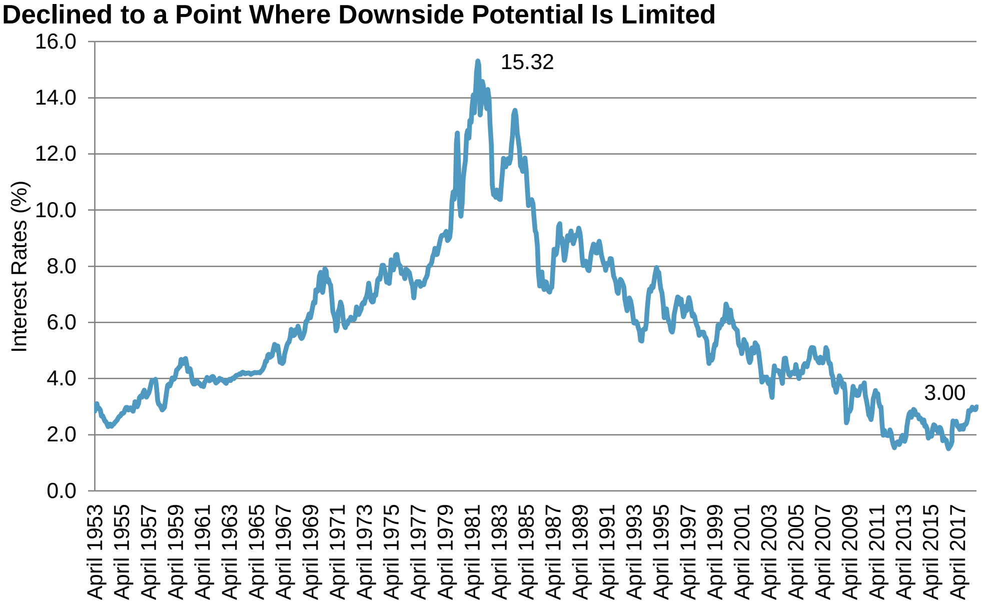
Investors who are unwilling or unable to bear the full risk of the equity market have traditionally constructed balanced portfolios of stocks and bonds.

In 2017, the S&P 500 was up 22%, augmented by another 11% through the first nine months of 2018. Since bottoming in March 2009, the index has gained more than 300%, and in 2018 it entered the 10th year of a bull market cycle. While bull markets do not automatically die of old age, recent turbulence in the equity market has reminded us all of the unpredictable nature of stocks.[1]

Investors who are unwilling or unable to bear the full risk of the equity market have traditionally constructed balanced portfolios of stocks and bonds. In the 30+ year bull market in bonds that began in 1981, such defensive allocations did not require a major sacrifice in returns. As Exhibit 2 illustrates, the 10-year U.S. Treasury rate hit a peak of 15.3% in 1981 and declined until bottoming out at 1.5% in July 2016. Rates increased to 3.0% as of September 30, 2018.

We're not in the business of forecasting the bond market, but a glance at Exhibit 2 will confirm that, unless rates reverse and start to go negative, we are much closer to the bottom of the range than the top. If rates continue to rise, bond values will decline—meaning **that the efficacy of bonds as a defensive asset class will be less than it has been historically**. Investors concerned about the level of equity prices might understandably be interested in other defensive alternatives.[2]

Exhibit 2: Since Peaking at 15% in the Mid-1980s, Interest Rates Have Declined to a Point Where Downside Potential Is Limited



Source: Federal Reserve. Data from March 31, 1953, through Sept. 30, 2018. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

[1] Chan, Fei Mei, "Vectors of Volatility," Feb. 6, 2018.

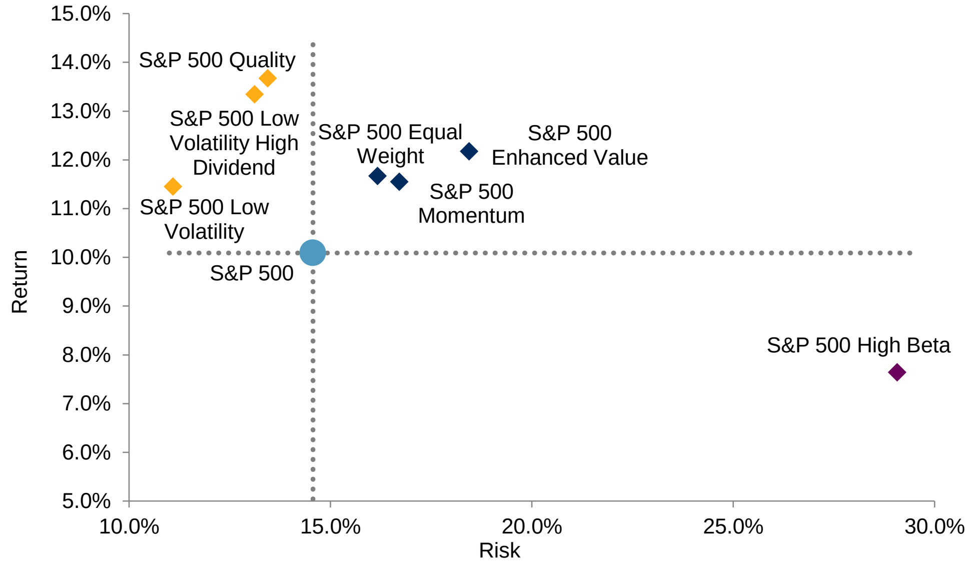
[2] We are hardly the only ones to make this observation. See Ward, Karen, "Equity Investors Can Defend Against the Next Downturn," *Financial Times*, Oct. 8, 2018.

DEFENSE IN THE FRAMEWORK OF THE EFFICIENT FRONTIER

While most strategy subindices outperformed the S&P 500, not all did so with lower risk.

Exhibit 3 provides some perspective to help us think about risk and return. The strategy indices highlighted in the exhibit are all subsets of the S&P 500. With the exception of the S&P 500 High Beta Index,[3] all have outperformed the S&P 500 in the observed 23-year period. However, not all have done so with lower risk. Some diminished risk, while others magnified it. This insight allows us to identify particular strategies as building blocks to a more defensive portfolio.

Exhibit 3: While Most Strategy Indices Have Outperformed the S&P 500, Not All Did so With Less Risk



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 4 shows two efficient frontiers, one constructed using the S&P 500 and bonds, the other utilizing the S&P 500 Low Volatility Index[4] and bonds.[5] In the 23-year period from 1995 through 2017, the low volatility strategy index outperformed the S&P 500—but, anomalously, with lower risk.[6] It is therefore not surprising that the efficient frontier using the S&P 500 Low Volatility Index as the risky asset dominates the one using the S&P 500. A 60/40 equity/bond allocation using the low volatility strategy was both lower in risk and higher in return than a 60/40 mix using the S&P 500.

[3] The S&P 500 High Beta Index is designed to measure the performance of the 100 constituents in the S&P 500 that are most sensitive to changes in market returns. For more details, see the complete methodology.

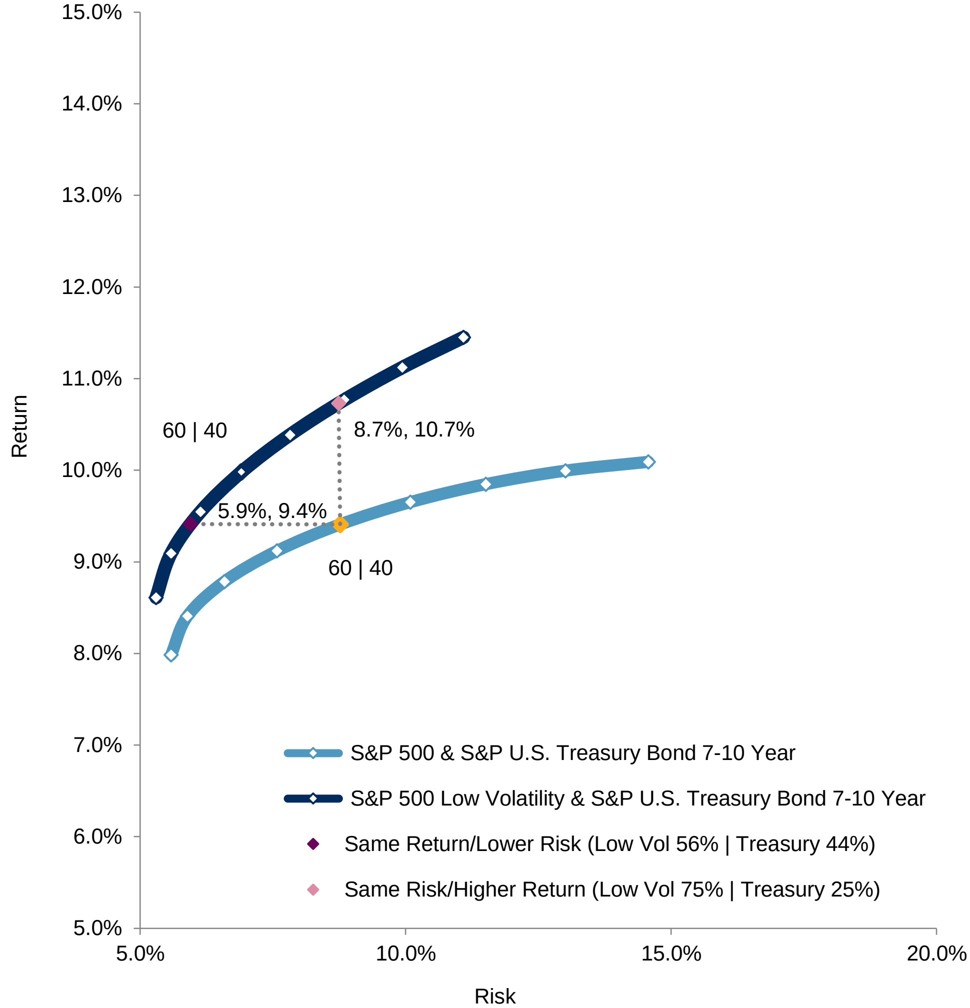
[4] The S&P 500 Low Volatility Index, a defensive strategy index, is designed to measure the performance of the 100 least volatile stocks in the S&P 500. For more details, see the complete methodology.

[5] Efficient frontiers are constructed with indicated allocations rebalanced annually.

[6] See Edwards, Tim, Craig J. Lazzara, and Hamish Preston, "Low Volatility: A Practitioner's Guide," S&P Dow Jones Indices, June 2018.

A 60/40 equity/bond allocation using the low volatility strategy was both lower in risk and higher in return than a 60/40 mix using the S&P 500.

Exhibit 4: The Efficient Frontier Using the S&P 500 Low Volatility Index Was an Improvement in Both Risk and Return Compared to the Benchmark



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Furthermore, the same level of risk as the 60/40 allocation would have yielded a higher return (10.7%) using the S&P 500 Low Volatility Index and, similarly, achieving the same level of return required a much lower risk level (5.9%).

Exhibit 5 shows the performance of the S&P 500 and several defensive strategies through the lens of four market regimes. Between 1995 and 2017, the S&P 500 fell in 92 months and rose in 184 months. We split both negative and positive categories in half; proceeding down the rows of Exhibit 5, we find large declines, small declines, small gains, and large gains. This provides a more nuanced understanding of performance patterns relative to the S&P 500 in various market environments. Not surprisingly, bonds were the best performer during the worst 46 months of S&P 500 performance, and lagged by the most during the best 92 months.

In the last two columns, we can see a balanced portfolio using low volatility as the equity vehicle offered additional protection compared to its S&P 500-based counterpart.

Exhibit 5: The 60/40 Portfolio Using Low Volatility Was More Defensive During Both Good and Bad Times Compared to the Portfolio Using the S&P 500

MARKET REGIME (MONTHLY RETURN)	NUMBER OF MONTHS	S&P 500 (%)	S&P 500 LOW VOLATILITY MINUS S&P 500 (%)	S&P U.S. TREASURY BOND 7-10 YEAR MINUS S&P 500 (%)	S&P 500 60% | BOND 40% MINUS S&P 500 (%)	LOW VOLATILITY 60% | BOND 40% MINUS S&P 500 (%)
Less Than -2.55%	46	**-6.04**	3.15	6.68	2.77	4.60
Between 0 and -2.55%	46	**-1.41**	0.93	1.95	0.78	1.35
Between 0 and 2.58%	92	**1.29**	-0.14	-0.57	-0.20	-0.29
Greater Than 2.58%	92	**5.06**	-1.74	-4.68	-1.87	-2.90

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

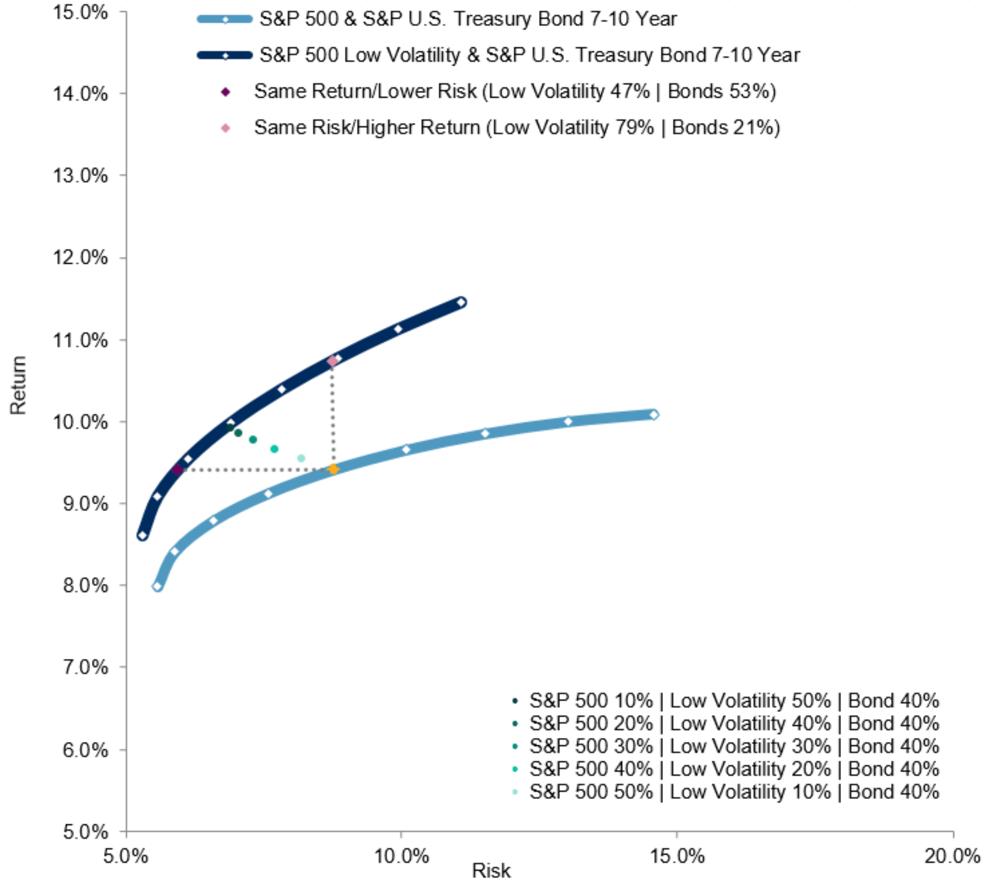
Performance patterns for the 60/40 portfolio using the low volatility strategy offered additional protection compared to the equity/bond portfolio using the S&P 500.

It is, of course, unrealistic to assume that an asset owner would shift his entire equity allocation to a single strategy. But **the possibility of doing so provides a framework within which we can conceptualize strengthening a portfolio's defenses without increasing, and possibly even while decreasing, its bond allocation.**

DEFENSE UTILIZING STRATEGIC EQUITY

Assuming a static bond position, shifting any part of an equity allocation from the S&P 500 to the S&P 500 Low Volatility Index should result in a reduction in overall portfolio risk and an increase to portfolio return. In Exhibit 6, the green dots show incremental 10% reallocations from the S&P 500 to the low volatility strategy, holding bond exposure constant. With every shift, the portfolio's plotted risk/return characteristics move upward and to the left, finally coming to rest on the low volatility-based efficient frontier. Moving to the dominant frontier produces a 21% reduction in risk and additional compound annual return of 60 bps.

Exhibit 6: In a 60/40 Equity/Bond Allocation, Any Shift From S&P 500 to S&P 500 Low Volatility Index Lowered Risk *and Also Increased Return*



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

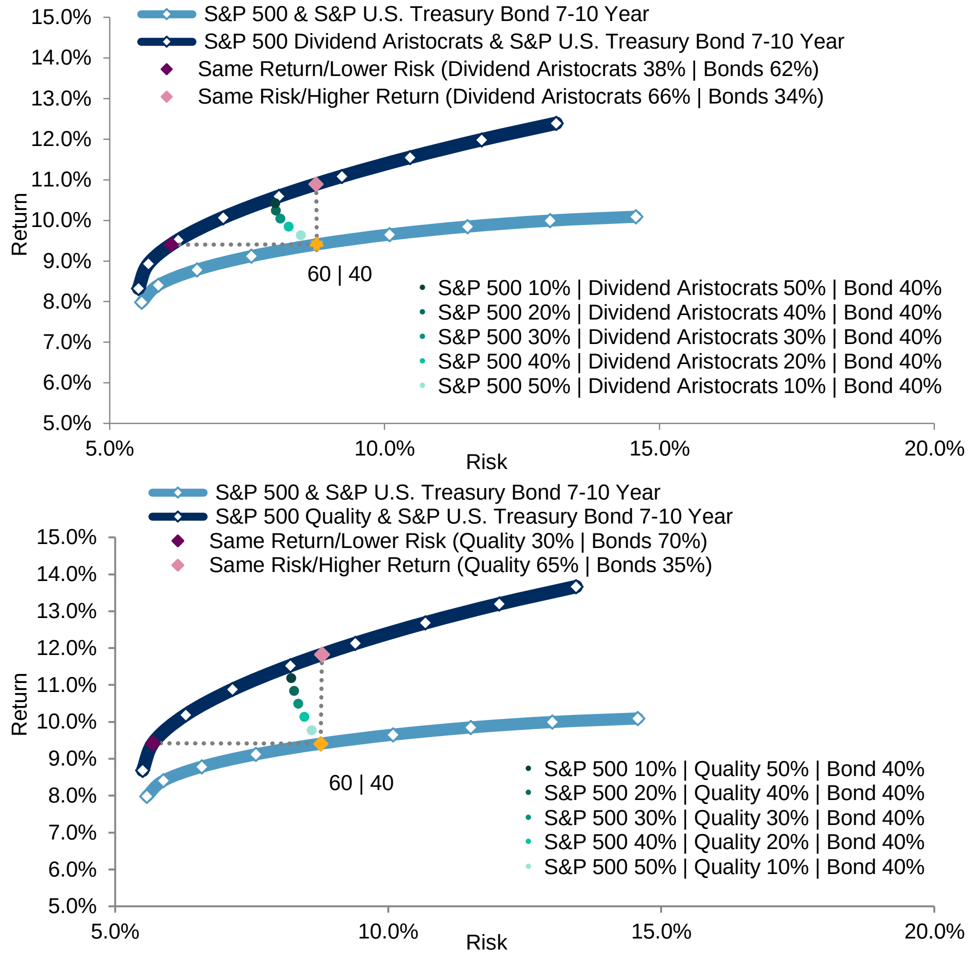
While low volatility is the archetypal low risk strategy, any strategy with a similar risk/return profile would shift the overall portfolio in the same way. For instance, both the S&P 500 Dividend Aristocrats[7] and the S&P 500 Quality Index[8] exhibited lower risk than the S&P 500, and both outperformed in the last 23 years. In Exhibit 7, we see that with the introduction of either strategy, the 60/40 point moves upward and to the left (although to a lesser degree than when low volatility is the defensive vehicle). Notably, with all three strategies, the addition of the strategy index not only lowered the risk of the overall portfolio but also led to higher returns.

[7] The S&P 500 Dividend Aristocrats is designed to measure the performance of S&P 500 companies that have increased dividends every year for the last 25 consecutive years. For more details, see the complete methodology.

[8] The S&P 500 Quality Index is designed to track high quality stocks in the S&P 500 by quality score, which is calculated based on return on equity, accruals ratio, and leverage. For more details, see the complete methodology.

The addition of defensive strategy indices not only lowered the risk of the overall portfolio but also led to higher returns.

Exhibit 7: Defensive Equity Strategies Produce Dominant Efficient Frontiers



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Charts are provided for illustrative purposes and reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

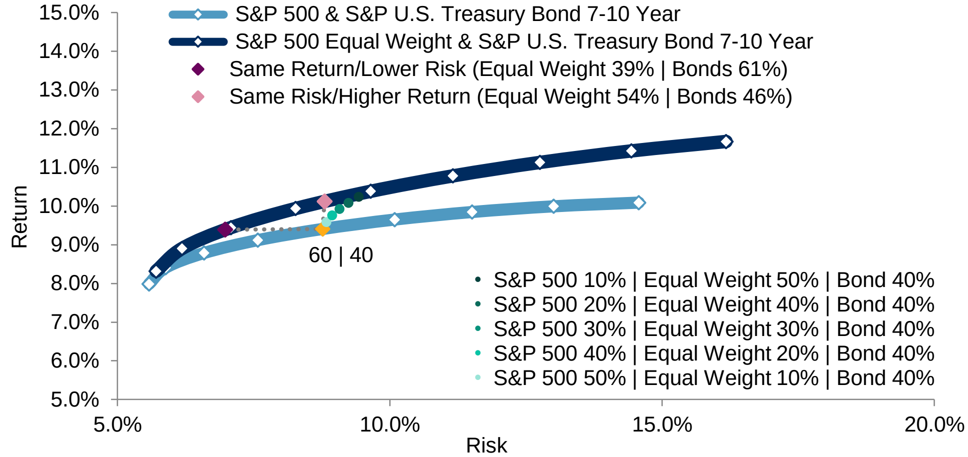
In contrast, the introduction of more aggressive (i.e., less defensive) equity strategies produced different results. The charts in Exhibit 8 compare efficient frontiers using the benchmark versus using the S&P 500 Equal Weight Index[9] and the S&P 500 Momentum Index.[10] While both strategy indices outperformed the S&P 500 in the period observed, they also incurred higher risk levels than the benchmark. In contrast to the charts in Exhibits 6 and 7, here the addition of the equity strategy indices improved returns but increased the overall risk of the portfolio, assuming constant bond positions.

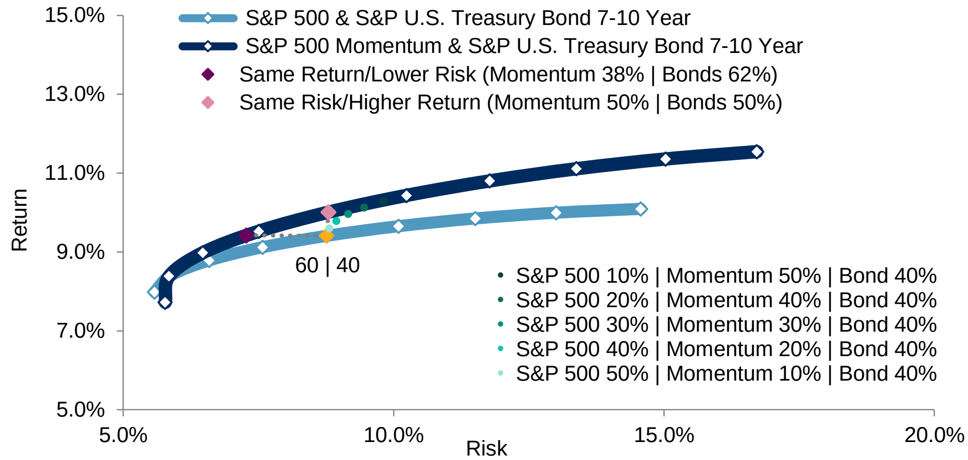
[9] The S&P 500 Equal Weight Index includes the same constituents as the market-cap weighted S&P 500, but each company in the S&P 500 Equal Weight Index is allocated the same weight. For more details, see the complete methodology.

[10] The S&P 500 Momentum Index is designed to measure the performance of securities in the S&P 500 universe that exhibit persistence in their relative performance. For more details, see the complete methodology.

Less defensive strategy indices outperformed the S&P 500 in the period observed but they also incurred higher risk levels than the benchmark.

Exhibit 8: Not All Strategies Exhibit the Same Defensive Qualities





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DEFENSE BEYOND LONG EQUITY STRATEGIES

Defensive strategies do not have to be constrained to long-only approaches.

Although we have focused on various combinations of long equity so far, defensive strategies need not be constrained to long-only approaches. Recall that in Exhibit 3, the S&P 500 High Beta Index was by far the riskiest among all the strategy indices highlighted. It is a strategy that, as the name suggests, aims to reflect the performance of the highest-beta stocks in the market. Exhibit 9 shows that between 1995 and 2017, the S&P 500 High Beta Index underperformed the S&P 500 but with almost twice as much risk. High beta is, at considerable risk of understatement, not a defensive strategy.

If *owning* a high beta strategy reduces return and increases risk, then presumably *shorting* high beta would do the opposite. If it does, then arguably a short position in high beta can be thought of as the functional equivalent of a long position in low volatility or other defensive indices.

If the degree of leverage and the size of the short position are calibrated adroitly, the combined long-short position might resemble a defensive strategy index.

We need to approach this prospect with some subtlety, however. The S&P 500 High Beta Index may have underperformed the S&P 500, but its total return was definitely positive, so shorting it should, other things equal, reduce portfolio returns. To compensate for this, we need to hold an offsetting leveraged position in the S&P 500. If the degree of leverage and the size of the short position are calibrated adroitly, the combined long-short position might resemble a defensive strategy index.

Exhibit 9 also highlights several risk/return statistics for the S&P 500, the S&P Low Volatility Index, the S&P 500 High Beta Index, and one example of a hypothetical defensive long-short strategy. This strategy is long 150% S&P 500 and short 30% S&P 500 High Beta Index; we chose those position sizes because they produce total portfolio volatility and beta roughly in line with those of the S&P 500.[11]

Exhibit 9: Long-Short Strategies Can Also Be Part of the Defensive Toolbox

RISK/RETURN STATISTICS	S&P 500	S&P 500 LOW VOLATILITY	S&P 500 HIGH BETA	DEFENSIVE LONG-SHORT
CAGR (%)	10.09	11.45	7.64	11.61
Standard Deviation (%)	14.57	11.09	29.07	14.63
Return/Risk	0.73	1.03	0.40	0.83
Beta	1.00	0.56	1.78	0.97
Tracking Error (%)		9.90	17.40	3.99
Information Ratio		0.14	-0.14	0.38

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1994, through Dec. 31, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The long-short strategy's standard deviation was higher than that of the S&P 500 Low Volatility Index; its compound return exceeded that of the S&P 500 Low Volatility Index, and its tracking error was significantly lower. Therefore, **the strategy's information ratio was significantly higher** than that of the S&P 500 Low Volatility Index.

Exhibit 10 offers some context around the performance patterns of a few strategies. Relative performance for the S&P 500 Low Volatility Index and the S&P 500 High Beta Index behaved as expected in each market regime. The low volatility strategy lagged the market in good times but lost less in bad times, while high beta was almost a mirror opposite. Between these extremes, the long-short strategy is much more like low volatility—it outperformed falling markets, was more or less neutral when the S&P 500 rose modestly, and underperformed in strong rallies (to be sure, its margins of out- and underperformance were both less than those of the S&P 500 Low Volatility Index.)

[11] The portfolio is rebalanced monthly to reflect targeted allocations.

Exhibit 10: The Long-Short Strategy Had Smaller Spreads Compared to the S&P 500 Low Volatility Index Both in Good Times and in Bad Times and Outperformed the S&P 500 in Every Market Regime With the Exception of the Best Months for the S&P 500 (Greater Than 2.58%)

MARKET REGIME (MONTHLY RETURN)	NUMBER OF MONTHS	S&P 500 (%)	S&P 500 LOW VOLATILITY MINUS S&P 500 (%)	S&P 500 HIGH BETA MINUS S&P 500 (%)	LOW VOLATILITY 60% | BOND 40% (%)	DEFENSIVE LONG-SHORT MINUS S&P 500 (%)
Less Than -2.55%	46	**-6.04**	3.15	-5.11	4.60	0.57
Between 0 and -2.55%	46	**-1.41**	0.93	-2.03	1.35	0.37
Between 0 and 2.58%	92	**1.29**	-0.14	0.34	-0.29	0.07
Greater Than 2.58%	92	**5.06**	-1.74	3.14	-2.90	-0.22

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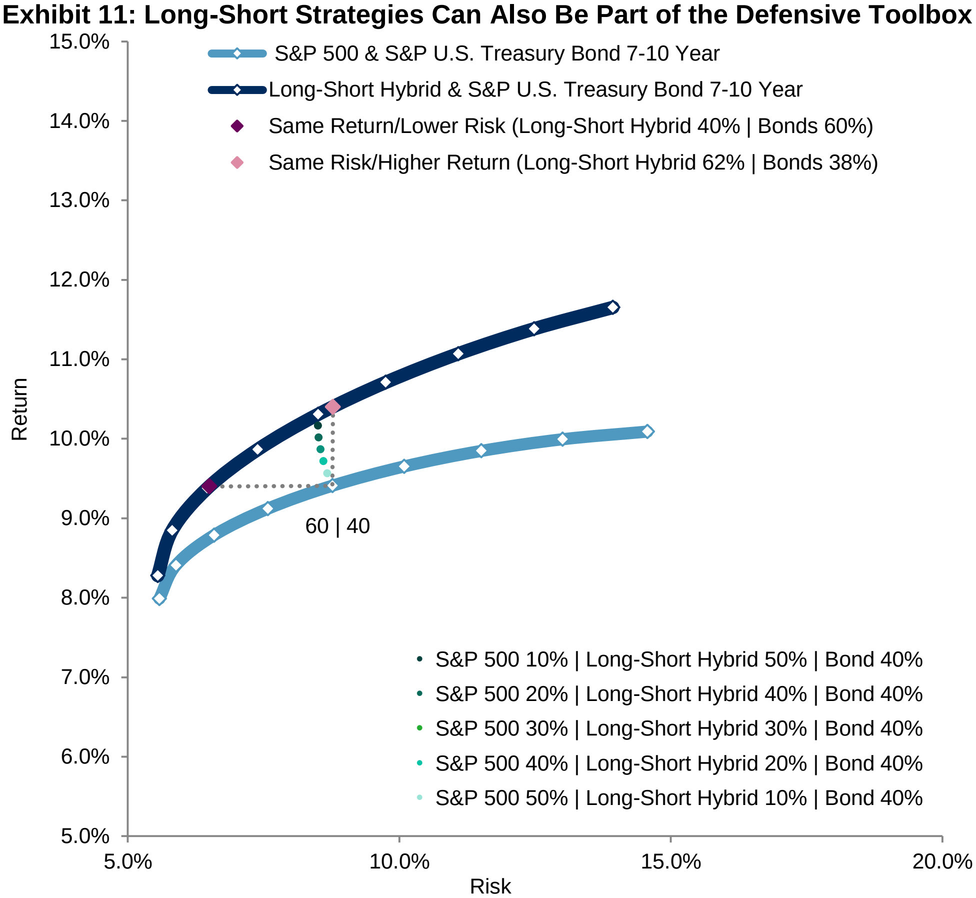
The addition of the long-short strategy improved return while at the same time allowing the portfolio to be more defensive.

Because of this, Exhibit 11's efficient frontiers using the long-short strategy as our defensive equity vehicle appear strikingly similar to those in Exhibit 6. Notably, the addition of the long-short strategy improved return while at the same time allowing the portfolio to be more defensive.

Exhibit 11: Long-Short Strategies Can Also Be Part of the Defensive Toolbox



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CONCLUSION

"By failing to prepare, you are preparing to fail."

--Benjamin Franklin

Combining well-chosen defensive factor indices with the S&P 500 and bonds has historically resulted in reduced portfolio volatility, as well as incremental returns.

Market cycles are an inevitable part of investing, and investors are understandably wary of a possible downturn in the equity market. 2018's interest rate levels mean that bonds are a less appealing defensive asset than they have been historically. It is, however, possible to build portfolio defense within the equity world. **Combining well-chosen defensive factor indices with the S&P 500 and bonds has historically resulted in reduced portfolio volatility, as well as incremental returns.** The same benefits are available from a hybrid long-short strategy using the S&P 500 High Beta Index.

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PERFORMANCE DISCLOSURE

The S&P 500 High Beta Index and S&P 500 Low Volatility Index were launched on April 4, 2011. The S&P 500 Quality Index was launched on July 8, 2014. The S&P 500 Dividend Aristocrats was launched on May 2, 2005. The S&P 500 Enhanced Value Index was launched on April 27, 2015. The S&P 500 Equal Weight Index was launched on January 8, 2003. The S&P 500 Momentum was launched on November 18, 2014. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. Complete index methodology details are available at www.spdji.com.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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