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Leveraged Strategies: Benefits of Implementing a Moderate Amount of Leverage

I. INTRODUCTION

Leveraged strategies started to make their way to the consumer market in 2006. The investment thesis underpinning the strategy is simple and intuitive. As the name indicates, it allows market participants to express their bullish or bearish views in a packaged solution format.

The goal of a leveraged index-linked product is to generate a multiple of the return (through borrowing) of the underlying reference index. Therefore, there are two inputs to the strategy: the underlying instrument and the leverage factor. The underlying may be from equities, bonds, or commodities. The leverage factor is a number that, when multiplied by the underlying *daily* return, will give you the *daily* return of the leveraged strategy (minus explicit costs and market frictions).

Due to the well-known compounding issues that leveraged strategies face, they are not without controversy. Part of this stems from the inaccurate expectation that the strategy will maintain its leverage factor over any time horizon. Therefore, education is critical when trying to understand the appropriateness of the strategy. This paper seeks to increase the awareness of leveraged strategies and their implementation. It also explores the potential benefits of a small amount of leverage being used within a single strategy as well as a diversified portfolio.

II. LEVERAGED STRATEGY CONSTRUCTION

A leveraged strategy (specifically the payoff profile) can be constructed by borrowing a percentage of the total portfolio in order to buy more of the underlying. This results in the market participant receiving a daily return that is equal to the leverage factor multiplied by the return of the underlying, minus the cost of the funds borrowed.

A leverage factor that is equal to 1 is an investment in the underlying instrument (i.e., there is nothing borrowed). A factor that is greater than 1, henceforth taking on a value of 1.25, creates a leveraged profile. For this paper, we are specifically interested in the effects of a modest positive amount of leverage versus the underlying. That is, a strategy to gain more beta exposure.

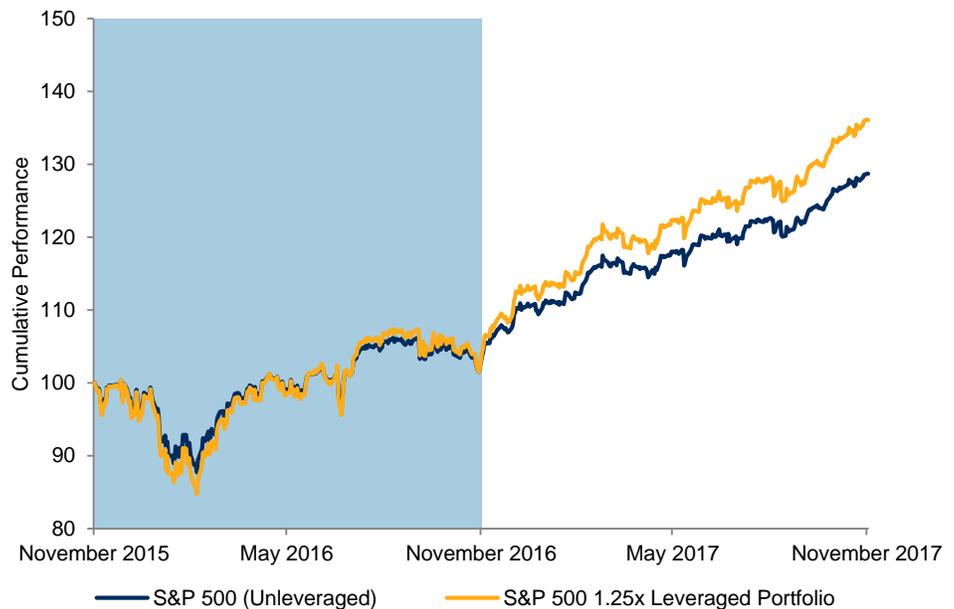
III. ASSOCIATED RISKS

There are two main risks associated with a leveraged strategy, with varying levels of importance: volatility and interest or cost. These act as driving factors that each play a role in the long-term performance of the strategy.

Volatility, defined as the spread or variation in the data, has a direct impact on the performance of a leveraged strategy. Simply put, the more disperse the underlying returns are, the greater the chance that the leveraged strategy could underperform the leverage factor multiplied by the underlying return. For illustration, Exhibit 1 shows the performance of the [S&P 500®](#) (unleveraged) and a hypothetical 1.25x leveraged strategy over the two-year period ending on Nov. 7, 2017.

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Exhibit 1: Performance of the Unleveraged and 1.25x Leveraged Strategies Over a Two-Year Period



S&P 500 1.25x Leveraged Portfolio is a hypothetical portfolio. Source: S&P Dow Jones Indices LLC. Data from Nov. 6, 2015 to Nov. 7, 2017. Index performance based on total return in USD. 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.

The two-year period in Exhibit 1 displays the importance of volatility coupled with the performance of the underlying. The light blue shaded area is the year prior to the U.S. presidential election, while the unshaded is the year following the election. With respect to the former period, the S&P 500 and the 1.25x leveraged strategy had total returns of 3.77% and 4.31%, respectively. This performance is short of the 4.71% cumulative performance posted by the underlying (3.77%) multiplied by the leverage factor (1.25). This is due to the standard deviation being 14.19% on an annualized basis for the period, coupled with the fact that the market did not “overcome” this volatility with a strong positive return. With respect to

the latter period, volatility was at a historical low of 6.85% on an annualized basis. When combined with the underlying's return of 24.03%, the 1.25x leverage strategy (30.49%) did slightly better than the cumulative [S&P 500](#) return times 1.25 (30.04%).

Second, interest rates (and by extension explicit or implicit cost to the portfolio) directly affect the performance of the strategy because the portfolio must pay the costs in order to finance the leveraged aspect of the strategy. For example, if we assume a USD 100 portfolio has a 2% interest rate and an underlying return of 0%, this means that the 1.25x portfolio would pay USD 0.50 in interest. This results in an ending value of USD 99.50. Conversely, if the interest rate was larger at 15% (to illustrate the difference), the portfolio would pay USD 3.75 and would be left with an ending value of USD 96.25.

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IV. HISTORICAL PERFORMANCE

When strictly looking at the U.S. equities market, a market participant may want exposure to various capitalization ranges. Furthermore, a leveraged overlay on each of these market cap segments may be more applicable to achieve the desired portfolio construction characteristics. For this, we look at the [S&P 500](#), [S&P MidCap 400[®]](#), and [S&P SmallCap 600[®]](#) to represent the large-, mid-, and small-cap segments, respectively.

Exhibit 2 shows the historical returns, annualized volatility, and the risk-adjusted returns for the various indices and their leveraged counterparts. The first point of interest is that the S&P MidCap 400 exhibits an attractive profile, prior to any leverage exposure. This is in reference to the return per unit of risk being higher than those of the large- or small-cap indices. Furthermore, even though mid caps did not have the lowest volatility (low volatility being a better-suited environment for leverage), the S&P MidCap 400 was still able to outperform in the 1.25x leveraged strategy on a risk-adjusted basis because of the strong return. We will discuss this further when looking at the benefit of diversification.

Exhibit 2: Risk/Return Statistics of U.S. Equity Market Cap Segments and Their Respective 1.25x Leverage Profile

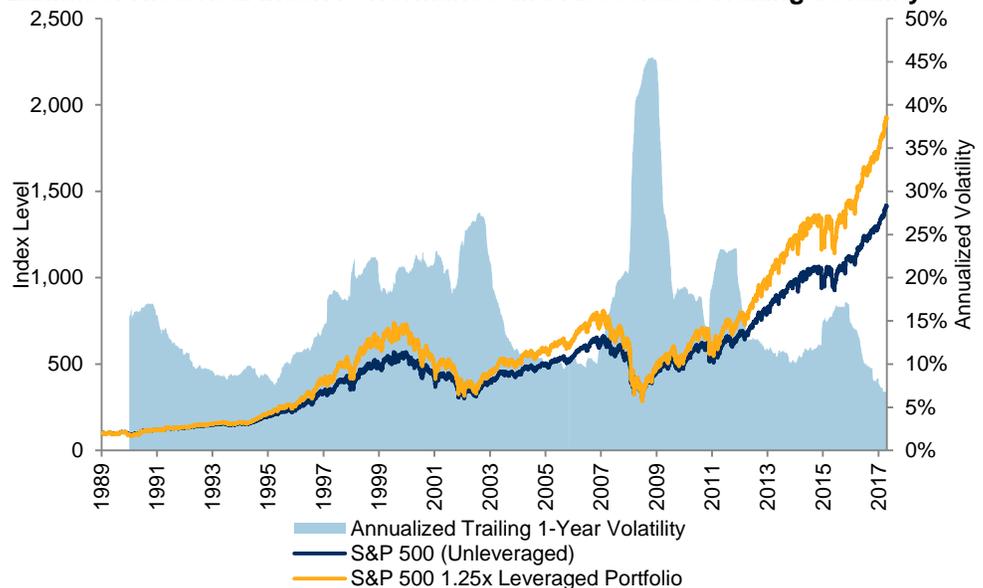
PERIOD	UNLEVERAGED UNDERLYING			1.25X LEVERAGED PROFILE		
	S&P 500	S&P MIDCAP 400	S&P SMALLCAP 600	S&P 500	S&P MIDCAP 400	S&P SMALLCAP 600
ANNUALIZED RETURN (%)						
1-Year	21.83	16.24	13.23	27.58	20.22	16.23
3-Year	11.41	11.14	12.00	14.04	13.64	14.63
5-Year	15.79	15.01	15.99	19.74	18.66	19.83
10-Year	8.50	9.97	10.43	9.89	11.55	12.00
20-Year	7.20	10.58	9.73	7.87	12.00	10.83
23-Year	10.05	12.63	11.67	11.39	14.55	13.25
26-Year	9.61	11.98	-	10.85	13.75	-
28-Year	9.81	-	-	11.03	-	-
ANNUALIZED VOLATILITY (%)						
3-Year	10.07	11.06	13.79	12.65	13.89	17.33
5-Year	9.49	11.24	13.45	11.92	14.10	16.88
10-Year	15.08	17.86	19.36	18.95	22.40	24.27
20-Year	14.87	17.43	18.81	18.63	21.81	23.53
23-Year	14.57	16.84	18.24	18.25	21.07	22.82
26-Year	13.97	16.20	-	17.49	20.27	-
28-Year	14.21	-	-	17.79	-	-
RISK-ADJUSTED RETURN						
3-Year	1.13	1.01	0.87	1.11	0.98	0.84
5-Year	1.66	1.34	1.19	1.66	1.32	1.18
10-Year	0.56	0.56	0.54	0.52	0.52	0.49
20-Year	0.48	0.61	0.52	0.42	0.55	0.46
23-Year	0.69	0.75	0.64	0.62	0.69	0.58
26-Year	0.69	0.74	-	0.62	0.68	-
28-Year	0.69	-	-	0.62	-	-

The long-term volatility of the resulting portfolio is approximately scaled by 1.25 times, while the return is generally scaled by less than this.

S&P 500 1.25x Leveraged Portfolio, S&P MidCap 400 1.25x Leveraged Portfolio, and S&P SmallCap 600 1.25x Leveraged Portfolio are hypothetical portfolios.

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2017. Index performance based on total return in USD. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

The second point of interest is that market participants should be aware of the tradeoff between risk and reward when looking at leveraged strategies. That is, the long-term volatility of the resulting portfolio is approximately scaled by 1.25 times, while the return is generally scaled by less than this.

Exhibit 3: Historical Index Performance and Associated Trailing Volatility

S&P 500 1.25x Leveraged Portfolio is a hypothetical portfolio.

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2017. Index performance based on total return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

As volatility increases, the long-term outperformance diminishes.

Finally, when looking at the entire history of the 1.25x leveraged strategy in Exhibit 3, we see the empirical relationship between volatility and leverage. As volatility (light blue area) increases, we see a convergence of the 1.25x leveraged strategy with the unleveraged index. Simply put, as volatility increases, the long-term outperformance diminishes. The implication is that if we believe that volatility comes in short, intense waves (and is thus short-lived), then there may be a long-term strategic benefit to adding a moderate amount of leverage, such as 1.25, to the underlying.

V. DIVERSIFICATION BENEFITS

As previously discussed, a leveraged strategy is not necessarily conducive to an environment in which there is a high amount of volatility. Therefore, a natural extension would be to use the properties of portfolio diversification when building this type of strategy. The market cap segments represented in Exhibit 2 provide robust building blocks for portfolio construction, as they do not overlap in constituents and cover a wide range of the U.S. equity market.

There are two different approaches that may be implemented to achieve the desired results. First, the leveraged strategies in Exhibit 2 can be used and reweighted on a quarterly basis. Second, the [S&P Composite 1500®](#), which is the combination of the [S&P 500](#), [S&P MidCap 400](#), and [S&P SmallCap 600](#) indices, can be used as the underlying portfolio. The results of both strategies are presented in Exhibit 4.

Exhibit 4: Risk/Return Statistics of Leveraged Strategies Within a Portfolio Construction Framework

PORTFOLIO	CAPITALIZATION ALLOCATION (%)			PERFORMANCE		
	LARGE	MID	SMALL	RETURN	STANDARD DEVIATION	RISK-ADJUSTED RETURN
Quarterly Rebalanced Portfolio	33	33	33	13.23	24.30	0.54
	50	25	25	12.82	23.83	0.54
	75	15	10	12.16	23.37	0.52
	88	8	4	11.78	23.26	0.51
S&P Composite 1500*	88	8	4	11.65	23.25	0.50

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2017. Index performance based on total returns in USD. Past performance is no guarantee of future results. Table is provided for illustrative purposes. * These allocation weights represent the rounded monthly average over the history of the S&P Composite 1500.

A moderately leveraged strategy may provide desirable risk/return characteristics when replacing an unleveraged position.

Exhibit 4 shows there is a potential benefit in creating a portfolio of individual components rather than implementing the strategy with the [S&P Composite 1500](#). Because the S&P Composite 1500 is a market-cap-weighted index, and the fact that the market cap of the largest 500 companies is much larger than that of the smallest 600, the S&P Composite 1500 will behave much like the [S&P 500](#).

Furthermore, the main benefit arises from the fact that market participants may use the three individual strategies as building blocks and assign weights to achieve their desired exposures, rather than being restricted to the S&P Composite 1500 weights. Because the mid-cap strategy is attractive from a risk/return viewpoint, it may make sense to increase the weight from 8%.

VI. CONCLUSION

When used appropriately, a moderately leveraged strategy like the one we presented here can potentially benefit market participants looking to make a tactical or strategic allocation. More specifically, a moderately leveraged strategy may provide desirable risk/return characteristics when replacing an unleveraged position. Within a passive framework, adding a small amount of leverage could improve long-term returns through the effects of compounding.

Furthermore, we show that, because diversification naturally lowers portfolio volatility, the suite of S&P DJI headline U.S. equity indices could be used to form a broad U.S. leveraged exposure with improved risk/return characteristics. We show that it may be advantageous to use the indices as building blocks within the portfolio construction process, rather than overlaying the leverage on the S&P Composite 1500. This allows market participants the flexibility to construct a portfolio with the appropriate allocation to each asset class or to target a desired risk/return profile.

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