Alternatives Update

1st Quarter 2018

The 1st quarter of 2018 came in like a lion with the S&P 500 Index (SPX) up 5.73% in January and the MSCI Emerging Markets Index up 8.33%. It however, did not go out like a lamb. The SPX fell 6.13% and MSCI Emerging Markets Index fell 6.39% over the subsequent two months. There was a distinct reversal in themes from 4th quarter of 2017, namely cryptoasset mania and the absence of volatility. Bitcoin lost over 52% of its value during the quarter (see Figure 1). Equity volatility, as measured by the closing value of the CBOE VIX Index (VIX), spiked to a high of 37.32 during the quarter. This level was over 4 times the record low reading in November 2017 (9.14) and almost 4 times the average of the first week of the first quarter. Lost in the closing values was that the VIX went on to hit 50.30 in overnight trading after the equity markets had closed on February 5th. The portmanteau "Volmagedon" is being used by some to describe the breathtaking movement of the VIX from February 2 to February 6 and its impact on various corners of the capital markets.

One of the most expensive/profitable trades of the past 6 years has been to buy/sell short-term equity volatility when the volatility curve is positively sloped and hence there is a great amount of negative carry (when the futures contract in the current month is lower in price than the futures contracts in the subsequent months). This can be done a number of ways including futures contracts or volatility exchange-traded notes (ETNs) and exchange-traded funds (ETFs) that use futures. The annualized return to being long/short volatility since 2012 through December 2017 was -61.61/+61.61% according to the S&P 500 VIX Short-term MCAP Index. The NASDAQ 100 Index (NDX) and the SPX look positively meager with +20.33%, +15.86% annualized returns respectively during this period. Being long volatility in this manner can potentially be a great hedge against equity downturns due to its sizable negative beta. Unfortunately, it is costly to maintain a constant exposure as reflected in the -61.61% annualized return. On the flipside, short volatility seemed to be a license to print money during this time period. It should be noted that long/short volatility, as measured by the S&P 500 VIX Short-term MCAP Index, had a beta to the SPX of -4.41/+4.41 from 2012 through 2017. For reference, the NDX had a beta to the SPX of +1.11 during the same time period. On Monday, February 5th the SPX fell 4.10%, while the S&P 500 VIX Short-term MCAP Index was up 96.11%. While the S&P 500 VIX Short-term MCAP index is not investable, it serves as a reasonable proxy for expected performance if one were long volatility and the inverse if one were short volatility through VIX futures contracts or a number of ETFs or ETNs that proxy VIX futures returns. Investors that were leveraged and short volatility therefore likely experienced a return that would have wiped out their capital. For those keeping score, that meant a realized beta for the index to the SPX of -23.4.

While the SPX went on to post a positive return for the rest of February, short volatility ETFs, notes and other funds were permanently impaired, had to be restructured, or were closed. The volatility tourist (Commodity Trading Advisors, mutual funds and the like who dabbled in the short volatility trading seduced by its outsized returns but such trading being outside their core expertise) were left with everything ranging from a flesh wound that would leave a nasty scar to a fund terminating mortal wound. At the time, it was worried that the Volmagedon might have a more widespread effect, not unlike what happened with Credit Default Swap (CDS) sellers in 2007/2008. For the time being, it looks as though the severe wreckage is mostly contained to smaller niches of the market but the regime shift in risk is likely to be longer lived.

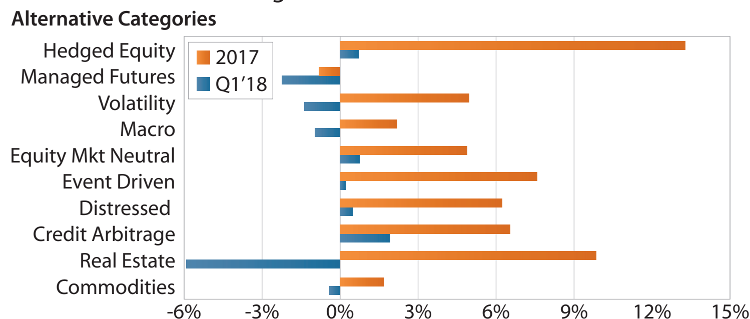
During the up and down quarter, Alternative Investment ("alternatives") returns were mixed, though given the violent swings in equities, alternatives did seem to offer some diversification and stability. For the quarter, 5 of the 10 alternatives categories had positive returns. Credit Arbitrage was the best performing category and Real Estate the worst (see Figure 2). Exposure to equity beta did not appear to be a significant driver of returns. Given the pattern of returns for both Managed Futures and Volatility Arbitrage (negative in February), it would not be unreasonable to think that these categories might have been affected by the volatility blow

Figure 1: **Asset Class Returns**

	1Q18	2017
S&P 500	-0.76%	21.83%
MSCI EAFE	-1.53%	25.03%
MSCI Emerging Markets	1.42%	37.28%
U.S. Treasury	-3.36%	8.99%
Real Estate	-5.91%	9.84%
Commodities	-0.40%	1.70%
High-Yield Bonds	-1.22%	6.81%
Aggregate Bonds	-1.46%	3.54%
Bitcoin	-52.12%	1403.24%

Source: Bloomberg, 3/31/18. Past performance is no guarantee of future results. An investor cannot invest directly in an index.

Figure 2: **Performance**



Source: Bloomberg, 3/31/18. Past performance is no guarantee of future results. An investor cannot invest directly in an index.

Figure 3: **Correlations (2-Year) & Returns**

	S&P 500	1Q18
Hedged Equity	0.84	0.71%
Macro	0.62	-0.97%
Equity Market Neutral	0.60	0.74%
Event Driven	0.57	0.20%
Managed Futures	0.57	-2.23%
Volatility	0.36	-1.37%
Distressed	0.33	0.48%
Real Estate	0.31	-5.91%
Credit Arbitrage	0.14	1.92%
Commodities	0.05	-0.40%

Source: Bloomberg, 3/31/18. Past performance is no guarantee of future results. An investor cannot invest directly in an index.

Figure 4: **Real Asset Returns**

	1Q18	2017
Real Estate	-5.91%	9.84%
Commodities	-0.40%	1.70%
Gold	1.68%	13.09%
Average	***-1.54%***	***8.21%***

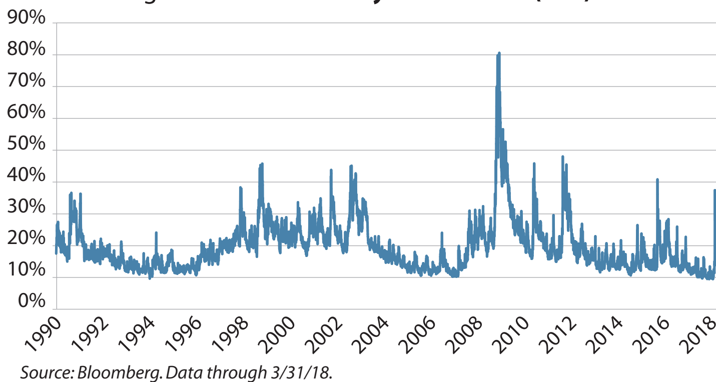
Source: Bloomberg, 3/31/18. Past performance is no guarantee of future results. An investor cannot invest directly in an index.

up referenced earlier. There was no particular alignment between correlation with the SPX and returns, which points to a continued change in the market drivers (see Figure 3). Real assets (commodities, real estate, gold), had divergent returns as real estate fell on both equity beta exposure and the prospect of higher rates. Commodities followed equities up and down realizing a small loss of -40 basis points (bps) for the quarter. Gold ended in positive territory, up 1.68%, likely gaining from increased inflation expectations, dollar weakness and flight to quality buying (see Figure 4).

Managed Futures, Commodities, and Macro strategies have historically shown low correlation and beta to stocks and bonds over the course of a market cycle, thus they serve as potentially strong portfolio diversifiers. Strategies such as Credit Arbitrage, Event Driven, Hedged Equity, et al., which typically have higher correlations with equities and bonds, provide attractive risk/return profiles through lower volatility. These characteristics may allow investors to broaden their investment choices and create more efficient portfolios.

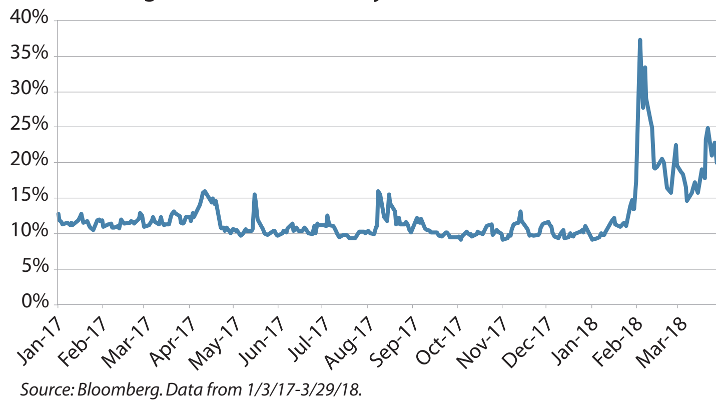
In contrast to the 4th quarter of 2017 which saw U.S. equity volatility (as measured by closing values of the VIX Index) touch its lowest value on record (9.14) , the 1st quarter of 2018 reintroduced investors to volatility with a capital "V" (see Figure 5 and Figure 6). The CBOE VVIX Index (VVIX) is a slightly less known volatility benchmark that measures how volatile equity volatility is, i.e. the "vol of vol." Since mid 2017, there has been a trend higher in the VVIX and this trend accelerated in 2018 (see Figure 7). The average daily VIX level in the 1st quarter was 17.35 and in stark contrast to the record low value of 10.31 in the fourth quarter (see Figure 8). Despite a nearly 70% increase, this level is only around the 50th percentile for the entire history of the VIX. Credit spreads, Baa/BBB rated bonds over U.S. Treasuries, tightened appreciably (19 bps) in January, but then reversed course in the face of equity volatility and ended 9 bps wider from the close of the fourth quarter (see Figure 9). Spreads are still a bit rich and are in the lower third of historical rankings (see Figure 10). It is worth noting that the spread between below investment grade corporate bonds and Baa/BBB corporate bonds continues

Figure 5: **U. S. Volatility Benchmark (VIX)**



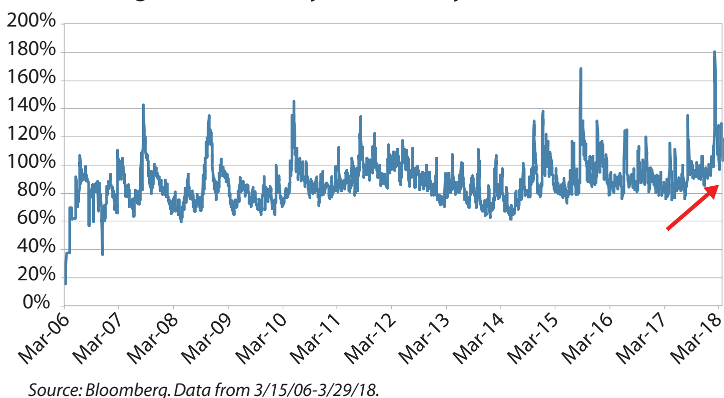
Source: Bloomberg. Data through 3/31/18.

Figure 6: **U. S. Volatility Benchmark (VIX)**



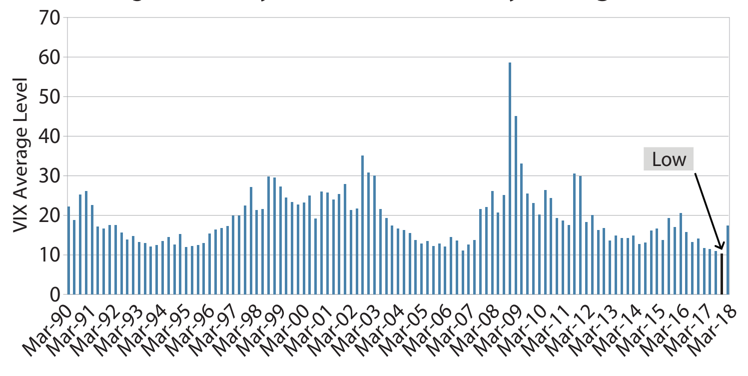
Source: Bloomberg. Data from 1/3/17-3/29/18.

Figure 7: **Volatility of Volatility (CBOE VVIX)**



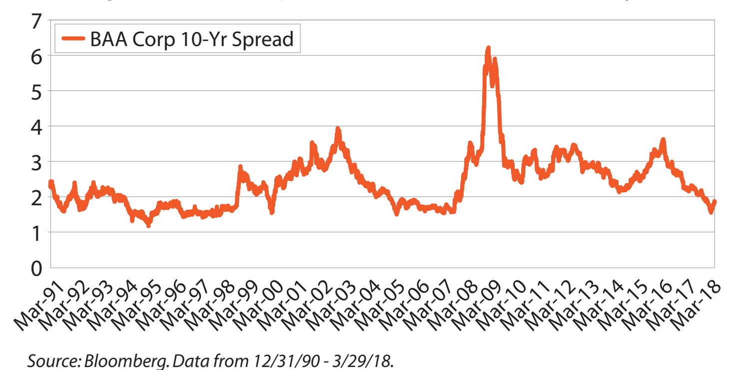
Source: Bloomberg. Data from 3/15/06-3/29/18.

Figure 8: **Daily VIX Level - Quarterly Average**



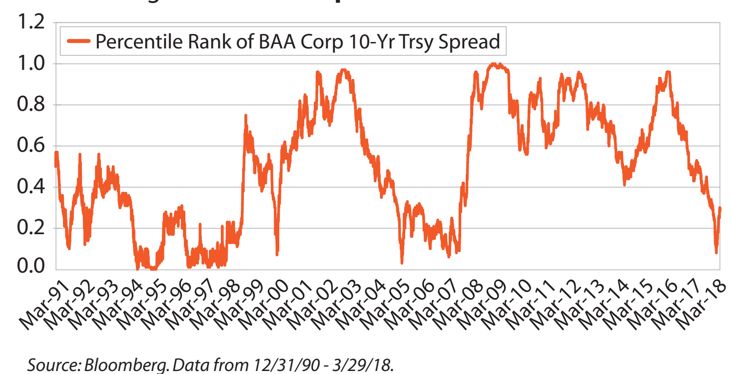
Source: Bloomberg. Data from 3/30/90-3/31/18.

Figure 9: **Credit Spread vs. 10-Year U.S. Treasury**



Source: Bloomberg. Data from 12/31/90 - 3/29/18.

Figure 10: **Credit Spread Percentile Rank**



Source: Bloomberg. Data from 12/31/90 - 3/29/18.

to display a trend upward, something that started early in 2017, but does not appear to be indicating distress (see Figure 11).

The Janet Yellen era at the Federal Reserve came to a close in the first quarter of 2018. The January 31st meeting resulted in no change to rates but there was a statement of an expectation of rising inflation. What was a bit unexpected were Yellen's comments a few days later (perhaps free of the burden of being FED chair) that stock and real estate valuations were "so high" and a concern. Stocks did not react particularly well. Her successor, Jerome Powell, becomes the first FED chair to not hold a PhD in economics in over 30 years and signaled that he would continue on the path of raising rates and normalizing the FED's balance sheet. On March 21st, the first Federal Open Market Committee (FOMC) with Chairman Powell at the conn, the FOMC raised rates a quarter point.

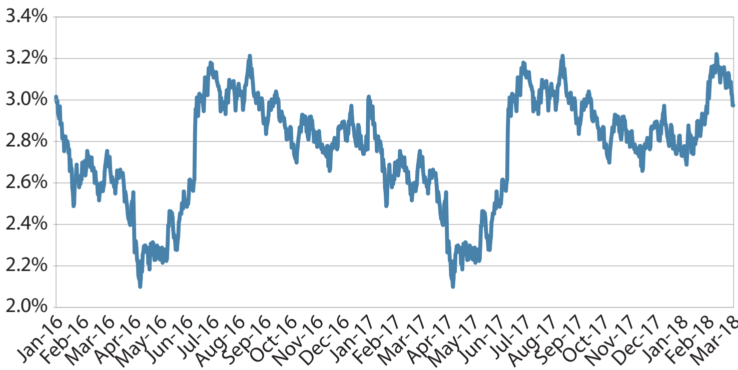
U.S. Treasury 10 year yields rose from 2.41% to 2.74% during the quarter. The long end of the Treasury curve (30 Year Maturity) rose 23 bp to a yield of 2.97% (see Figure 12). The T-bills (3 Months Maturity) to 30 yr. spread narrowed marginally (9 bps) reflecting a continued flattenting. Since December of 2016 the curve has flattened 130 bps (see Figure 13). While the curve is not inverted as it was in 2007, there are some fears that the rise in short-term interest rates may start to impact economic growth (see Figure 14).

Given the explosion in volatility, it is not a surprise to see a weak quarter for "Risk On" assets (+0.36% avg return) and reasonably positive quarter for "Risk Off" assets (+1.57% avg return). Long-dated (20-Year) U.S. Treasuries stood out in the "Risk Off" category as the poor performer with a -3.36% return for the quarter reflecting increased inflation expectations (see Figure 15). Both the Japanese Yen and the Chinese Renminbi benefited from a sinking U.S. dollar further shaken by comments from U.S. Treasury Secretary Steve Mnuchin in praise of a weaker currency. Alternatives have historically provided significant diversification benefits when paired with a portfolio of traditional assets, in addition to both competitive absolute returns and attractive risk-adjusted returns.

Figure 11: **B/CA Spread over BBB (US Corp)**

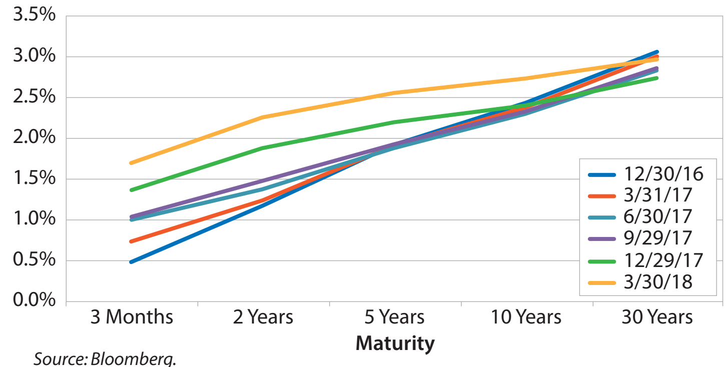
Source: Bloomberg. Data from 1/3/11-3/30/18.

Figure 12: **U.S. 30-Yr. Treasury Yield**



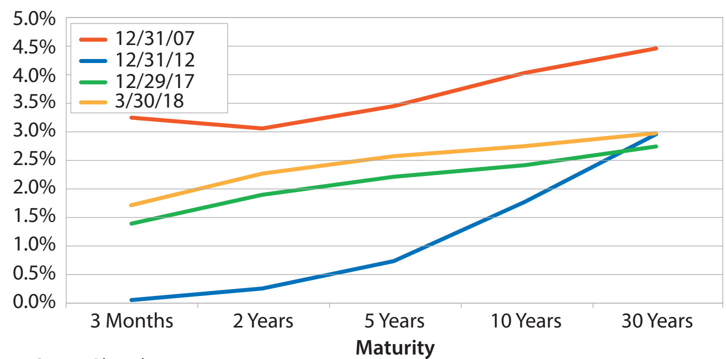
Source: Bloomberg. Data through 3/30/18.

Figure 13: **U.S. Treasury Yield Curve**



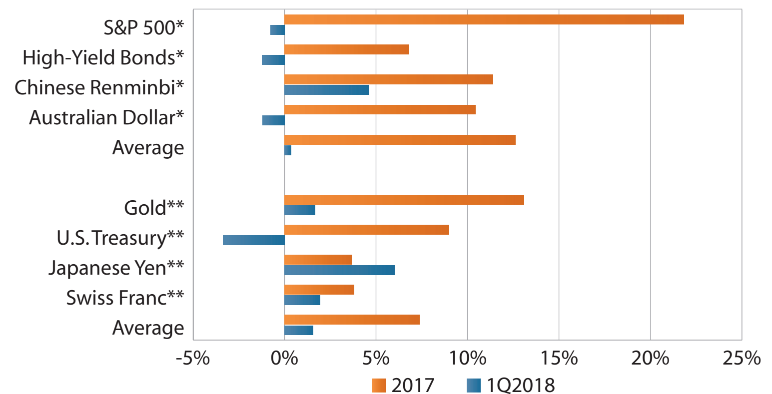
Source: Bloomberg.

Figure 14: **U.S. Treasury Yield Curve**



Source: Bloomberg.

Figure 15: **Risk Off vs. Risk On Asset Returns**



Source: Bloomberg, 3/31/18.
** Considered to be "Risk On" asset class. ** Considered to be "Risk Off" asset class.*

All charts shown herein are for illustrative purposes only and not indicative of any investment. The performance illustrations exclude the effects of taxes and brokerage commissions or other expenses incurred when investing. Past performance is not indicative of future results and there can be no assurance past trends will continue in the future. An investor cannot invest directly in an index.

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Definitions

10-Yr Treasury: Yield of U.S. Treasury securities maturing in approximately 10 years.

Aggregate Bonds: The Bloomberg Barclays US Aggregate Bond Index is a broad-based benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market.

Australian Dollar: The return from selling the short currency (USD) to buy the long currency (AUD) and earning interest. The return is calculated by adding the spot return to the interest earned from the long currency position. It is designed to measure the performance of the Australian dollar vs. the U.S. dollar.

BAA Corp: Moody's Bond Indices Corporate BAA. Moody's Long-Term Corporate Bond Yield Averages are derived from pricing data on a regularly replenished population of corporate bonds in the U.S. market, each with current outstandings over $100 million. The bonds have maturities as close as possible to 30 years; they are dropped from the list if their remaining life falls below 20 years, if they are susceptible to redemption, or if their ratings change. All yields are yield-to- maturity calculated on a semi-annual basis.

Beta: A measure of price variability relative to the market.

Bitcoin: A digital currency using encryption techniques created for use in peer-to-peer online transactions Introduced in 2008 by a person or group using the name Satoshi Nakamoto.

Bloomberg Barclays US Corp B-Ca Capped Index: The Bloomberg Barclays index measures the performance of the taxable B1 – Ca rated range of the fixed-rate U.S. dollar-denominated corporate bond market. The index is market capitalization weighted and caps individual issuers at 3% of the total market value.

Central Bank Balance Sheet: The U.S. Federal Reserve Balance Sheet as a percentage of U.S. GDP is calculated as the month-end value of the Fed Reserve Balance divided by a four quarter average of interpolated U.S. nominal GDP. The Bank of Japan (BOJ) balance sheet as a percentage of GDP is reported as the month-end value of BOJ Total Assets divided by a four quarter average of interpolated Japan nominal GDP. The Bank of England (BOE) balance sheet as a percentage of GDP is reported as the month-end value of BOE Reserve Balances divided by a four quarter average of interpolated UK nominal GDP. The European Central Bank (ECB) Balance Sheet as a percentage of GDP is reported as the month-end value of ECB Total Assets divided by a four quarter average of interpolated Euro Area nominal GDP.

Chinese Renminbi: The S&P Chinese Renminbi Index is designed as a tradable index that replicates the performance of the Chinese Renminbi versus the U.S. Dollar.

Commodities: The Bloomberg Commodity Index is made up of exchange-traded futures on physical commodities and represents 20 commodities, which are weighted to account for economic significance and market liquidity.

Correlation: A statistical measure that quantifies the extent to which two or more data series fluctuate together. Values run from -1.0 to +1.0.

Credit Arbitrage: Hedge Fund Research HFRI Event-Driven Credit Arbitrage Index. Credit Arbitrage strategies employ an investment process designed to isolate attractive opportunities in corporate fixed-income securities; these include both senior and subordinated claims as well as bank debt and other outstanding obligations, structuring positions with little of no broad credit market exposure. These may also contain a limited exposure to government, sovereign, equity, convertible or other obligations but the focus of the strategy is primarily on fixed corporate obligations and other securities are held as component of positions within these structures.

Credit Spread: The difference in yield between two fixed-income instruments with differing credit profiles.

Distressed: Hedge Fund Research HFRI Event-Driven Distressed/Restructuring Total Index. Distressed/ Restructuring strategies employ an investment process focused on corporate fixed-income instruments, primarily on corporate credit instruments of companies trading at significant discounts to their value at issuance or obliged (par value) at maturity as a result of either formal bankruptcy proceeding or financial market perception of near term proceedings.

Equity Market Neutral: Hedge Fund Research HFRI Equity Hedge Equity Market Neutral Index. Equity Market Neutral strategies employ sophisticated quantitative techniques of analyzing price data to ascertain information about future price movement and relationships between securities, select securities for purchase and sale. Equity Market Neutral Strategies typically maintain characteristic net equity market exposure no greater than 10% long or short.

Event Driven: Hedge Fund Research HFRI Event-Driven (Total) Index. Investment Managers who maintain positions in companies currently or prospectively involved in corporate transactions of a wide variety including but not limited to mergers, restructurings, financial distress, tender offers, shareholder buybacks, debt exchanges, security issuance or other capital structure adjustments.

Federal Reserve Balance Sheet: The notional amount of assets held by the Federal Reserve (primarily US Treasuries and mortgage backed securities).

Gold: The return of the gold spot price as quoted as U.S. dollars per Troy Ounce.

Hedged Equity: Hedge Fund Research HFRI Equity Hedge (Total) Index. Investment Managers who maintain positions both long (positions that are owned) and short (positions that are owed) in primarily equity and equity derivative securities. Hedged Equity managers would typically maintain at least 50%, and may in some cases be substantially entirely invested in equities, both long and short.

High-Yield Bonds: The Bloomberg Barclays US High Yield Very Liquid Index (VLI) is a component of the US Corp High Yield Index that is designed to track a more liquid component of the USD-denominated, high yield, fixed-rate corporate bond market. The US High Yield VLI uses the same eligibility criteria as the US Corp High Yield Index, but includes only the three largest bonds from each issuer that have a min amount outstanding of USD500mn and less than five years from issue date.

Japanese Yen: The return from selling the short currency (USD) to buy the long currency (JPY) and earning interest. The return is calculated by adding the spot return to the interest earned from the long currency position. It is designed to measure the performance of the Japanese yen vs. the U.S. dollar.

Long/Short: "Long" and "short" are investment terms used to describe ownership of securities. To buy securities is to "go long." The opposite of going long is "selling short." Short selling is an advanced trading strategy that involves selling a borrowed security. Short sellers make a profit if the price of the security goes down and they are able to buy the security at a lower amount than the price at which they sold the security short.

Macro: Hedge Fund Research HFRI Macro (Total) Index. Investment Managers which trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed-income, hard currency and commodity markets.

Managed Futures: BarclayHedge US Managed Futures Industry Top 50 (BTop 50) Index. The Index seeks to replicate the overall composition of the managed futures industry with regard to trading style and overall market exposure.

MSCI EAFE: The MSCI EAFE Index is designed to represent the performance of large and mid-cap securities across 21 developed markets, including countries in Europe, Australasia and the Far East, excluding the U.S. and Canada. The index is a free-float weighted equity index.

MSCI Emerging Markets: The MSCI Emerging Markets Index captures large and mid cap representation across Emerging Markets (EM) countries. The index covers 85% of the free float-adjusted market capitalization in each country.

Nasdaq 100: The NASDAQ 100 Index is a modified capitalization-weighted index of the 100 largest and most active non-financial domestic and international issues listed on the NASDAQ.

Real Estate: The Dow Jones US Real Estate Index is designed to track the performance of real estate investment trusts (REITs) & other companies that invest directly or indirectly in real estate through development, management or ownership, including property agencies.

S&P 500 VIX Short-Term MCAP Index: The S&P 500 VIX Futures Index Series measures the return from a daily rolling long position in the VIX futures contracts traded on the CBOE. The short-term index is comprised of the first and second contract months.

S&P 500: An unmanaged index of 500 stocks used to measure large-cap U.S. stock market performance.

Swiss Franc: The return from selling the short currency (USD) to buy the long currency (CHF) and earning interest. The return is calculated by adding the spot return to the interest earned from the long currency position. It is designed to measure the performance of the Swiss franc vs. the U.S. dollar.

U.S. 30-Yr Treasury Yield: Yield of U.S. Treasury securities maturing in approximately 30 years.

U.S. Treasury: The ICE U.S. Treasury 20+ Years Bond Index is part of a series of indices intended to assess U.S. Treasury issued debt. Only U.S. dollar denominated, fixed-rate securities with minimum term to maturity greater than twenty years are included.

VIX: Chicago Board Options Exchange (CBOE) SPX Volatility Index. The Chicago Board Options Exchange Volatility Index reflects a market estimate of future volatility, based on the weighted average of the implied volatilities for a wide range of strike prices.

Volatility: Hedge Fund Research HFRI Relative Value Volatility Index. Volatility strategies trade volatility as an asset class, employing arbitrage, directional, market neutral or a mix of types of strategies, and include exposures which can be long, short, neutral or variable to the direction of implied volatility, and can include both listed and unlisted instruments. Directional volatility strategies maintain exposure to the direction of implied volatility of a particular asset or, more generally, to the trend of implied volatility in broader asset classes. Arbitrage strategies employ an investment process designed to isolate opportunities between the price of multiple options or instruments. Volatility arbitrage positions typically maintain characteristic sensitivities to levels of implied and realized volatility, levels of interest rates and the valuation of the issuer's equity, among other more general market and idiosyncratic sensitivities.

VVIX: Chicago Board Options Exchange (CBOE) VVIX Index. The VVIX is a volatility of volatility measure in that it represents the expected volatility of the 30 day forward price of the CBOE Volatility Index (VIX Index). The index was launched on March 14th, 2012.