Alternatives Update
4th Quarter 2018

In the 4th quarter, U.S. equity beta went from highly desired to migraine inducing. There was a spike in risk aversion as investors dumped equities (growth stocks and small caps in particular), preferring the safe haven of bonds and precious metals (see Figure 1). Trade tensions with China and the potential global ramifications, worries of an overly aggressive Federal Reserve, the appearance of downward earnings revisions, and President Trump threatening to shut down the government over border wall funding all contributed to negative sentiment in the quarter. Growth worries were accompanied by spikes in volatility, widening credit spreads, and increasing chatter that the bull market in equities/risk assets was ending. While one quarter hardly makes a trend, there is concern about what happens when a generation of investors trained to "buy the dip" and algorithms created in a zero interest rate, low volatility biome, grapple with the curtailment of Central Bank supported capital markets and a new volatility regime. While hardly canon, the New York Fed's recession model jumped significantly in the quarter, putting the probability of a recession in the next 12 months at over 20% (see Figure 2).

The cryptocurrency sector experience a significant carnage in the 4th quarter. Bitcoin, the flagship cryptocurrency, crashed -44.69%. The wider universe of cryptocurrencies, as measured by the Bloomberg Galaxy Crytpo Index (BGCI), fell -45.47% (see Figure 3). In late 2017, the exponential rise in cryptocurrency prices drew comparisons to the Dotcom bubble in the 2000s. That comparison seems valid with a nearly 75% decline in the price of Bitcoin and over 80% decline in the BGC Index during 2018. The SEC has pushed back a decision on one pending Bitcoin exchange-traded fund proposal to 2019, though price manipulation of the underlying asset will likely remain a key issue. The sector also must address issues such as trading security (several coin exchanges have been hacked), competing approaches which hinder standardization, as well as questions pertaining to the soundness of the blockchain technology and potential vulnerabilities such as "51% attacks."

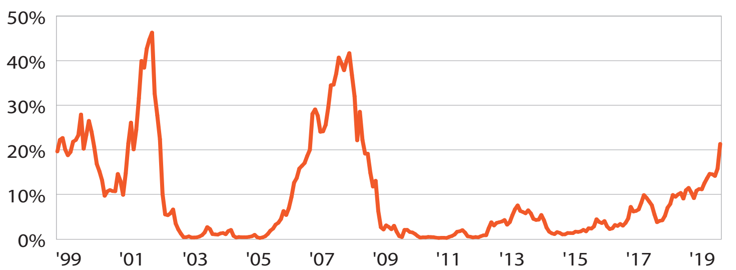
Global economic news was mixed during the fourth quarter. Domestic economic news was generally upbeat. The Federal Open Market Committee (FOMC) raised the target rate only once in the quarter, at the December meeting, but pivoted to a dovish tone. Unemployment, as measured by U-3 seasonally adjusted rate, saw a slight uptick to 3.9%, (see Figure 4) which is still near 30-yr lows. Consumer sentiment, as measured by the University of Michigan Consumer Sentiment Index, slipped below the 100 level but still reflected a positive outlook. Another sentiment indicator, the Consumer Board Confidence Index, hit its highest level since late 2000 in October before dipping a bit, perhaps due to volatility in the financial markets and on-going trade tensions (see Figure 5). The year-over-year consumer price index (CPI) trended downward during the fourth quarter, settling at 1.9% at the end of the year and not yet showing any significant inflation pressures in the economy (see Figure 6).

Figure 1: **Asset Class Returns**

	4Q18	2018
U.S. Equities	-13.52%	-4.38%
International Developed	-12.54%	-13.79%
Emerging Markets	-7.46%	-14.57%
U.S. Treasury	4.18%	-1.98%
Real Estate	-5.97%	-4.03%
Commodities	-9.41%	-11.25%
High Yield Bonds	-4.72%	-2.57%
U.S. Aggregate Bonds	1.64%	0.01%
Bitcoin	-44.69%	-74.33%
U.S. Dollar	1.09%	4.40%

Source: Bloomberg, 12/31/18.

Figure 2: **Federal Reserve Bank of New York Probability of Recession in U.S. 12 Months Ahead**



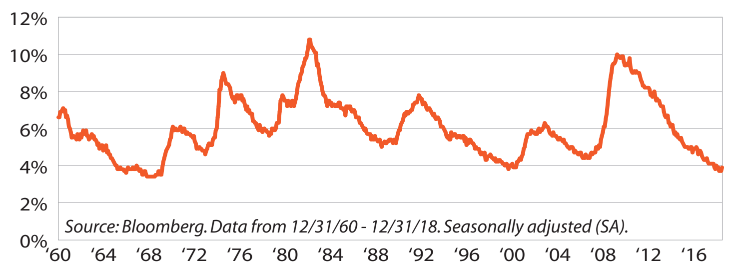
Source: Bloomberg. Data from 12/31/98 - 12/31/20. Recession indicator based upon 10y - 3mo spread.

Figure 3: **Cryptocurrency Returns**

	4Q18	3Q18
BB Galaxy Crypto Index	-45.47%	-11.11%
Bitcoin	-44.69%	12.61%
Ethereum	-41.03%	-46.63%
Ripple	-35.18%	22.98%
Litecoin	-52.21%	-16.62%

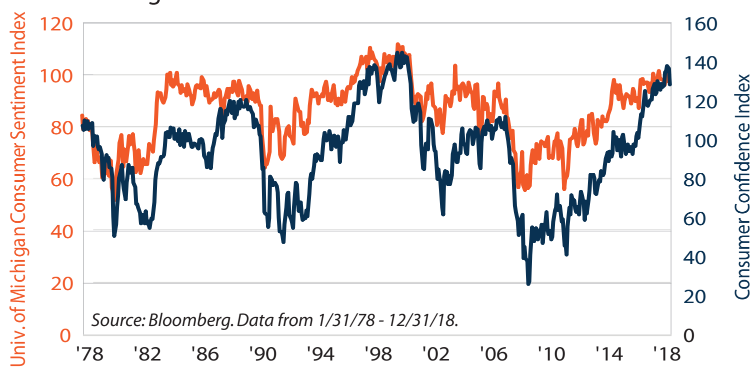
Source: Bloomberg, 12/31/18.

Figure 4: **U.S. Unemployment (U-3)**



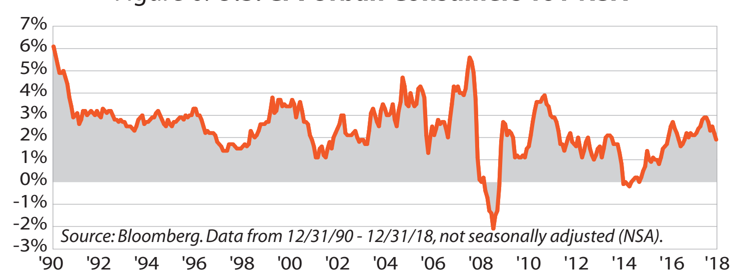
Source: Bloomberg. Data from 12/31/60 - 12/31/18. Seasonally adjusted (SA).

Figure 5: **Economic Measures of Sentiment**



Source: Bloomberg. Data from 1/31/78 - 12/31/18.

Figure 6: **U.S. CPI Urban Consumers YoY NSA**



Source: Bloomberg. Data from 12/31/90 - 12/31/18, not seasonally adjusted (NSA).

The S&P 500 Index (SPX) was once again the standout performer among traditional assets classes, unfortunately not in a good way, falling -13.52% in the fourth quarter (the worst quarterly return since 2011 and second worst since 2008). The MSCI EAFE Index fell -12.54%, while long-term 20+ year U.S. Treasuries rose +4.18% as investors reallocated from equities and sought the safety of flight-to-quality assets (see Figure 1). Alternative Investment ("alternatives") fourth quarter returns were negative across all 10 categories, though relative to equities, significantly outperformed (see Figure 7 and Figure 8). Global Macro was the best performing category (-1.86%), closely followed by equity market neutral (-1.92%) and managed futures (-1.95%). Commodities were the worst performer during the quarter, continuing to be victimized by a strong dollar, a faltering Chinese economy, and ongoing trade tensions. Correlation with the SPX did seem to influence the magnitude of returns (see Figure 9) though it was not particularly strong.

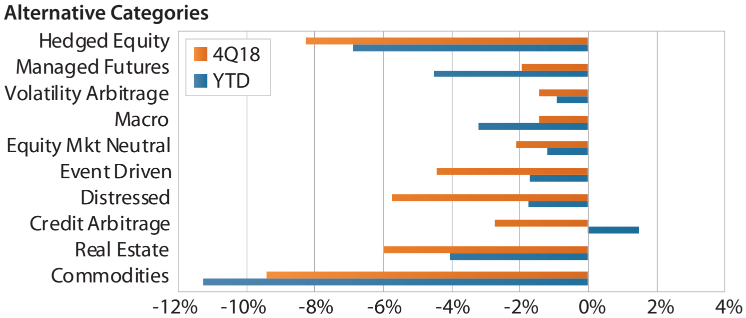
Traditionally, managed futures and macro strategies are viewed as having low correlations to equities because they are generally diversified across a variety of markets and often employ shorting as part of their approach. While 2-yr correlations have risen vs 2-yr correlations as measured a year ago, both categories strongly outperformed equities (see Figure 10). Real assets (commodities, real estate, gold) outperformed the general equity markets in the fouth quarter (see Figure 11). Gold was up sharply as it fulfilled the role of a flight to quality asset nicely. Real estate was negative, likely due to concerns about higher rates and slower economic growth while commodities fell significantly.

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 may serve as potentially strong portfolio diversifiers. Strategies such as credit, event driven, hedged equity, et al., which have historically had higher correlations with equities and bonds, may provide attractive risk/return profiles through lower volatility. These characteristics may allow investors to broaden their investment choices and create more efficient portfolios.

Lower-rated bond yields and long duration U. S. Treasury yields diverged significantly causing an appreciable widening in credit spreads. Baa/BBB rated corporate bonds over 10-yr U.S. Treasuries, widened 63 basis points (bps) during the fourth quarter (see Figure 12). Spreads are now in the 59th percentile of historical rankings (see Figure 13). The spread between below investment grade corporate bonds (B/CA rated) and BBB rated corporate bonds (investment grade) widened 201 bps during the quarter. This yield spread is now in the lower half of historical percentiles (see Figure 14). Most of the spread widening was due to rising yields in the B/CA rated bond category and is consistent with the theme of investors seeking to shed/reprice risk.

The Fed raised rates 0.25% during December 2018 and the tone of their narrative shifted to a decidedly more dovish stance. After a swift decline in equities, Fed Chairman Jerome Powell, backtracked on a statement from early in the fourth quarter that rates were a "long way" from neutral, and

Figure 7: **Performance**



Source: Bloomberg, 12/31/18.

Figure 8: **Excess Return vs. S&P 500 Index**

	Q4 2018
Hedged Equity	5.21%
Macro	11.66%
Event Driven	8.49%
Managed Futures	11.57%
Equity Market Neutral	11.60%
Volatility Arbitrage	11.07%
Distressed	7.90%
Real Estate	7.55%
Credit Arbitrage	11.38%
Commodities	4.11%

Source: Bloomberg, 12/31/18.

Figure 9: **Correlations (2-Year) & Returns**

	S&P 500	4Q18
Hedged Equity	0.90	-8.31%
Event Driven	0.83	-5.03%
Distressed	0.64	-5.62%
Volatility Arbitrage	0.74	-2.45%
Credit Arbitrage	0.58	-2.14%
Real Estate	0.59	-5.97%
Commodities	0.58	-9.41%
Macro	0.49	-1.86%
Equity Market Neutral	0.31	-1.92%
Managed Futures	0.35	-1.95%

Source: Bloomberg, 12/31/18.

Figure 10: **Correlations with the S&P 500 Index**

	12/31/18	12/29/17
Hedged Equity	0.90	0.86
Macro	0.49	-0.10
Event Driven	0.83	0.77
Managed Futures	0.35	-0.23
Equity Market Neutral	0.31	0.49
Volatility Arbitrage	0.74	0.45
Distressed	0.64	0.57
Real Estate	0.59	0.71
Credit Arbitrage	0.58	0.62
Commodities	0.58	0.14

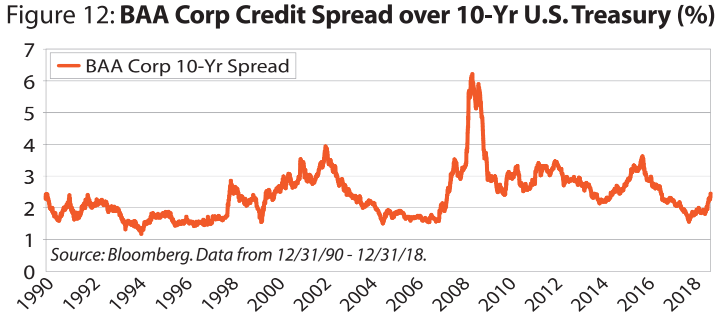
Source: Bloomberg, 12/31/18. Monthly returns over 24 months.

Figure 11: **Real Assets**

	Q4 2018	Q3 2018	Q2 2018	Q1 2018	YTD 2018
Real Estate	-5.97%	0.65%	7.78%	-5.91%	-4.03%
Commodities	-9.41%	-2.02%	0.40%	-0.40%	-11.25%
Gold	7.54%	-4.84%	-5.42%	1.68%	-1.58%
Average	***-2.61%***	***-2.07%***	***0.92%***	***-1.54%***	***-5.62%***

Source: Bloomberg, 12/31/18.

Figure 12: **BAA Corp Credit Spread over 10-Yr U.S. Treasury (%)**



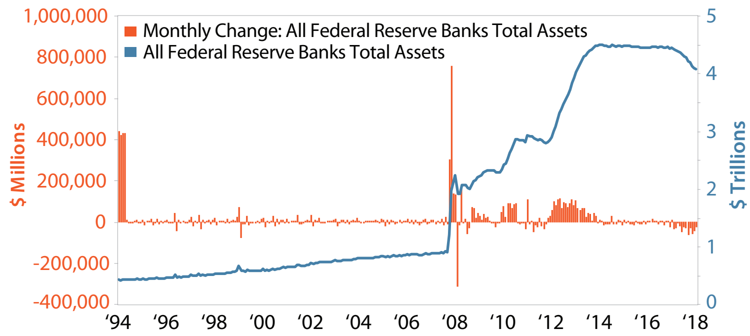
Source: Bloomberg. Data from 12/31/90 - 12/31/18.

offered up that rates were "just below neutral" later in the quarter. It appears that the "Powell Put" (a colloquialism for the Central Bank's willingness to actively try and prevent large drawdowns in the stock market and other risk assets by non-traditional activity) is alive and well. There was no indication that the Fed's balance sheet runoff would be substantially altered. While balance sheet assets have declined, the pace is very modest, the percentage changes small, and normalization to pre-2008 crisis level is not likely to be realized for quite some time (see Figure 15). Ten-year U.S. Treasury yields fell nearly 40 bps to 2.69% amidst the equity turmoil. The long-end of the U.S. Treasury curve (30-yr maturity) fell 18 bps to a yield of 3.02%. The credit spread between 30-yr Treasuries and T-bills (3-mo maturity) narrowed (36 bps), reflecting a continued flattening of the curve. The yield spread between 30-yr. to 10-yr. U.S. Treasuries widened (16 bps). Over the past two years, the 30-yr Treasury vs. T-bill spread has flattened 192 bps (see Figure 16). The last time the treasury yield curve was this flat was in 2007 (see Figure 17).

Returns for "Risk On" assets (-4.73% average return) underperformed the returns for "Risk Off" assets (+3.78% average return) with the S&P 500 posting the largest loss in the fourth quarter and gold the largest gain (see Figure 18). Focusing on non-currencies, U.S. equities and high yield bonds underperformed gold and long-dated (20-yr+) U.S. Treasuries by an average of nearly 1500 bps. 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.

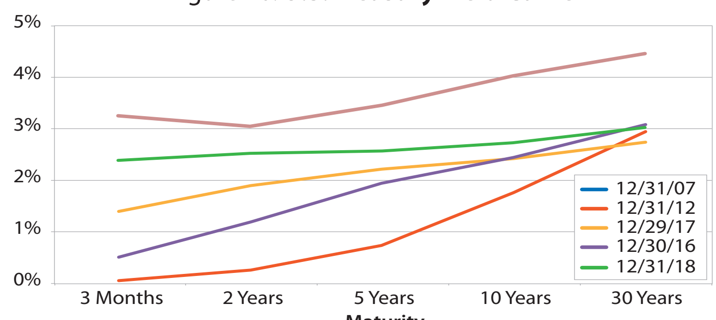
Please Note: Alternative investments may employ complex strategies, have unique investment and risk characteristics that may not be suitable for all investors.

Figure 15: **Federal Reserve Balance Sheet**



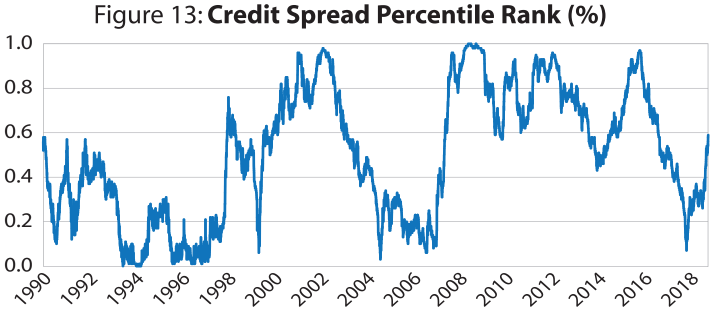
Source: Bloomberg. Data from 12/30/94 - 12/31/18.

Figure 16: **U.S. Treasury Yield Curve**



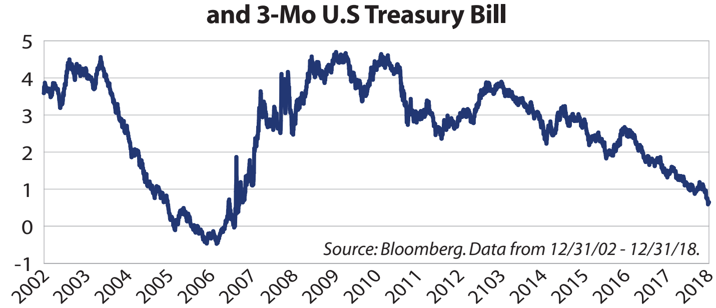
Source: Bloomberg.

Figure 13: **Credit Spread Percentile Rank (%)**



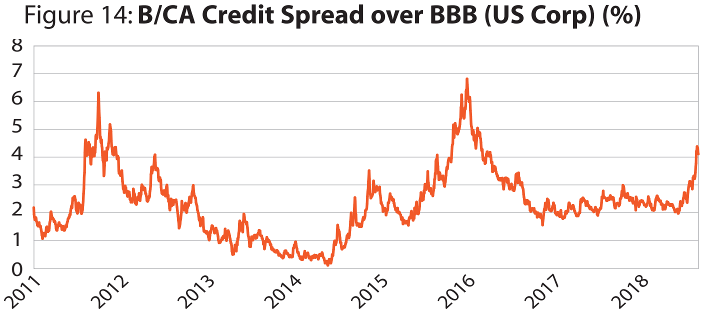
Source: Bloomberg. Data from 12/31/90 - 12/31/18.

Figure 17: **Yield Spread between 30-Yr U.S Treasury and 3-Mo U.S Treasury Bill**



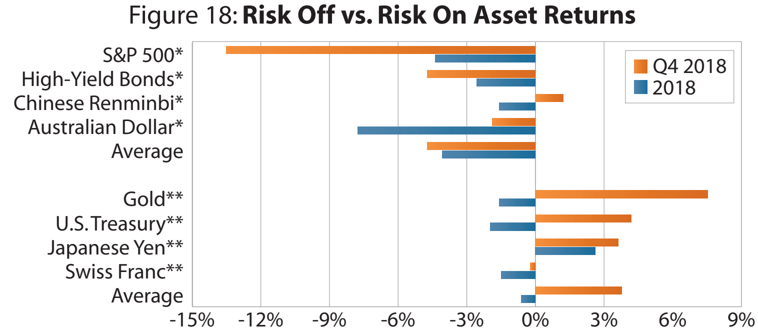
Source: Bloomberg. Data from 12/31/02 - 12/31/18.

Figure 14: **B/CA Credit Spread over BBB (US Corp) (%)**



Source: Bloomberg. Data from 1/3/11-12/31/18.

Figure 18: **Risk Off vs. Risk On Asset Returns**



Source: Bloomberg, 12/31/18.
** 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.

Definitions

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

51% Attack: A potential attack on the bitcoin network whereby an organization is somehow able to control the majority of the network mining power (hash rate) to revise transaction history and prevent new transactions from confirming.

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.

Bloomberg Galaxy Crypto Index (BGCI): The BGCI is designed to measure the performance of the largest cryptocurrencies traded in USD.

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.

Ethereum: Ethereum is a platform that offers programming code of any decentralized application. It has been linked to payment style transactions. Ether is the cryptocurrency issued through open-source code executed on thousands of nodes.

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.

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 Corporate 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 Corporate 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.

Litecoin: A peer-to-peer cryptocurrency and open source software project similar to Bitcoin, Litecoin uses blockchain technology to process transactions. Litecoin, referred to as an alt-coin can process blocks faster than Bitcoin, uses a different mining algorithm and has larger supply.

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.

International Developed: 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.

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.

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.

Ripple: Known as XRP, Ripple is a cryptocurrency that can be used on open source distributed ledger created by the company Ripple. It is built upon the principles of blockchain as an on-demand option for faster cross border payments.

U.S. Equities: The S&P 500 Index. 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. Dollar: The U.S. Dollar Index (USDX) indicates the general international value of the U.S. dollar. The USDX does this by averaging the exchange rates between the USD and major world currencies. The ICE US computes this by using the rates supplied by some 500 banks.

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.

Volatility Arbitrage: 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.

Alternative investments may employ complex strategies, have unique investment and risk characteristics that may not be suitable for all investors.

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