Alternatives Update

3rd Quarter 2018

In the 3rd quarter, U.S. equity beta rewarded investors. "Buy risk," "buy on the dips," "buy growth", was the path to outperformance. Thanks to a strong earnings season, reasonably tame inflation, and a business-friendly administration, the S&P 500 Index was the clear winner among the various asset class returns in the third quarter (see Figure 1). Chinese equity markets continued to weaken amidst trade war rhetoric and successive rounds of tariffs. Tesla, Inc.'s CEO, Elon Musk's tweets and taunting of short sellers finally caught up with him. The U.S. Securities and Exchange Commission (SEC) fined both Tesla and Musk and required his removal as chairman because of his off-the-cuff comments proposing taking Tesla private.

Figure 1: **Asset Class Returns**

	3Q18	YTD 2018
U.S. Equities	7.71%	10.56%
International Developed	1.35%	-1.43%
Emerging Markets	-1.09%	-7.68%
U.S. Treasury	-3.04%	-5.92%
Real Estate	0.65%	2.07%
Commodities	-2.02%	-2.03%
High Yield Bonds	2.57%	2.26%
U.S. Aggregate Bonds	0.02%	-1.60%
Bitcoin	12.61%	-53.58%
U.S. Dollar	0.70%	3.27%

Source: Bloomberg, 9/28/18.

Figure 2: **Cryptocurrency Returns**

	3Q18	2Q18
BB Galaxy Crypto Index	-11.11%	-8.38%
Bitcoin	12.61%	-13.91%
Ethereum	-46.63%	7.31%
Ripple	22.98%	-12.17%
Litecoin	-16.62%	-36.76%

Source: Bloomberg, 9/28/18.

Bitcoin, the flagship cryptocurrency, rose 12.61% in the third quarter. The wider universe of cryptocurrencies, as measured by the Bloomberg Galaxy Crytpo Index, fell -11.11% in the quarter, weighed down by a dramatic -46.63% drop in Ethereum (see Figure 2). The path forward for a retail-friendly vehicle to access cryptocurrencies remains blocked as the SEC continues to dismiss all exchange-traded funds' (ETFs) suitors related to the asset class. Most ETF applications have been for bitcoin and focused on the use of futures as the primary exposure. Despite futures contracts trading on both the Chicago Board Options Exchange and the Chicago Mercantile Exchange, the SEC has rejected nine bitcoin ETF proposals. Specifically, the SEC has stated that they are concerned about fraud and manipulation in the bitcoin marketplace. One can infer the SEC is also concerned that this would flow through to the futures markets. The SEC also temporarily halted trading in two recently listed bitcoin exchange-traded notes issued by XBT Provider AB. These exchange-traded notes sought to track the prices of bitcoin and Ethereum/ether. The SEC had issue that the funds were characterized as ETFs and such characterization was confusing and not accurate.

While global economic news was mixed during the third quarter, the domestic economic news was positively rosy. The Federal Open Market Committee (FOMC) raised the target rate only once in the quarter, at the September meeting, and kept much of the language (other than raising rates) consistent with the August 1st, 2018 statement. Unemployment, as measured by U-3 seasonally adjusted rate, fell to a decades low 3.7%, (see Figure 3). Consumer sentiment, as measured by the University of Michigan Consumer Sentiment Index, breached the 100 level for only the fourth time

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

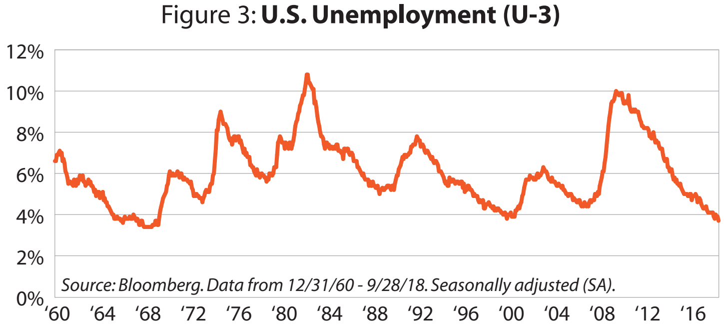


Figure 4: **Economic Measures of Sentiment**

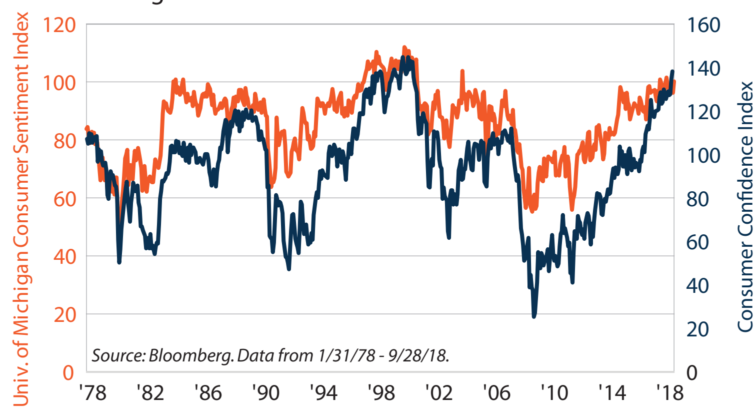


Figure 5: **U.S. CPI Urban Consumers YoY NSA**

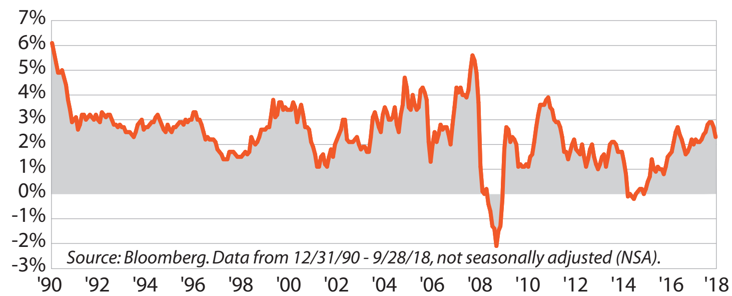
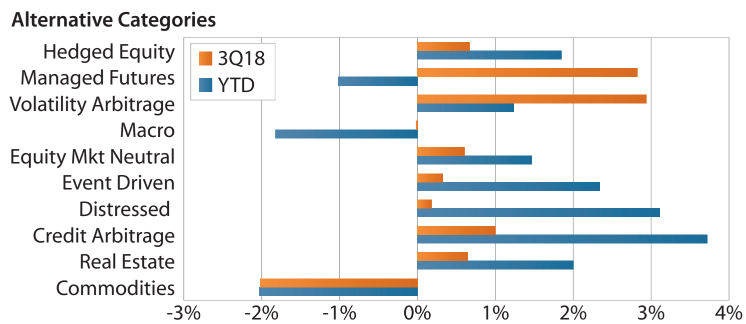


Figure 6: **Performance**



Source: Bloomberg, 9/28/18.

since late 2000. Another sentiment indicator, the Consumer Confidence Index, hit its highest level since late 2000 (see Figure 4). The year-over-year consumer price index (CPI) dropped during the third quarter, coming in at 2.3% as of 9/28/18, and supporting the narrative of economic growth but tame inflation (see Figure 5).

The S&P 500 Index (SPX) was the standout performer among traditional asset classes, with a total return of 7.71% in the third quarter. The MSCI Emerging Markets Index slipped -1.09% and the bear market at the long-end of the yield curve accelerated as long term (20+ year) U.S. Treasuries sank -3.04%. Alternative Investments ("alternatives") returns were mostly positive for the quarter; 8 of the 10 alternatives categories had positive returns. Volatility arbitrage was the best performing category, closely followed by managed futures. Commodities were the worst performer (see Figure 6), a victim of the strong dollar and ongoing trade tensions. There was no particular alignment between correlation with the SPX and the magnitude of returns (see Figure 7).

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.

Figure 7: **Correlations (2-Year) & Returns**

	S&P 500	3Q18
Hedged Equity	0.80	0.67%
Macro	0.70	-0.03%
Event Driven	0.62	0.33%
Equity Market Neutral	0.55	0.60%
Volatility Arbitrage	0.53	2.94%
Managed Futures	0.53	2.82%
Real Estate	0.31	0.65%
Distressed	0.31	0.18%
Commodities	0.26	-2.02%
Credit Arbitrage	0.19	1.00%

Source: Bloomberg, 9/28/18.

Figure 8: **Correlations with the S&P 500 Index**

	9/28/18	9/29/17
Hedged Equity	0.80	0.87
Macro	0.70	(0.07)
Event Driven	0.62	0.75
Equity Market Neutral	0.55	0.57
Volatility Arbitrage	0.53	0.50
Managed Futures	0.53	(0.27)
Real Estate	0.31	0.71
Distressed	0.31	0.49
Commodities	0.26	0.16
Credit Arbitrage	0.19	0.51

Source: Bloomberg, 9/28/18. Monthly returns over 24 months.

Figure 9: **Real Asset Returns**

	3Q18	2Q18	1Q18
Real Estate	0.65%	7.78%	-5.91%
Commodities	-2.02%	0.40%	-0.40%
Gold	-4.84%	-5.42%	1.68%
Average	***-2.07%***	***0.92%***	***-1.54%***

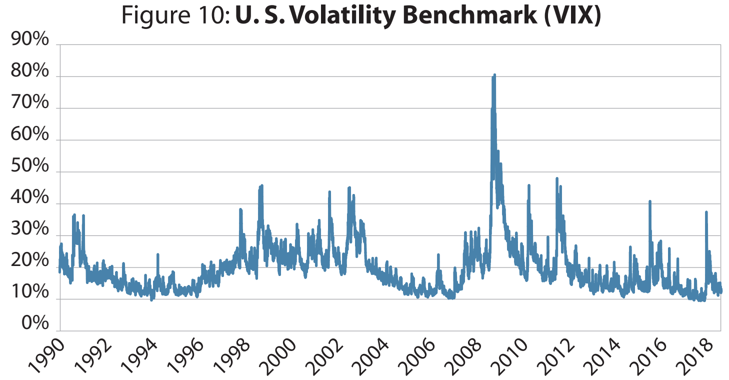
Source: Bloomberg, 9/28/18.

Recent returns in these sectors continue to show higher than normal correlations with equities. We believe these correlations may reflect a positioning for global growth with a larger exposure to equity-related risk, increased adoption of short volatility strategies, or trend following strategies switching to long equities and increasing position sizes as trend confirmation continues and equity volatility declines. Real assets (commodities, real estate, gold) had weak to very poor performance in the third quarter (see Figure 9). Commodities in general, and gold specifically, were again buffeted by a strong dollar, weak yuan, slowing Chinese economy and a deteriorating global trade environment. Real estate, despite being interest-rate sensitive, survived a strong sell-off in bonds and ended positive (+0.65%) for the quarter.

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. As mentioned previously, correlations for the managed futures and macro sectors with equities are elevated and this bears monitoring. Strategies such as credit arbitrage, 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.

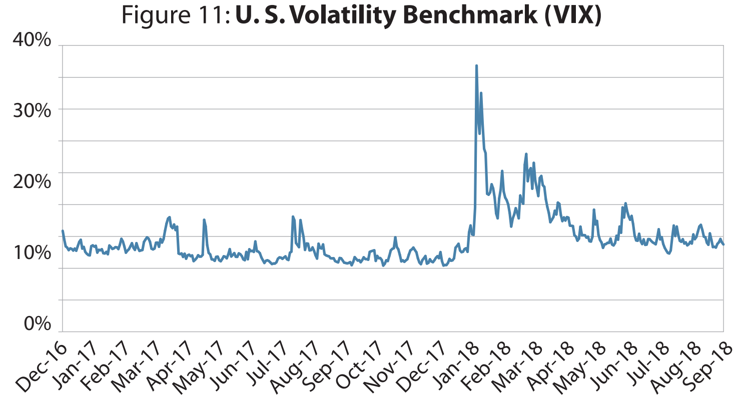
U.S. equity volatility (as measured by closing values of the VIX Index) started the 3rd quarter at just under 16 and despite rising rates, heated trade negotiations, and rising oil prices, drifted lower throughout the quarter, ending at a 12.12. The current level of VIX is still significantly lower than the long-term average of approximately 19 from January 1990 through September 2018 (see Figures 10 and 11). Both lower-rated bond yields and

Figure 10: **U. S. Volatility Benchmark (VIX)**



Source: Bloomberg. Data from 1/1/90-9/28/18.

Figure 11: **U. S. Volatility Benchmark (VIX)**



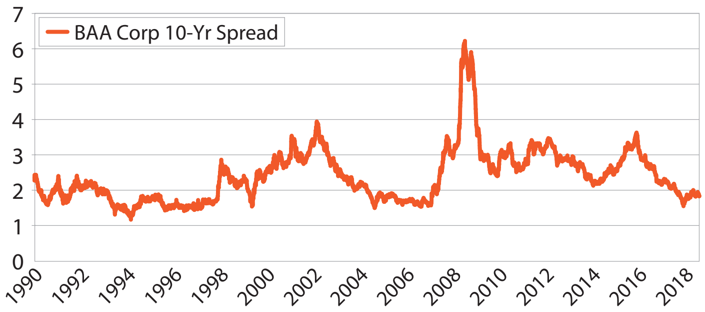
Source: Bloomberg. Data from 12/30/16-9/28/18.

long duration U. S. Treasury yields moved higher on an absolute basis. Credit spreads, particularly Baa/BBB rated corporate bonds over 10-year U.S. Treasuries, tightened roughly 15 basis points (bps) over the third quarter (see Figure 12). Spreads are now in the 28th percentile of historical rankings (see Figure 13). Inflation data continues to drift upward, and the long-end of the fixed income yield curve is starting to reflect some concern. The spread between below investment grade corporate bonds (B/CA rated) and BBB rated corporate bonds (investment grade) narrowed significantly during the quarter (39.6 bps) and is now in the lower half of historical percentiles (see Figure 14). Most of the spread compression (34.6 bps) was due to declining yields in the B/CA rated bond category.

With a hike in the Fed Funds rate during September, the third this year, 4 hikes for 2018 seems to have a reasonably high probability. With the domestic economy doing so well and unemployment at decades lows, the consensus is coming around to 3 or possibly 4 hikes in 2019. 10-year U.S. Treasury yields rose from 2.86% to 3.06% during the third quarter definitively breaching the 3% threshold. The long-end of the Treasury curve (30-yr. maturity) rose 21.6 bps to a yield of 3.21%. The credit spread between 30-yr. Treasuries and T-bills (3mo-maturity) narrowed (6.7 bps), reflecting a continued flattening. The credit spread between 30-yr. and 10-yr Treasuries also narrowed (1.5 bps). Since December of 2016, the curve has flattened 156 bps (see Figure 15). While the 30 yr. rate has served as a remarkably stable pivot point the past several years, it has started to creep up. One has to wonder if there might be more volatility ahead if economic growth continues with such low unemployment or if the U.S. dollar were to retreat.

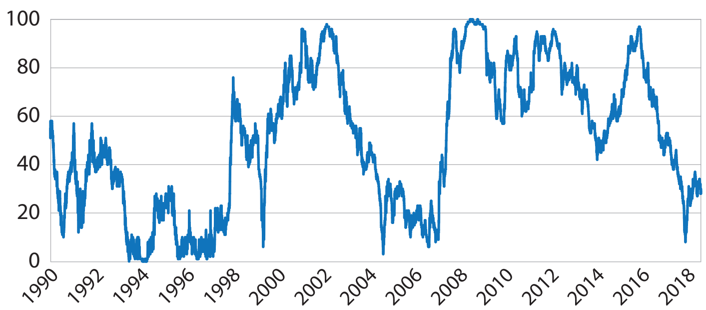
Returns for "Risk On" assets (1.44% average return) outperformed the returns for "Risk Off" assets (-2.44% average return) with the S&P 500 towering over all other sectors in the third quarter (see Figure 16). Focusing on non-currencies, it was a "Risk-on" market as U.S. equities and high yield bonds outperformed gold and long-dated (20-yr. +) U.S. Treasuries by an average of 900 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 12: **BAA Corp Credit Spread over 10-Year U.S. Treasury (%)**



Source: Bloomberg. Data from 12/31/90 - 9/28/18.

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

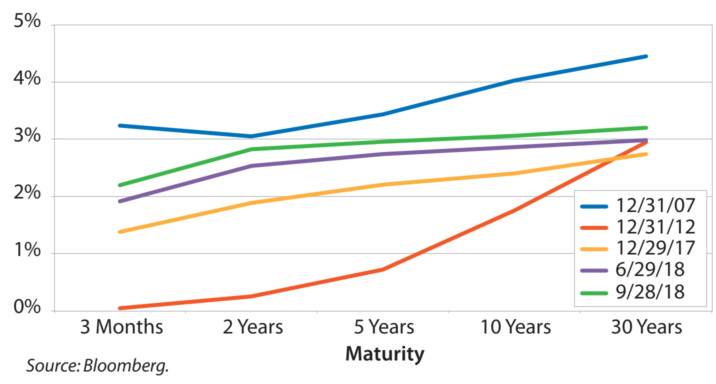


Source: Bloomberg. Data from 12/31/90 - 9/28/18.

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

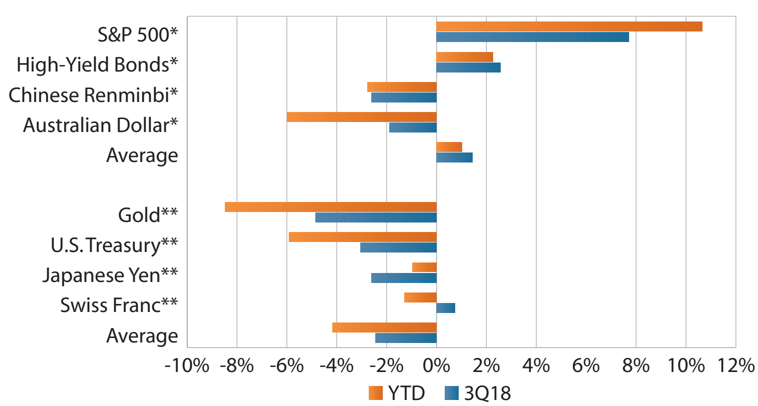
Source: Bloomberg. Data from 1/3/11-9/28/18.

Figure 15: **U.S. Treasury Yield Curve**



Source: Bloomberg.

Figure 16: **Risk Off vs. Risk On Asset Returns**



Source: Bloomberg, 9/28/18.
** Considered to be "Risk On" asset class. ** Considered to be "Risk Off" asset class.*

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.

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 build 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.

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 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.