Potential Disruptions in Stock Market Liquidity

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Introduction

Many indicators and factors impact stock market liquidity. In comparison to other periods, this economic cycle is more complex given the historically low level of interest rates, global central bank easing of monetary policy, increased global debt levels, high-frequency trading (HFT), algorithm-based "artificial intelligence" (AI) trading models, and large inflows into passively managed investments. Interest rates are rising as in previous cycles, but they are doing so from levels that are far lower than in the past. HFT now accounts around half of all domestic equity trading by some estimates[1], and many major financial institutions have replaced portfolio managers and traders with AI-based trading models. Inflows into passive investing have surged, with passive and quantitative investing doubling versus a decade ago, according to a study by JP Morgan.[2]

This paper will review multiple economic indicators of market liquidity, which often show deterioration late in the economic cycle as monetary policy becomes less accommodative and interest rates rise. We offer some observations on how HFT and AI-based models may affect market liquidity in the future. We then look at how the unprecedented inflow of assets into passive investing may affect liquidity as we approach the end of an economic and stock market cycle. Finally, we note several alternative strategies that are designed to protect portfolios from potential disruptions in liquidity.

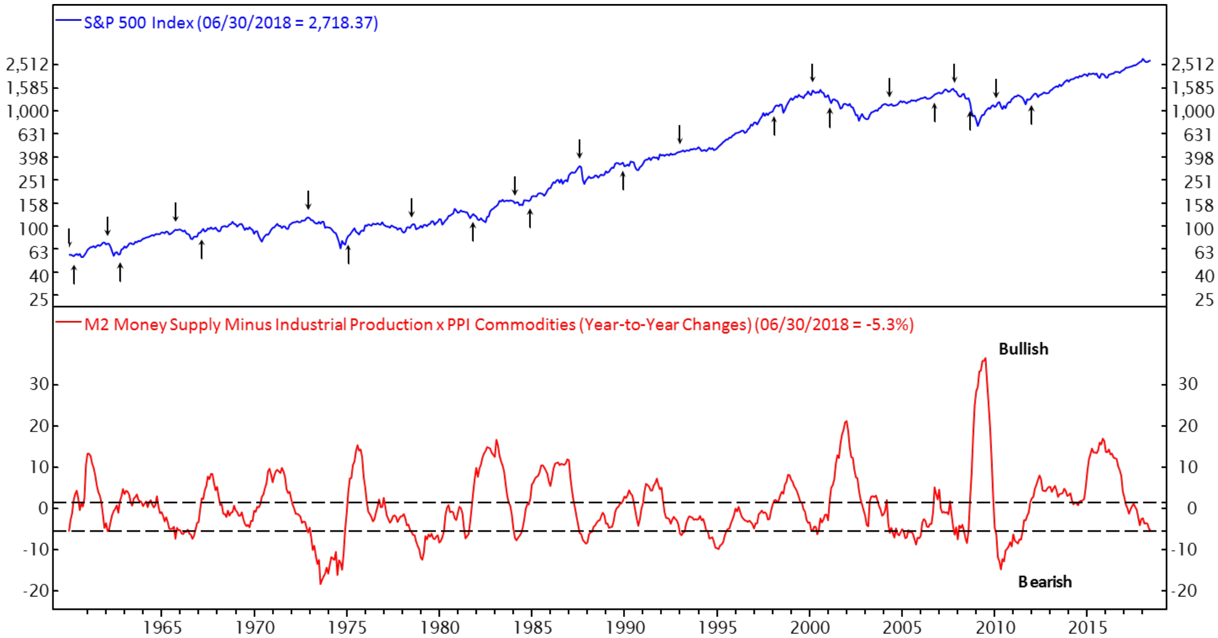
Monetary Policy and Interest Rates

U.S. Federal Reserve (Fed) monetary policy has become less accommodative in recent months. The Fed's goal is to gradually increase, or "normalize," interest rates over the next several years. Assessing how much interest rates must rise to adversely impact the economy—and determining the Fed's willingness to continuing its tightening process—is difficult because this process is beginning from some of the lowest interest rate levels in U.S. history. Nonetheless, it remains fundamentally true that the cost and availability of money should have an impact on the supply and demand for stocks.

Let's begin by looking at the growth rate of industrial production compared to the growth rate of money supply. If the growth of money supply remains above industrial production, it means there is still enough liquidity to fuel the economy. On the other hand, if the growth of money supply drops below the growth of industrial production, it often means that there is not enough liquidity to support economic growth.

One relationship to assess this metric is real money supply (M2) minus industrial production on a year-over-year basis (*Figure 1*). We have adjusted for the low level of interest rates and inflation by multiplying this relationship by the Producer Price Index (PPI). When M2 has risen rapidly compared to industrial production (above 1.5 on the chart), the S&P 500 has historically risen at an annual rate of 12.02%. When M2 has dropped below industrial production on a year-over-year-basis by -5.5%, the S&P 500 has declined an average of 5.62% on an annual basis. Currently, this indicator is at -5.2%, which is close to a reading that may adversely affect liquidity.

Figure 1. S&P 500 Index vs. Excess Liquidity Growth



Model:

Bullish = Excess Liquidity

Buy signal (100% long S&P 500) when liquidity growth rises above 1.5%.

Bearish = Economic Growth Exceeds Liquidity Growth

Neutral signal (100% long commercial paper) when model falls below -5.5%.

S&P 500 Index Performance Chart View: 01/31/1960 to 06/30/2018		
Excess Liquidity Growth is:	% Gain/ Annum	% of Time
Above 1.5	12.02	39.08
-5.5 - 1.5	8.17	42.07
Below -5.5	-5.62	18.85
Buy/Hold = 6.88% Gain/Annum		

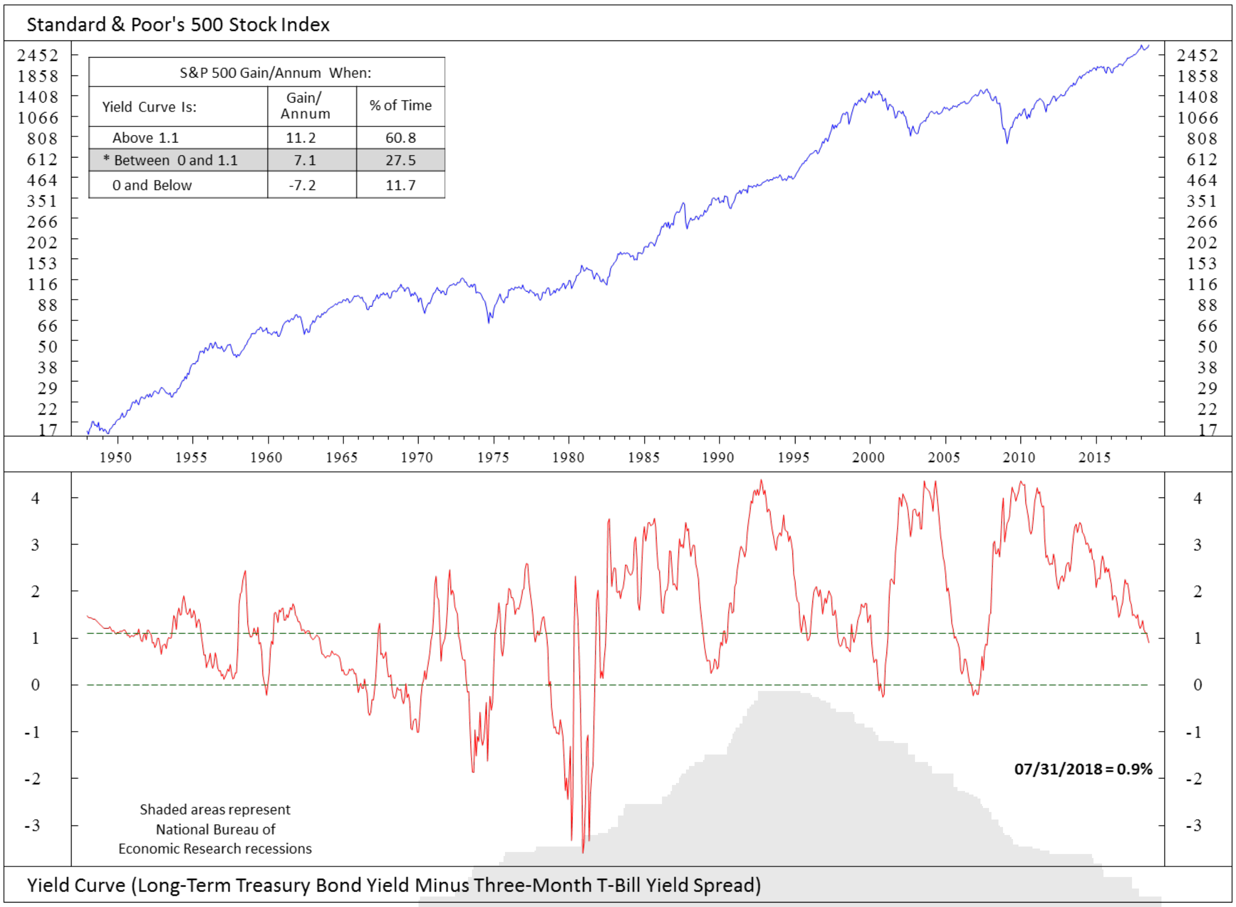
Model Performance Long Only: 01/31/1960 to 06/30/2018					
Signals	% Gain/ Annum	% Profitable	% Gain/ Trade	Trades/ Annum	% of Time
All	8.5	91.7	24.8	0.4	100.0
Buy	9.6	83.3	36.2	0.2	62.1
Neutral	6.6	100.0	13.4	0.2	37.9
Buy/Hold	6.9	--	--	--	--
Last Signal: Buy (01/31/2012 = 1,312.41)					

For illustrative purposes only. Sources: Ned Davis Research, S&P Dow Jones Indices. Monthly data, 01/31/1960 – 06/30/2018 (Log Scale). *Past performance is not indicative of how the index will perform in the future. The index reflects the reinvestment of dividends and income and does not reflect deductions for fees, expenses or taxes. The index is unmanaged and is not available for direct investment.*

Major global central banks, notably the People's Bank of China, The European Central Bank (ECB) and the Bank of Japan, are still expanding their balance sheets and providing liquidity to the capital markets. The resulting global liquidity has offset some of the tightening by the U.S. Fed. Nonetheless, the ECB has indicated a tapering of monetary accommodation beginning later in 2018, and other central banks may follow their lead in coming months.

Another way to evaluate economic growth and liquidity is analyzing the yield curve (Figure 2). Historically, an inversion of the yield curve (when short-term interest rates rise above long-term rates) has often indicated that economic growth is beginning to slow and has often preceded recessions. When the spread between short-term rates and long-term rates narrows, the statistical probability of poorer stock market performance increases historically. As of July 31, 2018, the spread remains in positive territory at 0.9%—still almost 100 basis points away from inverting. In addition, there has often been a lead time of six months to two years from the point at which the yield curve inverts and a top in the stock market.[3] Since 1948, when the spread has narrowed to 1.1% (close to where it is now), the average annual return on the S&P 500 has dropped to +7.1% from an average annual rate of +11.2% when the spread remains above 1.1%. Although this level is still positive, if the yield curve actually inverts (below 0.0), the S&P 500 has historically had a negative annual return of 7.2%.

Figure 2. The Yield Curve



For illustrative purposes only. Sources: Ned Davis Research, S&P Dow Jones Indices. Monthly data, 01/31/1948 – 07/31/2018 (Log Scale).
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Global Liquidity Concerns

In its June 2018 Annual Economic Report, the Bank for International Settlements (BIS) points out several concerns that bear upon global market liquidity. While the BIS Report primarily focuses on bond market liquidity, disruptions in global bond markets would inevitably impact U.S. capital markets as well.

First, the BIS report indicates that global debt levels have increased to 217% of gross domestic product, up from 179% a decade ago. Government borrowing has increased, but corporate leverage has exploded, particularly among high-risk borrowers in western countries and emerging market (EM) companies, most notably China. This surge could produce defaults if interest rates rise or growth slows. The BIS cites a McKinsey study that states, “Even at today’s low interest rates, 20 to 25 percent of corporate bonds in Brazil, China, and India are at higher risk of default." If interest rates rise 200 basis points "that share could increase to 30 to 40 percent."[4]

Second, the BIS says post-financial crisis reforms have discouraged private sector banks and brokers from holding risky assets, making them less willing to step in and make markets. The BIS notes that trading has also migrated to anonymous electronic platforms where there is frenetic activity from HFT groups, none of which are likely to want to act as buyers and sellers of last resort in a crisis.

Third, the BIS calculates that bond funds of western countries hold nearly 25% of their assets in risky securities rated BBB or lower—more than double the level from a decade ago. Funds that promise daily redemptions to their investors now hold more than 16% of U.S. corporate debt in the U.S., up from 7% in 2005. Regulators are pressing asset managers to build liquidity buffers to counter this duration risk, but the opposite has occurred: the BIS calculates that international bond funds have just 6% of their assets in liquid assets, down from 25% a decade ago.

The BIS concludes that markets that seem flush with liquidity in good times could still freeze if a shock occurs. As the BIS puts it: "Structural changes in the provision of immediacy services may not be visible in standard measures of market liquidity, masking the risks associated with holding assets that may turn out to be illiquid in some scenarios."

High Frequency Trading and Artificial Intelligence-Based Trading Models

While in the past we have witnessed periods of high market volatility attributable to computer-based program trading (notably during the 1987 stock market decline and subsequent flash crashes), the enormous increase in high-frequency trading and, more recently, the prevalence of "artificial intelligence" computer trading models is far greater now than in previous cycles.

Goldman Sachs recently suggested that computerized trading may exacerbate the volatility of the next stock market decline. Charles Himmelberg, co-head of global markets research at Goldman Sachs, cited recent evidence that high-frequency traders may be forced to withdraw liquidity during periods of market stress to avoid being adversely affected. "In our view," he says, "this at least raises the risk that as machines have replaced people, and speed has replaced capital, the inability of the market's liquidity providers to process complex information may lead to surprisingly large drops in liquidity when the next crisis hits."[5]

Flash crashes in the past have affected even the biggest, most liquid markets: on May 6, 2010, the S&P 500 dropped 10% in a matter of minutes (the Dow Jones Industrials Average dropped over 1,000 points), on October 15, 2014, the U.S. 10-year Treasury yield declined 15% (from 2.20% to 1.85%), and on October 6, 2016, the British pound declined 30% vs. the U.S. dollar in one day.[6] Most recently, on February 5, 2018, the VIX shot up from 16 to almost 40 while the ProShares Short VIX Short-Term Futures exchange-traded fund (ETF), a "short-volatility" product, plunged 83%, wiping out more than $1 billion in market value. Credit Suisse liquidated its short volatility fund after a 93% drop (its market value had topped $2 billion before the drop). Horizons ETF Management Canada, Nomura Europe Finance and dozens of exchange-traded products tied to the VIX triggered limit rules and stopped trading as volatility spiked.

Goldman Sachs's research further found that "HFTs systematically withdraw liquidity when 'complex' (non-routine) information is known to be in the market."[7] Thus, they suggest that the "Greater Moderation" in the economy—namely, that the economy is on a slower but more predictable growth path—may overlook the risk that the markets themselves are a rising source of risk.

Our conclusion from this research is that the long economic expansion and almost uninterrupted stock market advance since the financial crisis may have helped to disguise an underappreciated rise in "market fragility." Liquidity, and not leverage, may now pose a potential "systemic risk."

Passive Investing and Inflows into ETFs

Nearly 60% of equity-fund assets are now passively managed—double the level from a decade ago.[1] Vanguard alone owns positions greater than 5% in 491 of the 500 stocks in the S&P 500. Nobel Prize laureate and Yale professor Robert Shiller has compared this huge increase in passive investing to seeing a green light at an intersection and crossing the street without looking both ways.[8] He notes that the stock market is supposed to efficiently allocate capital to the most deserving companies, i.e., the companies that generate the most after-tax profit per dollar of capital, the highest return on invested capital, and the like. Professor Shiller has said that index investing disrupts this process. When an index fund or ETF receives inflows, the money is invested based upon the index allocation without any consideration of fundamentals or valuation.

Further, with cap-weighted indices, passive index funds must buy stocks that are already overweight and may be overexposed to a few large securities, as has happened with the big tech companies that now dominate the major U.S. indices. This dynamic has created a momentum play as passive funds have been forced to buy the largest capitalization stocks. However, the momentum play could work in reverse if and when the stock market undergoes a correction or bear market. In the event of this type of reverse momentum in ETFs, a liquidity mismatch between ETFs and the underlying securities could arise. While small-cap stocks and other less liquid securities may pose a threat to ETFs that track them, even more liquid shares might be affected. If a large investor tries to sell its ETF position in a single day, there might not be immediate buyers for such a large holding. The price impact might be substantial, causing the ETF to fall to a price below the value of the assets it owns, resulting in disruptions in the market.

The central problem with passive investing is that it does not offer a method of managing systemic risk. Passive investing provides a method of diversifying portfolios among various asset classes, which can be effective in reducing non-systemic risk, but offers no way of addressing the risk of a more general stock market decline or global financial crisis.

Alternative Strategies and Portfolio Construction

Alternative investment strategies may help protect portfolios from market volatility caused by disruptions in market liquidity. Many alternatives strategies are designed to manage downside volatility and can provide low or negative correlations to the general market. To the extent that these strategies are able to mitigate downside volatility, they may cushion the effects of potential shocks to the system. Equity strategies that can be considered in portfolio construction and asset allocation include:

Equity Long/Short strategies offset a long stock portfolio with short positions in stocks that are considered overvalued or that are expected to perform poorly as compared with the market and the rest of the portfolio. Most of these strategies are long-biased, but can adjust long and short positions based upon market conditions. The majority of the portfolio is usually composed of long positions in stocks that have upside potential while the short positions can add value by mitigating the overall downside risk of the portfolio.

Market Neutral and Relative Value strategies are designed to balance long and short positions so that the total portfolio has little correlation to the market. They emphasize stock selection—the relative value of the long and short positions—but the portfolio has a “neutral” exposure to the market. Like Equity Long/Short strategies, these portfolios will hold long and short positions. But while Equity Long/Short strategies are usually long-biased, Market Neutral and Relative Value strategies usually maintain their market neutral exposure and are only minimally adjusted for changing market conditions.

Global Macro strategies are usually top-down and emphasize long and short positions spread across diverse sectors and asset classes. The process for selecting these areas for investment can be fundamental, quantitative or a combination of the two. Global Macro strategies can often “go anywhere” to capture returns from diverse asset classes and sometimes will combine a top-down approach with bottom-up security selection.

Tactical strategies are usually more fully top-down approaches, emphasizing avoiding downside risk through adjustments in market exposure. Most tactical strategies do not use individual stock selection but rather use index ETFs and futures contracts in order to adjust the overall exposure of the portfolio to the market, which adds to the overall liquidity of the portfolio. Some of these strategies can allocate partially or completely to cash and take sizeable short positions in an attempt to provide positive returns in difficult markets.

Commodity Trading Advisors (CTAs) generally use rules-based systematic trading strategies to capture trends in the markets. These strategies usually employ top-down strategies that use futures contracts in a wide range of commodities including currencies, financial futures, and agricultural commodities. Unlike Global Macro and Tactical strategies, however, these strategies often use systematic model-based systems to capture trends in the market, identify inflection points, track reversions to the mean, and more. In addition, these strategies are often uncorrelated or even negatively correlated with the stock market.

Summary and Conclusion

The market’s liquidity position is more fragile today than it has been in many years. The long economic expansion and almost uninterrupted stock market advance since the 2008-2009 financial crisis may have helped to disguise an underappreciated rise in “market fragility.” Liquidity, and not leverage, may now pose a potential systemic risk.

U.S. monetary policy is tightening, albeit gradually, from interest rate levels that are among the lowest in U.S. history. Global central banks are continuing to add liquidity to the markets and the gradual tightening by the Fed has been offset in part by this additional liquidity.

More of a concern currently is the potential withdrawal of liquidity from the markets from high-frequency traders and algorithm-based trading models. Global debt levels have increased, and while government borrowing has increased, corporate leverage has exploded, particularly among high-risk borrowers in western countries and emerging market companies. International bond funds now hold less liquid and more risky securities than a decade ago. The massive inflows into passive market indices and ETFs in recent years is a potential cause for concern when the economic and stock market cycle enters a downturn. Some evidence of market fragility are the flash crashes of recent years.

Investment management consultants and investors would be wise to review their portfolio construction process, begin to stress test their portfolios, and consider introducing defensive strategies into their asset allocations as the economic and stock market cycle reaches maturity. Alternative investment strategies, which began as hedge fund structures but are now widely available as mutual funds or "liquid alternatives," have the potential to manage downside risk and cushion the potential volatility of disruptions in liquidity.

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10-year U.S. Treasury is a debt obligation issued by the U.S. Treasury that has a term of more than one year but not more than 10 years.

Basis point (bps) is a unit of measure that is equal to 1/100th of 1% and used to denote a change in the value or rate of a financial instrument.

Bottom-up investing focuses on a specific company and its fundamentals, rather than on the industry in which that company operates or on the greater economy as a whole.

Capital markets can refer to markets for any financial asset.

A **capitalization-weighted** (or "cap-weighted") index, is a stock market index whose components are weighted according to the total market value of their outstanding shares.

Commercial paper is uncollateralized loans obtained by companies, usually on a short-term basis.

Correlation is a statistical measure of how two securities move in relation to each other.

A **commodity trading advisor (CTA)** is an individual or firm who provides individualized advice regarding the buying and selling of futures contracts, options on futures or certain foreign exchange contracts.

Dow Jones Industrial Average (DJIA) is a price-weighted average of 30 blue-chip stocks that are generally the leaders in their industry and are listed on the New York Stock Exchange.

Duration risk is the risk that the value of an asset or liability may change as a result of changes in interest rates.

The **economic cycle** is the natural fluctuation of the economy between periods of expansion (growth) and contraction (recession).

An **emerging market** is a country that has some characteristics of a developed market but does not meet all of the standards to be a developed market.

An **exchange-traded fund** tracks an index but trades like a stock on an exchange.

Federal Reserve is the central bank of the United States that is responsible for regulating the U.S. monetary and financial systems.

Fundamental analysis is a method of evaluating a security to assess its intrinsic value by examining related economic, financial, and other qualitative and quantitative factors.

Futures are financial contracts that obligate the buyer to purchase an asset (or the seller to sell an asset), such as a physical commodity or a financial instrument, at a predetermined future date and price.

Gross domestic product (GDP) is the monetary value of all the finished goods and services produced in a country in a given year. GDP is one way of measuring the size of a country's economy.

High-frequency trading (HFT) is a program trading platform that uses powerful computers to transact a large number of orders at fractions of a second using complex algorithms to analyze multiple markets and execute orders based on market conditions.

Inflation is the rate at which the general level of prices for goods and services is rising, and, subsequently, purchasing power is falling.

Liquidity is the degree to which an asset or security can be bought or sold in the market without affecting the asset's price.

Long-term treasury bond is an unweighted average of rates on all outstanding Treasury bonds neither due nor callable in less than 10 years, as published by the Federal Reserve.

M2 is a measure of money supply that includes cash and checking deposits, savings deposits, money market mutual funds and other time deposits. It is a key economic indicator used to forecast inflation.

Market capitalization refers to the total dollar market value of a company's outstanding shares calculated by multiplying a company's shares outstanding by the current market price of one share.

Monetary policy refers to the actions of a central bank, currency board or other regulatory committee that determine the size and rate of growth of the money supply, including a change in interest rates or the amount of money banks need to keep in bank reserves.

Producer Price Index (PPI) is a family of indices that measures the average change in selling prices received by domestic producers of goods and services over time.

Quantitative analysis is a technique that seeks to understand behavior by using mathematical and statistical modeling, measurement, and research.

S&P 500 Index is an unmanaged index of 500 common stocks chosen to reflect the industries in the U.S. economy.

Top-down investing involves looking first at the macro picture of the economy, and then looking at the smaller factors in finer detail.

Treasurys (or Treasury bills) are debt obligations issued and backed by the full faith and credit of the U.S. government that have various maturities and are issued at a discount from par.

Valuation is the process of determining the value of an asset or company based on earnings and the market value of assets.

VIX (the ticker symbol for the Chicago Board Options Exchange Volatility Index) is a popular measure of market risk and is constructed using the implied volatility of S&P 500 index options.

Yield curve is a line that plots the interest rates, at a set point in time, of bonds having equal credit quality but differing maturity dates.

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[4] McKinsey Global Institute, Rising Corporate Debt: Peril Or Promise?, June 2018
[5] From "Goldman Sachs says computerized trading may make next 'flash crash' worse," by Tae Kim, May 23, 2018, https://www.cnbc.com/2018/05/23/goldman-sachs-rise-of-trading-machines-could-make-next-market-crash-much-worse.html
[6] Source: Bloomberg.
[7] From "An Unexpected Warning From Goldman Sachs: 'Something Is Not Quite Right,'" by ZeroHedge, May 23, 2018, https://www.zerohedge.com/news/2018-05-22/unexpected-warning-goldman-sachs-something-not-quite-right
[8] From "Passive investing is a 'chaotic system' that could be dangerous, warns Robert Shiller," by Stephanie Landsman, November 14, 2017, https://www.cnbc.com/2017/11/14/robert-shiller-passive-investing-is-a-dangerous-chaotic-system.html