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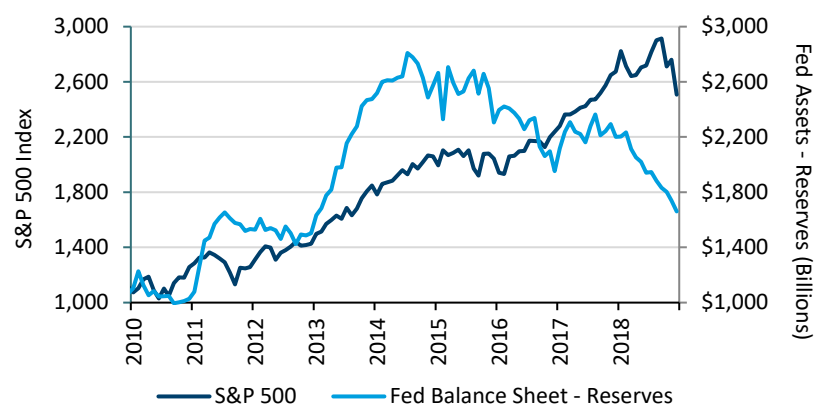
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## QUANTITATIVE FRIGHTENING

Many thoughtful commentators have suggested that recent market volatility has been due to central bank actions tightening liquidity—in particular, the Federal Reserve’s (Fed) commitment to quantitative tightening (QT). But is this view overly reductive—a matter of confusing correlation and causation? In this note, we consider the connection between QT and market volatility, as well as a taxonomy of liquidity that helps put Fed action into greater context.

The argument that “quantitative easing (QE) was good for the stock market, therefore the opposite must be bad” has an appealing logic, but it is an argument that holds everything else constant (*ceteris paribus*). It assumes that there was no fundamental recovery in the economy or in earnings post crisis—that the bull market was somehow entirely a result of the Fed printing money (i.e., creating liquidity). In fact, QE ended in 2014, and the Fed began reducing its reserves at that time (see Exhibit 1 below). If the “equal and opposite” argument were true, then U.S. equity gains in the period since would have been meager at best, and below zero at worst. Instead, we saw U.S. stocks rise 13.5% in 2014, 1.5% in 2015, 11.8% in 2016, and 21.6% in 2017: in the four years since the Fed stopped QE, the S&P 500 index is up about 50% through 2018.

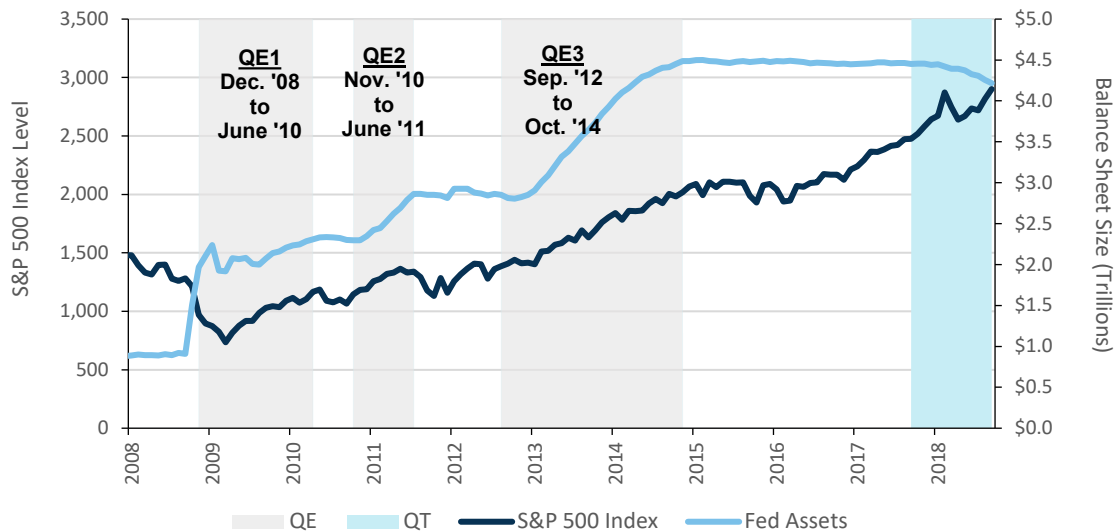
**Exhibit 1: Fed Reserves and the S&P 500**



Source: Columbia Threadneedle Investments.

Exhibit 2 below is a classic example of correlation not necessarily being proof of causation. A version of this chart is often circulated to suggest that the bull market was a result of balance sheet expansion.

**Exhibit 2: QE and S&P 500 gains: equities rose after QE3 ended**



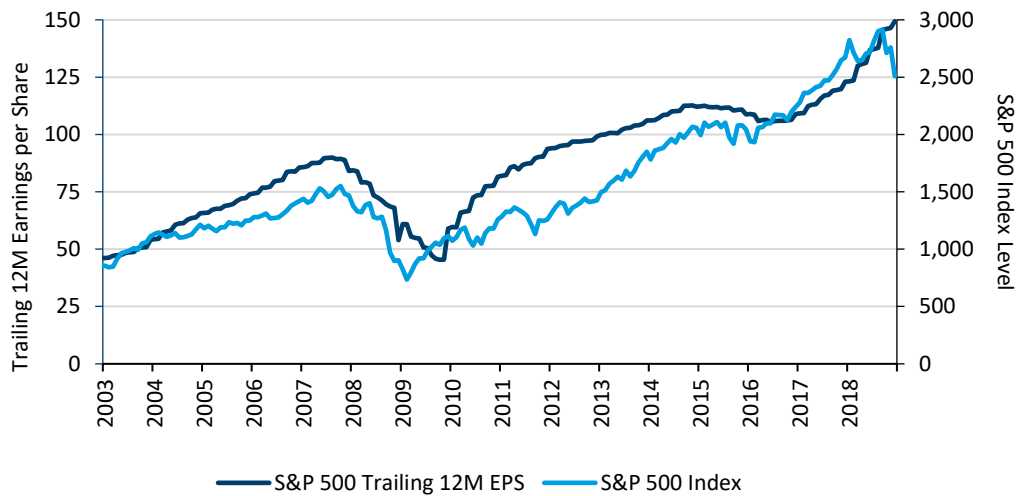
Source: Columbia Threadneedle Investments.

Those who have read Daniel Kahneman's seminal work on behavioral economics would recognize this as an example of "framing", the phenomenon by which the brain gravitates to the "easy" explanation when several factors are the actual explanation.<sup>1</sup> As noted in "The Fat Pitch", a widely-read finance and economics publication: "A modestly experienced investor knows that stock markets are not driven by a single factor; by presenting only two variables in isolation, the balance sheet chart uses framing to force the reader to make the mental effort to fill in the missing data. The human mind resists making this effort, so it interprets the chart as "what you see is all there is."<sup>2</sup>

If not the Fed alone, then what other catalysts should we consider? Certainly, earnings have been a driver (see Exhibit 3). S&P earnings rose after the financial crisis, except during 2015, when U.S. dollar strength negatively impacted earnings. As a result, U.S. equities had a year of flat returns.

<sup>1</sup> Thinking Fast and Slow, Daniel Kahneman

<sup>2</sup> The Fat Pitch, October 31, 2017

**Exhibit 3: Higher earnings drove S&P 500's rally**

Source: Columbia Threadneedle Investments.

Going forward, our view is that any number of (conventional) reasons could drive equity movements: global growth might slow down more than expected, the Fed may go one rate hike too far, and policy fights in the U.S. and with trade partners (e.g. China trade, NAFTA) may all play a role. The focus on QT as the principal driver of the volatility that we saw at the end of 2018, in our view, belies a fundamental misunderstanding of the Fed's role in providing liquidity, failing to make distinctions between categories of liquidity and their impact.

Our thanks to Mark Dow (Behavioral Macro), who proposed the classifications below and offered concise descriptions of the basic types of liquidity: Systemic, Credit and Transactional. Understanding these different categories of liquidity is critical to any discussion of QT and its impacts.

1. Systemic Liquidity is most closely related to the Fed. But it doesn't leave the banking system and is managed by the Fed, its member banks, and it is used for maintaining adequate reserves as defined by the Fed.

*It can be loosely thought of as the unencumbered resources in the banking system that can be used to settle intra-bank payments. Think Fed funds... Importantly, Fed funds is a closed system. A bank can draw on its reserves to meet payments to other banks in the system, or, when necessary, get physical cash, but it can't "lend them out" to clients. Nor can it flood the equity or currency markets with them—contrary to the popular trope. They are not fungible in that way. Only the Federal Reserve can add or withdrawal from the system (with that small exception of physical cash). So, while the composition of reserves across banks can change, the aggregate level in the system*

*cannot unless the Fed wants it to. This type of liquidity is exogenous; it's all about the Fed.<sup>3</sup>*

2. Credit Liquidity is what we understand as the main source of growth in the economy. Lenders, typically banks and other financial institutions, provide access to credit for borrowers looking for financing. Bank loans, bond issuance, credit lines, trade finance, and many other forms of loans fall within this category. Credit availability, an important source of economic growth, is a function of risk appetite by economic agents (i.e. households, companies etc.). Systemic Liquidity (the level of Fed fund reserves) and Credit Liquidity are only very, very, very loosely correlated. Despite the perceived wisdom in macro-economic textbooks, it turns out that one is not necessarily driving the other—an increase in bank reserves deposited at the Fed does not feed credit growth and thereby inflationary pressures. In the 25 years before the Financial Crisis, total credit assets held by U.S. financial institutions grew by \$32.3 trillion while bank reserves held at the Fed fell by \$6.5 billion. Regardless of the reserve requirements, banks created liquidity and enabled one of the most expansive credit booms in U.S. history “out of thin air.” The example below from Mark Dow illustrates how credit is created and why it isn’t always tied to the Fed.

*If I give my brother an IOU for \$100, and he accepts it, we have created credit out of thin air. No cash needed, no reserves liquidated, no assets pledged. He can then sell it to my sister, if he so decides and she trusts my creditworthiness. She then has the claim on me, and we have just created money. If my reputation in her town is sufficiently creditworthy, she could then sell the claim to others, and so forth and so on. No one has to even think about systemic liquidity or the Federal Reserve's balance sheet, much less be constrained by it. It all comes down to risk appetite, in this case specifically others' perception of my creditworthiness and their perceived vulnerability should I not make good on it. This is what is called endogenous credit creation.<sup>4</sup>*

3. Transactional Liquidity is what traders refer to as “market-making” liquidity. It is the ease with which buyers and sellers can transact financial assets. We can proxy this by the bid-ask spread, market depth, etc. Transactional liquidity is also driven by risk appetite and more recently has been impacted by regulations and market structure. The Volcker Rule which limits the ability of some financial institutions to engage in proprietary trading has resulted in shrinkage of this type of liquidity.

The main objective in undertaking QE was never to simply flood the market with liquidity, but to restore confidence after the financial crisis. Former Fed Chair Ben Bernanke described QE as a means to encourage risk-taking through the portfolio rebalancing channel. “Imperfect substitution of assets implies that changes in the supplies of various assets available to private investors may affect the prices and

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<sup>3</sup> “Misunderstanding Liquidity, Misunderstanding QT”, Mark Dow, Behavioral Macro, 2018, cited with permission.

<sup>4</sup> Ibid. cited with permission.

yields of those assets... As investors rebalance their portfolios by replacing the MBS (mortgage-backed securities) sold to the Federal Reserve with other assets, the prices of the assets they buy should rise and their yields decline as well”.<sup>5</sup>

Thus, if the public begins to have confidence to undertake risk again, and the Fed is removing the supply of “safe assets” by buying Treasuries and MBS, investors might rebalance their portfolios by buying investment grade bonds and maybe even high yield bonds. Increased demand for these assets would encourage corporations to issue more debt and take the proceeds from their issuance to engage in more productive activities. And slowly, the activities of the financial sector would seep into the real economy. Reducing this complex psychological and balance sheet effort to “more liquidity good, less liquidity bad” blunts the Fed’s sophisticated approach and conflates the types of liquidity that contribute to market activity.

Does the reversal of portfolio re-balancing—the selling of safer Treasuries and MBS—inevitably discourage investors from taking risk? In the current environment of QT, have we seen a cascading sell-off in riskier spread assets and equities? We believe the answer is no. As shown earlier in Exhibit 3, equities have essentially risen in lock step with earnings. In addition, we’ve estimated that most of the post-crisis gains in the U.S. stock market have been a result of strong earnings growth and have not been driven by multiple expansion. According to our calculations, about three-quarters of the gains since the financial crisis have been a result of earnings growth, and about a quarter has been due to multiple expansion.

We did see some hit to sentiment in the fourth quarter of 2018, but trade rhetoric aside, the decline was primarily driven by fundamental worries about the outlook for growth and falling inflation. After growing at a fast pace (3% p.a.) for most of 2018, data began to indicate sharply slower U.S. growth in 2019. A slowdown in global growth preceded U.S. data, and there are legitimate concerns that the global slowdown has finally reached the U.S. Ambiguous communication from the Fed has further impacted market sentiment. In a Q&A session in October 2018, Fed Chair Powell stated that “We may go past neutral, but we’re a long way from neutral at this point, probably.”<sup>6</sup> Market participants, already on edge over monetary tightening, were alarmed to hear the Fed Chair indicate the prospect of substantial further tightening in the future. (Since then, monetary authorities have indicated their concerns on growth and appear to have backed off from earlier statements.)

While it is important to acknowledge the hit to sentiment, the overarching driver of the rush to risk-off in the fourth quarter of 2018 was the deterioration in the outlook for future growth in earnings. As noted by New York Fed Chair William Dudley, “Better explanations [than QT] for this fall’s weakness in the equity market abound. For one, economic growth and corporate profits looked set to falter in 2019, as the effects of corporate tax cuts waned and the labor market tightened ... and if the economy didn’t slow enough on its own, the Fed [appeared] likely to raise interest rates to make sure that happened.”<sup>7</sup>

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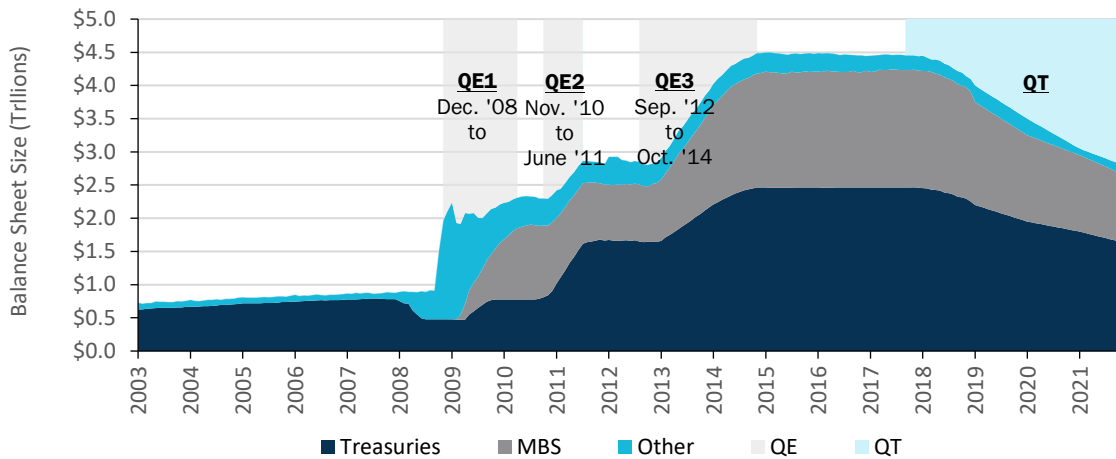
<sup>5</sup> [Ben Bernanke Jackson Hole Speech, August 12, 2012](#)

<sup>6</sup> PBS interview, October 3, 2018

<sup>7</sup> <https://www.bloomberg.com/opinion/articles/2019-02-05/stop-worrying-about-the-fed-s-balance-sheet>

This last point leads us to examine Systemic liquidity, and what, if anything, its withdrawal means for equity markets. Based on the current run rate of balance sheet sell-off and estimates of growth in the economy, the Fed could shed another \$1 trillion in assets over the next four years. The current size of the balance sheet is around \$4.1 trillion with a \$400 billion reduction over the past five quarters (Exhibit 4).

**Exhibit 4: Fed's QE history: Balance sheet**



Source: Columbia Threadneedle Investments.

We believe the balance sheet is likely never going back to its pre-QE size. The U.S. economy has experienced tremendous growth since then, and the size of the balance sheet must keep pace simply to service a growing economy. There is some confusion about what this ought to be, but about \$3-4 trillion will likely be the ultimate size of the balance sheet that the Fed might consider “normal.” At its January meeting, the Federal Open Market Committee (FOMC) indicated that it was “prepared to adjust any of the details for completing balance sheet normalization in light of economic and financial developments,” with Chair Powell advising that the final balance sheet size might not be too far from the current number.<sup>8</sup> (See “The Mechanics of a Less Large Fed Balance Sheet” below.)

<sup>8</sup> FOMC Meeting minutes, January 30, 2019

## The Mechanics of a Less Large Fed Balance Sheet

As the Fed reduces Treasuries and MBS holdings the question arises: who will step in to buy them? In Sept 2014, under new regulations, banks are required to hold “high-quality liquid assets” (HQLA) to ensure they would be able to withstand a shortfall of funding without external help. Banks can satisfy this new requirement using different assets but the cheapest and most liquid are bank reserves (the money the Fed printed to finance QE) and treasuries. This new rule came into effect just as QE ended. The timing is important, as when the Fed shrinks its balance sheet, it essentially reduces reserves. As reserves decline, banks that relied on reserves to meet liquidity requirements need “something else”. Treasuries present a perfect substitute. We have seen no shortage of demand for treasuries despite extra supply from the Fed and massive issuance by the government to fund the deficit, as securities once held by the Fed are now held by the banks. It shouldn't matter from an equity investor perspective who holds them. If the banks continue to demand reserves and don't buy treasuries, then we might have an issue. This could be a source of volatility which the Fed is only just beginning to acknowledge.

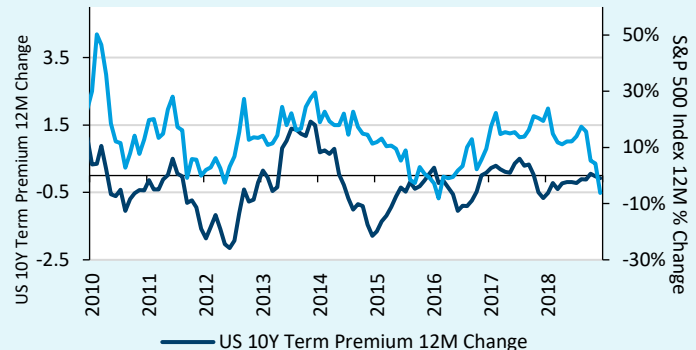
As noted by former Chair Ben Bernanke:

*Let me observe a couple of things. First, we have three distinct approaches to exiting. We have the various tools for draining reserves, including the time deposits and the reverse repos. We have the interest rate on excess reserves, which, in theory, should work all by itself. And then, third, of course, we have asset sales, which will always work. So, we know we've got a set of different tools that are complementary, and we can use them in different combinations.<sup>9</sup>*

Despite Chairman Bernanke's optimism, there is concern amongst bank analysts that this “burning” of reserves could affect short-term and long-term interest rates and therefore asset prices and financial conditions in general. This could be a realistic concern in terms of the direction of rates

but the magnitude of changes we are talking about are probably not significant. If the Fed increases the interest rate on excess reserves (IOER) less than the funds rate to maintain the differential between the two rates a bit longer (as they did in June and September 2018), it doesn't seem to be market moving event. The effective fed fund rate may be a bit more volatile (10-15 bps). We would not expect the equity markets to crash for this reason. So far, we have not seen any additional upward pressure on market rates other than the rise in short term rates which are more linked to the removal of extraordinary monetary conditions, i.e. raising the fed fund rates off the zero bound. In fact, work by Roberto Perli (Cornerstone Macro) has shown that the term premium now is lower than it was when the Fed started QE, and that the term premium and the stock market seem to move together – suggesting that both respond to other factors – predominantly the markets' outlook for growth and inflation. When the outlook is positive, stocks rise and the term premium increases as investors trade treasuries for equities and when the outlook deteriorates, people sell stocks and buy Treasuries, bringing down the term premium.

### Term Premium and Equity Markets



If demand for reserves by banks remains high, the Fed is likely to cut IOER. We already saw the Fed adjusting IOER to manage its relationship to the Fed Fund rate bands. IOER in a sense is the “floor” for market interest rates. Thus, some estimates from the street suggest that the Fed may not be able to shrink its balance sheet much more from here on and will stop close to \$3.5 to \$4 trillion.

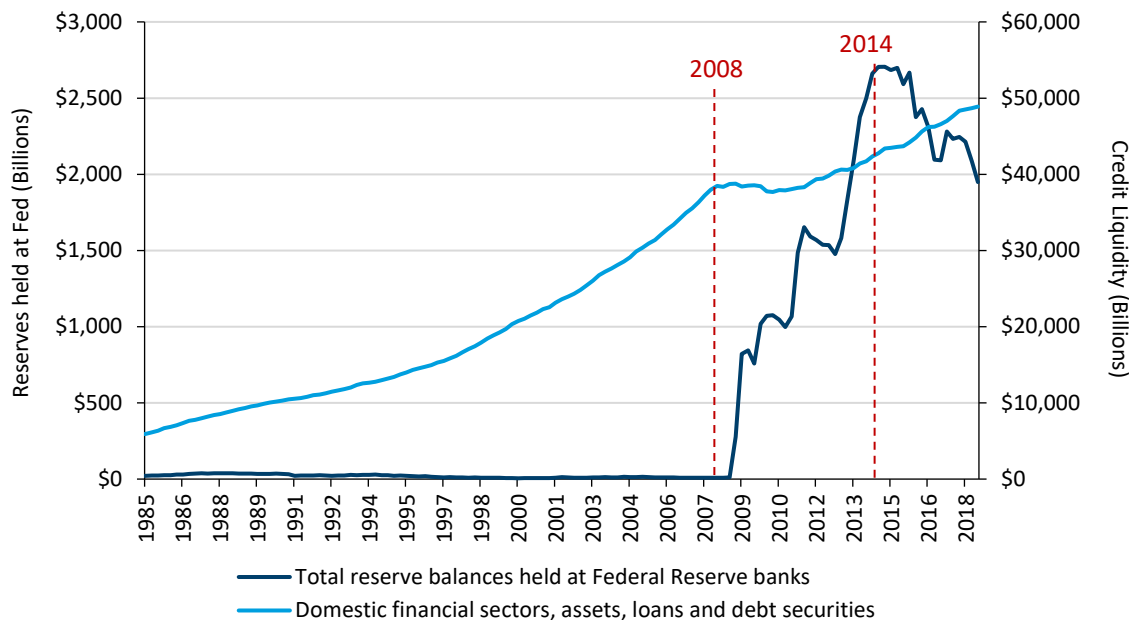
<sup>9</sup> Ben Bernanke, FOMC transcript

<http://federalreserve.gov/monetarypolicy/files/FOMC20120313meeting.pdf> (page 12)

All that said, as noted earlier, the Fed began reducing its reserves in 2014, and we do not believe that the reduction of this Systemic liquidity tethers the equity market to a similar downward path; see Exhibit 5 below.

#### Exhibit 5: U.S. credit liquidity and systemic liquidity

Reserve balances maintained with Federal Reserve Banks vs. Domestic financial sectors; loans and debt securities assets



Source: Federal Reserve Board of Governors: Aggregate Reserves of Depository Institutions and the Monetary Base H.3 Total Reserve Balances Maintained with Federal Reserve Banks [RESBALNS], retrieved from FRED, Federal Reserve Bank of St. Louis; domestic financials sectors, debt securities, assets; domestic financial sectors, loans, assets

In contrast to the Fed's actions to reduce Systemic liquidity, Credit liquidity—which helps promote risk taking—remains ample, with no signs of abating (see exhibit 5). The chart reveals the drop in credit liquidity at the depths of the financial crisis, as well as the beneficial impact of the Fed's subsequent reassurance that the cost of capital would remain low—growth in credit liquidity resumed its upward trend in 2010. By 2014, Fed Chair Ben Bernanke and the FOMC, observing the return of credit liquidity and risk-taking, began to end QE. The chart demonstrates the validity of their actions: Systemic liquidity was withdrawn from the market and Credit liquidity, along with risk assets, marched higher. There was a coincident reduction in Systemic liquidity and an increase in Credit liquidity, demonstrating that the focus on QT is likely a tempest in a teapot. We believe that Credit liquidity will continue to rise going forward, with increases moderated by economic growth, not by Fed actions to reduce Systemic liquidity.



## Conclusion

The prospect of QT has been described as a “profound negative” for the markets since at least 2014, but this argument has never made much sense to us. In fact, since it was first posited, it has had to be revised to reflect reality: “The Fed is keeping markets afloat” gave way to “The European Central Bank and the Bank of Japan are keeping markets afloat.” Markets are rarely driven by one single factor. And just as QE was not solely responsible for the markets on their way up, QT is not the sole reason for recent declines. It is certainly adding to negative sentiment, which can be very important for risk assets; that merits attention, but not at the expense of considering things like fundamentals and valuation. We believe Fed actions have had an enormous impact but mainly through restoring confidence among investors, households and corporations—the economic agents who drive growth and earnings and provide credit liquidity.

**Past performance does not guarantee future results. It is not possible to invest in an index. Important note: This chart is for illustrative purposes only and is not intended to represent any investment product. All the above are forecasts based on Columbia Management Investment Advisers, LLC models and analysis. As such, there is high likelihood that actual returns and economic results will deviate from our expectations.**

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