

SPECIAL REPORT

TD Economics



June 13, 2013

THE FEDERAL RESERVE'S EXIT STRATEGY: HOW WILL IT UNFOLD

Highlights

- The Federal Reserve's exit from quantitative easing hinges on the progression of the economic recovery. Benign inflationary pressures over the medium term and an acceleration in growth should allow the central bank to begin paring back its large scale asset purchases in the coming months.
- We expect 10-year treasury yields to rise by roughly 100 basis points by the end of next year and continue to trek upwards. But, the path of adjustment is unlikely to be smooth, as markets recalibrate expectations on the Fed's actions and the impact on the economy.
- There are two broadly-defined risks associated with the central bank's hyper-stimulative monetary policy: inflation and financial instability. With regards to the former, the Fed has numerous tools to combat inflationary pressures; but, the unprecedented increase in the monetary base represents an inflation risk once economic slack is absorbed.
- The bigger concern, in our opinion, is the potential for market distortions related to the "quest for yield" after an unusually lengthy period of low interest rates. There are few signs of an imminent problem, but some market segments, such as high-yield bonds and agency real-estate investment trusts, do represent emerging risks.

Quantitative easing (QE) has been one of the most controversial aspects of the Federal Reserve's strategy to support the U.S. economic recovery. The aggressive pace of asset purchases by the central bank since 2008 has raised a host of concerns among financial market participants. Among them are the potential for out-of-control inflation, currency wars, and long-term financial instability due to market distortions. Questions have even been raised about the efficacy of the policy itself in boosting the economy.

Faced with disinflationary pressures from an elevated unemployment rate and a convalescing credit market, the Federal Open Market Committee (FOMC) has thus far decided that the benefits of QE outweigh the risks. However, we are now at a turning point. With the US recovery now in its fourth consecutive year, the housing market is gaining significant momentum and the unemployment rate is falling. There is more optimism surrounding the economic outlook than at any other point in this recovery. As a result, the Federal Reserve is now beginning to discuss its exit strategy from QE.

TABLE 1: FEDERAL RESERVE QUANTITATIVE EASING PROGRAMS

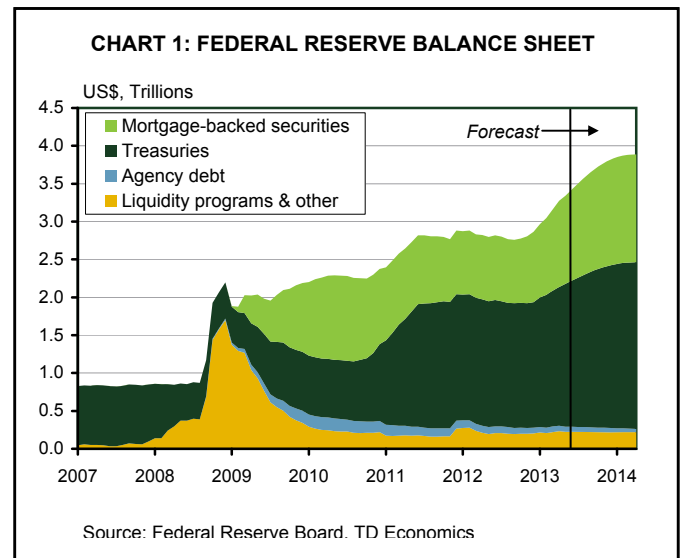
| | Date | Program details |
|-----------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------|
| QE1 | Nov 2008 | The Fed purchases \$175 billion in agency debt securities, \$300 billion in US Treasuries, and \$1.25 trillion in mortgage-backed securities |
| QE2 | Nov 2010 | The Fed purchases \$600 billion in mostly shorter-term US Treasuries |
| Operation Twist | Sep 2011 | Maturing on-balance sheet Treasuries are reinvested into longer-dated Treasuries, lengthening the maturity structure of the Fed's portfolio |
| QE3 | Sep 2012 | The Fed purchases \$40 billion in agency mortgage-backed securities and \$45 billion in longer-term Treasuries per month |

Source: Federal Reserve Board

In this report, we outline our view of the Fed’s exit strategy from QE and discuss the risks that come with several years of hyper-stimulative monetary policy. There are two broadly defined risks: inflation and financial instability. In our view, the risk of an inflationary spiral emerging in the next two years is small due to a high persistence of economic slack. The central bank also has numerous tools to control the flow of money and, ultimately, inflation. However, it would be shortsighted to completely rule out the possibility that a bout of inflation could emerge if the pace of the recovery quickens more than expected and the Fed suddenly finds itself behind the curve. Perhaps the greater near-term risk is to the stability of financial markets. After a period of record-low interest rates and dramatically reduced volatility, the quest for yield has pushed investors into riskier assets, such as high yield bonds. As interest rates rise and volatility increases, vulnerabilities could be exposed, leading to losses for a wide variety of investors, possibly including the Federal Reserve. Fortunately, these risks do not appear to be broadly represented across the financial system, though there are certainly pockets of concern. Overall, the Federal Reserve should be able to orchestrate a relatively smooth exit from quantitative easing, but realistically we should brace for the possibility that this will not be in a straight line or without an intensification of volatility.

The policy and the exit strategy

The Federal Reserve has introduced four different large scale asset purchase programs since 2008, known colloquially as QE1, QE2, Operation Twist, and QE3. Table 1 pro-



vides a brief overview of the four programs. In sum, the Fed has injected roughly \$2.5 trillion in liquidity into the U.S. financial system through its purchases of mortgage-backed securities, agency debt, and treasury bonds. This figure will rise beyond the \$3 trillion mark by the time QE3 is completed, which we estimate will be in early 2014 (Chart 1).

The exit strategy from QE was first detailed in the minutes of the June 2011 FOMC meeting. Several elements of the strategy, such as timing, have likely changed since then given that the document was released prior to both Operation Twist and QE3. However, it does provide the main tools the Fed will eventually use to reduce the size of its balance sheet. These tools include reducing the size of its purchases, reinvesting maturing debt into new assets, reserve draining operations, simultaneously raising the fed funds rate and the interest paid on excess reserves, and asset sales. Table 2 provides our view on how the exit strategy will unfold, including an expected timeline. Beginning in September or October, we anticipate that the Fed to begin paring back the rate of purchases by roughly \$10-20 billion per month, split between mortgage-backed securities and Treasuries. Once the purchases have ended, the Fed will maintain the size of its balance sheet by reinvesting maturing debt into new assets. Reinvestment will occur until the final months of 2014 at which point the balance sheet will naturally contract as bonds mature. This will be followed by interest rate hikes in mid-2015.

The first five steps, which will occur over the next two years, are the most critical. However, the full normalization of monetary policy will likely take more than a decade. The Federal Reserve is likely to sell assets only as a very last

| TABLE 2: THE FEDERAL RESERVE'S EXIT STRATEGY | |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Description | Timeline |
| 1. Asset purchases are reduced at a rate of \$10-20 billion per month split between Treasuries and mortgage-backed securities | September-October 2013 |
| 2. Asset purchases are ceased | Q1 2014 |
| 3. Maturing principal is reinvested in order to maintain the size of the Fed's balance sheet | Q1 2014 - Q3 2014 |
| 4. Principal payments are no longer reinvested and the Fed's balance sheet is run off through maturing assets | Q4 2014 |
| 5. Fed funds rate begins to increase, interest on excess reserves will also rise | Q3 2015 |
| Optional: Should economic conditions warrant, the Federal Reserve could consider selling assets to normalize the balance sheet more rapidly | Beyond 2015 |

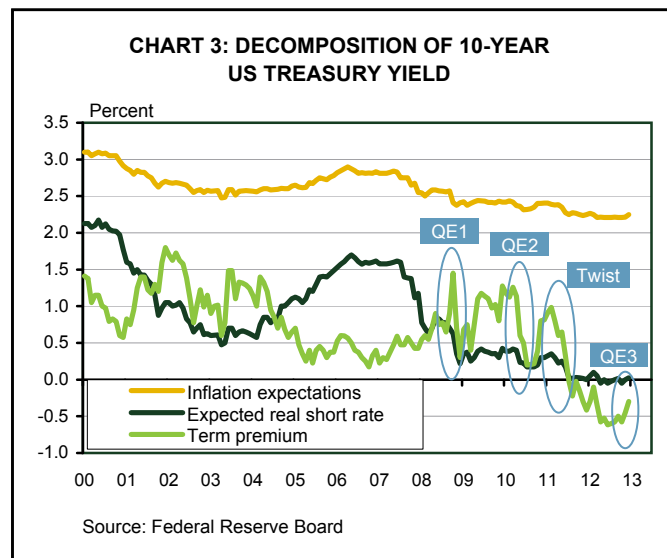
Source: Federal Reserve Board

step, and likely only if they believe there is a risk that they are behind the inflation curve or that economic momentum is sufficiently stronger than expected. Reductions in the size of the Fed's asset holdings are primarily going to be achieved by allowing securities to mature and run off its balance sheet. This will take a number of years. Just under \$40 billion worth of treasuries and agency debt are scheduled to mature before mid-2015, which is when we expect the Fed to begin raising rates. A considerable portion of the Fed's holdings of these assets – \$900 billion (nearly half of the total) – will not mature until after 2020 (Chart 2). A recent estimate from the Federal Reserve suggests that the balance sheet may not normalize back to the \$1- \$1.5 trillion mark until 2025.

The economic outlook is still the main consideration, but financial stability concerns cloud the picture

The level of uncertainty shrouding the exit strategy is substantial, as this is uncharted territory for the Federal Reserve. Moreover, it is not just the expansion of the balance sheet that has increased uncertainty. In January 2012, the Fed introduced an explicit 2% inflation target and linked the future path of interest rates to the unemployment rate and the inflation outlook. However, in recent statements and speeches by Federal Reserve members, concerns were voiced about the impact of monetary policy on financial stability. As a consequence, the Fed may be, at least implicitly, adding another consideration to its full employment and price stability mandates.

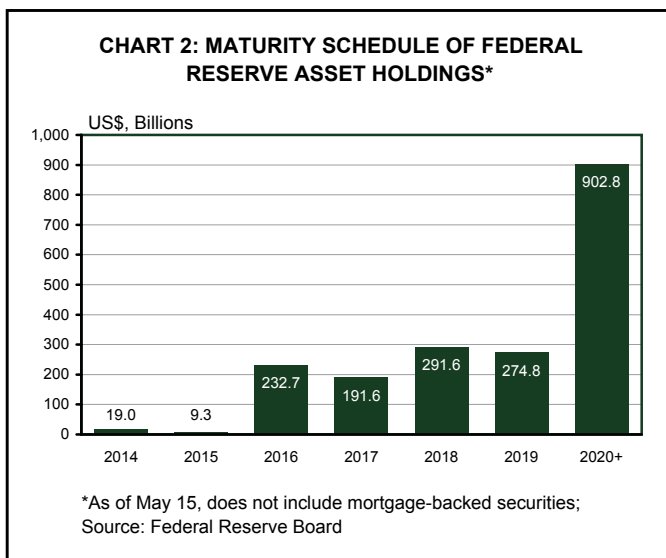
Since the path of monetary policy is now linked to both the unemployment rate and inflation, the timing and pace



of the exit is still primarily dependent on how the economic recovery progresses. In our view, the pace of economic growth so far this year has been held back by substantial fiscal drag. However, as the impact of government spending cuts diminishes in the second half of this year, economic growth is likely to accelerate above trend. This will translate into stronger job growth and a decline in the unemployment rate. Combined with benign inflationary pressures over the medium term, these factors will allow the Fed to begin paring back QE in the Fall. That being said, Bernanke and other Fed members have also noted that the benefits of monetary stimulus must be weighed against the costs. Even if the recovery does not gain speed as we expect, the calculus moves more in favor of the costs as time ticks forward. It is possible that the Fed may begin to move away from its strict reliance on economic data to guide its exit in this scenario. This serves to highlight the degree of ambiguity in the exit strategy, punctuated by the fact that Fed officials have made it explicit that the pace of asset purchases could decrease, increase, end, or restart in response to economic conditions. In sum, the exit may not move in a straight line.

How much could treasuries yields rise?

Of all the markets that the Federal Reserve has affected, the treasury market is the most critical. Treasury yields act as benchmarks for everything from mortgage rates to corporate borrowing costs. Through quantitative easing, the Federal Reserve has been able to stimulate the U.S. economy by lowering borrowing costs, despite short-term interest rates being pegged at their zero nominal bound. Logically, the end of QE will lead to higher treasury yields. This is a foregone



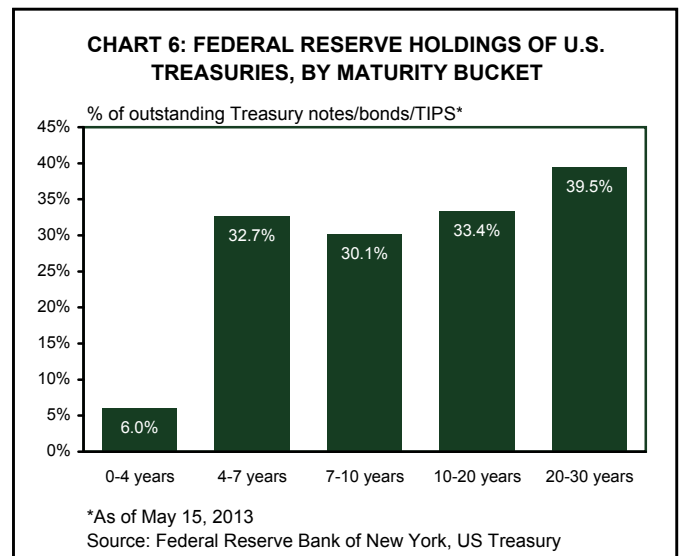
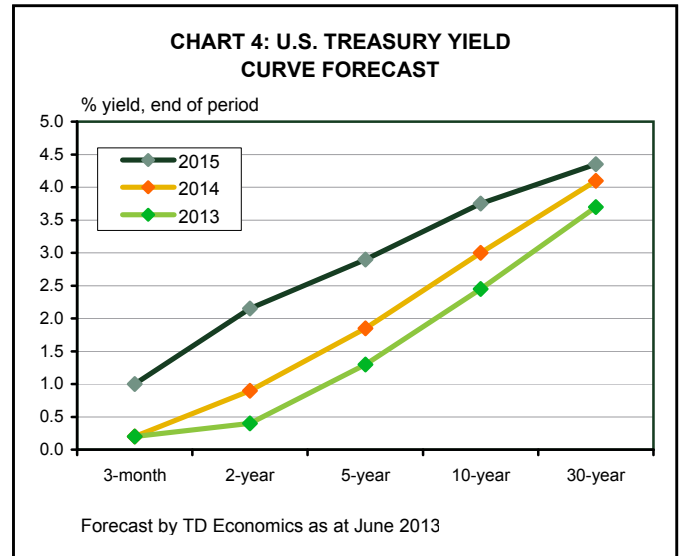
conclusion. However, estimating how high yields could rise and, more importantly, how fast is highly uncertain.

The Federal Reserve cites estimates that QE lowered the yield on 10-year treasuries by 80-120 basis points. Other estimates increase that impact to as high as 150 basis points. To assess the potential for yields to rise, it is useful to decompose the 10-year treasury yield into its three components: expected real short-term interest rates, expected inflation, and the term premium. Chart 3 shows that all three have fallen since QE1 was implemented, but that the brunt of the impact fell on the term premium. The term premium captures the additional compensation demanded by investors for things like unexpected inflation risk or for locking-in their money for extended durations.

Looking ahead, expected short-term interest rates are unlikely to shift until we are closer to the Federal Reserve's first rate hike in 2015. Meanwhile, inflation expectations appear to be well-anchored and are also unlikely to shift materially higher (though this could change – the risk of inflation is discussed in the following section). As a consequence, any rise in 10-year yields is likely to result from increases in the term premium. A reversion to its pre-recession average alone should increase 10-year yields by roughly 100 basis points. Indeed, TD Economics anticipates the yield on 10-year treasuries will increase from 2% to 3% by the time the Fed begins reducing the size of its balance sheet in late-2014 (Chart 4).

While a generally smooth rise upward is our base case scenario, there are three important considerations worth noting. First, ending the asset purchase program implies that any new issuance from the U.S. Treasury has to be absorbed by the private sector – either by domestic or foreign buyers. The upward pressure on treasury yields thus depends on how much capacity global financial markets have to absorb new issuance. As a share of global GDP, the outstanding marketable debt will remain elevated relative to history (Chart 5). This represents a risk that the increase in yields could be greater if supply outstrips demand. Fortunately, a mitigating factor is that the U.S. budget deficit has fallen much more than expected. The deficit is expected to decline by close to \$400 billion in fiscal 2013 and by an additional \$260 billion by 2015. This reduces the flow of additional Treasuries that the private sector will have to absorb, even as the Fed is reducing its purchases.

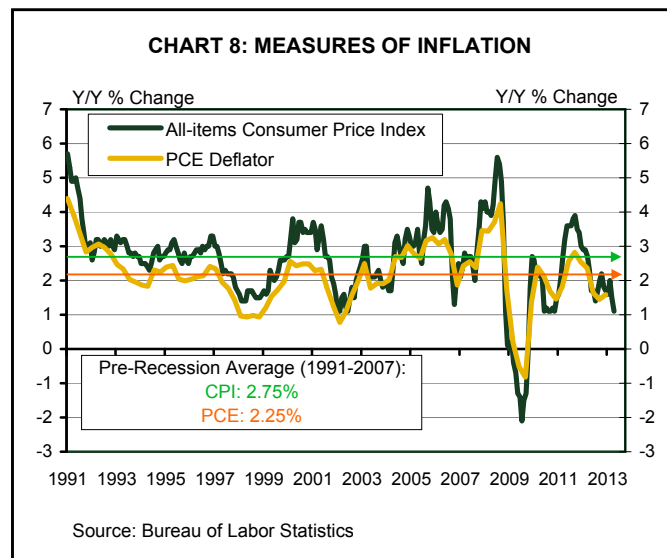
Second, the impact of ending QE may not be even across the yield curve. Since Operation Twist was implemented in



2011, the Federal Reserve's purchases of Treasuries have been concentrated towards the longer end of the curve. As of mid-May, the Fed owned between one-third and two-fifths of all outstanding 10-30 year Treasuries (Chart 6). Thus, when asset purchases are ceased, there could be a disproportionate impact on long-term bonds, and a lesser impact on shorter-term bonds, which are anchored to expectations for the fed funds rate.

Third, the discussion among market observers currently centers on the relative importance of the total outstanding amount of assets held by the Fed versus the flow. Referencing our timeline in Table 2, the issue this raises is which is more important, paring back/ending the pace of asset purchases or allowing the balance sheet to contract through runoff. In our view, this debate is moot, because what really matters is the signal markets interpret by each action. Since the pace of asset purchases is variable and dependent on economic conditions, paring back purchases does not signify the end of QE, but markets will have to adjust to the view that the Fed believes it need not have such a heavy hand in the monetary policy. When the Federal Reserve decides to ultimately runoff its balance sheet, they will be sending a powerful signal to markets that the economic recovery is sustainable and no longer requires extraordinary monetary stimulus. Thus, each element of the strategy is important, but there may be a more substantive impact on yields from certain actions than from others.

All three points above highlight that although we expect the 10-year yield to adjust upwards by 100 basis points by the end of 2014, it may not occur in an even or tempered



fashion. In other words, it may get there more quickly than we expect, or certainly with greater volatility. In the next section, we examine some of the concerns market participants have around inflationary risks and asset distortions that may arise from this extended (and some may say, excessive) period of easy monetary policy.

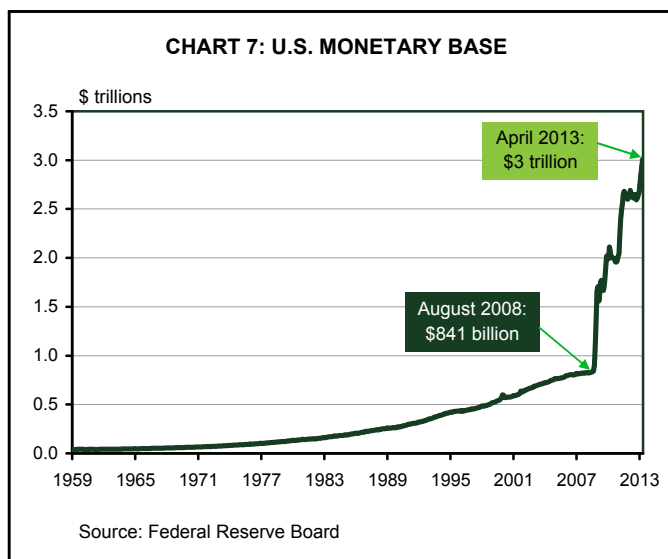
A risk-filled landscape

Will inflation rear its head?

The most obvious hazard of printing money to purchase assets is the risk of creating an inflationary episode at some point in the future. The faster the money supply rises relative to the real economy, the greater risk inflation will be. To illustrate, consider that in less than 5 years, the monetary base has risen by \$2.2 trillion, a 256% gain and the largest increase of any country in history (Chart 7).

However, the monetary base is only part of the equation. Nominal consumer spending has risen at one-twentieth its pace, highlighting that the larger money base is not filtering through the economy. Instead, the price indexes for both consumer prices and personal consumption expenditures (PCE) are well below the Fed's 2% inflation target (Chart 8). The most recent reading on the core PCE price index (excluding food & energy), which the Fed monitors for its ability to predict future headline inflation fell to just 1.1% – its lowest level since data collection began over fifty years ago.

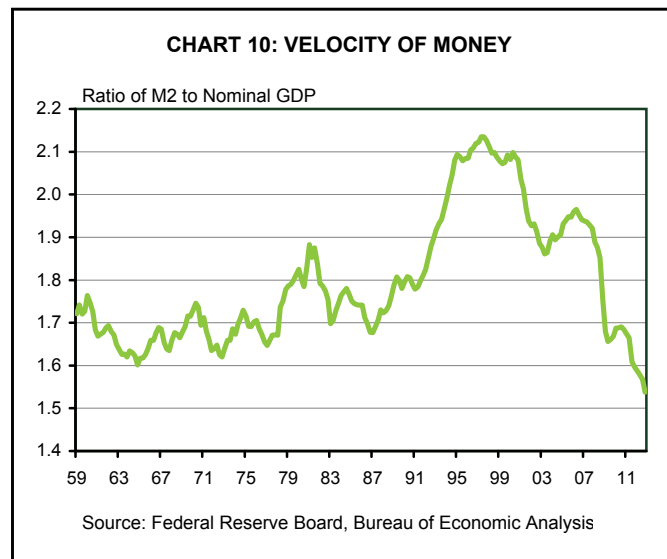
Several reasons underpin this seemingly counterintuitive result and why a disconcerting rise in prices is unlikely to emerge over the next few years. For one, total money creation depends on the creation of new loans. If households



and businesses do not borrow and invest, total money in circulation will not rise despite the huge increase in base money. The money supply can even shrink, despite the Fed adding to it, if households are paying off debt rather than borrowing. Case in point, of the \$2.2 trillion increase in base money, \$1.8 trillion is sitting at the Federal Reserve in the form of excess reserves among commercial banks (Chart 9). In the wake of the financial crisis, the Fed was given the ability to pay interest on these excess reserves (IOER). The IOER is currently slightly higher than the fed funds rate. Since commercial banks can earn a guaranteed safe return with the Fed by keeping their cash in reserve, they have had no incentive to lend it out at a rate of interest below this level. As a result, this money still sits outside the real economy and, hence, is not creating inflationary pressures. As economic conditions normalize, paying interest on excess reserves will become fundamental to managing the exit from non-traditional monetary policy, as it provides a way for the Fed to influence the money creation process.

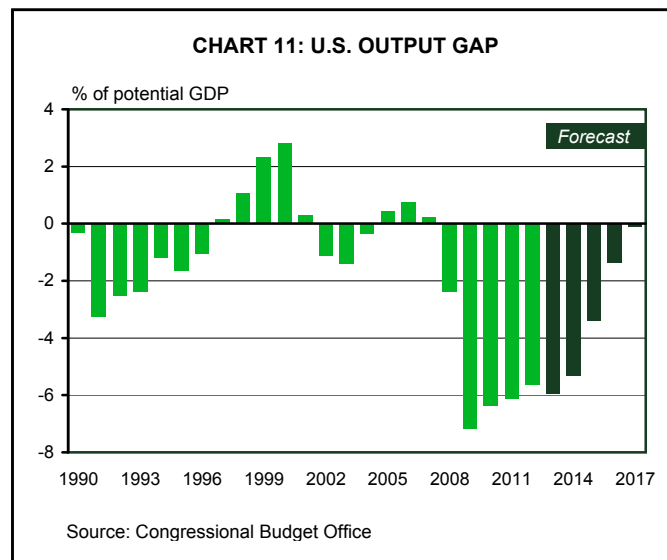
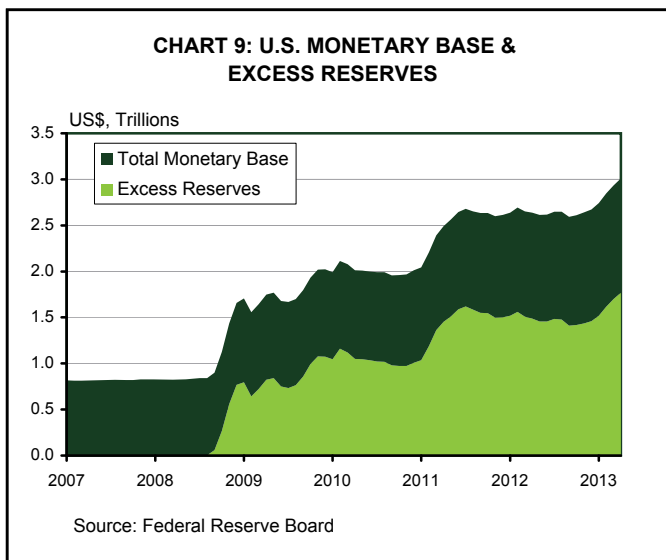
The Fed also has a number of other tools at its disposal to limit the circulation of reserves in the economy. It can conduct reverse repurchase agreements, in which the Fed trades a bond to the private sector with an agreement to buy the bond back at a later date. Since the Fed is taking in reserves in exchange for the bond, a reverse repurchase agreement is similar in effect to paying interest on reserves. Secondly, the Fed can offer term deposits to commercial banks. A term deposit would offer a potentially higher rate of interest to lock up reserves for a defined period of time.

In addition to the fact that the majority of base money



is sitting in excess reserves, several macroeconomic factors underpin a moderate inflation outlook.

- *Economic slack remains in the U.S. Economy* – The unemployment rate is still high relative to its pre-crisis level and trend economic growth has been below the natural cruising speed. This slack acts on inflationary pressures through the velocity of money which, at present, sits at a multi-decade low (Chart 10). Basically, businesses and households are investing and spending less than they would in normal economic conditions (Chart 11). Historical and international experience would suggest that it is difficult to generate inflationary pressures when an economy is in excess supply. While there is some uncertainty as to the amount of slack left

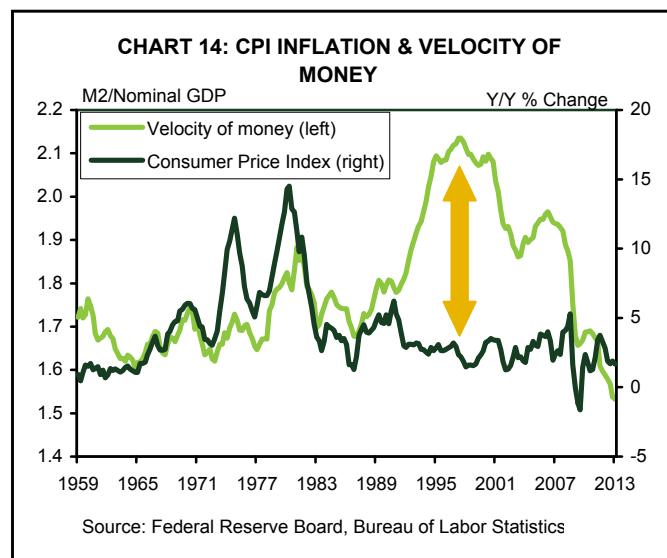
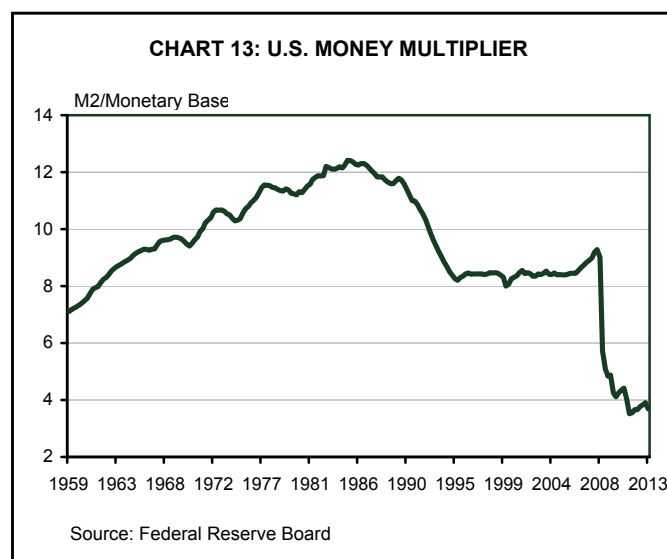


in the economy, there is little doubt that at 7.6%, the unemployment rate remains above its structural level. As long as this is the case, wages are unlikely to be bid up substantially. Indeed, unit labor costs – which measure the cost of adding an additional worker accounting for their productivity, fell 4.3% in the first quarter of this year – hardly cause for concern of a wage-price spiral. In our base case forecast, the unemployment rate falls gradually as economic slack is reabsorbed and remains roughly a percentage point above its estimated structural level by the time we expect the Federal Reserve to begin hiking rates in mid-2015. This should keep a lid on inflationary pressures.

- Inflation expectations remain well-anchored***– Economic theory suggests that the best predictor of future inflation is expectations of future inflation. And, by all available metrics, financial markets do not anticipate a problem even over the next decade. Expectations measured by the spread between Treasury Inflation Protected Securities (TIPS) and nominal bonds over the next 5-10 years are well-within the 50 basis point “comfort zone” around the Federal Reserve’s 2% target (Chart 12). Meanwhile, by the Fed’s own estimation, inflation expectations have shifted very little since the crisis began (Chart 3). Transparency and ongoing credibility from the Fed in its commitment to price stability will be key to anchoring expectations.

The potential for an unintended inflationary episode rises as we move past the next one-to-two years. As economic slack materially diminishes, there is a considerable risk that both the money multiplier and the velocity of money will accelerate (Chart 10 & 13).

How much inflation then emerges will depend on how surgically precise the Federal Reserve is in controlling expectations as well as the level and the flow of money. The Fed’s commitment to long-term price stability does not mean that they will not miss the mark from time to time. From the perspective of the money multiplier, the interest on excess reserves is going to be a critical tool in the Fed’s arsenal. This rate can be adjusted alongside the fed funds rate to influence the flow from excess reserves into the actual money supply, thereby mitigating some of the upside to inflation. The Fed has less control over the velocity of money. However, in truth, an acceleration in this metric is not sufficient to drive inflation so long as the Fed is successful in maintaining inflation expectations (Chart 14).

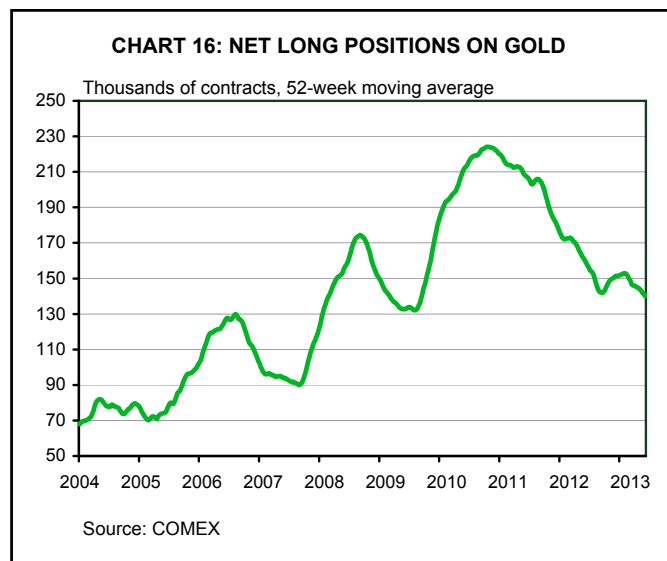


Nonetheless, the current environment is a particularly difficult one for the central bank. The traditional monetary playbook where the stance of policy is determined by how far the economy is operating relative to full potential has been put into question by the prolonged nature of the economic slump. Moreover, questions about how much of the slack in the economy is cyclical versus structural make the Fed’s job even more difficult if it gets the estimation wrong.

In sum, we are doubtful that inflationary pressures will intensify over the next two years given the degree of economic slack and the many tools the Fed has available in its repertoire to combat inflation. But, we are mindful of the risk beyond that period because we are essentially in uncharted territory with monetary policy. It is unknown how financial markets will recalibrate asset valuations and inflation expectations once economic slack is absorbed. The Fed will have to act with surgical precision when removing stimulus in order to anchor inflation expectations. An additional inflation-related concern is outlined in the following textbox.

Market distortions

This brings us to the second concern that has been raised (including by some members of the FOMC): excessive risk-taking among financial markets. While QE admittedly works in part by forcing market participants to venture out the risk curve into higher-yielding assets to generate stronger portfolio returns, this “quest for yield” creates uncertainty regarding long-term financial stability. At the very least it raises concerns about a potential misallocation of capital or a mispricing of risk. For example, some doubt has been

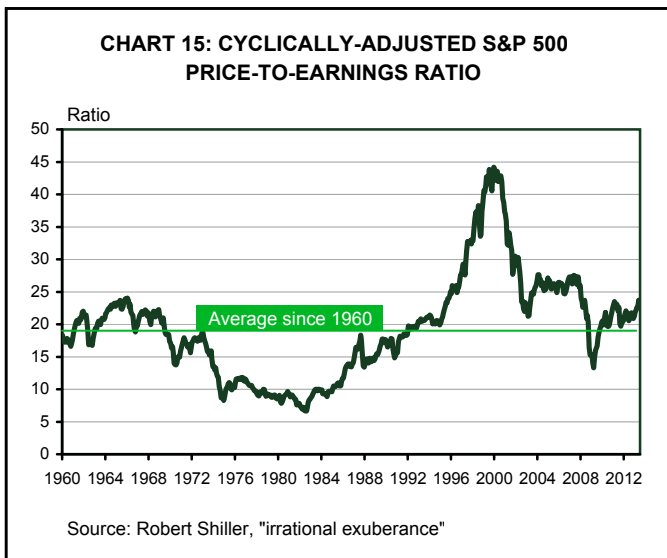


expressed over the return of synthetic collateralized debt obligations (CDOs) – fixed-income instruments backed by derivatives on corporate bonds that were demonized in the wake of the financial crisis.

In the aftermath of the crisis, risk aversion was severe and a return to some risk-taking behavior is a necessary part of the healing process. However, has the pendulum swung too far in the other direction and will this become apparent as interest rates rise? The remainder of this section considers some potential sources of financial risk that could reveal themselves as QE is unwound.

Financial Repression

An additional inflation-related concern that observers have noted is the possibility of “financial repression”. The concept was first introduced in the 6-year period immediately following WWII, in which the Federal Reserve allowed inflation to rise while artificially maintaining low Treasury yields. The government’s borrowing costs were thus reduced, aiding its efforts to combat the national debt. We think this is an extremely unlikely scenario to take place today. It took many decades for the Fed to gain credibility as an independent institution and a miserable double dip recession in the 1980s to gain credibility as an inflation-fighter. Credibility is painstaking to earn, but easy to lose. It is very unlikely that Congressional pressure to help fight the deficit will force the Fed to yield its hard-earned reputation. If inflation emerges, it will more likely be due to a policy error as opposed to an active decision to promote it.



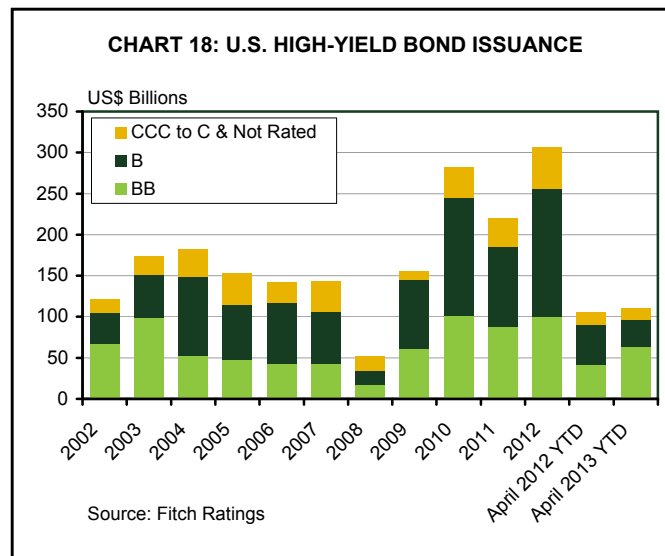
Equities and commodities

At present, the usual suspects do not seem to show any of the “irrational exuberance” typical of past financial market run-ups. For equities, overvaluation concerns stem from the substantial gains recorded in U.S. indexes since the middle of 2012. Despite some choppiness in the economic data, the S&P 500 increased by 30% between June 2012 and May 2013. Yet, equity prices do not immediately flash overvaluation warnings signs. Price-to-earnings ratios could be considered slightly elevated, but are not out-of-line with historical averages. (Chart 15).

Commodity prices could have been considered exuberant in the early years of the recovery. The Commodity Research Bureau’s (CRB) commodity price index doubled between the end of 2008 and 2011. The gain was primarily driven by commodities such as gold, crude oil, and some base metals, prices of which doubled or nearly tripled in just over two years. However, many commodity markets have since pulled back – the CRB index has fallen nearly 20% since 2011 – and the outlook is only for modest gains. A weak spate of global data and lower growth prospects for emerging markets, particularly China, have led to a significant pullback in expectations for demand. The weaker outlook is reflected in net long positions on commodities like gold, where there has been a collapse in expectations for higher prices. (Chart 16).

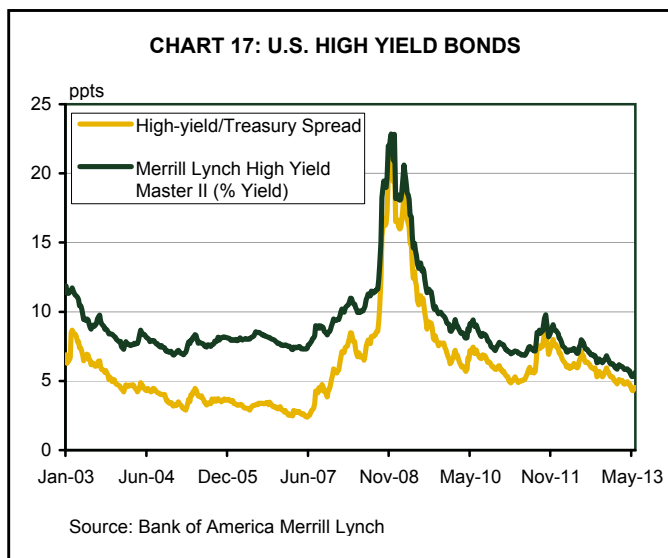
High-yield bonds wave a red flag

Equities and commodities are typically looked at for evidence of froth and excessive risk-taking behavior in a low



interest rate environment, but neither is currently flashing red. However, there are pockets of investment instruments that deserve caution. The high-yield bond market is one such pocket that is an emerging risk. The sector has become a hotspot of investment activity since the recovery began, due to the stronger income stream produced relative to higher-grade corporate bonds or treasuries. The “quest for yield”, has caused investors to flock to these assets, pushing down yields to their lowest level on record. The first thought is that this is a by-product of low Treasury yields, from which corporate bonds are priced. But, the spread between high-yield bonds and Treasuries has narrowed to its lowest level since late-2007 (Chart 17). What is more, the intensification of demand for these products has spurred a record pace of issuance, as companies take advantage of cheap wholesale funding. In 2012, US\$307 billion worth of high-yield bonds were issued in the U.S. alone – double the average issuance between 2002 and 2007. Early signs also indicate that issuance in 2013 is likely to surpass even last year’s record-breaking number (Chart 18).

The question is: are investors mispricing the risk associated with these bonds? The answer is unfortunately unclear. The low yield spread with Treasuries is still more than 200 bps higher than its pre-crisis level (Chart 17), so investors have not reverted back to the exuberant amount of risk taking behavior of that period. And certainly, proponents of high-yield debt would point to the historically low default rates. According to data from Fitch, defaults in 2011 and 2012 were well-below their historical averages. B-rated bonds, where the majority of issuance tends to occur, had a default

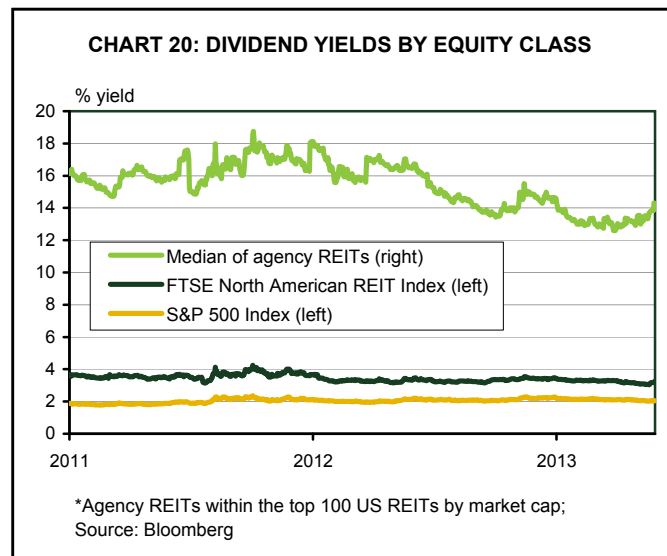


rate in 2012 of just 1%, roughly 3 percentage points lower than its historical average.

However, to what degree has the supportive interest rate environment kept defaults artificially low, and what happens when that environment is removed? To clarify this risk, we identify two scenarios. The first is that a higher interest rate environment could reveal that a number of these firms that were only able to survive due to cheap wholesale funding. However, this risk is mitigated if yields are increasing in response to an improving economic outlook. The latter would be a rising tide that lifts all ships. The continuation of firms should be facilitated by a stronger demand environment, unless there is something unique to the firm's structure such as the type or quality of its products or services, a high leverage ratio, or balance sheet rollover risk that might cause a loss in investor confidence. The second, and of greater concern, would be a rapid adjustment in yields, should markets front-load expectations of the Fed's exit path. Given that total high-yield debt outstanding is estimated at roughly US\$1 trillion, a sudden disruption to this market would likely pose a shock to the financial system and broad investor confidence.

Agency real estate investment trusts (REITs) also warrant caution

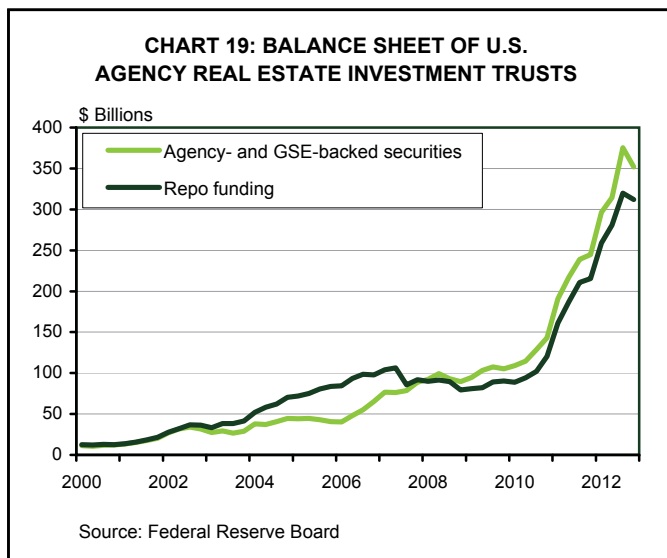
A second area of note is Agency REITs, which should also be viewed as an emerging risk to the financial system. Like the Federal Reserve, there has been a ramp-up in purchases of agency mortgage-backed securities (MBS) – those that are insured and securitized by the FHLMC, FNMA, and



GNMA, better known as Freddie Mac, Fannie Mae, and Ginnie Mae – in this sector. In the last three years, these REITs have increased their holdings of agency MBS by nearly \$250 billion, a 235% increase. However, those purchases have been funded almost entirely through short-term repo markets – essentially issuing cheap short-term debt to fund higher-yielding longer-dated assets (Chart 19). The income generated by this practice far exceeds the returns on competing asset classes. The median dividend yields on agency REIT stocks is roughly seven times the yield on the S&P 500 and nearly five times that on the FTSE North American REIT index. It is little wonder that investors have flocked to these assets (Chart 20).

However, this practice, while profitable in the current interest rate environment, becomes less so when rates are rising. As the Fed pares back QE and longer-term Treasury yields normalize, the value of those MBS will decline. Funding conditions for these REITs could then be threatened should their counterparties begin demanding higher haircuts on collateral used in the repos or if they refuse to rollover financing. This could potentially lead to a forced unwinding of those positions. The level of risk to the financial system is then dependent on how leveraged this part of the REIT sector is, who their counterparties are, and to what extent MBS prices fall – an additional risk related to MBS is outlined in the textbox on page 11.

If risk aversion behavior or mounting losses causes a selloff in the MBS market, the housing market may be impacted, as well. Falling MBS prices imply that it becomes more expensive for Freddie, Fannie, and Ginnie to issue



Convexity Event Risk

A systemic concern related more broadly to MBS holders, referred to as a convexity event risk, was recently outlined by the U.S. Treasury's emerging risk committee. MBS are unique securities in that the assets that back them – mortgages – can be pre-paid. What is more, the incentive to pre-pay a mortgage increases as interest rates fall. As investors must be compensated for this pre-payment risk, the price of an MBS security at low interest rates is higher than a comparable asset of similar maturity (like a Treasury bond). However, this changes as interest rates rise. In a rising rate environment, the incentive to pre-pay is removed. As a result, the price of MBS fall more swiftly in a rising rate environment. This characteristic is known as “negative convexity.”

When longer-term treasury yields rise and MBS prices fall, and if a financial institution is unwilling to book those losses, they can offset them by short-selling treasuries. The sensitivity of a bond price to interest rates is known as “duration” and this short-selling is referred to as “duration hedging”. Unfortunately, when investors sell treasuries, the yield on treasuries is further increased, creating the need for additional hedging. The risk then is that even a modest increase in treasury yields can snowball into a larger one due to this hedging behaviour. This occurred in 2003 when both long-term treasuries and mortgage rates spiked by roughly 120 basis points over a 3-month period, considered to be caused by the GSEs hedging their duration risk.

The extent of any sell-off is then dependent on who holds the convexity risk and whether or not they are duration hedgers. The Federal Reserve is the primary purchaser of MBS today and officials have alluded that losses on its portfolio are of less concern than the stability of financial markets. However, the Fed will likely only own 20% of the MBS market when QE3 is completed. This implies that the other 80% of the market may need to hedge its duration risk – agency REITs most of all given their risky business model. Stronger capital buffers since the crisis could have an insulating effect, but the possibility of a convexity event remains highly uncertain.

securitized mortgages. A widening in spreads between MBS and Treasury yields could impair the ability of the GSEs to facilitate the proper functioning of the mortgage market, possibly leading to downward pressure on home sales and prices.

The multifaceted risks around the MBS market sound daunting, but there are several mitigating factors to consider. First, the GSEs are still in conservatorship (thereby having the implicit backing of the U.S. Treasury) and GSE-backed debt remains one of the most widely used forms of safe collateral. Thus, a detrimental tightening in funding conditions is unlikely. Second, systemic risk to the financial system is reduced by the fact that agency REITs represent just 10% of the total REIT market in the U.S. and they hold only 5% of the total outstanding agency MBS. In addition, leverage ratios remain below their pre-crisis levels. Structural reforms since the financial crisis have led to stronger capital buffers. Last, so long as the rise in interest rates is accompanied by continued improvement in the housing market, then the increase in duration of those MBS will be partially offset by rising payment and recovery rates on the mortgages themselves. In sum, the agency REIT sector

represents an emerging risk, but not one that is large and systemic at this point.

Concluding Thoughts

If the economic recovery progresses as we anticipate, the Federal Reserve will be able to begin its exit from quantitative easing later this year. This will signal the beginning of the end of the most prolonged period of monetary easing in history. But, the Fed's slow extraction from loose monetary settings will be just as delicate as its entry into them. In the coming years, the central bank will juggle supporting economic growth, amidst increased potential for inflationary pressures and asset misallocations that may undermine the expansion and market confidence. The gravity of these challenges cannot be understated.

There has been an unprecedented increase in the amount of base money in the economy due to the Fed's large scale asset purchases. That money has not generated inflationary pressures because of economic slack and repairing credit markets. However, as the economic foundation steadily improves, this could change rapidly. In short, the risk of inflation over the medium term is significant.

Fortunately, the central bank has an unwavering commitment to price stability. Fed officials have repeatedly noted that their ability to influence employment depends on the stability of inflation expectations and its reputation as an inflation fighter. The Federal Reserve has an arsenal of tools to control the flow of money, including paying interest on excess reserves, conducting reserve draining operations, and old fashioned interest rate hikes. This should be effective in limiting the risk of a sudden or rapid increase in inflationary pressures. But, given that the Fed has waded into uncharted waters, intellectual humility suggests we should not dismiss the risk of a policy error, even if it is temporary.

The Fed's unwinding of monetary conditions is further complicated by the very real possibility that the "quest for yield" has caused some market participants to misallocate

resources and misprice asset risk. We have outlined the emerging risks related to two sectors, high-yield bonds and agency real estate investment trusts. However, this may only scratch the surface of what is easily visible. One cannot rule out the possibility that there is some overvaluation bubbling beneath the surface in other segments of the market. These sectors may not reveal themselves as serious risks until the supportive low rate environment is removed. In this respect, bank regulators will play an increasingly important role. Oversight processes like stress tests, monitoring by the Treasury's Financial Stability Oversight Council, and other regulatory changes made through the Dodd-Frank Act should help identify and guard against market distortions before they become systemic. Larger capital buffers and more stringent collateral requirements will hopefully provide more insulation against the emergence of any such risk.

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