



FRANKLIN TEMPLETON  
INVESTMENTS

# GLOBAL MACRO SHIFTS

with Michael Hasenstab, Ph.D.

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THE FED'S LONG  
UNWINDING ROAD



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# Global Macro Shifts

## The Fed's Long Unwinding Road

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Global Macro Shifts is a research-based briefing on global economies featuring the analysis and views of Dr. Michael Hasenstab and senior members of Templeton Global Macro. Dr. Hasenstab and his team manage Templeton's global bond strategies, including unconstrained fixed income, currency and global macro. This economic team, trained in some of the leading universities in the world, integrates global macroeconomic analysis with in-depth country research to help identify long-term imbalances that translate to investment opportunities.



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# Overview

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The US Federal Reserve (Fed) has unveiled plans to start shrinking its balance sheet, which has more than quadrupled in size since the global financial crisis (GFC). The multi-year massive expansion of the Fed's balance sheet has had a recognized powerful effect on asset markets—lowering yields and flattening the yield curve. Yet investors now seem to expect that the reverse process will have little impact, if any.

We disagree. We believe three factors have the potential to push bond yields higher; any single one could be sufficient to push yields well beyond current market expectations, and we see very little chance that none of them will materialize.

First, as the Fed reduces its purchases and the US Treasury increases supply to finance the ongoing fiscal deficit, new buyers must step in to keep the market for US Treasuries (USTs) in equilibrium. Our analysis shows that the burden will fall disproportionately on domestic, price-sensitive buyers like banks, mutual funds, pension funds and corporations. For these buyers to increase their demand, UST prices must fall and yields rise.

Second, as the Fed unwinds its balance sheet in a gradual manner, banks' excess reserves will remain extremely high for the next few years. A well-entrenched and strengthening economic recovery will give banks a growing incentive to increase credit supply—all the more so as financial regulations will likely be eased over the coming year. With stronger global growth and bolstered confidence, credit demand will also likely rise. This underscores the risk of a faster-than-expected acceleration in credit, which could further stimulate growth and raise inflation.

Third, wage and price pressures are unlikely to remain muted as the US economy, having reabsorbed all economic slack, keeps growing above potential—and the global economy with it. We find arguments that the wage and price Phillips curves<sup>1</sup> have *permanently* flattened unconvincing. Moreover, both wage and price trends have a strong global component, and inflationary trends in the global economy are now likely to get stronger.

To assume that none of these three factors will come into play would be, we believe, foolhardy. As the Fed unwinds its balance sheet, we should ask not whether yields will rise, but how much faster and higher than market expectations.

The remainder of this paper flows as follows: Section 1 briefly outlines the global economic backdrop; Section 2 lays out the monetary policy normalization challenge, contrasting the set of expectations held by markets with the three factors we see at play; Section 3 describes the likely path of Fed balance sheet unwinding and it assesses the potential impact on asset markets, notably on net demand for USTs and on bond yields; Section 4 discusses the risk that vast excess reserves will fuel an acceleration in credit with the unwinding still underway; and Section 5 addresses the potential macroeconomic pressures for higher inflation. We conclude this paper with a summary of our views.

1. The wage Phillips curve measures the relationship between wage growth and labor market slack, and the price Phillips curve measures the relationship between prices and economic slack.

# 1. Macro Background: The State of the Global Economy

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The global economy has picked up stronger momentum this year, with global gross domestic product (GDP) growth projected to step up to 3.6% from 3.2% in 2016, and to accelerate marginally over the next couple of years.<sup>2</sup> Commodity producing countries have benefited from the stabilization in raw materials prices, which helped Brazil and Russia come out of recession, the eurozone has been enjoying a robust cyclical upswing, India has maintained a robust pace, China should meet its 6.5%–7% target, and the US recovery has proved resilient.

Global trade has recovered to a 4%–5% annualized growth rate, from just 1% in the second half of last year, and global corporate profits have increased, driving a recovery in capital expenditures. Fears of deflation have been dispelled.

After a slow-burning but sustained eight-year recovery, the global economy has largely repaired the damage of the GFC and ensuing Great Recession. The US labor market has returned to full employment—in fact, the unemployment rate has probably fallen below the non-accelerating inflation rate of unemployment: Our analysis indicates that the output gap has been closed,

meaning that the US economy no longer has any slack in the rate of resources utilization. The eurozone's recovery has lagged behind, as the common currency area suffered a double-dip recession in 2012–2013, but at the current pace both unemployment and capacity utilization should be back to equilibrium by some time next year.

While this global recovery has already been quite long by historical standards, it has the potential to continue for a few more years at least: Corporate margins are still improving, and the consequent acceleration in business investment can give growth a second wind, including by reviving productivity growth. The cautious stance of the Fed and other major central banks limits the risk that the recovery will be cut down by overly aggressive monetary tightening. And both corporate and household leverage are lower than prior to the GFC, thanks also to strengthened macroprudential regulation.

Our baseline outlook, therefore, sees global growth marching at the current pace for the next few years, further eroding any remaining slack.

2. Source: International Monetary Fund, *World Economic Outlook*, October 2017.

## 2. Monetary Policy Normalization: Challenges and Risks

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The global recovery has been enabled by massive sustained monetary policy support in key advanced economies. Over the last eight years, the Fed has carried out an unprecedented experiment in monetary easing, combining a zero interest-rate policy with several rounds of quantitative easing (QE) that have driven a massive expansion in its balance sheet, which more than quadrupled in size between 2008 and 2014.

The Fed halted QE in October 2014. Over a year later, in December 2015, it began to reverse monetary policy course with a 25 basis-point (bp) hike in the federal funds rate. It took another 12 months for the Fed to judge that a second rate hike was appropriate, and two more hikes this year so far have brought the policy rate to 1%.

Even with these hikes, the real—inflation adjusted—policy interest rate has remained negative for eight years now. The Fed has indicated it will continue to move cautiously. It has argued that the equilibrium real policy interest rate has likely fallen to a significantly lower level than before the crisis, so that in the near term a limited number of additional rate hikes will suffice to bring the policy rate back to equilibrium—though in the longer run the equilibrium rate itself might rise again.

**Last September the Fed opened a more delicate phase of its policy adjustment, announcing that it will begin to reduce the size of its balance sheet.** The decision to start shrinking the balance sheet while the policy interest rate still remains below its equilibrium level reflects two considerations:

- First, a desire to limit the negative impact on growth and inflation: empirical studies show that compared to quantitative tightening, interest-rate hikes have a stronger impact on the exchange rate, reducing export demand, GDP growth and inflation.
- Second, a recognition that an oversized balance sheet can pose risks to financial stability.

Reducing the size of the balance sheet can therefore allow the Fed to modulate the impact of monetary tightening on growth while lowering financial stability risks.

**So far the change in Fed policy has had little impact on financial markets: bond yields have remained at very low levels, and equity markets have continued scaling new heights. Investors seem to expect that the Fed's policy normalization will have only a very limited impact on asset prices. This expectation appears based on the following assumptions:**

- That US and global growth are in a sweet spot, neither too cold nor too hot, running at a healthy pace that will slowly run down residual overcapacity without exerting excessive pressure on resources—in particular labor;
- That wage growth and inflation have settled at permanently lower rates because of structural forces, including technological innovation and globalization;
- That equilibrium real interest rates have also been driven down by structural forces, including slower global growth, weaker demographics and a global savings glut;
- That money multipliers will not recover and credit growth will not accelerate sharply before the Fed has made sufficient progress in shrinking its balance sheet; and
- That asset markets can smoothly adjust to the withdrawal of Fed demand for USTs and mortgage-backed securities (MBS).

Financial markets assume that the Fed will therefore be able to normalize monetary policy in a gradual and controlled manner: only a few more interest-rate hikes will be needed, and slow quantitative tightening will have limited impact on asset prices.

**We see only a very small probability that all these assumptions will prove right. We believe three factors have the potential to push bond yields higher—and any single one could be sufficient to push yields well beyond current market expectations:**

- 1. Unwinding the asset side of the Fed's balance sheet:** As the Fed shrinks its balance sheet, it will significantly reduce its demand for USTs. As the UST market must currently be in equilibrium, this will push yields up (the alternative would imply pent-up demand ready to step in, but if that were the case we should see downward pressure on yields).
- 2. An acceleration in credit growth built on the liabilities side of the Fed's balance sheet:** Given a stronger growth outlook and a likely easing of financial sector regulations, we see a high likelihood that banks could start lending out their substantial excess reserves, further fueling the macroeconomic pressures on inflation.
- 3. Stronger wage and price pressures fueled by a sustained economic recovery:** We see the ongoing strengthening in US and global growth as likely to fuel stronger wage growth and consumer price inflation. This would either lead the Fed to accelerate the pace of rate hikes, or result in a rising term premium as markets anticipate inflation running ahead of the Fed.

In the remainder of this paper we analyze the different pieces of the puzzle and provide a detailed discussion of the dynamics of the Fed's balance sheet unwinding challenge.

# 3. The Great Unwinding: Shrinking the Fed's Balance Sheet

The reversal of QE marks an important chapter in economic policy in the post-GFC world. Since 2008 the expansion of the Fed's balance sheet—mirrored by QE in the eurozone, Japan and the UK—has arguably been the most dominant force shaping the global economic environment.

The Fed's balance sheet expanded from around US\$900 billion in September 2008 to just less than US\$4500 billion in October 2014, when QE3 concluded; it has been kept steady since then by reinvesting the principal payments from maturing securities. After raising the fed funds rate by 100 bps since December 2015, the Federal Open Market Committee (FOMC) confirmed at its September 2017 meeting that it would let the balance sheet start shrinking in October 2017 by phasing out its reinvestment policy.

**QE had a major impact on asset markets and macroeconomic conditions; its reversal, "quantitative tightening," (QT) will be equally powerful.** This section begins by describing how QE affected financial markets and the economy; it describes the likely path of QT; and it assesses the potential impact on asset markets, notably on net demand for USTs and on bond yields.

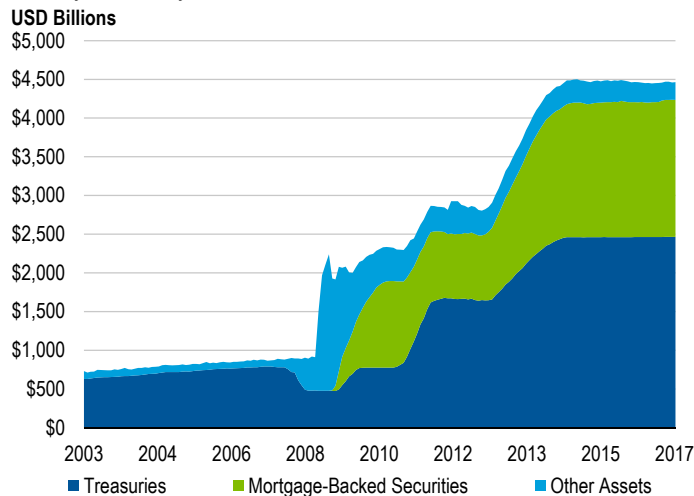
## The Known Benefits and Unknown Costs of QE

In the early stages of the crisis, the Fed reduced the base rate aggressively and began buying toxic assets while selling Treasuries, keeping the size of its balance sheet steady.<sup>3</sup> By October 2008 that approach was insufficient and massive liquidity

## Expanding the Balance Sheet: The Fed's Large-Scale Asset Purchases

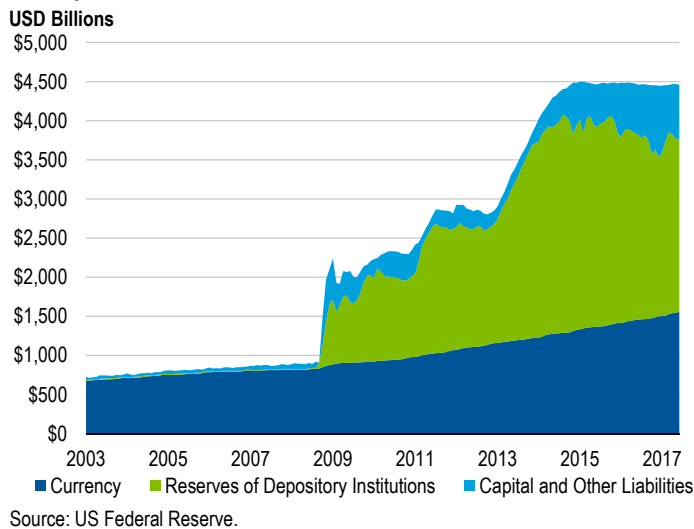
**Exhibit 1: The Fed's Assets**

January 2003–July 2017



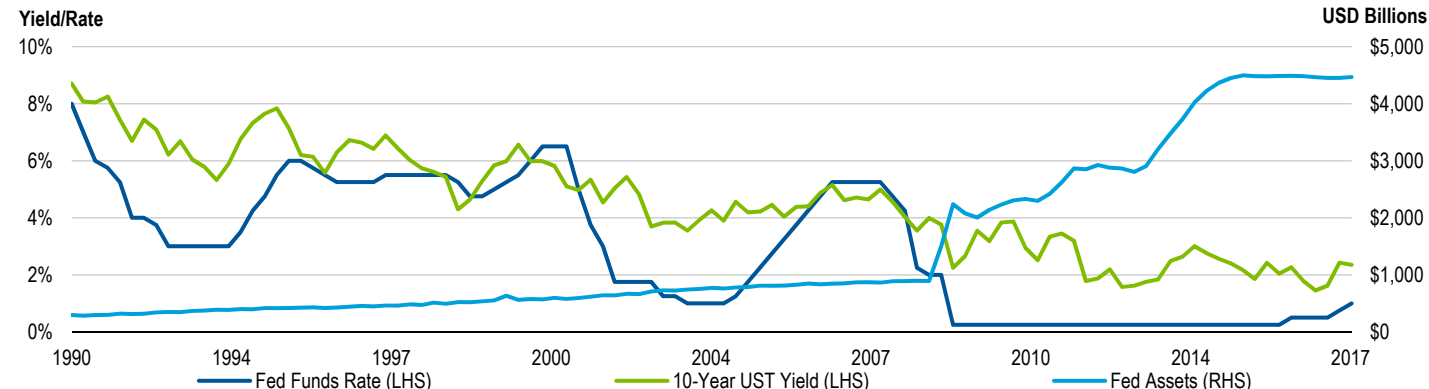
**Exhibit 2: The Fed's Liabilities**

January 2003–June 2017



**Exhibit 3: QE Deployed When Fed Funds Went to 0.0%**

December 1990–June 2017



Source: US Federal Reserve, Bloomberg.

3. It also received a loan from the Treasury.



injections ensued (while the fed funds rate was dropped to zero in December); the Fed purchased a large quantity of assets and credited the account of commercial banks, increasing their reserves. This initial stage, termed QE1, concluded in March 2010. Additional rounds (QE2, Operation Twist and QE3) reflected the transition of the Fed's objective from crisis response to stimulating growth. In the process the asset side of its balance sheet swelled with longer-term USTs and MBS.

Asset purchases were crucial in stabilizing the financial system at the height of the crisis. While business investment did not respond to lower funding costs as strongly as initially hoped, the Fed's intervention helped the economy in two important ways:

- **Driving a wealth effect:** large-scale purchases of long-term assets boosted asset prices and helped private wealth recover sharply after 2012, even as the relative decline of employees' compensation to personal income accelerated (see Exhibit 4); it also induced a portfolio rebalancing effect, compressing the term premium and diverting private sector funds to risky assets.

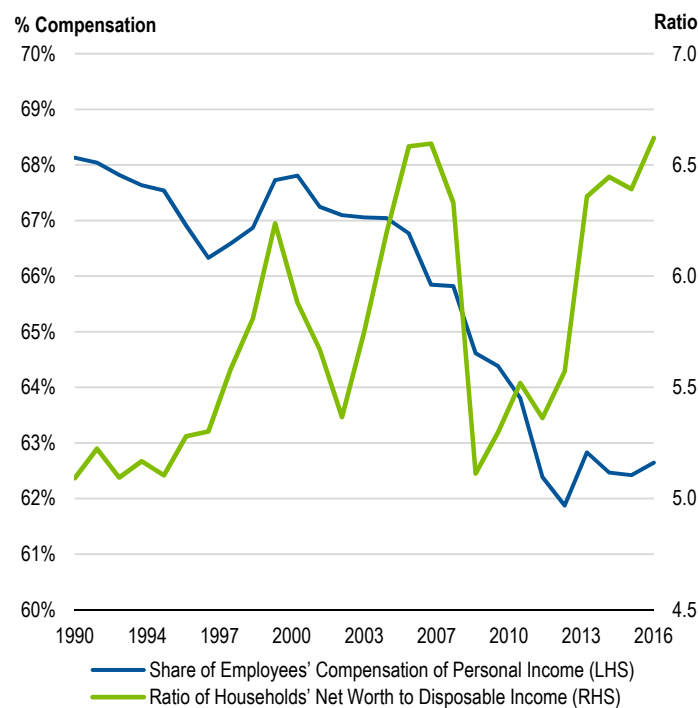
- **Financing fiscal spending:** lower funding costs mitigated the impact of large fiscal deficits on debt servicing. Although government debt more than doubled from 2007 to 2012, net interest payments remained stable in nominal terms and fell below 1.5% as a share of GDP, significantly lower than in recent decades (as graphed below).

**Importantly, the liquidity created by QE stayed within the financial system. Loan growth to the private sector remained subdued because of two factors:** lackluster credit demand—as households and corporations repaired their balance sheets—and the banks' need to reduce risk exposure and meet tougher regulatory requirements.<sup>4</sup> Therefore, the traditional relationship of the monetary base (liquidity) to money supply and credit broke down after 2007 (see Exhibits 6 and 7). This environment of anemic credit growth and weak inflationary pressures made it easier for the Fed to signal that its extraordinary policies would remain in place for a prolonged period of time, giving time for the recovery to establish itself.

## Boosting the Private Sector through the Wealth Effect and Inexpensive Fiscal Stimulus

**Exhibit 4: Wealth, Income and Compensation**

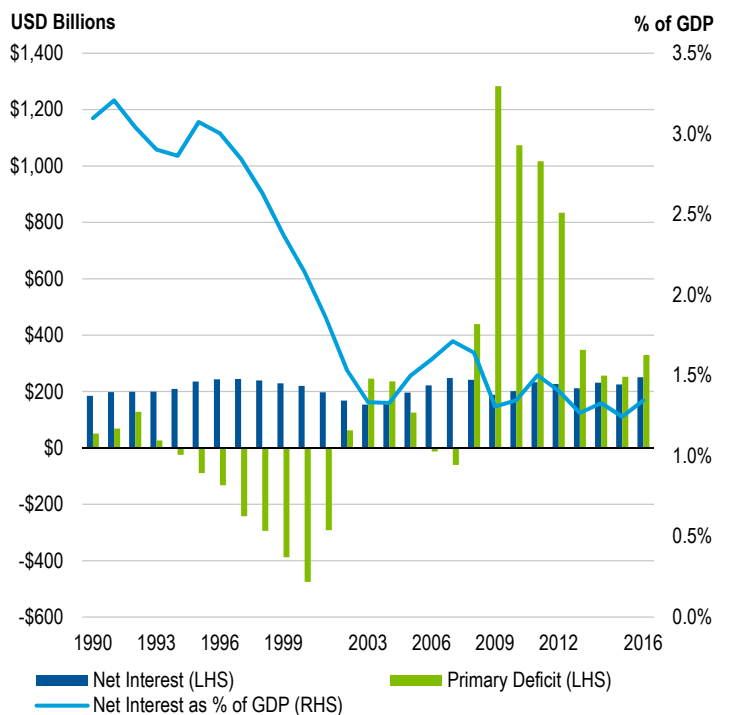
1990–2016



Source: US Bureau of Economic Analysis, US Federal Reserve.

**Exhibit 5: Fiscal Deficit and Interest Payments**

1990–2016



Source: US Treasury.

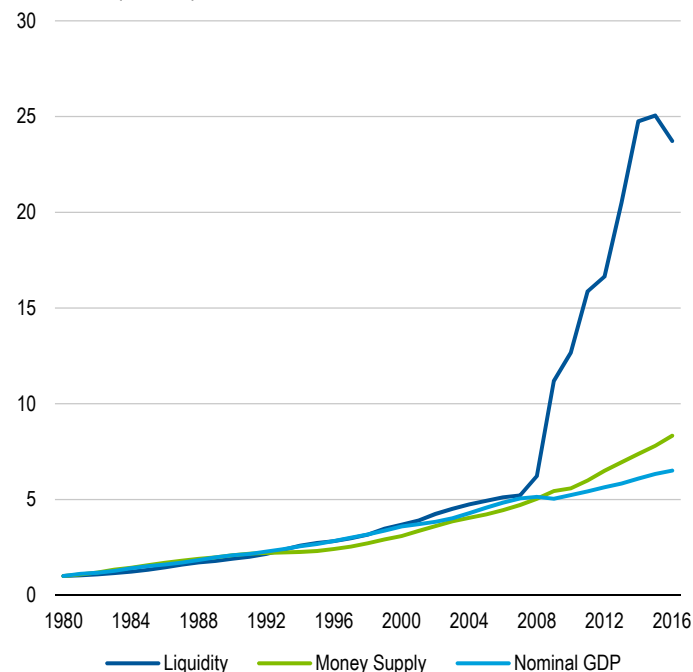
4. Of course, government debt exploded, offsetting weak private demand.

## Liquidity Stayed within the Financial System after 2007

**Exhibit 6: Monetary Aggregates and GDP (1980 = 1)**

1980–2016

Index Value (1980 = 1)



Source: US Federal Reserve, US Bureau of Economic Analysis.

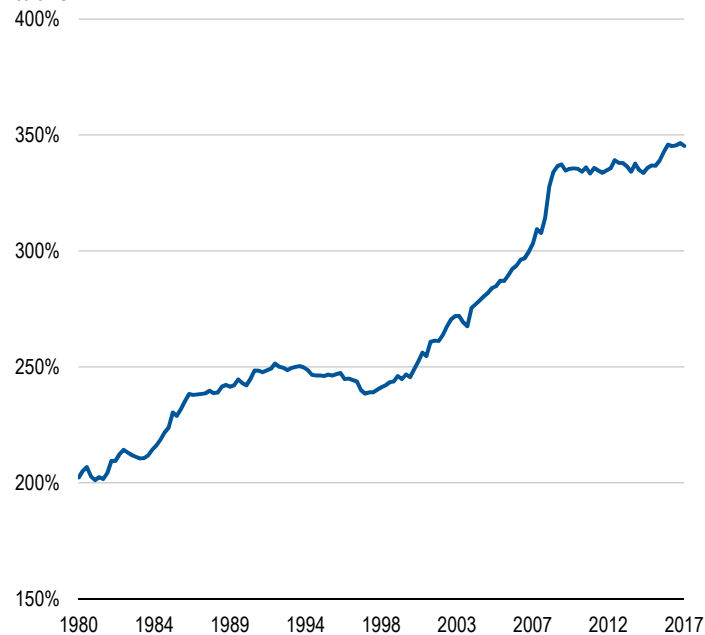
**The impact of Fed policy on real economic activity worked mainly by engineering a sharp rebound in asset prices and supporting large fiscal deficits at a time of weak domestic private demand.** Even though these channels had very little influence on potential growth—as business investment failed to respond—they facilitated an impressive recovery in private consumption and the labor market, which largely took hold by 2014.

**At the same time, however, massive Fed intervention in financial markets created substantial dislocations.** For a long time, the Fed played down the attendant risks to financial stability, trusting in stronger macroprudential regulations and emphasizing the positive impact on growth. The Bank for International Settlements (BIS), on the other hand, has long warned of the risks to financial stability stemming from this unprecedented QE—carried out not only by the Fed but also by the Bank of Japan (BOJ), the Bank of England (BOE) and the European Central Bank (ECB). More recently, the Fed has also begun to openly acknowledge these risks.

**Exhibit 7: Credit – Nonfinancial Sector Debt Outstanding**

January 1980–March 2017

% of GDP



Source: US Federal Reserve, US Bureau of Economic Analysis.

**Can the Fed unwind liquidity without significant disruption to asset prices, government finances and ultimately economic growth? There are two opposite risks linked to the Fed's exit strategy.**

- First, the unwinding process itself could cause a disorderly adjustment in financial asset prices.
- Second, credit growth might accelerate further even as the balance sheet unwinding takes place, reawakening price pressures and forcing the Fed to either accelerate the pace of rate hikes and possibly triggering a recession, or risk that inflation will accelerate well above target.

The remainder of this section focuses on the risk to financial asset prices, while Section 4 addresses the potential acceleration in credit growth.

## Quantitative Tightening I: Predetermined Path, Uncertain Magnitude

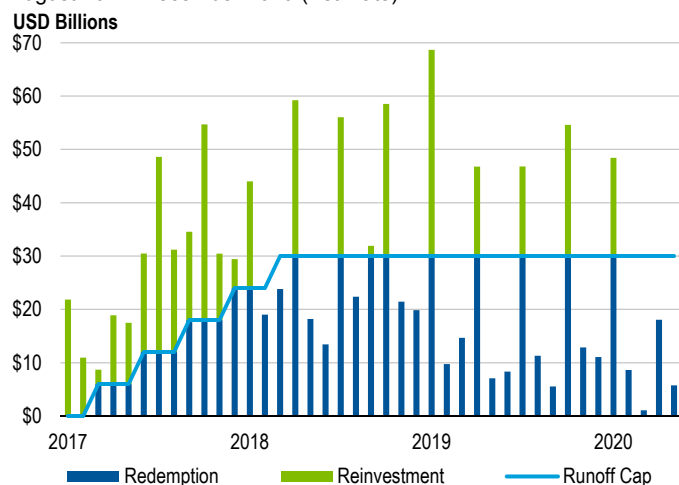
The Fed aims to set the balance sheet unwinding on a predetermined course, as long as economic conditions remain steady, while using more discretion in hiking rates to meet its dual mandate.<sup>5</sup> To set a predetermined unwinding path, the Fed will abstain from outright asset sales and simply stop reinvesting the proceeds as securities reach maturity. By itself, this would make the unwinding path predetermined, but could also make it uneven and faster than the Fed deems appropriate:

- Since Treasury issuance shows a substantial peak in the middle month of each quarter, the natural redemptions schedule would be very uneven and could potentially be disruptive.
- If the Fed were to halt all reinvestments starting in the fourth quarter, then its balance sheet would shrink by almost US\$2 trillion by the end of 2020.

### The Fed's Disinvestment Program – Static Picture

**Exhibit 8: Runoff of the Fed's US Treasuries**

August 2017–December 2020 (Estimate)<sup>7</sup>



Source: US Federal Reserve.

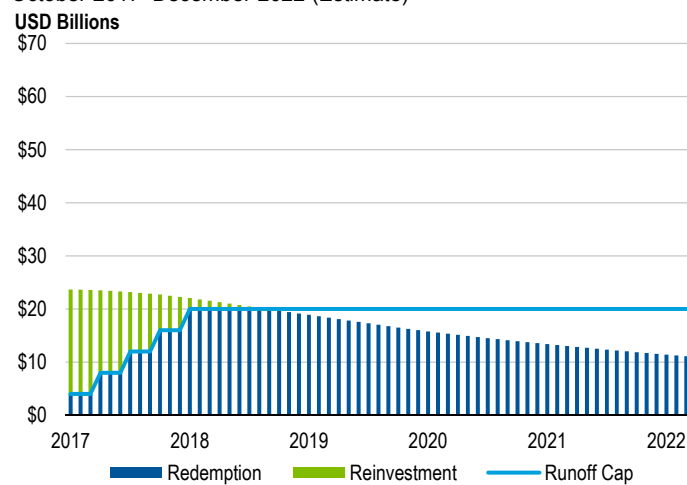
The Fed's disinvestment program therefore introduces caps for maturing USTs and MBS to limit the size of redemptions per month (the amount beyond the cap would be reinvested). According to the disinvestment scheme, the caps will start at US\$6 billion for USTs and US\$4 billion for MBS, and would rise in equal steps every three months, until they reach US\$30 billion for USTs and US\$20 billion for MBS (by October 2018).

This will make the process smoother. Moreover, the steadily escalating size of the caps will lead to a gradual increase in the pace of redemptions, giving markets time to digest the new policy and allowing the Fed to make adjustments if necessary.

Exhibits 8 and 9 present a static profile for USTs and MBS while ignoring the reinvestment issue. In order to generate runoff projections, we have to make additional assumptions on how the Fed reinvests maturing USTs and MBS and how other components of the liabilities part of the balance sheet evolve.<sup>6</sup>

**Exhibit 9: Projected Fed MBS Pay-Downs**

October 2017–December 2022 (Estimate)<sup>7</sup>



Source: US Federal Reserve.

**Table 1: The Fed's Disinvestment Program – Dynamic Picture (USD Billions)**

Q4 2017–2020 (Estimate)<sup>7</sup>

|                                   | Q4 2017 | 2018 | 2019 | 2020 |
|-----------------------------------|---------|------|------|------|
| <b>Treasuries</b>                 |         |      |      |      |
| Natural Runoff                    | 45      | 426  | 400  | 334  |
| Projected Runoff                  | 18      | 229  | 280  | 242  |
| <b>Mortgage-Backed Securities</b> |         |      |      |      |
| Natural Runoff                    | 71      | 272  | 238  | 200  |
| Projected Runoff                  | 12      | 168  | 238  | 200  |
| <b>Total</b>                      |         |      |      |      |
| Natural Runoff                    | 116     | 698  | 638  | 535  |
| Projected Runoff                  | 30      | 397  | 518  | 442  |
| <b>Fed Assets</b>                 | 4486    | 4193 | 3679 | 3214 |
| <b>Excess Reserves</b>            | 2229    | 1859 | 1264 | 713  |

Source: Calculations by Templeton Global Macro using data sourced from US Federal Reserve, US Treasury Department.

5. The Fed's dual mandate is to maximize employment and maintain price stability.

6. We assume that Fed holdings of USTs and MBS are proportionally reinvested in Treasury bonds. For USTs, we used disaggregated data to separate out the mid-month and end-month maturities, given the different issuance schedule at these auctions. For mid-month auctions, 38.6% of reinvested USTs were channeled into three-year securities, while at the end-month auctions, 29.5% of reinvested USTs were channeled into two-year securities (as per the Treasury's auction schedule over the past year). Since the remaining securities issued at both mid- and end-month auctions have tenors greater than three years, they do not affect the analysis (over the relevant horizon). Additional assumptions were made on the liability side of the balance sheet regarding the growth of currency, required reserves and the capital/other liabilities category to back out excess reserves.

7. There is no assurance that any estimate will be realized.

The projected runoffs are summarized in Table 1. If everything goes according to plan, by 2020 the majority of the tightening will have been achieved. While the actual trajectory remains uncertain, the Fed's balance sheet would shrink by US\$1.3 trillion over the next three years, with Treasuries and MBS redemptions in 2018–2020 totaling US\$700 billion and US\$630 billion, respectively.

**Note that the actual terminal size of the balance sheet remains unknown.**<sup>8</sup> The FOMC said it would ultimately have a balance sheet “appreciably below that seen in recent years but larger than before the financial crisis” in part because it expects banks to maintain higher demand for excess reserves. That spans a very wide potential range. Documents from the New York Fed appear to indicate an end-level closer to the pre-crisis one, in line with carrying out the unwinding program through 2020.<sup>9</sup>

Others, including former Fed Chair Ben Bernanke, have made a case for a larger balance sheet and a shorter unwinding.<sup>10</sup> Bernanke argued that “there are reasonable arguments for keeping the Fed's balance sheet large indefinitely, including improving the transmission of monetary policy to money markets, increasing the supply of safe short-term assets available to market participants, and improving the central bank's ability to provide liquidity during a crisis.”<sup>11</sup>

**Whatever the end point, the Fed hopes this unwinding will have little market impact, if any.**<sup>12</sup> **Most investment banks' analysts seem to agree, and project only a modest increase in yields,** with the 10-year UST yield rising by around 50 bps. These forecasts are based on three factors: 1) the size of the unwinding, which markets expect will be significantly smaller than the 2008–2014 expansion; 2) the Fed's transparent communication of the process; and 3) structural factors that should keep the equilibrium real rate lower than in the past, including demographics, lower trend growth, weak investment and a debt overhang.

But for these expectations to be realized, new buyers must step in as the Fed steps out.

## Quantitative Tightening II: Who Will Buy What the Fed Won't Buy?

**What happens when securities held by the Fed mature and the Fed does not reinvest the proceeds?** The simplest (and safest) scenario would be for the Treasury to reduce the outstanding level of public debt correspondingly: The Treasury would transfer money from its cash account at the Fed to cover the maturing debt. An equal amount would be removed from both sides of the Fed's balance sheet, which would shrink by the amount of debt maturing.<sup>13</sup> In this scenario, both the demand for USTs (from the Fed) and the supply (from the government) would decline by the same amount, so that other things being equal the shrinking of the Fed's balance sheet would have no impact on bond prices.

This, however, can only happen if the stance of fiscal policy results in a fiscal surplus, allowing a reduction in the debt level. In practice, however, **Treasury issuance will likely rise substantially over the next few years.** The Treasury Borrowing Advisory Committee's latest report (8/2/17) notes:

- “Treasury's borrowing needs are likely to be substantially higher over the coming years. In the baseline estimates, borrowing needs will increase from US\$525 billion in calendar year 2017 to US\$1,010 billion in calendar year 2020, effectively a doubling.”
- “The highlight of the findings is that **Treasury should consider increasing auction sizes across all tenors while gradually increasing T-bills as a share of overall debt.** Under this proposal, the weighted average maturity of the debt would gradually increase.”<sup>14</sup>
- “Several other scenarios were presented. For example, were Treasury to concentrate increases at the front end of the Treasury curve with a large jump in the T-bill share to 22% of outstanding principal, coupons would increase only modestly.”

8. Note that even after the Fed's balance sheet stabilizes and begins to expand again to accommodate natural growth in currency demand, the Fed may continue to favor buying short-term assets to return closer to the pre-GFC composition, which comprised roughly 35% T-bills and less than 10% of Treasury securities over five years of duration.

9. Federal Reserve Bank of New York, Liberty Street Economics, “How the Fed Changes the Size of Its Balance Sheet,” 7/10/17.

10. Bernanke, Ben, “Shrinking the Fed's Balance Sheet,” Brookings Institution Blog, 1/26/17. In the blog, Bernanke argued that 1) the balance sheet unwind should be very predictable, and, once set in motion, should not be halted; 2) therefore, the Fed should start the unwinding only after short-term interest rates are “comfortably away from their effective lower bound”; and 3) only a modest reduction in the balance sheet would be required.

11. Bernanke also argued that a permanently larger balance sheet would be needed to meet higher demand for currency from the public: He noted that the stock of currency had nearly doubled to US\$1.5 trillion at the time of writing, with the Fed projecting a further rise due to low interest rates and international demand for dollars. He concluded that “the critical level of bank reserves needed to implement monetary policy through a floor system seems likely to be well over \$1 trillion today, and growing. Taking currency demand into account as well, it's not unreasonable to argue that the optimal size of the Fed's balance is currently greater than \$2.5 trillion and may reach \$4 trillion or more over the next decade. In a sense, the US economy is ‘growing into’ the Fed's \$4.5 trillion balance sheet, reducing the need for rapid shrinkage over the next few years.”

12. From Yellen's June press conference: “My hope and expectation is that...this is something that will run quietly in the background over a number of years...as exciting as watching paint dry.”

13. The same logic applies to the issuers of MBS.

14. The weighted average maturity of interest-bearing public debt stood at 66 months as of June 2017, five months higher than the historical average since the early 1990s.

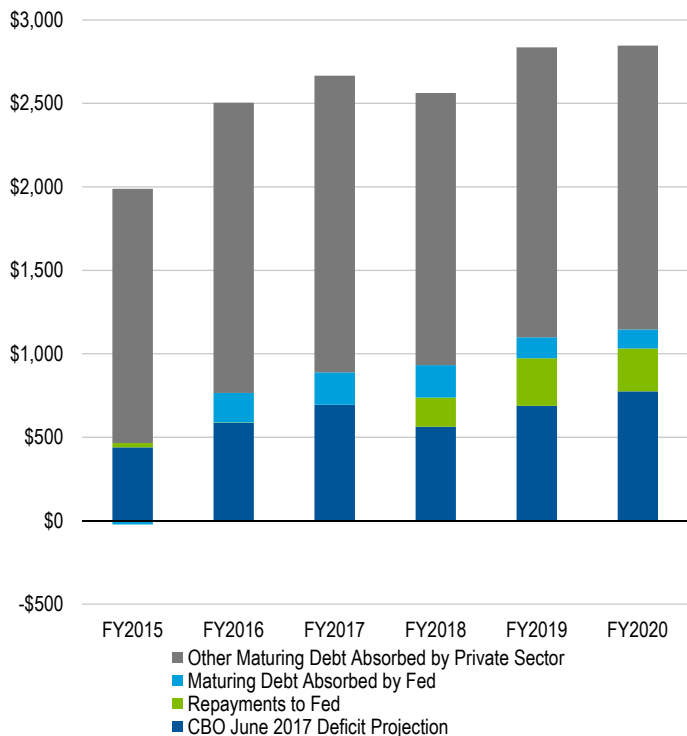


## Putting Fed Repayments in Perspective

### Exhibit 10: Treasury Repayments to Fed and Debt Absorbed by Private Sector

FY2015–FY2020 (Estimate)<sup>15</sup>

USD Billions



Source: Calculations by Templeton Global Macro using data sourced from Congressional Budget Office, US Federal Reserve, US Treasury Department.

Exhibits 10 and 11 put the Treasury's repayments to the Fed in perspective given the Congressional Budget Office's (CBO's) deficit projections.<sup>16</sup>

In practice, therefore, **the Treasury will need to issue new securities to cover those maturing (plus additional ones to finance the deficit). The new securities could be purchased by the domestic public or by domestic financial institutions, or by foreign buyers.**

**Consider domestic buyers first: To be induced to increase their demand for USTs, both financial institutions and individuals will need to be enticed by a lower price, i.e., a higher yield.** If they were willing to buy more USTs at the current price, they would already be trying: We would have today an excess demand that would drive prices up and yields down. In other words, since supply and demand for Treasuries are in equilibrium at the current price, we need a lower price to generate additional demand.

15. There is no assurance that any estimate will be realized.

16. We also make a tax reform assumption based on a US\$1 trillion tax cut over 10 years for illustration purposes. Of course, the prospects and details of the Republican tax bill are highly uncertain at this point in time.

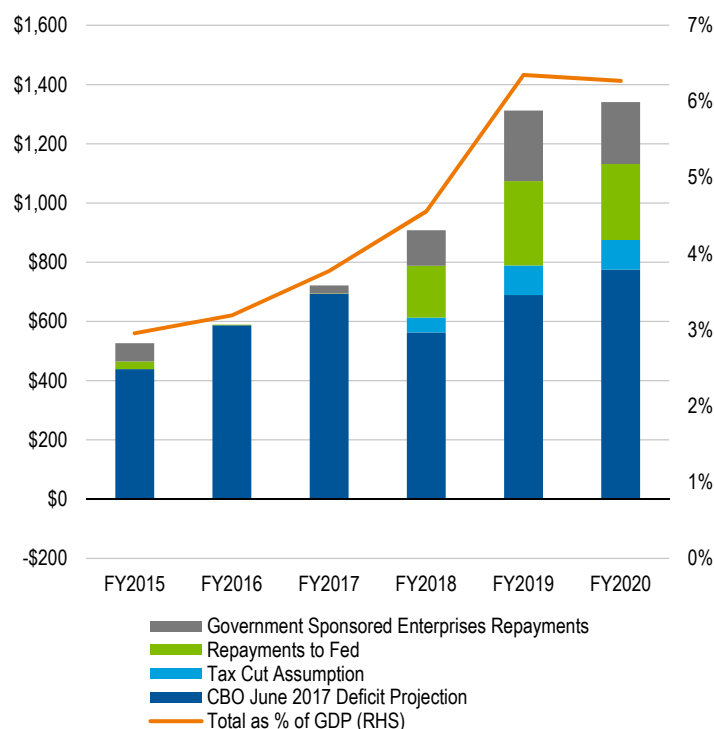
17. Level 2A assets entail a 15% hair cut when calculating LCR.

### Exhibit 11: Additional Private Savings Needed

FY2015–FY2020 (Estimate)<sup>15</sup>

USD Billions

% of GDP



Source: Calculations by Templeton Global Macro using data sourced from Congressional Budget Office, US Federal Reserve, US Treasury Department.

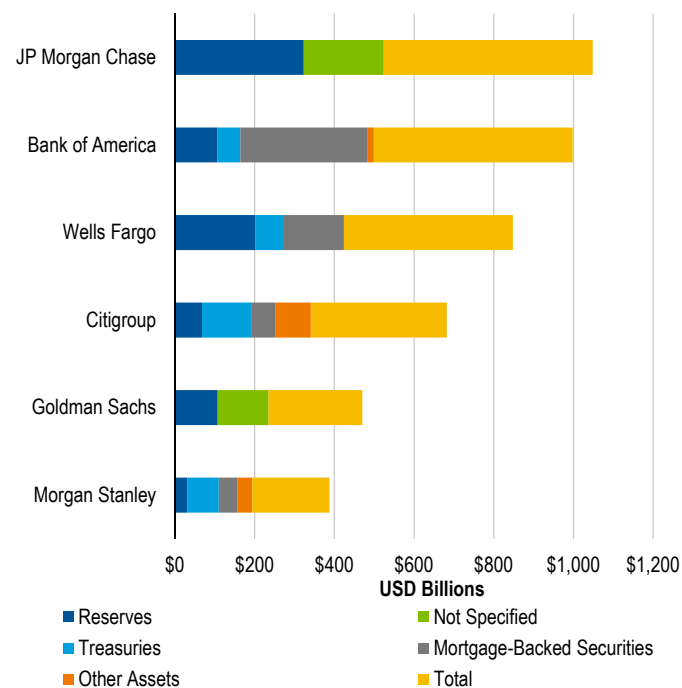
**Could regulations “force” banks to buy more USTs (and MBS) at current prices? Under existing regulations, this seems unlikely.** Banks would need to experience an increase in their liabilities forcing them to increase liquid assets to meet Liquidity Coverage Ratios (LCR). An increase in bank deposits would have this impact (it would also mean that the public has no appetite for additional USTs). Even in this case, however, banks are likely to be more selective than the Fed. For instance, USTs are Level 1 assets, making them more attractive than MBS (which are Level 2A).<sup>17</sup> Or banks may favor holding Treasury bills, demanding a much higher term premium than the Fed did (T-bills are probably the closest substitute to reserves). The Treasury could respond by issuing more T-bills, sharply skewing issuance toward short-term duration. This would be a riskier choice in terms of debt-management strategy, though, and appears unlikely.

This point bears repeating: Some analysts assume that banks will be happy to shift from cash reserves into UST to make up for the

## Reserves Make Up a Large Share of Banks' High-Quality Liquid Assets

**Exhibit 12: Composition of High Quality Liquid Assets – Major US Banks**

As of June 2017



Source: Cornerstone Macro, LLC. JP Morgan and Goldman Sachs do not specify asset categories.

decline in Fed demand. After all, from a regulatory perspective, USTs are liquid instruments that help meet LCRs. But **from a bank's perspective, USTs are not the same as cash reserves. USTs carry much higher duration risk, which a bank can hardly ignore especially in an unwind scenario.**

Existing regulations, therefore, are unlikely to generate additional bank demand for USTs at current prices. Moreover, as we will discuss in the next section, regulations are likely to become looser, not tighter.

### Could less price-sensitive foreign investors step in?

Proponents of the savings glut theory say they will. The data, however, show the opposite: Demand for perceived safe-haven assets has waned, though it has been concealed by the effects of QE across the major advanced economies.

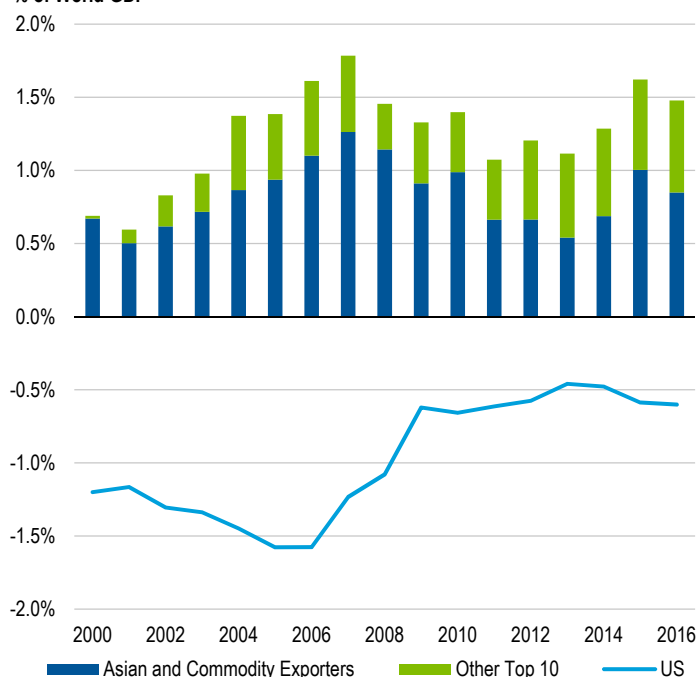
Central banks and sovereign wealth funds are the best examples of non-price-sensitive foreign buyers. Here, while the BOJ and the ECB are still engaged in QE, they seem unlikely to step up the pace of easing: The global economy keeps accelerating, and the ECB has started to eye the right time to begin tapering its asset purchases, as slack in the eurozone has almost disappeared. Meanwhile, commodity prices have stabilized at low levels, reducing the firepower of most sovereign wealth funds. Exhibits 13 and 14 highlight how the global savings glut has been substantially reduced.

## The Savings Glut Has Evolved, with Foreign Exchange Reserves Peaking in 2013

**Exhibit 13: Top 10 Current Account Surplus Countries**

2000–2016

% of World GDP

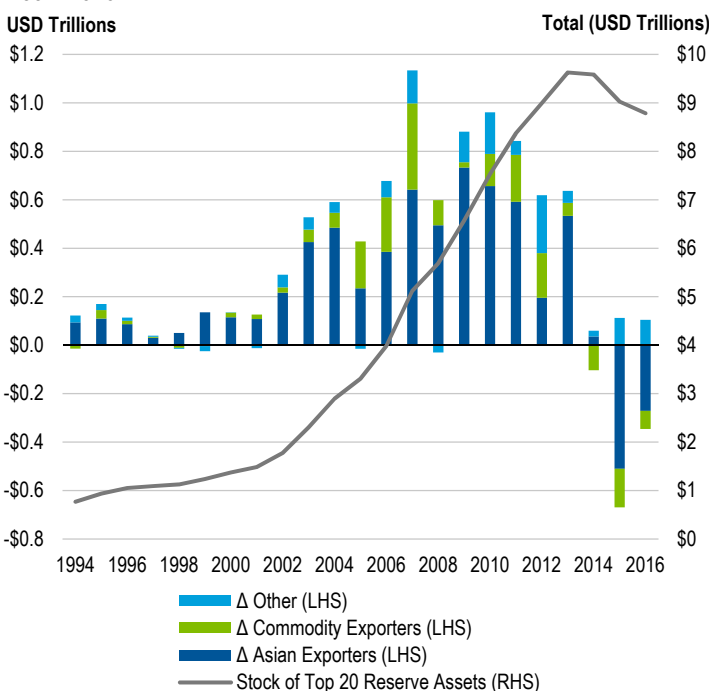


Source: Economist Intelligence Unit, IMF, Central Bank of the Republic of China.

**Exhibit 14: Changes in FX Reserves of Top 20 Largest US Treasury Holders (Annual)**

1994–2016

USD Trillions

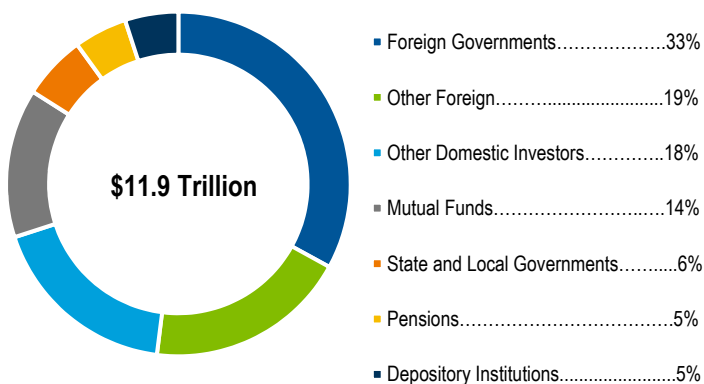


Source: IMF.

## The Composition of USTs Held by the Public

### Exhibit 15: Holders of US Treasuries

As of March 2017



Source: US Bureau of the Fiscal Service, US Treasury Department. As of end-Q2 2017, total privately held debt excluding Fed holdings was \$11.9 trillion.

- The savings glut, which weighed on safe assets in the previous decade, has decreased. Although current-account imbalances persist, the surplus countries, with a larger representation for Europe, have stopped accumulating FX reserves.<sup>18</sup>
- China has driven much of the drop in reserves. The country's UST holdings fell by over US\$250 billion from their peak in 2014, though they have partially recovered this year. China also holds a substantial amount of USTs through accounts in other countries, which also probably have been impacted, but cannot be verified.<sup>19</sup>
- The decline in commodity prices has undermined the ability of oil producers to accumulate financial reserves, and indeed most oil producers are actively running down their reserves (i.e., selling USTs) to meet their fiscal commitments.

The waning role of foreign buyers can be seen in the breakdown of the outstanding UST stock by holders in Exhibits 15 and 16.

18. Additionally, the US current account deficit has shrunk significantly from a high of 1.5% of world GDP to around 0.6% over the past several years, thanks in large part to reduced reliance on imported oil.

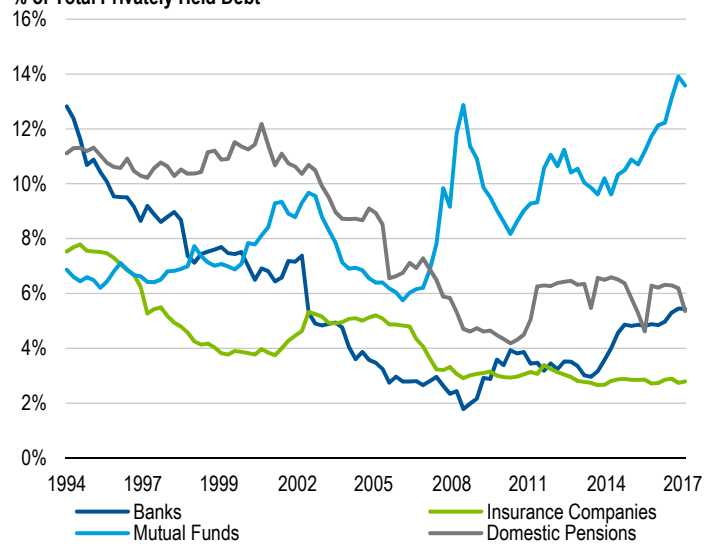
19. Heightened concerns about protectionism have likely already curtailed the appetite of China and other Asian reserve managers to accumulate foreign safe assets to limit the appreciation of their currencies and will continue to do so in the foreseeable future.

**The observations in this paper contain theoretical estimates based on a series of assumptions and should not be interpreted as investment advice. The analytical opinions of the authors are based on a series of assumptions, which may change at any time.**

### Exhibit 16: Domestic Holders of US Treasuries

January 1994–March 2017

% of Total Privately Held Debt



Source: US Bureau of the Fiscal Service.

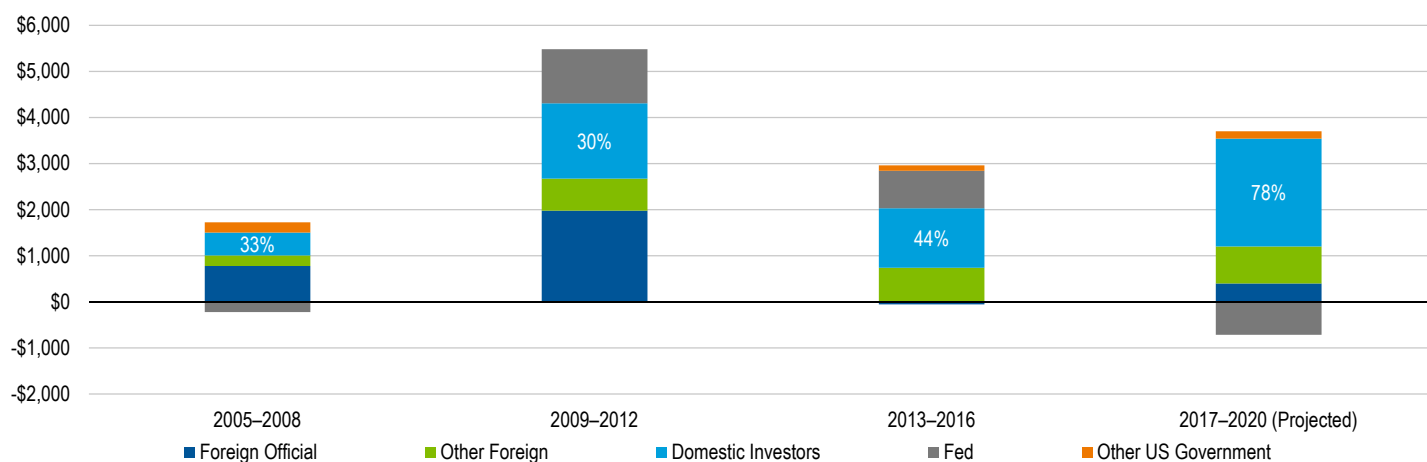
- The share of the UST market owned by foreigners climbed from 21% in 1994 to 35% in 2001 and to a peak of 59% in 2014, before sliding to just over 50% at the start of 2017.
- The US corporate sector has emerged as another important and relatively new domestic player, captured in the “other domestic investors” category in the pie chart above. Corporations have amassed more than a trillion dollars in fixed income securities, including USTs and MBS, and are also likely to be very sensitive to prices.
- Similarly, private foreign investors from Europe and elsewhere will be sensitive to yield differentials as well as the exchange rate. These buyers would also be affected by the supply of safe assets in their countries and the amount of purchases by their central banks (with the same portfolio-rebalancing effect working in other major developed markets).

## Domestic Private Investors Projected to Sharply Raise Their Share of the UST Market

### Exhibit 17: Net Borrowing from the Public

2005–2020 (Projected)<sup>20</sup>

USD Billions



Source: Calculations by Templeton Global Macro using data sourced from Congressional Budget Office, US Bureau of the Fiscal Service, US Treasury Department, US Federal Reserve.

Having assessed these trends, we have modeled the supply and demand picture for the UST market through 2020.<sup>21</sup> Exhibit 17 above visualizes the key results.

- In the four four-year periods above, net debt increased the most in 2009–2012, but demand was spread across the four large groups, with the Fed playing an important role (21%) while about half was purchased by foreign investors (during a period of heightened risk aversion and generally falling yields). Foreign official buyers (central banks and sovereign wealth funds) played a major role.
- Domestic investors became the largest group in 2013–2016, a period of relatively low deficits. As mentioned above, reserve managers' holdings stabilized around 2012–2014, and net purchases were slightly negative during this period. However, other foreign investors constituted 25% of demand.
- In the next four fiscal years (note that FY2017 just ended, though our data ends in Q1 17), we expect a moderate increase in UST demand by foreign official buyers, but significantly below the peak of 2009–2012. Other foreign buyers would maintain purchases at a level consistent with the last three to five years, roughly US\$200 billion per year (though significantly higher than the average over the last 10 years). The Fed's net demand would turn negative, in line with the results of Table 1.

- As a consequence, domestic investors would need to absorb close to 80% of net marketable debt, or around US\$2.3 trillion over four years.

**Our model therefore shows that even if demand from foreign official buyers recovers somewhat after being absent for the last four years, a much larger share of UST supply would need to be absorbed by price-sensitive investors, including private foreign buyers but especially domestic investors like banks, mutual funds and pension funds. This would significantly increase the likelihood of sharp snapbacks in yields. This transition could be exacerbated by negative feedback loops as players reassess their interest-rate forecasts.<sup>22</sup>**

The analysis developed in this section shows that even under moderate assumptions on the pace and magnitude of Fed unwinding, fully absorbing the projected UST supply over the next three years could require a significant increase in demand from price-sensitive investors. **This implies that even if US economic activity holds at current lackluster levels and inflation pressures remain subdued, the Fed's unwinding should trigger a meaningful rise in bond yields.**

In the next section we consider the complementary risk, namely that in the early stages of the unwinding the large stock of excess reserves could begin to fuel an acceleration in credit.

20. There is no assurance that any projection will be realized.

21. We focus on net borrowing from the public, which closely approximates the change in marketable debt, the stock of which currently stands at above US\$14 trillion. This way we avoid dealing with intragovernmental borrowing, which is typically classified as non-marketable debt and quite erratic. The forecast for the deficit uses CBO projections and our tax cut assumptions detailed above. We model Fed demand based on our projected runoff of USTs and a second category of non-Fed private borrowing. We break the latter category into four sub-categories, which we model based on recent trends for foreign investors and state and local governments. We treat the domestic investors category, which includes banks and other private investors, as a residual.

22. The BIS has highlighted amplification mechanisms in financial markets that pushed yields lower during QE. Potentially, these dynamics can easily reverse. For an example of such a mechanism, see a case study on risk management in German insurance firms described in the BIS paper "How Much Should We Read into Shifts in Long-Dated Yields," Hyun Song Shin, 3/3/17.

The observations in this paper contain theoretical estimates based on a series of assumptions and should not be interpreted as investment advice. The analytical opinions of the authors are based on a series of assumptions, which may change at any time.

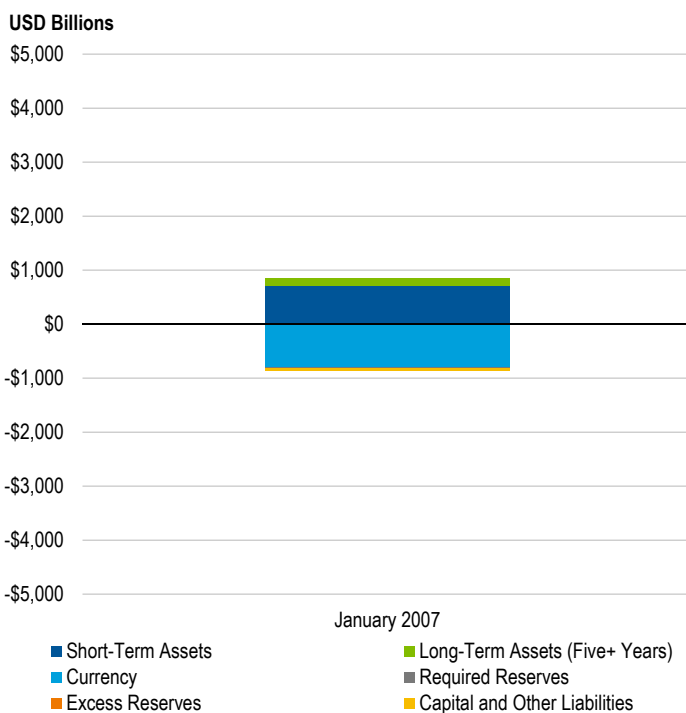


# 4. The Liabilities Side: The Return of the Money Multiplier?

Discussions of quantitative tightening tend to focus on the asset side of the Fed’s balance sheet. The liabilities side of the Fed’s balance sheet has attracted much less attention—and yet it hides the potential risk of a sudden credit boom—and faster inflation—as shown in Exhibits 18 and 19. Before the crisis, the Fed’s liabilities consisted predominantly of currency in circulation, while the weight of reserves was trivial. Now, excess reserves make up nearly half of the liability side, and they can be lent out at the discretion of commercial banks.<sup>23</sup> The Fed has indicated it wants the unwinding process to be smooth and gradual; as only around 40% of the Fed’s assets will mature over the next five years, and the central bank wants to avoid outright asset sales, the pace at which its balance sheet will shrink has a natural limit. **Excess reserves will therefore remain extremely high over the next few years.**

## The Fed’s Balance Sheet – Then and Now

**Exhibit 18: The Fed’s Balance Sheet in 2007, US\$860 Billion**  
As of January 2007

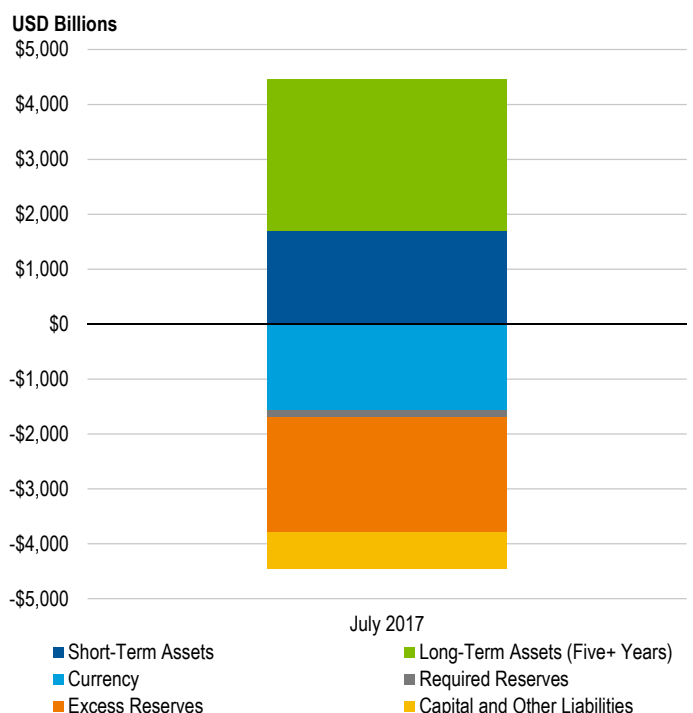


Source: US Federal Reserve.

**Why should we worry about excess reserves?** A surprisingly common misconception holds that excess reserves cannot fuel lending: since banks’ reserves are the counterpart of the Fed’s assets, (a) only the Fed can reduce the level of bank reserves; hence, (b) banks cannot turn reserves into loans.

The first part of the statement (a) holds true: The Fed sets the overall level of reserves in the banking system. The second part of the statement (b), however, does not: Each individual bank can use its excess reserves to extend new loans, as long as it keeps enough reserves to back the new loans and meet its regulatory requirements. This classic “fractional reserves” mechanism allows banks to use excess reserves to generate new lending—even though at the end of the process, total reserves of the banking system will be unchanged.<sup>24</sup>

**Exhibit 19: The Fed’s Balance Sheet in 2017, US\$4.5 Trillion**  
As of July 2017



Source: US Federal Reserve.

23. But subject to regulations (e.g., policymakers can raise reserve requirements).

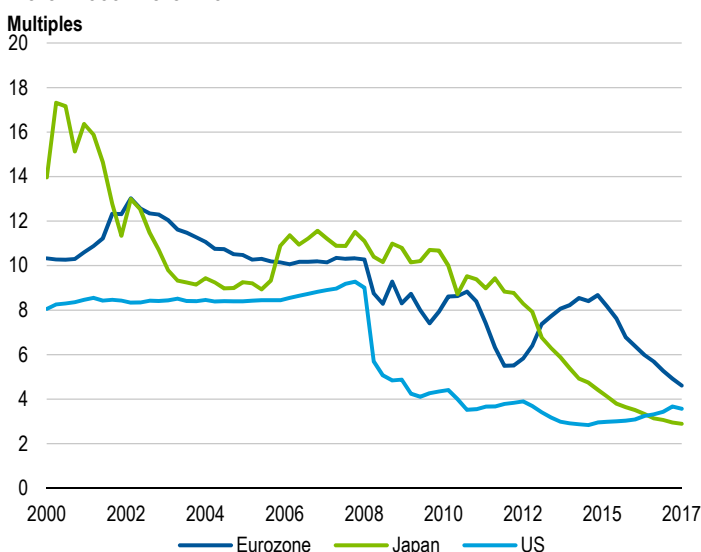
24. For example, see Phelan, Christopher, “Should We Worry about Excess Reserves?” Federal Reserve Bank of Minneapolis, 11/3/15.

As we noted above, so far bank lending has been held back by two factors: 1) regulations; and 2) a tentative economic recovery which limited loan demand from corporations and households. Now the recovery has become more entrenched, with a labor market at full employment—this should bolster credit demand. Households have been deleveraging sharply over the last nine years: The ratio of household debt to GDP dropped to about 80% at the end of 2016 from a pre-crisis peak of nearly 100% (Q1 2008). As a share of disposable income, household debt fell back to 2001–2002 levels of just over 100% from over 130%. Both ratios have stabilized since 2015, suggesting scope for household leverage to start trending up again in this more favorable macro environment. And regulations are set to ease, which could decrease banks' need to maintain very high levels of liquid assets and curb new loans. **We could therefore see a rise in both credit demand and credit supply, enabled by the large stock of excess reserves.**

## Money Multipliers Remain Historically Low

**Exhibit 20: Money Multiplier (Broad Money/Monetary Base)**

March 2000–March 2017



Source: European Central Bank, Bank of Japan, US Federal Reserve, OECD Main Economic Indicators Database.

**Table 2: If Velocity and Multipliers Normalize**

As of August 2017

|   | Eurozone    | Japan       | US          |
|---|-------------|-------------|-------------|
| <b>Money Multiplier (Broad Money/Monetary Base)</b> |             |             |             |
| Pre-2008  | 11.0        | 11.6        | 8.5         |
| Whole Sample  | 9.2         | 9.4         | 6.2         |
| Latest (Q1 2017)                                    | 4.6         | 2.9         | 3.6         |
| <b>Money Velocity (Nominal GDP/Broad Money)</b>     |             |             |             |
| Pre-2008  | 1.3         | 0.5         | 2.0         |
| Whole Sample  | 1.1         | 0.5         | 1.8         |
| Latest (Q1 2017)                                    | 0.9         | 0.4         | 1.4         |
| % Change Multiplier (Log)                           | -87%        | -139%       | -86%        |
| % Change Velocity (Log)                             | -32%        | -16%        | -34%        |
| <b>Total Potential Price Impact</b>                 | <b>118%</b> | <b>155%</b> | <b>121%</b> |

Source: Calculations by Templeton Global Macro using data sourced from European Central Bank, Bank of Japan, OECD Main Economic Indicators Database, US Federal Reserve.

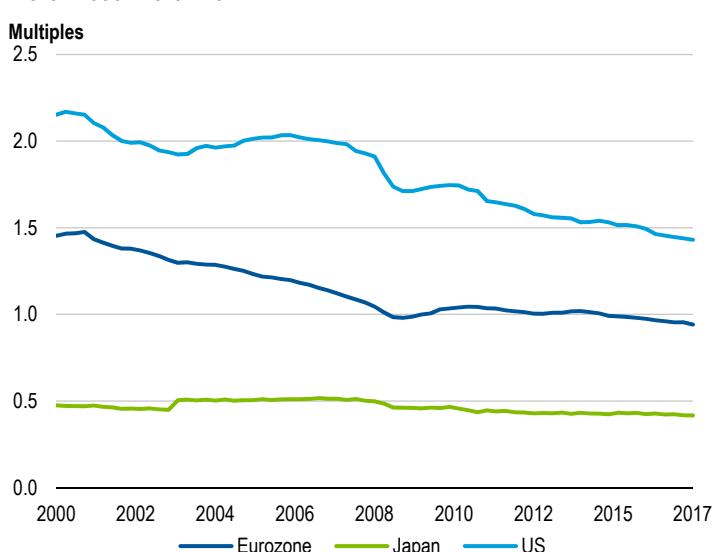
25. The declines in velocity and the money multiplier have followed somewhat different dynamics across the three economies. In the case of the US, a visible drop in 2009 was followed by a further gentler decline. In the eurozone, the money multiplier suffered a second sudden drop at the time of the 2012 eurozone debt crisis; it rebounded during 2013–2014, and then experienced another significant fall. In Japan, the money multiplier has been driven to new lows by the acceleration in QE under Abenomics.

In other words, **a well-entrenched economic recovery could set the stage for the money multiplier and money velocity to move back toward their pre-crisis levels.** As the Fed and other major central banks launched several rounds of QE, both money velocity (the ratio of nominal GDP to broad money) and the money multiplier (the ratio of broad money to the monetary base) declined sharply, reflecting sudden deleveraging and a freezing up of the financial system. Indeed, the massive expansion of central bank balance sheets was initially needed to counteract the sudden contraction in the rest of the financial system.

For the eurozone, Japan and the United States, the money multiplier currently sits at a significantly lower level than prior to the GFC (see Exhibits 20 and 21).<sup>25</sup> Money velocity has remained stable in Japan, but has also settled at a measurably lower level in the US and the eurozone.

**Exhibit 21: Money Velocity (Nominal GDP/Broad Money)**

March 2000–March 2017



Source: Eurostat, European Central Bank, Japan Cabinet Office, Bank of Japan, US Bureau of Economic Analysis, OECD Main Economic Indicators Database.

The decline in money velocity and the money multiplier explains (from a mechanical perspective) why the massive expansion in money supplies has coexisted with muted inflation rates. However, it also implies that if money velocity and the money multiplier were to return to their pre-GFC rates, with money supplies at their current levels this would trigger a sharp rise in prices—in fact, other things being equal, this would imply a more than doubling of price levels in all three economies—especially in Japan (see Table 2).

We are not suggesting a sudden doubling of prices as a plausible scenario. We do, however, want to flag the risk that **even a gradual and moderate normalization of money velocity and the money multiplier would put significant upward pressure on inflation.**

Note that no case has been made as to why the decline in velocity and the money multiplier should prove permanent. To the contrary, if you assume that money velocity and the money multiplier will remain constant at their current levels, the unwinding of the Fed's balance sheet would trigger a dangerous decline in inflation rates by reducing banks' reserves (i.e., shrinking the monetary base). **The Fed and most analysts, therefore, expect that money velocity and the money multiplier will rise as monetary policy normalizes. But we see no guarantee that they will rise at exactly the pace that would make QT consistent with stable or moderately higher inflation. Just as the decline in money velocity and the money multiplier proved faster than expected in the GFC, their rebound could be faster than expected in the recovery phase.**

## Deregulation

**The US Treasury recently issued a report proposing a number of changes to the financial sector's regulatory framework**, including on capital requirements, liquidity rules and banks stress testing. These proposed changes reflect concern that the tightening of regulations post-GFC has been excessive, with an adverse impact on credit growth that has especially hurt small and medium enterprises and reduced economic growth. Some analysts (for example, Steve Strongin, head of investment

research at Goldman Sachs) note that because of the regulations, small and medium enterprises can only borrow at significantly higher rates than those available to larger corporations in public debt markets.<sup>26</sup> This competitive disadvantage might help explain the decline in new business creation, which has gone hand in hand with a decline in the potential growth rate. Tighter restrictions on consumer credit (such as on credit cards and second mortgages) might also have negatively affected the growth of small businesses.

**The proposed financial deregulation aims at enabling faster credit growth and greater economic dynamism.** The majority of the proposed changes could be enacted directly by the relevant regulatory agencies, without passing new legislation in Congress. This implies a quite high probability that financial deregulation will in fact take place, even though implementation will take time, stretching well into 2018.

Experts disagree on whether tighter regulations have created a binding constraint on credit supply, or whether subdued credit demand bears a larger responsibility for slower credit growth. As we argued above, however, the current macro environment should favor a recovery in credit demand, given a more entrenched economic recovery and the very healthy job market. The confluence of stronger credit demand and easier credit supply conditions should lead to an acceleration in overall credit growth, supporting economic activity. With slack in the economy having been reabsorbed, this should exert upward pressure on prices.

In Section 3 we showed that the Fed's unwinding process could put upward pressure on yields, through the impact of reduced Fed demand on asset markets. In this section we have highlighted that the gradual pace of the unwinding leaves us exposed to the risk of a sudden acceleration in credit; this could boost economic activity in a US economy already running above potential, and push up inflation expectations—this would in turn quickly translate into higher yields. This risk could be magnified by macroeconomic factors, such as a partial normalization of the wage and/or price Phillips curve, as we discuss in the next section.

26. See Goldman Sachs, "Top of Mind: Regulatory Rollback," 7/26/17.

# 5. Macroeconomic Factors: The Wage Growth and Inflation Puzzle

Inflation remains well below central banks' targets in both the US and the eurozone, and has remained subdued in most other advanced economies as well, even though economic activity has picked up momentum. Low inflation partly reflects muted wage growth: In the US, even as the labor market has returned to full employment, average hourly earnings have only increased 2.9% y/y as of September 30.

In this section, we discuss why wages and prices have not yet responded to stronger economic activity, and we assess the likelihood that they will remain muted even as existing resource slack gets fully eliminated.

## The Wage Phillips Curve

The subdued pace of wage growth has surprised most economists and central bankers. In the case of the US, some analysts initially posited that the unemployment rate underestimated the degree of slack in the labor market, as improved conditions would attract more people back into the labor force. However, at just over 63% (as of September 30), the participation rate matches its end-2013 level, providing no evidence that the tightening of the labor market has pulled more people into the labor force. Demographic forces appear to account for most of the decline in participation. So why has wage growth failed to accelerate?

**The wage Phillips curve has flattened: Wage growth shows very little response to changes in the unemployment rate. Many economists attribute the flattening of the Phillips curve to two structural factors:**

- **Globalization:** the gradual integration of emerging Asia and the former Soviet Union into the global economy has vastly increased the available labor pool, so that the threat of outsourcing limits labor's bargaining power in advanced economies.
- **Technology:** advances in robotics and artificial intelligence have broadened the range of tasks that can be automated, compressing wages for low and medium-skills workers.

Based on this interpretation, a number of **analysts see this shift as permanent**, and believe that the wage Phillips curve—the relationship between wage growth and labor market slack—no longer provides a useful guide for forecasting wage and inflation trends—and for policymaking.

**We find this interpretation far from fully convincing, however:**

- First, if automation were playing such an important role, we would expect to see faster productivity growth and modest gains in employment; so far we have seen exactly the opposite.
- Second, while academic studies suggest that global competition (notably from China) has caused meaningful losses in manufacturing employment, services account for the bulk of US employment, and the majority of services jobs should still be less exposed to global competition.

We also note that overall hourly earnings underestimate the true extent of wage pressures, due to an ongoing shift in the composition of the workforce: As the population ages, a large cohort of experienced workers reaches retirement, and gets replaced by younger workers with less experience and lower wages. The Atlanta Fed tracks wages of continuously employed workers. This measure of wage growth, which corrects for the composition effects, has been running at 3.5% over the last six months (as of August 31).

Wage growth for continuously employed workers averaged 3.3% during 2015–2017, up from 2.1% in 2010–2014, consistent with the improvement in the labor market. The pre-crisis average was higher still, at 3.8% over 2003–2007, but inflation was also higher. If we take a very simplistic ex-post measure of real wage growth deflated by contemporaneous Consumer Price Index inflation, real wages for continuously employed workers are now running twice as fast as before the crisis (an average of 2.2% in 2015–2017 versus 0.9% in 2003–2007; the average for the earlier phase of the recovery, 2010–2014, was 0.1%). In other words, after correcting for the shift in labor force composition wage dynamics are not that low, especially given the extremely weak pace of productivity growth.

At the same time, most US labor market indicators have been improving and signal an ongoing tightening: voluntary quits have increased, and the manufacturing sector has been recording a growing gap between openings and hires, pointing not only to sustained labor demand but also to a growing skills gap.

**That the ongoing US labor market tightening can proceed indefinitely without sparking broader, faster wage growth seems a heroic assumption—especially given the dynamics of wages for continuously employed workers.**

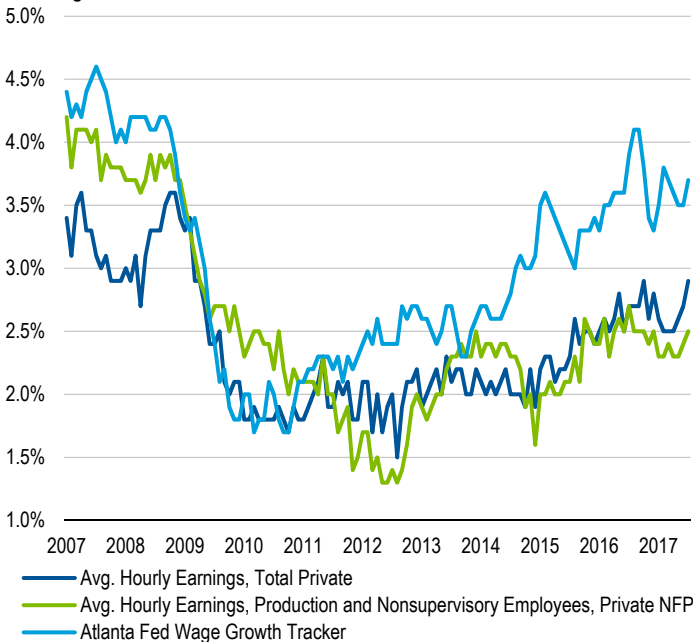


## Wage Pressures Have Been Rising as Job Openings Now Exceed Hire Rates

**Exhibit 22: Atlanta Fed Wage Growth Tracker, Average Hourly Earnings**

March 2007–September 2017

% Change



Source: US Department of Labor. NFP = nonfarm payrolls.

Moreover, a recent BIS study finds that 1) the link between unit labor costs (ULC) and domestic labor market slack remains significant—though it has weakened over the past three decades; and 2) ULC growth in a given country has become more closely correlated with global ULC growth.

We therefore believe that:

- The sustained tightening in the US labor market will likely result in stronger wage pressures over the remainder of 2017 and into 2018.
- The upswing in global growth will drive global ULC higher, which should in turn put upward pressure on US ULC. Given that productivity growth seems unlikely to slow even further, this should translate into stronger wage pressures. In other words, the same globalization effect that may have contributed to compressing wages would eventually reverse direction as global labor market conditions improve further.

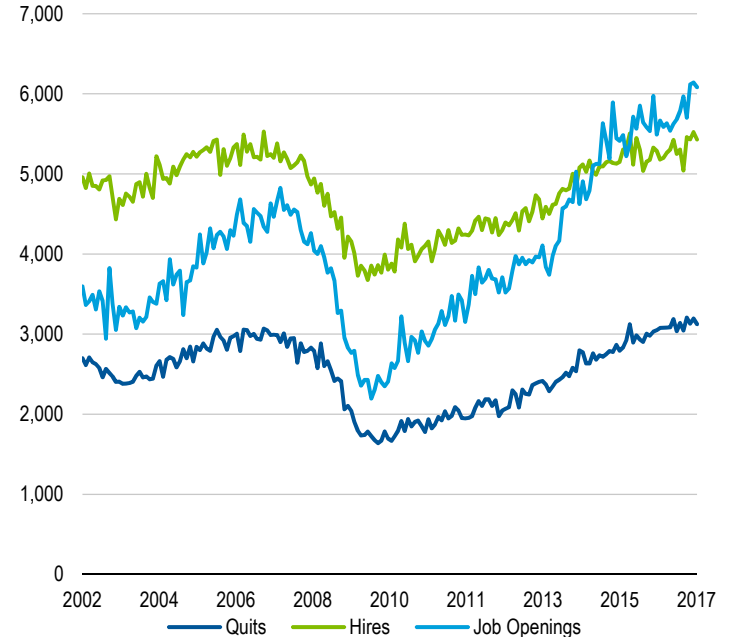
### The Price Phillips Curve

A similar debate has emerged on the relationship between prices and economic slack—the price Phillips curve. Here again views have converged on a consensus that the price Phillips curve has flattened due to a combination of technological improvements and intensified global competition. And **here again, we believe the**

**Exhibit 23: Total Private Job Openings, Hires and Quits**

May 2002–August 2017

Thousands of Jobs



Source: US Department of Labor.

two pillars of the consensus view need to be taken with a pinch of salt:

1. New technologies do seem to have helped reduce price pressures, in some cases by lowering production costs but, more importantly, by increasing price transparency and competition—think of consumers' ability to quickly compare prices on the web. At the same time, however, these technologies have created winner-take-all dynamics in several markets, where a successful platform can acquire a quasi-monopolistic power. Near-monopoly power should eventually translate into greater pricing power and stronger price increases; indeed, the eye-popping stock market valuations of platform-style technology companies (like Amazon and Uber)<sup>27</sup> reflect investors' belief that these companies will be able to generate substantially greater profits down the line.
2. Global competition also appears to have contributed to reducing price pressures in advanced economies. But as emerging markets converge toward advanced economies, this impact will weaken: Wage levels have already been rising in large emerging markets, increasing their production costs. And since inflation tends to have an important global component, the rise in global growth and global capacity utilization should push up global price pressures, which in turn should impact inflation trends in the US and other major advanced economies.

27. The information provided is not a recommendation to purchase, sell or hold any particular security.

**We find it important to underscore the uncertainty on the inflation outlook.** The Fed, other central bankers and many economists recognize that the reasons for the flattening of the Phillips curve are not well understood. Hypotheses on the role of technology and globalization are plausible, and we do believe these factors have played a role. However, we do not have a convincing demonstration that technology and globalization have played a decisive role in capping wage and price pressures, let alone that their deflationary impulse will remain as intense in the future.

Current macroeconomic conditions are likely to support an acceleration in consumer demand; this could be fueled further by an acceleration in bank credit as financial sector regulations ease—as we discussed in Section 4. This could well push the rate of resources utilization to the point where wages and prices begin to respond at a faster pace, driving a re-steepening of the Phillips curve.

**The fact that wages and inflation have remained unexpectedly subdued over the last couple of years should not lead us to think inflation can never come back; if we do not fully understand why the Phillips curve has flattened, we need to recognize the risk that it might steepen again.**

# Conclusion

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Both the Fed and financial markets seem to expect that the unwinding of the central bank's balance sheet will be uneventful, smooth and with little market impact. In this paper we have argued that this will most likely not be the case. In fact, only an extremely unlikely combination of events could ensure a smooth and painless transition. In particular, we believe markets are underestimating the impact on UST yields.

As the Fed reduces its demand for USTs, and as the Treasury increases supply to cover the fiscal deficit, bond prices must fall and yields rise to entice new buyers. QE reduced yields; its reversal will increase them. Our finding that domestic price-sensitive buyers will have to cover a disproportionate share of demand strengthens this basic point.

To reduce the risk of disruption to asset markets, the Fed plans to reduce the balance sheet at a slow and gradual pace. By implication, however, banks' excess reserves will remain

extremely high for the next few years (no free lunch...). This could fuel a sudden acceleration in lending, as both credit demand and supply respond to stronger economic conditions, and financial regulations ease.

Price pressures have remained muted so far. This might not last. Wages for continuously employed workers are rising at a healthy clip; wage and price Phillips curves have flattened, but the arguments that they have *permanently* flattened fail to persuade us. Moreover, trends in wages and prices have a strong global component, and the global outlook points to greater stress in resources utilization and faster wage and price growth.

Not all of these three forces need to come into play, but all have to be proven wrong for market expectations to be validated. We find this extremely unlikely—and definitely not a scenario to invest on. We expect the Fed's unwinding road to be a long and potentially disruptive one for markets.

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