Allianz Global Investors White Paper Series

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Under the *Macro*scope

The end of the Fed as we know it?

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Executive summary

Beset with low rates, slow growth and a shocking change in the US government's political power structure, the Federal Reserve is facing one of the most uncertain periods in its 104-year history. This edition of Under the *Macro*scope explains what this could mean for the economy at large, and investors in particular.

Discussion points

- President Trump likely will have an opportunity to fill five or six of the seven governorships on the Federal Reserve Board over the next 12 months. Nominees will hold views akin to those of the administration and, as a Fed governor, they can be expected to favor policies consistent with those of the President.
- The Trump Administration and some prominent members of Congress favor legislation to audit the operations of the trading desks at the New York Fed. Doing so risks politicizing monetary policy and diminishing the independence of the central bank.
- President Trump and key members of his administration call for the removal of unfettered discretion by the FOMC to formulate monetary policy. They instead favor a more rules-based approach.
- Over the months ahead, the Federal Reserve will consider when to begin reducing the size of its asset-holdings and strategies for doing so in ways that will not upset the orderliness of financial markets.
- While still data-dependent, several key Federal Reserve officials have a bias in favor of raising the federal funds rate target as soon as possible. Vice Chair Stanley Fischer concludes that interest rates have been too low for too long to stimulate economic growth.

Investment implications

- Later in 2017, the Administration's pro-growth agenda may collide with the monetary policy mandate of the Fed to foster price stability and maximize employment. New Fed governors will likely be in a quandary if faced with accelerating inflation that calls for higher policy rates that could slow down real economic growth.
- Strong advocates for the independence of the Fed from political pressures can be expected to fend off "audit the Fed" proponents, thereby supporting the U.S. dollar and helping to stabilize fixed-income markets.
- If adopted, a more rule-based approach would force the FOMC to raise policy rates faster and further than under the current data-dependent procedures. However, raising interest rates more rapidly could conflict with fiscal policy initiatives and intensify policy debates within the Federal Reserve.
- Eventual reduction of the size of the Fed's portfolio of assets, perhaps beginning before the end of 2017, likely will not affect interest rates materially, particularly over the near term.
- The Federal Reserve will continue to raise its policy rates in 2017 and 2018 toward their neutral real level, or the level at which they neither impede nor stimulate real economic growth. Currently, that level is roughly 1.75% - 2.25%, depending on the strength of the real economy.

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President Trump has plans for the Fed

Throughout his presidential campaign, Donald Trump asserted that Federal Reserve monetary and regulatory policies failed to stimulate real economic growth, resulted in too little inflation, impaired the profitability of US banks and put the US financial system at a competitive disadvantage relative to other developed market countries.

Consequently, candidate Trump advocated a series of actions that would alter dramatically the *policies, powers and functions* of the central bank. These included:

- Appointing Federal Reserve governors who support pro-growth economic policies;
- Removing Federal Reserve chair Janet Yellen from office;
- Shrinking the discretion of the monetary policy-making Federal Open Market Committee (FOMC) and adopting a rules-based approach to policy formulation;
- Rolling back the scale and scope of the Fed's regulatory and supervisory authority; and
- Auditing the operations underlying the formulation and implementation of monetary policy.

Existing legislation empowers President Trump to appoint, and the US Senate to confirm, Federal Reserve governors who favor changes in monetary and regulatory policies similar to those supported by the Trump Administration. By stacking the Board of Governors with like-minded governors, President Trump can weaken the Treasury-Federal Reserve Accord of 1951 that freed the central bank to formulate monetary policy regardless of the wishes of the president.

Barring new legislation, though, meaningful changes in the *structure* of the Federal Reserve System do not appear likely, judging from the relatively tepid attacks upon the Fed during Janet Yellen's semi-annual Congressional testimony in February. Even the Trump administration has toned down its attacks against the Fed, at least for now.

Exhibit 1: Terms of Fed Chairs varied from short to long

If Yellen leaves next year, her term will be among the shortest ever

Chairmen and Active Executive Officers of the Board of Governors of the Federal Reserve System	Date of Term	Length of Term (Months)
Marriner S. Eccles	Feb. 1, 1936[6] – Jan 31, 1948	144
Thomas B. McCabe	Apr. 15, 1948 – Mar. 31, 1951	37
Wm. McC. Martin, Jr	Apr. 2, 1951 – Jan. 31, 1970	226
Arthur F. Burns	Feb. 1, 1970 – Jan. 31, 1978	96
G. William Miller	Mar. 8, 1978 – Aug. 6, 1979	17
Paul A. Volcker	Aug. 6, 1979 – Aug. 11, 1987	96
Alan Greenspan	Aug. 11, 1987 – Jan. 31, 2006	221
Ben S. Bernanke	Feb. 1, 2006 – Jan. 31, 2014	96
Janet L. Yellen	Feb. 3, 2014 –	37+

Source: Federal Reserve; Allianz Global investors.

For investors, changes expected within the Fed would likely intensify the central bank's bias in favor of raising interest rates gradually, but repeatedly, until the federal funds rate rises to "neutrality"–the level that neither stimulates nor restrains real economic growth.

On the supervisory side, scrapping of stress tests is unlikely, though they likely will be altered to scale back their costs to relatively small banks.

The Trump administration disfavors the international agreements among central banks that set minimum required capital levels, leverage, liquidity and solvency standards, as well as home-country supervision of international banking organizations. Partial or complete withdrawal from these multinational agreements cannot be ruled out once the administration changes the composition of the Board of Governors.

More certainly, the Fed can be expected to take steps to reduce the regulatory compliance burdens on banks, especially regional and community banks; loosen enforcement of individual regulations; and speed up the application process for mergers and acquisitions among depository institutions.

Enactment of many of the changes supported by the Trump administration would provide an important reminder that the US central bank is "independent *within* government" and not "independent *from* government." Their potential impact on financial markets, like those of changed fiscal and regulatory policies, will depend on four words: process, timing, scale and scope.

Filling Board of Governors vacancies

President Trump likely will have an opportunity to fill five or six of the seven governorships on the Federal Reserve Board over the next 12 months. (See Exhibit 1.)

Two vacancies already exist, Daniel Tarullo has announced his intention to retire effective early April, and the four-year terms of Janet Yellen and Stanley Fischer as chair and vice chair of the Board of Governors, respectively, end on January 31, 2018. Neither Yellen nor Fischer appears likely to be nominated by the president for another four-year term. Further, it would not be a stretch to imagine that Governor Lael Brainard, who supported Hillary Clinton openly during the presidential campaign, will toss in the towel, as well.

A search committee appointed by the Administration likely has begun looking for a successor to Governor Tarullo, who heads the Federal Reserve System's supervisory and regulatory operations. In light of the Administration's emphasis on regulatory rollback, Tarullo's successor likely will have extensive knowledge of banking laws and regulations and strong conviction that regulations ought to be rolled back and enforced less rigorously. (See Exhibit 2.)

Once confirmed, governors do not report to any members of the executive branch of government and are not beholden to the wishes and policies of the administration. However, their nomination suggests that they hold views akin to those of the Administration and, as a Fed governor, they likely will favor policies in general agreement with those of the administration.

Later in 2017, President Trump likely will reveal his selections to become chair and vice chair of the Board of Governors. Judging

Exhibit 2: Fed's supervisory role remains huge
Big banks gained market share in recent years

Entity/item	2015	2014	2013	2012	2011
State member banks					
Total number	839	858	850	843	828
Total assets (billions of dollars)	2,356	2,233	2,060	2,2005	1,891
Number of Examinations	698	723	745	769	809
By Federal Reserve System	392	438	459	487	507
By state banking agency	306	285	286	282	302
Top-tier bank holding companies					
Total number	547	522	505	508	491
Total assets (billions of dollars)	16.961	16,642	16,269	16,112	16,443
Number of inspections	709	738	716	712	672
By Federal Reserve System[1]	669	706	696	691	642
On site	458	501	509	514	461
Off site	211	205	186	177	181
By state banking agency	40	32	21	21	30
Small (assets of $1 billion or less)					
Total number	3,719	3,502	4,036	4,124	4,251
Total assets (billions of dollars)	938	963	953	983	982
Number of Examinations	2,783	2,824	3,131	3,329	3,306
By Federal Reserve System	2,709	2,737	2,962	3,150	3,160
By state banking agency	123	142	148	200	163
Total assets (billions of dollars)	2,586	2,595	2,814	2,950	2,997
Number of Examinations	74	87	169	179	146
Financial holding companies					
Domestic	442	426	420	408	417
Foreign	40	40	39	38	40

from the composition of the president's cabinet and policy advisors, either or both of these positions will be filled by business or financial executives instead of academicians or corporate economists. With monetary policy and the performance of the economy and financial markets so critical to the success foreign relations, the President likely will lean toward executives of large multinational corporations experienced in cross-border and multinational negotiations.

Opening all Fed operations to additional oversight

Congress, not the Federal Reserve, has the ultimate responsibility of assuring itself and the public that monetary policy is being conducted reasonably and in the national interest. However, a small but growing number of representatives and senators argue that they do not have sufficient information to provide that assurance.

According to Representative Thomas Massie, a Kentucky Republican, "The American public deserves more insight into the practices of the Federal Reserve. Behind closed doors, the Fed crafts monetary policy that will continue to devalue our currency, slow economic growth, and make life harder for the poor and middle class."[1]

Senator Rand Paul, a Libertarian from Kentucky, adds that "No institution holds more power over the future of the American economy and the value of our savings than the Federal Reserve. Yet Fed Chair Yellen refuses to be fully accountable to the people's representatives."[2]

Following international best practice, Congress has effectively managed the tradeoff between maximizing Federal Reserve accountability and politicizing an independent central bank. In this context, Congress allows the Fed to set monetary policy consistent with the Congressional mandate (price stability, maximum employment and financial market stability) without political interference as long as policy makers regularly explain FOMC decisions to Congress and the public.

Substantial information about the full scope of Fed's operations comes from audits conducted by the Government Accountability Office (GAO). (See Callout Box 1.) Yet some in Congress would like to overturn current law that prohibits the GAO from auditing four operations. These include:

1. See Chriss W. Street, January 7, 2017.
2. See Chriss W. Street, January 7, 2017.

1. The scope of audits and oversight

The Fed is already thoroughly audited independently by the inspector general and an outside accounting firm (currently, Deloitte and Touche). Their financial reports are available publicly.

Here is a list of information about Federal Reserve operations made available to congress and, by extension, to the public:

- Every security owned by the Fed, up to the detail of the identifying CUSIP number, is also available online.
- In-depth GAO reviews and analyses ("audits" of a different type) of government activities at the request of Congress.
- GAO audits Fed policies and practices in its supervision and regulation of bank holding companies, state member banks, and other banking organizations. These include assessments of capital standards, a review of our consolidated supervision function and reviews of actions in connection with troubled banking organizations.
- GAO audits of oversight and operation of payment systems; Federal Reserve implementation and enforcement of consumer protection laws; policies on the acquisition of US banking organizations by sovereign wealth funds; efforts to address cyber security; and the need for financial regulatory reform.
- GAO has authority to audit the credit facilities extended by the Federal Reserve to "single and specific" companies under section 13(3) of the Federal Reserve Act. This authority allowed the GAO to audit the loan facilities the Federal Reserve has created for AIG, Bear Stearns, Citigroup, and Bank of America.

- Transactions for, or with, a foreign central bank, government of a foreign country, or private international financing organization;
- Deliberations, decisions, or actions on monetary policy matters, including discount window operations; the reserves of member banks; securities credit; interest on deposits; and open market operations;
- Transactions made under the direction of the Federal Open Market Committee;
- Communications among or between members of the Board of Governors and officers and employees of the Federal Reserve System.

A bill dubbed "Audit the Fed" (H.R. 24 and S.16), would make meeting-by-meeting monetary policy decisions subject to Congressional review. These bills would end the restriction that blocks GAO from reviewing "deliberations, decisions, or actions on monetary policy matters," as well as "discussion or communication among or between members of the Board and officers and employees" related to such deliberations.

If enacted, the end of these restrictions would allow the GAO to view all materials and transcripts related to a meeting of the FOMC any time. It also would require the GAO, at Congressional request, to provide recommendations on monetary policy, including interest-rate decisions. Congress traditionally resisted direct oversight of monetary policy.

The intent of Congress for more than 40 years has been to enable the Fed to "independently conduct the nation's monetary policy." The Fed acknowledges that it should continue to improve its transparency and accountability to ensure that Congress has all the information it needs to fulfill its oversight responsibilities. However, for more than a half century, Congress has rejected overturning inserting Congress and the GAO into monetary policy decisions. Doing so would call into question the Fed's independence. Here's why:

- GAO audits of the formulation and implementation of monetary policy, or the threat of them, could be used both to second-guess the FOMC's judgments and influence subsequent monetary policy decisions.
- Accordingly, tearing down audit restrictions would likely undermine public and investor confidence in monetary policy by raising concerns that the FOMC's judgment in fulfillment of its mandate would become subject to political considerations.
- The bond rating agencies view operational independence of a country's central bank as an important factor in determining sovereign credit ratings. In that context, actions that weaken monetary policy independence could raise the Treasury's cost of borrowing. Higher long-term interest rates would further increase the burden of the national debt on current and future generations.
- From simply a practical standpoint, Congress is not well-suited to make monetary policy decisions itself, because of the technical and time-sensitive nature of those decisions. Monetary policy achieves its best results when the FOMC can focus on the longer-term interests of the economy, free of short-term political considerations.
- Considerable experience shows that monetary policy independence—within a framework of legislatively established objectives and public accountability—tends to best promote price stability and economic growth.
- Monetary policy independence prevents governments from succumbing to the temptation to use the central bank to fund budget deficits. This reinforces public confidence that monetary policy will be guided solely by the objectives laid out in the Federal Reserve Act.
- Monetary policy independence also enables policymakers to look beyond the short term as they weigh the effects of their monetary policy actions on price stability and employment.
- GAO audits of monetary policy also would repress candor at monetary policy deliberations if policymakers believed that GAO audits would result in early publication and analyses of their policy discussions. Unfettered and wide-ranging internal debates are essential to identifying the best possible policy options for achieving

maximum employment and stable prices in light of data that may be conflicting or, at best, ambiguous as to the optimum policy path.

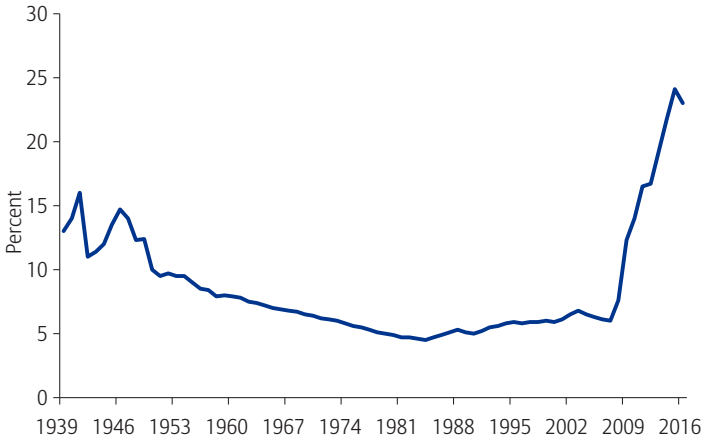
- Audits of discount window lending and the Fed's broad liquidity facilities could reduce their effectiveness. The almost legendary stigma banks perceived attached to borrowing from the Fed would likely return, making management of the discount window a less powerful monetary policy tool.
- Adoption of the "Audit the Fed" bills could disrupt US relationships with foreign central banks and governments that help the Fed fulfill its mandate and erect barriers to official cooperation among central banks and governments.

Finally, official FOMC statements and utterances by senior officials have a stronger impact on financial market sentiment and behavior than ever before. In that context, publication of the results of GAO audits related to monetary policy actions and deliberations could heighten the public's uncertainty and interfere with the FOMC's communications to the markets. In turn, uncertainty by the public about the implications of the GAO's findings for future FOMC decisions likely would increase market volatility and undermine the ability of monetary policy actions to achieve the FOMC's desired effects. (See Callout Box 2.)

Adjusting the SOMA

Implementation of unconventional monetary policies during and after the Great Financial Crisis bloated the Fed's portfolio of assets holdings, or the System Open Market Account (SOMA). Never in the post-World War II period has the SOMA been so large relative to nominal GDP and the level of excess reserves in the banking system.[3] (See Exhibit 3.)

Exhibit 3: SOMA Portfolio is largest ever relative to GDP
Federal Reserve assets as a percent of GDP



Source: Federal Reserve Bank of St. Louis; Factset; Allianz Global Investors. Information as of 12/31/16.

By holding no Treasury bills but owning non-Treasury assets, the composition of the Fed's portfolio has tilted toward longer-duration assets like never before. Officially, the FOMC seeks to return the composition of its portfolio to all Treasury securities while also eliminating most excess reserves. (See Exhibit 4.)

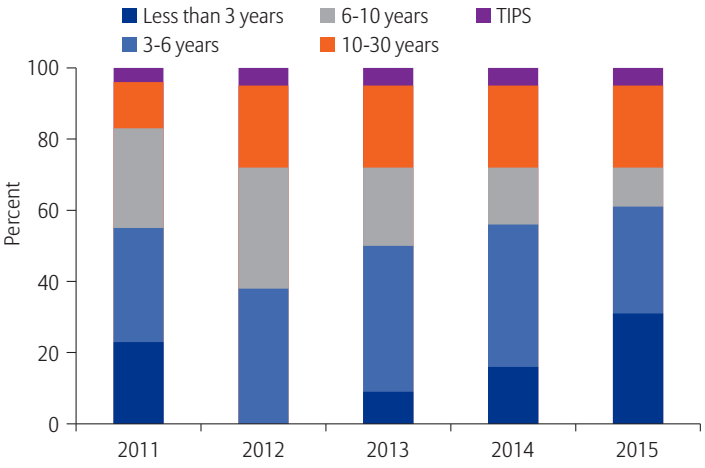
Current holdings of $2.5 trillion in Treasury securities roughly approximate the level required to support a liability side of the Fed's balance sheet consisting of $1.5 trillion in currency, $0.4 trillion in reverse repos, $0.4 trillion in the Treasury Department's account, and $0.2 trillion in required reserves.

2. The Fed's policy-related communications

- Announcement of a target range for the federal funds interest rate. Description of the state of the economy, a balance of risks statement and explanation of the rationale for the policy actions found in the statement following each FOMC meeting.
- Reported of the votes of individual members at FOMC meetings.
- Release of FOMC minutes three weeks after each meeting.
- A website to provide information on policy actions during financial crises.
- A statement of longer-run goals and monetary policy strategy, such as the current 2% inflation target.
- Release of the "beige book" providing a qualitative assessment of economic, business and financial conditions in each Federal Reserve district based on anecdotal evidence. Speeches and other public appearances by policymakers that lay out in detail the considerations affecting current and future policy moves, including arguments on both sides of the issue.
- Four press conferences annually by the chair of the FOMC.
- Testimony upon request before a variety of Congressional committees, including appearances before House and Senate committees every February and July to discuss monetary policy and other central banking issues.
- Dozens of meetings and calls each year between the chair and members of Congress and their staffs.
- Detailed minutes of each FOMC meeting released three weeks after the meeting is held, and verbatim transcripts after five years.
- Release each quarter of the individual economic forecasts of FOMC participants, the Summary of Economic Projections. In addition, the FOMC releases data showing what the participants consider to be the appropriate path for interest rates over the next three years. These statements, however, do not reveal by name the paths submitted by individual participants.

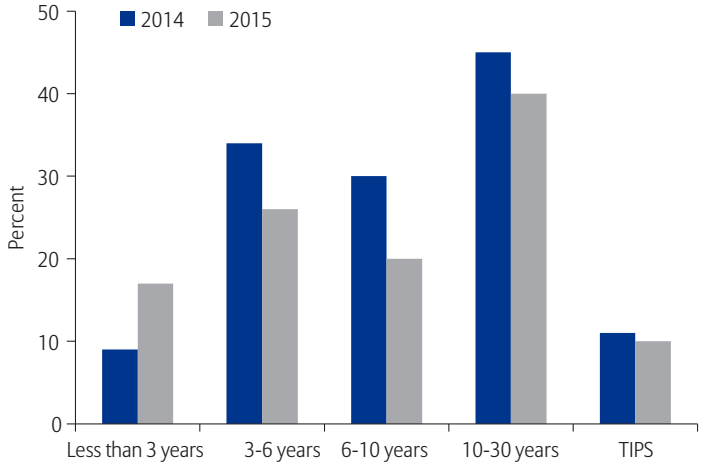
3. See the Federal Reserve Board's H.4.1 reports available at www.federalreserve.gov.

Exhibit 4: Maturity distribution of the Fed's Treasuries holdings



Source: Federal Reserve; Allianz Global Investors. Information as of 12/31/15.

Fed retains a preference for long-dated bonds



Source: Federal Reserve Bank of New York; U.S. Treasury Department.
Note: Figures are as of year-end and consist of coupon securities only.

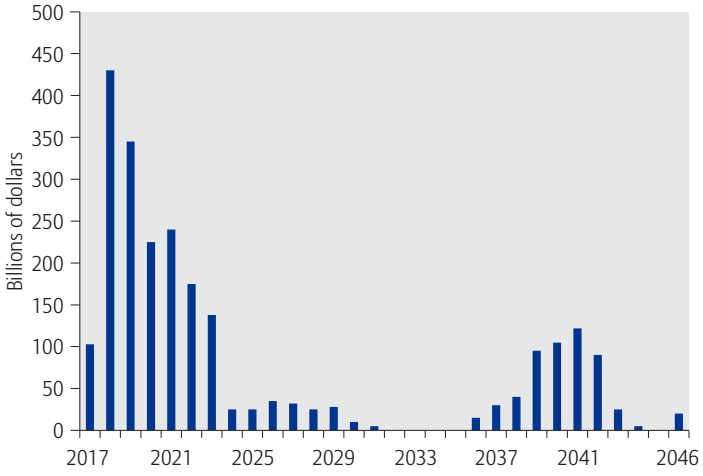
Sales of the Fed's holdings of $1.8 trillion in mortgage-backed securities would virtually eliminate all excess reserves. Excess reserves in the banking system have fallen already to roughly $2.0 trillion from a peak of $2.7 trillion and will continue trending down as demand for currency and required reserves rises over time.

Beginning in 2010, the FOMC began to consider strategies and tactics for the eventual normalization of the SOMA. To guide that process, the FOMC laid out what it called "exit principles" at its June 2011 meeting.[4]

Over the past two years, and as recently as February 2017, Janet Yellen stated repeatedly that asset sales would be delayed until after the federal funds rate has risen to its neutral level. The FOMC does not target a particular "optimal" size for its portfolio. (See Exhibit 5.)

A combination of asset sales and rolling-off of maturing securities would enable the Fed to keep its asset holdings large enough to implement monetary policy effectively in response to changing economic and financial conditions, avoid disruptions that may be caused by open market operations, and minimize impacts on the allocation of credit across sectors.

Exhibit 5: A lot of the Fed's Treasuries mature soon
Volume of maturing securities each year



Source: Federal Reserve Board; U.S. Treasury Department; Allianz Global Investors.

Financial implications

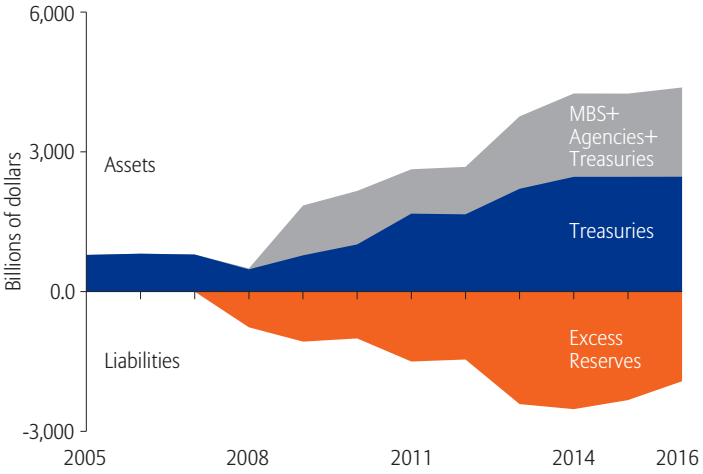
The weighted average maturity of the SOMA portfolio has shrunken considerably since its peak in January 2013. However, it is unlikely that the portfolio will be reduced to its pre-financial crisis levels. Asset-holdings in the area of $2.5-$3.0 trillion by roughly 2022 would be consistent with consensus estimates of nominal GDP, global demand for US currency and anticipated reserve balances of banks. (See Exhibit 6.)

Eventual ending of reinvestment of maturing securities can serve broadly as a kind of "reverse quantitative easing." Assuming that "reverse QE" has a roughly equal, but opposite, effect on interest rates as "quantitative easing," the impact could be as follows:

- Research by the New York Fed suggests that every $100 billion in asset purchases lowered the federal funds rate by about 10-15 basis points (bps).[5]
- Ben Bernanke's research generated a wider range of likely outcomes, a decline of 7-20 bps in the fed funds rate for every $100 billion in asset purchases.[6]
- Research by the staff at the Federal Reserve Board found impacts from the Fed's Forward guidance and asset purchases to be at the lower end of New York Fed and Bernanke's ranges.[7]

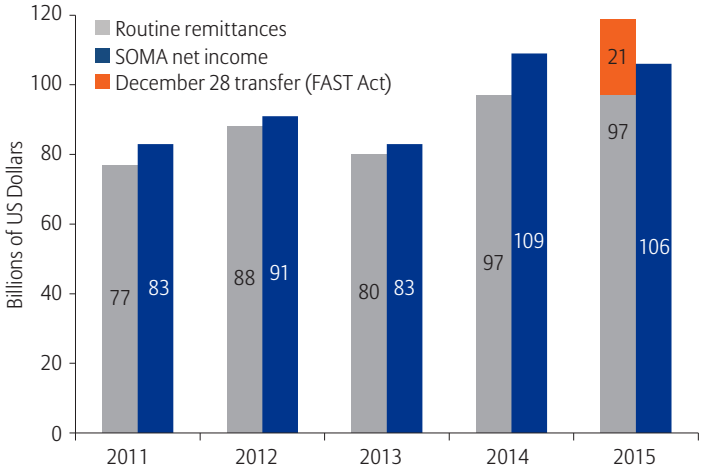
4. See the Federal Reserve's September 2014 press release on "Exit Principles"
5. See Carlo Rosa, May 2012.
6. See Ben Bernanke, January 26, 2017.
7. See Jeremy Stein, October 11, 2012.

Exhibit 6: Fed balance sheet remains bloated
Share of individuals intending to vote



Source: Federal Reserve Board; Allianz GlobalInvestors. Information as of 12/31/16.

Exhibit 7: SOMA net income and Fed remittances to Treasury



Source: Federal Reserve Bank of New York; Allianz Global Investors. Information as of 12/31/15.

According to Chair Yellen, downward pressure on longer-term interest rates will ease as the average maturity of the SOMA decreases and the end date for reinvestment draws closer.

Based on the estimated co-movement of short-term and long-term interest rates, Yellen estimates that such a change in longer-term yields would be similar to that which, on average, has historically accompanied two 25 basis point hikes in the federal funds rate. Assuming that Yellen's conclusions are robust, the Fed has already tightened policy beyond what the two rate hikes delivered since December 2015 would imply.

In the end, valuations of Treasury securities will largely come down to how Treasury addresses its funding needs as funding from the Fed shrinks and the federal budget deficit widens. Typically, Treasury addresses volatility in its funding needs by making changes in T-bill issuance.

Balance sheet reduction by the Fed intended to tighten financial conditions also could have knock-on effects that dampen economic activity. For example, in December 2015, Congress earmarked remittances of SOMA net income to funding of the Highway Trust Fund instead of the government's general revenue pool. Consequently, the effects of changes in the size and composition of the Fed's balance sheet will necessitate close monitoring by investors. (See Exhibit 7.)

Moving policy-making toward rules and away from discretion

President Trump and members of his administration favor removal of unfettered discretion by the FOMC to formulate monetary policy. Instead, the administration favors a rule-based regime.

The case for a rule-based regime

Under a rule-based regime, the central bank commits unquestionably to achieving stated policy objectives. By doing so, adherence to a rule eliminates "time inconsistency" problems, or the incentive of policymakers to commit to a policy and then pursue a different one later. For example, some policy makers with discretion in the past have "cheated" on their commitment to price stability by pursuing policies intended to influence employment mainly, leading to unplanned rates of inflation later.

Instead, rule-based policy makers adjust their policy instrument (the federal funds rate in the United States) predictably in response to new data or changes in their forecast that lead measured real growth to deviate from its potential and inflation to deviate from its target.

Policy rules anticipate that key causal connections observed in the past will remain fixed over time, or will evolve only very slowly. Their use presupposes that, with high probability, a particular policy step will be result over time in a predictable outcome.

By comparison, policy makers operating without a rule tend to look for additional data that might suggest the need for a different course of action, much as the "data dependent" FOMC has done over the past several years. However, the FOMC never says explicitly how it weighs the implications of individual data series, leading frequently to strikingly different policy prescriptions among individual FOMC members.

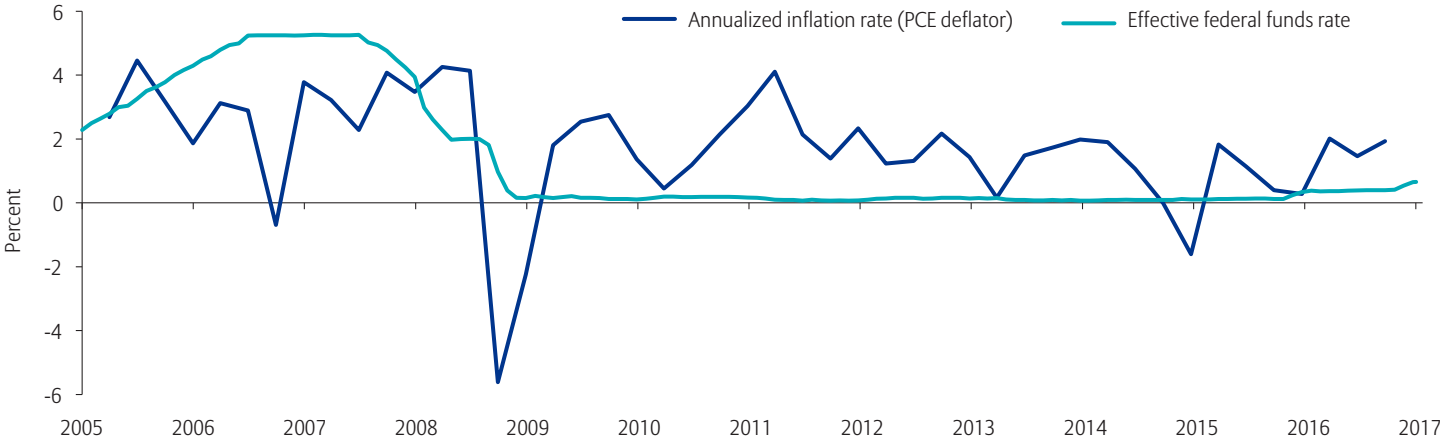
Without full knowledge of the workings of the economic system, this practice can cause uncertainty for private decision makers and be wrong for extended periods if there is no anchor to bring it back into line. In the event of an adverse shock, data dependent policy makers typically cannot move aggressively enough.

The case for policy maker discretion

Much like a fundamental stock analyst, policy makers in a discretionary regime:

- Gather and analyze vast amounts of data;
- Analyze relationships among the data;
- View their findings in the context of economic, financial and behavioral finance theory;
- Make judgments based on their experience and knowledge of the political, social and demographic context; and
- Apply their best judgment to make decisions based on perceived historical regularities among data series that can be embodied in formal empirical models, often covering only a portion of the economic system

Exhibit 8: Monetary policy remains accommodative
Effective federal funds rate remains below the inflation rate



Source: Federal Reserve Bank of St. Louis; Allianz Global Investors. PCE deflator as of 10/1/16. Effective federal funds rate as of 2/1/17.

Policy makers with discretion have a conceptual framework, or implicit model, of how the economy operates, however incompletely specified. They typically also use quantitative models extensively in order to provide additional perspectives. Deviations in the outcomes between the quantitative and more fundamental approaches lead typically to deeper analysis intended to reconcile the discrepancies.

Advocates for discretionary decision-making point out that sensible implementation of policy rules requires adjustments to take account of changes in actual and expected real growth and inflation. Models with fixed assumptions cannot provide this flexibility.

What's more, simple policy rules focus on current conditions and typically neglect information with potentially important implications for the economic outlook. As such, they often ignore important factors such as fiscal policy, trends affecting global growth, structural developments influencing the supply of credit, and overall financial conditions. Currently, for example, simple policy rules cannot account for future changes to the Fed's asset holdings or the "passive" removal of monetary policy accommodation as the Fed's asset-holding diminishes.

Financial implications

A variety of policy rules has been proposed by economists and is under consideration by the Trump administration. The best-known of these, the so-called Taylor Rule, has been a useful benchmark for US monetary policy makers for a quarter of a century.[8]

However, the Taylor rule never has been the driver of US monetary policy and is unlikely to do so as long as Janet Yellen continues as FOMC chair. Given the current economic outlook, Taylor Rule prescriptions would be too restrictive. The Taylor Rule ignores the likelihood that the forces restraining the economy presently could take years to dissipate. As of the beginning of March 2017, the Taylor Rule would prescribe a federal funds rate in the area of 3.5%.

Yellen does not rule out the eventual use of a "change" rule as a potential guide to monetary policy. A "change" rule does not prescribe a particular level of the federal funds rate at a given time. Instead, it suggests how the existing policy interest rate should change from quarter to quarter based on two gaps--the difference between inflation and its desired level and the difference between the unemployment rate and its longer-run normal level.

In contrast to other rules, including the Taylor Rule, the change rule does not take a stand on the value of the longer-run neutral level of the real federal funds rate, thus avoiding a potential source of error. Instead, it moves interest rates up and down until the inflation and real growth gaps close, an approach that in theory enables it to perform well when the true value of the neutral rate policy rate is unknown. Because both gaps are relatively modest at the moment and are projected to remain so, the change rule calls for fairly gradual adjustments in the stance of monetary policy over the next few years given the current economic outlook.

US interest rates dropped below their reversal rate

In a speech delivered before the Economic Club of New York in October 2016, Federal Reserve Vice Chair Fischer concluded that US monetary policy rates (notably, the federal funds rate) may be *too low* to stimulate real economic growth.[9] (See Exhibit 8.)

8. See John Taylor, 1993 and Wikileaks. The Taylor rule is based upon three factors: The targeted rate of inflation in relation to the actual inflation rates , the real levels of employment, as opposed to full employment and an interest rate consistent with full employment in the short term. According to the rule, central banks should increase short-term interest rates when one or both of the following occurs—the expected inflation rate exceeds the target inflation rate or the anticipated GDP rate of growth exceeds its long-term rate of growth. Conversely, when inflation rates and GDP growth rates are below what was expected, interest rates are expected to decrease.
A basic Taylor rule uses the following formula to calculate the appropriate target policy interest rate:
   - **Target rate:** the interest rate that the central bank should target in the short term
   - **Neutral rate:** the current short-term interest rate when the differences found among actual and expected inflation and GDP growth rates are equal to zero
   - **GDPe:** expected GDP growth rate
   - **GDPt:** long-term GDP growth rate
   - **Ie:** expected inflation rate
   - **It:** target inflation rate
9. See Stanley Fischer, October 2016.

In other words, Fischer concluded that there is a "reversal interest rate" below which economic and financial conditions would deteriorate rather than improve. This level changes constantly and varies from country to country. Fischer added that much tighter regulatory standards, as well, have distorted banking and financial markets for almost a decade and likely have restrained economic growth.

Of course, the transmission mechanisms through which ultra-low interest rates impact the economy and financial system can generate many powerful positive outcomes. In that sense, economic theory suggesting that *lower* interest rates tend to stimulate additional lending, borrowing and spending has not been refuted. According to Fischer, though, the *level, rather than the direction of change*, of interest rates becomes most critical once rates drop to below their reversal level. (See Callout Box 3.)

Evidence supporting the concept of a reversal interest rate and the impacts of too-low interest rates comes from the experience of households, businesses and financial institutions.

Experience of households

- Persistent ultra-low interest rates change the timing of spending and saving preferences of households. With expected income from bonds and savings accounts very low, some individuals feel compelled to curtail their spending and increase their saving rate in order to reach their retirement savings goals.
- Ultra-low policy interest rates exacerbated income and wealth inequality, augmenting the global savings glut that represses returns on the most commonly used savings vehicles of households.
- Rising income inequality in many countries created political conditions evermore favorable to entitlement programs and eventual tax, fee and insurance premium increases for which households tend to plan and save.
- Financial uncertainty tends to encourage individuals and households to reduce their indebtedness while shying away from credit with interest rates more likely to adjust upward than downward. (See Exhibit 9.)
- Tight mortgage credit standards and more onerous administrative costs constrain mortgage originations, despite localized housing market strength in some regions.

Experience of businesses

- Businesses took advantage of ultra-low financing costs to issue bonds, using the proceeds to buy back shares to meet the demands of yield-hungry investors. Rising corporate leverage and higher cash distributions to stockholders may be efficient shareholder relations, but they generally result in less investment and less potential real economic growth.
- Ultra-low interest rates send a signal to businesses that the central bank does not have full confidence that the economic outlook will be bright. In response, some businesses took a conservative approach to replacing aged equipment and software in an ultra-low interest rate environment, while also trimming expansion plans.
- Instead of ramping up domestic investment, the mix of monetary, fiscal and regulatory policies encouraged business expansion overseas and the buying of foreign firms for tax reduction purposes (tax inversions). In response to some government-mandated expenses and labor laws, some businesses also relied more on part-time workers. The combination of diminished domestic capital spending and reliance on contingent workers contributed to lower productivity growth.
- Keeping interest rates low for a protracted period of time reduced the net worth of some companies with large outstanding long-term debts and that operate defined benefit (DB) pension plans. With US DB plans only about 80% funded and with a $570-$600

3. Ultra-low rates can bring benefits, too

Discussions between the Trump administration, Congress and the Federal Reserve about the implications of raising policy rates can be expected to include arguments that persistently low interest rates have been beneficial in a wide variety of ways. Here's how:

Record low interest rates enabled some individuals to refinance loans, deleverage, trade-up to higher quality assets, restructure and strengthen balance sheets, finance business start-ups and purchase large-ticket items that may have been unaffordable previously. Statistical evidence does suggest, however, that when interest rates drop to below the reversal rate, these benefits shrink or fail to keep offset their growth-retarding impacts.

Much as homeowners refinance their mortgages as interest rates decline, banks took advantage of low interest rates to refinance a portion of their own liabilities.

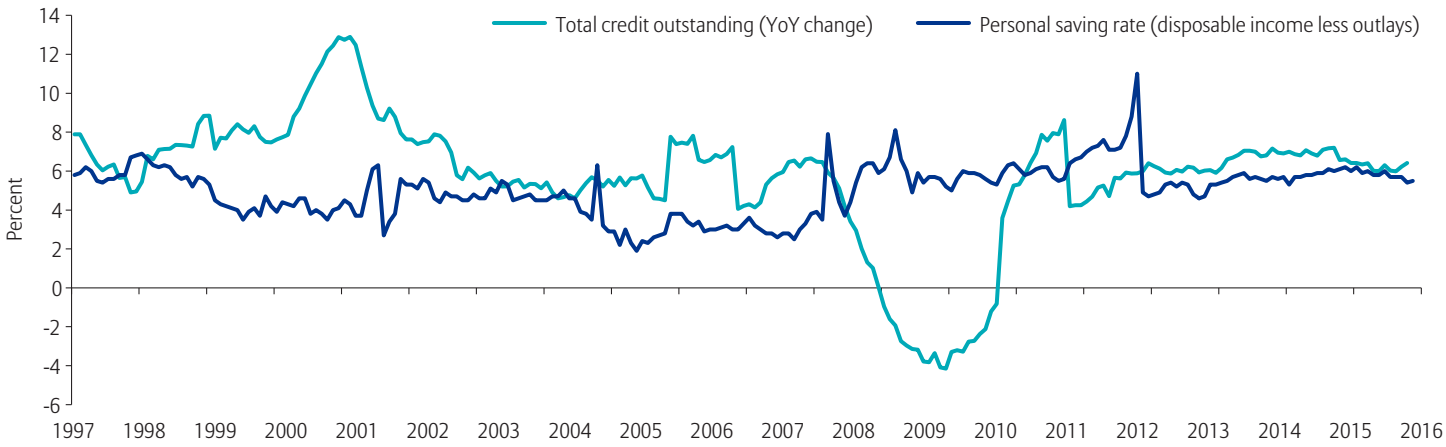
Even interest rates falling below the reversal rate can generate capital gains that exceed the profit shrinkage resulting from narrowing of net interest margins if the value of bank assets is highly sensitive to changes in policy interest rates.

Banks replaced assets held in reserve (like proceeds from the sale of securities to the central bank) and other "safe" holdings (typically cash equivalents) with more profitable loans to individuals and businesses. The greater the sensitivity of the value of these assets to changes in interest rates, the greater the profit gain banks experienced through this channel and the larger the boost to bank capital and equity.

By increasing banks' capital gains, declines in interest rates sub-reversal rate helped to boost regulatory capital. This unintentional, or "stealth," recapitalization reduced regulatory constraints on lending activities, enabled banks to take on more risk and accommodated credit expansion.

Interest rate decreases tended to be "good for business" in that certain customers loaded up on credit to lock-in more favorable borrowing rates and extend the duration of their loans. When highly credit-worthy customers with low default risk avail themselves of this opportunity, banks earned meaningful profits, especially from loan origination, application processing and other fees and through securitization.

Exhibit 9: Ultra-low interest rates did not spur a borrowing surge
Saving rate normalized and credit growth stayed dull



Source: Factset; Allianz Global Investors. Information as of 12/31/16.

billion deficit, the low ultra-low interest rates made asset-liability matching extremely difficult. Funding of pensions typically supersedes funding of capital investment.

Experience of banks

- Lower policy rates tend to reduce net interest margins on loans and credit.
- Interest rates falling below the reversal level led to smaller capital gains on relatively short-duration fixed-income assets than the losses banks incurred from net interest margin compression, thereby shrinking bank profits.
- Banks typically strive for low default risk. They typically respond to a shock that reduces the market value of their equity either by raising capital or by reducing risk by making fewer loans and increasing excess reserves.
- Persistent ultra-low interest rates raised the discount rate applied to calculations of expected future bank profits, putting downward pressure on the franchise value of individual banks. Experience during the financial crisis taught senior bank management to protect bank equity staunchly.
- Recent increases in minimum capital ratios and tougher liquidity, leverage and solvency standards limited the ability of banks to transform their excess reserves into loans and deposits. In response, some lenders became reluctant to lend to all but the most credit-worthy potential borrowers.
- As the risk-free interest rate went sub-reversal rate, the opportunity cost of maintaining the equity cushion set by regulators, typically bank capital, became too costly to hold. In response, banks concentrated their asset holdings subject to a capital charge on investments with the expected highest risk-adjusted rates of return.
- The Fed's open market operations withdrew a large amount of low-risk collateral from the market that cannot be rehypothecated, making repo funding of loans and other financial transactions harder to arrange.[10]

Financial implications

In the United States, recognition among the majority of FOMC members of the downsides of too-low interest rates partially underpins investor expectations that the Federal Reserve will raise rates on multiple occasions in 2017. Consequently, sizeable valuation adjustments among interest-rate sensitive investments can be expected over the next year.

The value of fixed-income investments, especially, will pivot on the magnitude of five key variables: coupon, spread, duration, correlation and volatility. On a total return basis, each of the following likely will compensate investors best during a rising rate environment:

- Bonds with relatively larger coupons that can generate positive returns even as rates rise.
- Bonds priced appropriately to compensate investors for taking on additional risks. Spreads of US corporate bonds and high-yield bonds had a moderate tendency to tighten during Fed rate hikes, though not in all episodes.
- Fixed-income assets that can take advantage of a rising, but flattening, yield curve.
- Assets least correlated with the prices of US treasury securities, emerging market equities and commodities, all of which are affected by US dollar appreciation.
- Assets whose valuations have the least downside capture as prices fall while also experiencing sizeable upside capture as prices rise. While strategies may exhibit similar overall returns during certain rate-rising periods, the volatility they experience can vary sharply.

10. Unfortunately, the Fed's role as a repo counterparty since 2013 does not offset the collateral drain produced by the accumulation of repo collateral on its balance sheet. The Fed lends its collateral into the market in exchange for cash that cannot be rehypothecated in other transactions. (Rehypothecation is the practice by banks and brokers of using, for their own purposes, assets that have been posted as collateral by their clients. Clients who permit rehypothecation of their collateral may be compensated either through a lower cost of borrowing or a rebate on fees.) Similarly, the "reverse repos" the Fed plans to use to eventually remove monetary accommodation do not provide collateral that can be used by other repo market participants.

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