Quantitative Easing Explained

April 2011

“All the perplexities, confusions, and distresses in America arise, not from defects in their constitution or confederation, not from a want of honor or virtue, so much as from downright ignorance of the nature of coin, credit, and circulation.”

—John Adams in a letter to Thomas Jefferson, August 25, 1787

The recent financial crisis and its aftermath have proven to be a great challenge for the Federal Reserve. In late 2008, in response to rapidly deteriorating economic and financial conditions, the Federal Open Market Committee (FOMC) pushed the federal funds rate target close to zero. As conditions worsened, the Fed turned to nontraditional policies to bolster financial market conditions. Such policies include large-scale asset purchases—in the hundreds of billions of dollars range—of, for example, mortgage-backed securities and Treasury securities. This action is commonly called “quantitative easing” (QE). Some believe QE will sharply increase inflation rates; however, these fears are not consistent with economic theory and empirical evidence—assuming the Fed is both willing and able to reverse QE as the recovery gains momentum.

Typically, the FOMC changes the federal funds rate target to achieve its dual mandate of maximum sustainable economic growth and price stability. From September 2007 to June 2008, the FOMC incrementally lowered the federal funds rate target from 5.25 percent to 2 percent as turmoil engulfed credit markets. The financial panic intensified in mid-September 2008 when the investment banking company Lehman Brothers declared bankruptcy (the largest such filing in U.S. history) and American International Group (AIG) neared bankruptcy as its stock plummeted. In response, the Fed rolled out new emergency lending programs and lowered the federal funds rate target in October 2008 from 2 percent to 1 percent. In December 2008, the continuing severity of the crisis prompted the Fed to drop the target to the extraordinarily low range of between 0 and 0.25 percent, where it has remained. Because nominal interest rates cannot go below zero and the Fed needed to continue to support a weakened economy, it turned to nontraditional policy, including QE.

QE affects the economy through changes in interest rates on long-term Treasury securities and other financial instruments (e.g., corporate bonds). To have an appreciable impact on interest rates, QE requires large-scale asset purchases. When the Fed makes such purchases of, for example, Treasury securities, the result is an increased demand for those securities, which in turn raises their prices. Treasury prices and yields (interest rates) are inversely related: As prices increase, interest rates fall. As interest rates fall, the cost to businesses for financing capital investments, such as new equipment, decreases. Over time, new business investments should bolster economic activity, create new jobs, and reduce the unemployment rate. QE is not a new approach; it was used by the Fed in the 1930s, the Bank of Japan in 2001, and more recently by the Bank of England. Since 2009, the Fed has initiated QE two times, each with different goals.

1 For more on traditional monetary policy and the federal funds rate, see Liborio, Constanza S. “Fiscal and Monetary Policy in Times of Crisis.” Federal Reserve Bank of St. Louis Liber8, March 2011.
2 A mortgage-backed security is an investment vehicle composed of pools of mortgages. Banks create mortgage loans that comply with standards set by Fannie Mae and Freddie Mac. These institutions then pool the mortgages for sale to investors. This allows banks to free up capital for other loans.
3 The technical term for the policy is “credit easing.” For more on the differences between “quantitative easing” and “credit easing,” see Bernanke, Ben S. “The Crisis and the Policy Response.” Speech at the London School of Economics, January 13, 2009.

The views expressed are those of the author and do not necessarily reflect the official positions of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Board of Governors.
The first round of QE began in March 2009 and concluded in March 2010. One of the primary goals was to increase the availability of credit in private markets to help revitalize mortgage lending and support the housing market. To accomplish this goal, the Fed purchased $1.25 trillion in mortgage-backed securities and $200 billion in federal agency debt (i.e., debt issued by Fannie Mae, Freddie Mac, and Ginnie Mae to fund the purchase of mortgage loans). To help lower interest rates in general (and thaw the frozen private credit market), the Fed also purchased $300 billion in long-term Treasury securities.

The second round of QE, widely called QE2, began in November 2010 and is scheduled to conclude by the end of the second quarter of 2011. Its goal is to strengthen the economic recovery and combat a possible Japanese-style deflationary outcome. QE2 works toward both of these objectives by fostering economic growth through lower interest rates intended to spur consumer spending and business investment. During QE2, the Fed will purchase up to $600 billion in long-term Treasury securities.

Critics of QE warn that because QE increases the monetary base significantly, dramatic inflation could result. Currently, banks hold a large amount of reserves, which constitutes the largest component of the monetary base. If banks were to loan these reserves, they would effectively increase the money supply. If the money supply were to grow at a rapid rate, the resulting increase in economic activity could cause inflation to accelerate and expectations of future inflation to increase. The Fed, however, remains confident that its programs, including incentives for banks to retain their reserves, will prevent such an outcome. For example, the Fed pays banks interest on reserves at Fed banks. If the interest rate on these reserves is higher than the return banks could receive from alternative investments (the banks' opportunity cost), reserves will remain idle.

Public expectations of future inflation are also crucial in determining the path of inflation and the ultimate effect of QE. If the public trusts that the increase in the monetary base QE creates is only temporary, then they will not expect rapid inflation in the near future. These expectations collectively influence actual pricing behavior and, in turn, actual inflation. As such, the credibility of the Federal Reserve is perhaps the most important determinant of successful monetary policy.

—By Lowell R. Ricketts, Research Associate

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8 The monetary base, the narrowest measure of money, is the sum of currency in circulation and bank reserves. Bank reserves are deposits of financial institutions at Federal Reserve Banks, plus the amount of currency and coin held in bank vaults.
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What “forward guidance” is, and how it (theoretically) works

Feb 11th 2014, 23:50 by R.A. | LONDON

IN DECEMBER 2012 Ben Bernanke, then chairman of the Federal Reserve, reached deep into the central banker’s bag of tricks and pulled out something novel (http://www.economist.com/news/finance-and-economics/21568426-fed-specifies-unemployment-threshold-raising-rates-other-mandate). Using a new trick which became known as “forward guidance”, the Fed declared (http://www.federalreserve.gov/newsevents/press/monetary/20121212a.htm) that it would not raise interest rates until America’s unemployment rate dropped to at least 6.5%, so long as inflation remained below 2.5%. In August 2013 the Bank of England followed suit (http://www.economist.com/news/britain/21583307-growth-back-many-britons-it-does-not-feel-it-squeezing-hourglass). Mark Carney (pictured), its governor, promised (http://www.bankofengland.co.uk/publications/Documents/inflationreport/2013/irspnote070813.pdf) to leave rates low until unemployment was down to at least 7%—again, so long as inflation and financial markets remained well behaved. In both America and Britain, unemployment fell quickly toward the thresholds. Yet neither central bank reacted by moving to boost rates, leading critics to argue that forward guidance had failed and should be scrapped. Central banks are instead tweaking their guidance: the Bank of England will update its guidelines on February 12th.
The goal of monetary policy is to smooth out macroeconomic wobbles by co-ordinating market expectations. Central banks want companies to be bullish enough to invest and hire willing workers, but not so exuberant that inflation begins to pick up. For most of the past generation, central banks performed their co-ordinating task by fiddling with short-term interest rates. Lower rates encourage more borrowing and signal that the central bank would like a faster pace of growth; higher rates encourage saving and tell markets to calm down. So severe was the global financial crisis, however, that even reducing interest rates to their lowest feasible level, near zero, failed to get growth back on track. Accordingly, central banks have since sought to influence the economy through other tools. “Quantitative easing”, or printing money to buy assets like government bonds, is one of the new, unconventional policies. Forward guidance is another.

Put simply, forward guidance is the use of communication about future central bank actions to influence present behaviour. If a central bank can convince markets that it will leave interest rates low for quite a while, allowing a faster recovery in the future than it might normally tolerate, then investors have an incentive to start investing more in the present so as to reap the benefits of that future bonanza. This sort of guidance actually predates the global crisis. In the late 1990s the Bank of Japan aimed to escape its economic doldrums by promising to leave interest rates at zero “until deflationary concerns subside”. And in 2003, when the Fed cut rates to 1% to shore up a weak recovery, it advised markets that policy would probably stay easy “for a considerable period”. In the wake of the global recession, central banks have experimented with new twists on forward guidance, such as the use of specific unemployment- and inflation-rate thresholds, to try to boost its potency. (After some initial confusion, central bankers now emphasise that such thresholds are necessary but not sufficient conditions for intervention.) By providing markets with more information about the type of recovery they would like to see, central banks hope to reassure investors that good times are ahead, and that regulators won’t immediately move to rein in the recovery at the first sign of market enthusiasm.

There is, no doubt, plenty of scope to improve and refine the technique of forward guidance. The latest fiddling is part of a long-term effort by central banks to improve communication about policy goals and methods. Over the past few decades they have gone from refusing even to share information about interest-rate decisions to setting official inflation targets, publishing meeting transcripts and releasing detailed forecasts for economic activity. To get the most bang for their
buck, however, central banks will need to resolve the long-running argument over what monetary policy should be trying to achieve. Many central bankers continue to see low and stable inflation as the only reasonable goal for policy, while others argue that inflation moderately above target is an acceptable price to pay for a stronger recovery. (Still others think central banks should worry less about inflation and unemployment, and more about financial stability.) So long as priorities remain unsettled within central banks, forward guidance will remain somewhat vague—and a less powerful tool than it could be.

**Update February 12th:** Mark Carney announces the next phase of the Bank of England’s [forward guidance](http://www.economist.com/blogs/freeexchange/2014/02/forward-guidance)

**Dig deeper:**

A detailed look at the "unconventional methods" central bankers have resorted to

What should the objective of central-bank policy be?
(http://www.economist.com/blogs/freeexchange/2013/03/central-banking) (March 2013)

Age shall not weary her: the Federal Reserve at 100
New banking regulations carry risk of unintended consequences

Retail-deposit grab to be 'defining feature' of tightening

The Federal Reserve will have to confront the costs of its massive balance-sheet expansion when policy makers raise interest rates.

The U.S. central bank’s exit strategy from unprecedented stimulus looks set to send big ripples through the financial system once it begins. These could hit the economy faster than they did in past tightening cycles, as rate rises radiate through a banking system constrained by new regulations and flooded with cash created by the Fed’s bond-buying program.

The question is what that means for the economy and how it alters Fed Chair Janet Yellen’s calculus over the pace of tightening. Understanding the plumbing of the new financial landscape will be vital for policy makers trying to fine-tune the economy and investors navigating turbulent markets.

“There are three or four things about how the financial system works that most people didn’t understand and didn’t really need to understand before 2008,” said Peter Stella, who led the central banking and monetary and foreign exchange operations divisions of the International Monetary Fund from 2005 to 2009. “They still don’t understand them, so I think there’s a lot of risk of volatility when things actually start happening.”

New Tools

Yellen and her colleagues on the Federal Open Market Committee wrap up a two-day meeting on Thursday to debate whether to increase the benchmark federal funds rate, which they have held near zero since late 2008. If and when they do move, it won’t be like before, and they’ll be using new tools to lift rates higher.

In the past, the central bank kept the fed funds rate at or near the target chosen by policy makers by injecting or draining bank reserves from the system via the New York Fed’s trading desk. The amounts of cash involved were small and the Fed was pretty good at hitting its desired rate. Not anymore.

Three rounds of so-called quantitative easing from 2008 to 2014, in which the Fed bought bonds to support the economy, has swamped banks with cash -- deposited with them by investors who sold bonds to the Fed. That added $2.6 trillion of reserves in excess of requirements to banks’ accounts held at the Fed. It also...
boosted the size of the Fed’s own balance sheet to $4.5 trillion, a five-fold increase from pre-crisis levels.

“We don’t know what’s going to happen when we lift off,” Simon Potter, the New York Fed official in charge of the trading desk, said in April, answering questions after a speech. “We’re pretty sure that we have the ability to lift rates at the initial point.”

Money Markets Swamped

With so much cash and little need for banks to borrow in the fed funds market, the Fed has lost the ability to lift the funds rate in the way that it did before the crisis. It has also decided for now against selling the bonds back to investors, which would shrink its own balance sheet and extinguish the excess reserves.

Instead, Fed officials designed new tools to help the central bank raise rates without reducing its balance sheet, which it hopes to slowly shrink over years by letting the bonds it now holds mature, without reinvestment. Officials say they expect to phase out reinvestments sometime after liftoff.

Their main innovation, an overnight reverse repurchase agreement facility, is a powerful solution, but heavy usage may cause problems for banks trying to comply with new regulations installed in the wake of the financial crisis, said Zoltan Pozsar, director of U.S. economics at Credit Suisse Securities USA LLC in New York.

The facility promises to drain reserves from the banks by encouraging investors to withdraw the deposits created when they sold bonds to the Fed, and place the cash in money-market mutual funds.

Through overnight reverse repos, the Fed can borrow the cash from money funds at a specified rate and post securities as collateral, unwinding the trades the next day. In effect, the Fed will be borrowing back the money it created to buy the bonds while cutting out the middlemen in the banking system.
Deposit Flight

The problem: Banks aren’t sure exactly how much of their deposits they will cede to money-market funds once the Fed starts raising rates, or whose money or how fast. All of those things are important to understand for banks trying to stay in compliance with the liquidity coverage ratio, a major new pillar of global post-crisis banking regulation.

“To the extent that the financial regulations affect behavior in the overnight markets, that will make a difference,” said Stephen Williamson, an economist with the St. Louis Fed. “These are all things we’re thinking about.”

The liquidity rule requires banks to hold more cash and other “high-quality liquid assets” like Treasuries and government-backed mortgage bonds against their deposit base to protect themselves from runs. Because they can hold less cash against retail deposits than investor deposits, they will probably raise retail-deposit rates aggressively to hang on to these customers, according to Pozsar, who previously studied the plumbing of the post-crisis financial system in positions at the New York Fed and U.S. Treasury.

“They are going to fight for retail deposits like you’ve never seen them fight for retail deposits before,” Pozsar said. “That is going to be basically the defining feature of this hiking cycle.”

Tighter Credit

The upshot: Credit will become more expensive faster than in previous tightening cycles as banks pass higher deposit costs on to borrowers in an effort to maintain profitability. The effects will probably become larger after the Fed’s second or third rate increase, according to Justin Fuller, a senior director at Fitch Ratings in Chicago.

“When you start to get up to 50 to 100 basis points of tightening and higher, that is when you start seeing much more competition by banks for operational retail-oriented deposits,” Fuller said. “Banks all over the country will be doing this.”

The potential side effects of rate increases with so much cash in the system and unfamiliar new regulations will make the Fed’s attempts to fine-tune the economy a lot more challenging, according to Michael Cloherty, head of U.S. interest-rate strategy at RBC Capital Markets LLC in New York.

“Under the old framework, you had 100 years of history to say: ‘If I raise the funds rate, I have a pretty good feel of how it hits the economy,’” Cloherty said. “It will take the Fed a really long time to figure out how the new world works.”
Cloherty estimates banks could see almost $1.5 trillion of deposits leave by the end of 2017, with $625 billion of it going to money funds, which would put it in the Fed’s overnight reverse repo facility. Those numbers jump to nearly $2.3 trillion and $900 billion in a worst-case scenario.

**Market Turbulence**

If that happens, markets will get more volatile as banks make on-the-fly adjustments to their portfolios in response to unexpected deposit losses.

“Someone won’t get things right,” Pozsar and his Credit Suisse colleague James Sweeney wrote in an Aug. 28 report. Volatility may spike for Treasuries maturing in three to five years because those are the ones banks have been buying to meet liquidity requirements, they said.

If the Fed stops reinvesting the proceeds of maturing securities in its portfolio and allows its balance sheet to shrink, that could mitigate some of the pressure on banks, even though it would be draining reserves, according to Todd Keister, an economics professor at Rutgers University who worked at the New York Fed from 2007 to 2012.

“A lot of the assets that banks potentially could hold” to meet their liquidity requirement are being held by the Fed, Keister said. Letting bonds mature and forcing the Treasury to issue replacement debt to the public would open up another source of high quality liquid assets for banks.

The Fed also has to contend with other potential hidden effects of pumping money onto bank balance sheets that are waiting to surface.

According to Jens Christensen, an economist at the San Francisco Fed, the challenge is compounded because data on the effect of the Fed’s reserve injections on bank behavior is hard to come by.
“Quantitative easing -- just the name -- should maybe make people look into what quantities are moving where, but we rarely track that,” Christensen said.

The challenge facing policy makers recalls the aftermath of World War II, according to Perry Mehrling, an economics professor at Barnard College in New York, when the nation was also adjusting to a long period of Fed intervention in markets.

“We’ve been through a period like a war, and it takes a long time to get from war finance to peace finance,” Mehrling said. “That is what we’re dealing with here.”

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The Federal Reserve has chosen to start the process of raising interest rates before shrinking its balance sheet.

According to economists at Deutsche Bank, that decision may force Fed Chair Janet Yellen to raise rates faster than the market expects in order to damp down the U.S. economy's momentum.

The hawkish commentary in the Federal Reserve's October statement, followed by a stellar non-farm payrolls report that supported this shift in tone, fostered a rise in interest rates across the yield curve, observes Deutsche's Chief Economist Peter Hooper.
As such, the market has once again recalibrated the expected pace of interest rate rises following liftoff (remember one and done?), while the probability of a first hike by year-end spiked.

"The pace of rate hikes will be influenced by a number of economic and financial factors, including, importantly, the reaction of long-term rates," the economist wrote.

Hooper expects a combination of the market's upward revision to the pace of Fed hikes, net sales of U.S. Treasuries by foreign central banks, and the tapering off of the Fed's principal re-investments from previous bond purchases will propel the 10-year Treasury yield to as high as 3.5 percent by the end of 2016 as U.S. government debt is sold off.

But, says Deutsche, that dynamic is set to change in 2017, as the Fed's massive Treasury holdings will cap the rise in longer-term yields relative to short-term rates. That is, Janet Yellen is poised to inherit former Fed Chair Alan Greenspan's conundrum, in which the supposed failure of long-term rates to rise by as much as the central bank's policy rate entails that monetary policymakers aren't able to tamp down on growth as much as they desire:

Deutsche Bank's economists cite a remark made by New York Fed President William Dudley in an April
speech to support their case.

"If financial market conditions do not tighten much in response to higher short-term interest rates, we might have to move more quickly to achieve the appropriate restraint on financial market conditions," Dudley said.

The upshot: the central bank's so-called glide path higher could be steeper than investors currently anticipate as more hikes are needed to tighten financial conditions in the face of persistently low yields at the longer end of the curve.

Hooper believes that Yellen & Co. would prefer an outcome of this nature, despite the imbalances that developed and culminated in the U.S. housing crisis in part due to the aforementioned conundrum.

"While the Fed wants to tighten financial conditions sufficiently to avoid an overheating economy, they also would like to be able to maneuver the fed funds rate as far away from the zero lower bound as possible," argued Hooper. "Doing so will provide them with ammunition to combat future downturns using traditional monetary policy tools, and allow them to cleanly exit from the extraordinary policies that have dominated the post-crisis policy landscape."

Conversely, the initiation of a hiking cycle could create a tightening of financial conditions and, in turn, economic activity, faster than during previous instances.

Some economists and strategists have suggested that the Fed's new regime, coupled with regulatory changes, could shorten the lag time for the transmission of monetary policy. After liftoff, more bank deposits are expected to flow into money-market funds thanks to a new instrument monetary policymakers are employing to execute the rise in their policy rate.

But new regulations also mandate that banks hang on to more high-quality liquid assets - so they'll need to make sure too many deposits don't head out the door. One way to do that is to raise the interest rate paid on these deposits. As this increases lenders' funding costs, the charge could then be borne by consumers in the form of higher borrowing costs, which would tend to prompt a decrease in the demand for credit.

If that proves to be the case, then Yellen and her colleagues at the Federal Reserve will have a new concern: whether inflation can trend up to 2 percent even after the central bank has begun tapping the U.S. economy's brakes.

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