What Have We Learned about Central Bank Balance Sheets and Monetary Policy?

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In the aftermath of the Great Recession of 2008–09, central banks conducted large-scale purchases of long-term bonds and other unconventional financial assets to stimulate economic recoveries and raise inflation toward its targeted level. Dire predictions of runaway inflation and financial distortions did not come to pass. But recovery proved much slower than had been expected. This article argues that the main lesson is that central banks need to use their powers more aggressively if confronted with a similar situation in the future. Planning now can help central banks to be more prepared later. It is also a good time to make sure central banks have all the tools they need to confront the zero bound on nominal interest rates.

A Deeper Understanding of Monetary Policy

For decades monetary policy has been focused on the manipulation of short-term risk-free interest rates to guide economic growth and inflation. John Taylor (1993) characterized desirable interest

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rate policy in his famous rule. Lower interest rates stimulate growth and inflation, whereas higher interest rates are contractionary. Michael Woodford (2003) wrote an authoritative textbook summarizing the principles of monetary policy in terms of a short-term rate of interest.[1] However, it was long understood that the existence of paper currency with a fixed interest rate of zero would make it difficult (or impossible) for central banks to push short-term interest rates substantially below zero (Hicks 1937). Any attempt to do so would cause lenders to hold their wealth in risk-free paper currency rather than accept a lower rate of return in any other form.[2]

The zero bound on short-term interest rates led Paul Krugman (1998) to conclude that the only monetary route out of deflation in Japan required a commitment by the Bank of Japan to create far more inflation in the future than anyone expected at the time.[3] He referred to this policy as a "credible promise to be irresponsible," but he questioned how easy it would be to put into practice.

This focus on the short-term risk-free interest rate grew naturally out of standard texts on monetary policy in which the central bank issues money to buy bonds (Patinkin 1965). However, the textbooks typically are silent on the maturity of the bonds held by the central bank. John Maynard Keynes (1930) was an early proponent of the possibility of central banks buying long-term bonds to influence long-term interest rates.[4] James Tobin (1969) went further and considered the implications of conducting monetary policy over a range of assets, including productive capital (equity).

[1]Woodford stresses what he calls the "Taylor principle." For stability of prices, the central bank must raise the interest rate by more than any excess of inflation over its target.

[2]Michael Bordo and Andrew Levin (2019) call for fees on the use of paper currency in order to allow for negative interest rates on electronic currency. If set sufficiently high, such fees would allow central banks to set their policy rates at potentially large negative values to fight future recessions without resort to quantitative easing (Ball et al. 2016). However, no country has yet implemented such fees. I assume in this article that a lower bound on interest rates in the vicinity of zero will remain for the indefinite future.

[3]With nominal interest rates stuck near zero, an increase in expected future inflation would lower real interest rates, which should boost spending and support the eventual increase in inflation.

[4]I thank Philip Turner for pointing this out to me.

The power of monetary policy derives from the unique ability of central banks to create liabilities with an exogenous rate of return (typically zero) that must be accepted as payment for any other asset or commodity. To ease policy, a central bank creates paper currency or bank reserves to buy financial assets and push their prices upward. If a central bank limits its purchases to short-term risk-free bonds, it may indeed reach an upper bound on asset prices that corresponds to the lower bound on interest rates.[5] However, there is no fundamental reason to restrict central bank balance sheets to short-term risk-free assets. The central bank can push up the price of any bond with a yield above zero and can always push up the prices of real assets such as equity and real estate.[6] It can also push up the prices of assets in foreign currencies by depreciating the exchange rate.[7] All of these actions raise nominal wealth, stimulate growth, and support inflation.

Milton Friedman (1969) famously proposed another form of monetary policy, distributing currency to the general public by dropping it from a helicopter. No central bank has ever conducted policy in this way (even by means other than a helicopter). Indeed, it is not clear that central banks have the legal authority to do so. Transfers to the public are generally considered to be the domain of fiscal policy. Consider the following definitions of expansionary monetary and fiscal policy:

- A monetary expansion is the creation of money to buy assets with the goal of raising their prices and reducing their rates of return.
- A fiscal expansion is the sale of assets (bonds) to fund government spending, tax cuts, and transfers to the public.

[5]The rate of return on a bond moves inversely with its price.

[6]This assertion assumes a stable long-run expected inflation rate. If the policy action raises long-run expected inflation, it is possible that it may lower the price of nominal long-term bonds. But it would lower the real, inflation-adjusted, rate of return on bonds and it would raise the prices of real assets.

[7]Lars Svensson (2000) showed how massive purchases of foreign currencies to depreciate the exchange rate were a "foolproof way" of getting an economy out of deflation. However, this approach has a beggar-thy-neighbor property in that it reallocates aggregate demand across countries without increasing global demand.

Monetary and fiscal contractions are defined as the reverse of the above operations. From these definitions, it follows that Friedman's helicopter money drop is a combination of monetary and fiscal expansion. The focus of this article is on monetary policy, but the final section revisits the possibility of Friedman's monetary-fiscal helicopter drop.

The Experience of Quantitative Easing (QE)

When their short-term policy interest rates hit zero during and after the Great Recession of 2008–09,[8] several central banks began to buy longer-term bonds in large quantities and the Bank of Japan also stepped up its purchases of equity and real estate investment trusts. Dozens of studies confirm that QE bond buying is effective at lowering long-term interest rates (Gagnon 2016). Studies also show that QE bond purchases tend to boost stock prices and depreciate the exchange rate (Rogers, Scotti, and Wright 2014). The experience of Hong Kong in 1998 suggests that purchases of equity are also profoundly stimulative (Bayoumi and Gagnon 2018).

Recovery from the Great Recession was slower than expected in many countries. The current conventional wisdom is that the 2008–09 financial crisis was unusually severe and that recoveries after financial crises are slower than other recoveries (Reinhart and Rogoff 2014). However, it is also apparent that the Fed did not ease policy as much or as rapidly as it did in previous recessions.[9] Glenn Rudebusch (2018, Figure 1) shows that his "balanced approach" version of a Taylor-type policy rule called for a federal funds rate of −7 percent in 2009, far below the near-zero rate that prevailed. As discussed in Gagnon and Sack (2018), the first QE program in 2008–09 is now estimated to have had a stimulative effect equivalent to a cut in the federal funds rate of about 1.25 percentage points below its then-target range of 0 to 0.25 percent. All the QE programs

[8]Some central banks left their policy rates slightly above zero, whereas others later moved their policy rates slightly below zero. Switzerland has the lowest policy rate, −0.75 percent. It is not clear how much lower central banks can usefully set their policy rates. For simplicity, this article refers to the lower bound on nominal interest rates as zero, though in practice it may differ somewhat from zero.

[9]In a multicountry panel, Christina and David Romer (2017) show that macroeconomic policy is enormously important in ameliorating the effects of financial crises.

at their peak in late 2013 had an effect equivalent to a cut of about 2.5 or 3 percentage points below zero. In 2009, Fed staff estimated that QE purchases would have a slightly larger effect than they now believe, but even so, the first QE program was far smaller than staff models called for.[10]

Other central banks, notably in the eurozone and Japan, were even more reluctant to use QE despite large recessions and weak recoveries. They continue to suffer greater shortfalls of inflation below target than in the United States.

In light of the novelty of the QE programs and the uncertainty surrounding the magnitude of their stimulative impact and any potential adverse side effects, it is not surprising that the Fed and other central banks chose policy stances considerably weaker than optimal. Consequently, it is also not surprising that recovery from the recession proved to be slow. An unfortunate side effect of this timidity is that the weak recovery gave credence to the views of some skeptics who argue that QE has little or no lasting impact (Greenlaw et al. 2018). A careful assessment of the skeptics' argument finds that—even if some of the initial effects of QE were transitory and unique to the crisis period—there remains a substantial long-lasting component, as confirmed by later QE episodes in Japan and Europe (Gagnon 2018).

Side effects of QE have been essentially nonexistent. Inflation has not risen above target and financial markets have not been harmfully distorted, as some economists feared.[11] Exit from the policy has proved to be smooth so far. It is debatable whether the prolonged period of ultra-low interest rates and a large Fed balance sheet contributed to recent signs of excessive risk-taking in financial markets. However, the appropriate response to risky behavior in financial markets is to increase lending and capital standards (Brainard 2018).

[10]In the March 2009 FOMC transcript, Janet Yellen (then president of the Federal Reserve Bank of San Francisco) said that the staff's optimal control model called for a federal funds rate of −6 percent. The staff presentations at that meeting suggested that a QE program close to what was adopted would move policy about one-third of the way toward the optimal control policy (www.federalreserve.gov/monetarypolicy/fomchistorical2009.htm).

[11]See the "Open Letter to Ben Bernanke" signed by 23 academic and market economists in the *Wall Street Journal* Real Time Economics column on November 15, 2010.

It is not even clear whether tighter monetary policy would improve or harm financial stability (Chodorow-Reich 2014). Moreover, if more aggressive QE had allowed for a faster recovery, the Fed could have begun its process of policy normalization sooner, perhaps forestalling any undue increase in risky activity.[12]

How to Use QE Next Time

It now appears likely that the United States and many other major economies will encounter the zero bound on policy interest rates in most future recessions (Ball et al. 2016). Yet, central banks have not conducted rigorous assessments of the optimal approach to the zero bound, in general, and QE, in particular.

The initial QE programs were announced as large one-time purchases after policy interest rates had reached a range near zero. In the United States, the first two programs were carried out without any material changes over spans of 7 to 12 months. The final U.S. program and the programs later adopted in Japan and the eurozone were structured as monthly paces of purchases that would proceed until specified economic conditions were reached. Both the one-time programs and the monthly purchase programs represented dramatic departures from the conventional policy framework in which the central bank meets regularly to review economic conditions and to set the policy interest rate accordingly. The one-time programs were like a large change in the policy rate that is not reassessed for several quarters. The flow programs were like a sequence of tiny monthly changes in the policy rate in a preset direction.

Gagnon and Sack (2018) propose an approach to QE that closely mimics the conventional policy rate-setting process. They propose that QE purchases of long-term bonds should start immediately after short-term interest rates hit the zero bound.[13] Based on central tendency estimates for several countries, they suggest that a QE purchase equivalent to 1.5 percent of GDP has a stimulative effect

[12]Lars Svensson (2016) shows that even in the absence of macroprudential tools such as capital standards, using monetary policy to fight financial excesses imposes far higher costs than benefits.

[13]Instead of stopping with an interest rate on reserves of 0.25 percent, the Fed should cut the interest rates it controls (and its target for the federal funds rate) to something slightly below zero, perhaps −0.5 percent. George Selgin (2018) argues that the Fed should not have left the rate of interest on excess reserves above zero after 2008.

roughly equal to that of a 0.25 percentage point cut in the policy rate. If the central bank decides that additional monetary stimulus is desired, it should proceed with QE purchases exactly as it would normally do with interest rate cuts.

Under the Gagnon-Sack proposal, forward guidance would not take on any special role at the zero bound. The central bank should provide guidance on future QE purchases in the same way that it provides guidance on future settings of the policy rate. The seamless transition at the zero bound would make communication easier. Conducting QE purchases would reinforce the message that the policy rate would remain at least slightly below zero for a long time, allowing longer-term interest rates also to fall slightly below zero.

Just as most interest rate moves occur in steps of 0.25 and 0.50 percentage points, most QE moves would consist of purchases of 1.5 percent or 3 percent of GDP. However, when faced with a particularly sharp deterioration in the economic outlook, as in early 2009, the central bank would be free to announce even larger QE purchases. As in the Fed's first QE program, future large programs might take several months to implement and might overlap with subsequent monetary policy meetings, but this is not a material drawback. Research shows that most of the impact of QE purchases occurs at announcement. Any future revisions to the policy stance could be added to, or subtracted from, the target for ongoing purchases.

When it is time to tighten monetary conditions after an episode at the zero bound, the current approach of the Federal Reserve and other central banks is to raise the short-term policy interest rate before allowing the QE assets to run off. This choice makes sense for two reasons: First, there is no comparable upward constraint on the policy rate, and policymakers may be more comfortable using the instrument they know best. Second, it is useful to establish the precedent of holding on to QE assets for a long time because the potency of QE depends importantly on how long markets expect the QE assets to be held. A QE purchase that was expected to be sold off soon would have little effect on bond yields or other asset prices.

Other Potential Changes to the Policy Framework

The experience of Japan shows that it is possible to drive long-term bond yields to, or even slightly below, zero. It is likely that further QE bond purchases at that point would have little stimulative impact.

Three options should be pursued to make sure the Fed does not run out of policy ammunition.

First, the Fed ought to raise its inflation target, either directly or indirectly by switching to a nominal GDP (NGDP) growth target of 5 percent (which would imply an inflation target of 3 percent as long as potential real growth is 2 percent).[14] This would push interest rates a bit further away from zero on average, creating more room before the Fed encounters the zero bound in a future recession. In order to further boost monetary potency in the event of a severe recession, the NGDP growth target ought to switch to a level target rising at 5 percent whenever the short-term policy rate hits zero. The central bank would commit to keeping its policy rate near zero until NGDP returns to the specified rising path. In other words, any shortfall of NGDP growth during the recession would be made up later. A credible level target would lower the real long-term interest rate in zero bound episodes both by extending the period of zero short-term rates and by increasing expected inflation over a medium-term horizon.[15] The Fed should always aim to achieve its target within a three-year horizon and it should cross-validate its forecasts with those of the private sector. The Fed should also use QE as needed when at the zero bound to achieve its goals in a timely manner.

Second, the Fed should be granted the power to buy any financial asset and it should make its default portfolio equal to the market portfolio of financial assets.[16] Adoption of a market-based standard would avoid concerns of credit allocation either toward the government or toward specific private sectors or firms. Conducting monetary policy through a wide range of assets would maximize the channels through which policy could influence the economy and minimize the possibility of policy being blocked by a fixed limit such as the zero bound on interest rates.

Third, the Fed should be given authority to make fiscal transfers (helicopter money) under strict rules and conditionality. Transfers

[14]For a discussion of the benefits of a higher inflation target, see Ball et al. (2016). For discussions of the benefits of nominal GDP targeting, see Beckworth (2017) and Sumner (2012).

[15]For similar reasons, former Fed chair Ben Bernanke (2017) recommended adopting a rising price level target during zero bound episodes.

[16]Most other central banks are granted the ability to purchase a wide range of financial assets, though they historically focused on government bonds and loans to banks.

should occur (1) only when short-term interest rates are constrained by the zero bound, (2) only when employment and inflation (or NGDP) are falling short of target, (3) only if the Secretary of the Treasury approves, and (4) only when using a distribution formula set in advance by Congress. The amount and timing of transfers would be determined by the Federal Open Market Committee in pursuit of its statutory mandate. The Treasury Department would transfer an equal amount of Treasury securities to the Federal Reserve to back the transfer. The main reasons for granting such power to the Fed, as opposed to using normal fiscal procedures, are that (1) the expertise for macroeconomic stabilization is primarily lodged with the Federal Reserve System and not with Congress or the Treasury Department, and (2) the Fed can act far more expeditiously than the Congress.

Conclusion

In the aftermath of the Great Recession, monetary policy was wrenched out of the narrow box of short-term interest rate management that had confined it for decades. Central bankers were forced to consider a broader and more fundamental view of monetary policy that operates on a wider range of instruments and requires large increases in their balance sheets. It is not surprising that they used these new tools timidly and the world suffered a slower recovery than was necessary. It is imperative that central bankers prepare themselves with improved policy frameworks and a clearer understanding of the tools at their disposal in order to do a better job in the next recession. It would also be useful for legislatures to grant central banks, especially the Fed, more tools to achieve their goals at the zero bound on nominal interest rates.

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