

Conventional Monetary Policy¹

We now examine the Federal Reserve's response to the economic downturn. I divide monetary policy into two types. These notes deal with conventional monetary policy which I define to include changes to the Federal Funds Rate target and efforts to affect expectations of future short term interest rates. Non-conventional monetary policy includes less common measures such as quantitative easing and TARP. This definition is somewhat arbitrary, but I find it convenient.

Some background

The Federal Reserve, through the New York Fed's trading desk, manipulates the demand for credit in order to affect short term interest rates. Specifically, the Federal Open Market Committee meets and selects a target for the Federal Funds Rate, a rate at which banks lend to each other overnight through the Fed. Recall that banks must hold at least 10% (the precise level depends on the size of the bank) of their deposits as reserves. If one bank is short of reserves, it may borrow from another bank that has a surplus. The Effective Federal Funds rate is an average of all such interest rates. The Fed cannot decree the Federal Funds Rate. It can only choose a target which then differs from the effective rate by some amount

Suppose that the Fed is able to effectively lower the Federal Funds Rate. Arbitrage (the ability to borrow at one rate and lend at another for a profit) suggests that other short term rates will fall as well. Part of the decrease in short term interest rates may be passed on to longer term interest rates. If prices are sticky, then real interest rates may also be affected.

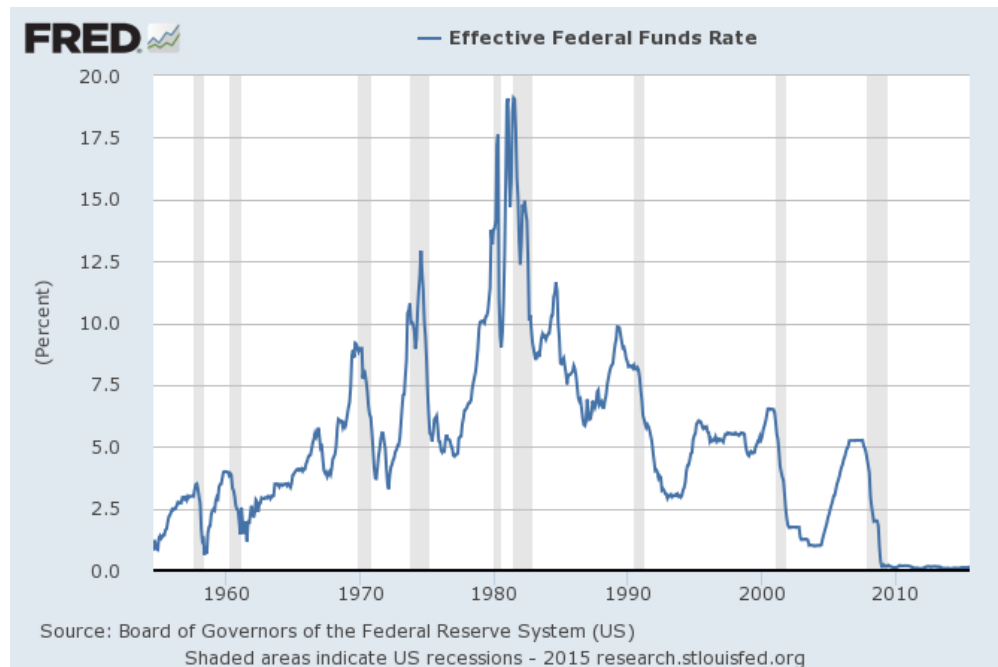
Lowering interest rates has two major channels by which output is increased and unemployment reduced:

1. The Interest Rate Channel. Recall that interest rates equal the opportunity cost of financing investment. More investment increases output. Also, as real interest rates fall, households have less incentive to save and consumption increases.

¹These are undergraduate lecture notes. They do not represent academic work. Expect typos, sloppy formatting, and occasional (possibly stupefying) errors.

2. The Credit Channel. Lower interest rates increase prices and output. All three of these results also cause a relaxation of credit constraints which amplifies and propagates the effects on P and Y .

The following, now familiar, graph shows the federal Funds Rate target since 1990.



FOMC Policy

In September 2007, the Federal Funds Rate target stood at 5.25%. First in response to the subprime mortgage crisis, and then in response to the financial panic, the FOMC instituted a series of rate decreases beginning on September 18, 2007. The tenth and final rate decrease occurred on December 16, 2008 when the FOMC lowered its target to its current level of 0-0.25%. At this point, the FOMC had exhausted its preferred weapon for stimulating the economy.

Another short term interest rate that the Fed employs is the discount rate, the rate at which the Fed loans reserves to banks. The FOMC also lowered this interest rate to very low levels.

The following paper conducts a useful exercise which allows us to quantify the liquidity trap, as well as shed further light on whether the Fed contributed to the housing bubble in the first place:

Rudebusch, Glenn. 2009. "The Fed's Monetary Policy Response to the Current Crisis." *Federal Reserve Bank of San Francisco Economic Letter*, 2009-17.

The author estimates the Fed's normal policy by regressing the federal funds rate (actual, not target) on inflation and the unemployment gap, which equals unemployment less the CBO's estimate of the natural rate:

$$FFR_t = 2.07\% + 1.28\pi_t - 1.95UEGAP_t + \mu_t \quad (1)$$

Rudebusch then examines how the Fed deviated from this normal rule. I extended the results from his paper using newer data. The following graph includes the Federal Funds rate vs. the rate implied by (1).

There are some notable deviations from the rule:

1. Between 2004 and 2006, interest rates were from 1-2% lower than the rate implied by the rule. This does not prove that rates were "too low for too long." But it does suggest that Fed policy was at least more expansionary than it would have been in the past for given values of inflation and unemployment.

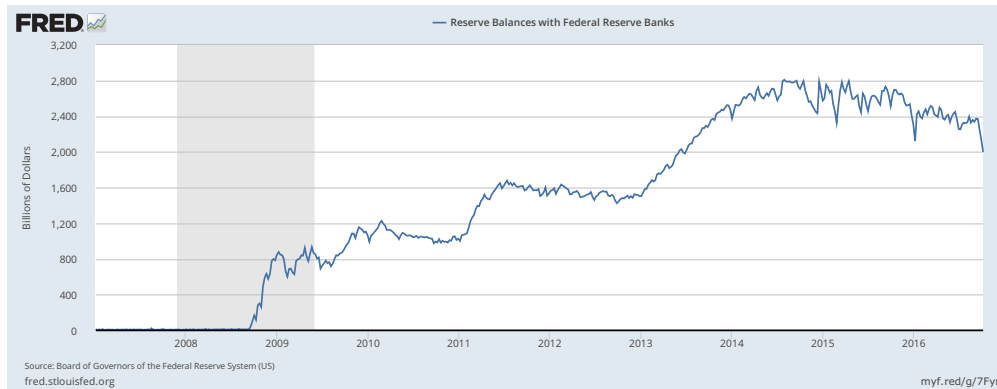
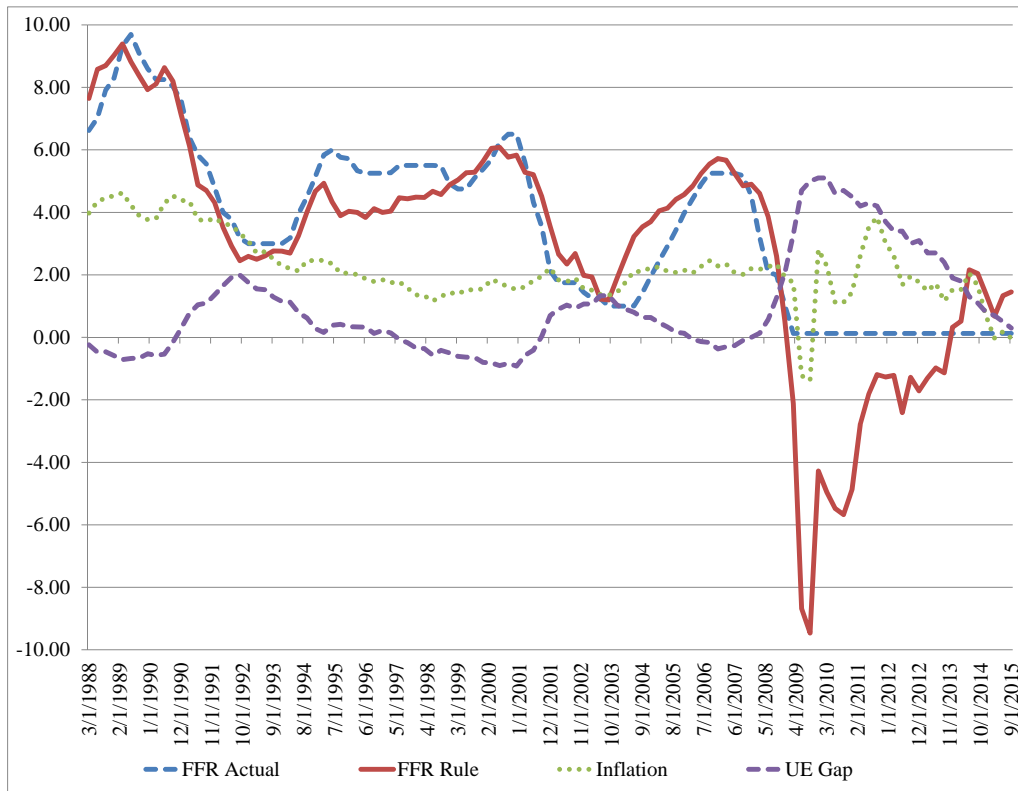
2. By early 2009, the Fed had reached the zero lower bound on interest rates. It was thus no longer possible to closely follow (1). Were there no longer bound, the Fed would have liked to lower interest rates to about -9.5% during the worst of the recession.

3. By late 2013, the rule suggested that the Fed raise interest rates above near zero. By September 2015, the rule suggested a 1.46% target.

Risks of Inflation

Commercial banks are currently holding about \$2 trillion in (largely excess) reserves. Recall from ECO 103 that this behavior reduces the effectiveness of the money creation process and thus the money multiplier. During the downturn, velocity has also decreased.

Figure 1: Actual Federal Funds Rate vs. Rule



The Fed's large purchases of assets have dramatically increased the monetary base (currency plus electronic reserves). Recall, however, that the money supply, not the monetary base, affects

inflation. The following table illustrates how these variables have changed since prior to the recession.

Table 1: Monetary Base and Money Supply

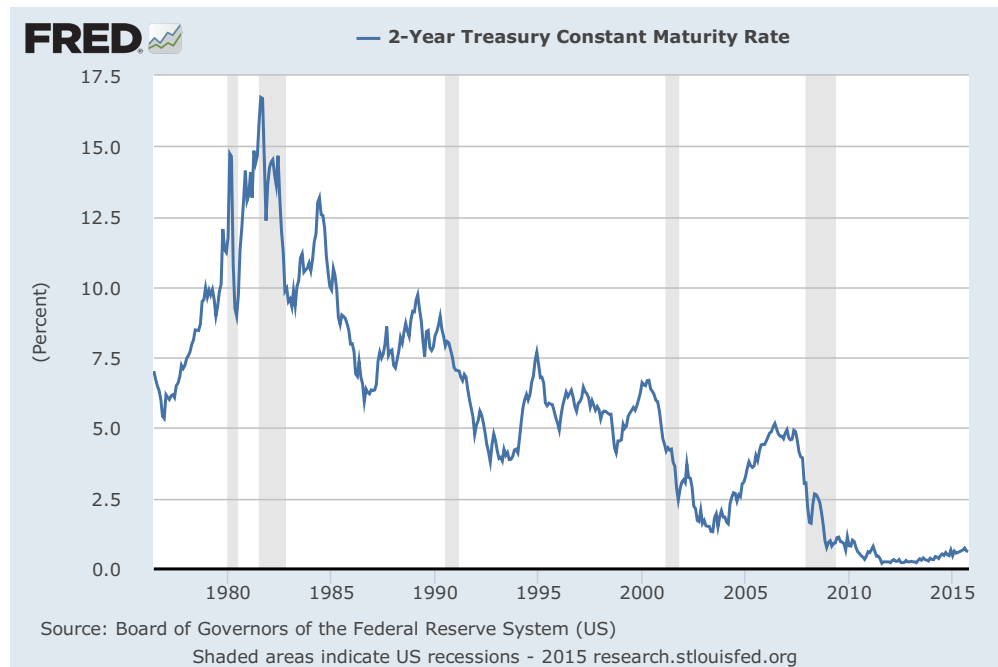
	March 2008	February 2011	August 2013	August 2016
Monetary Base	860.6	2275.1	3393.8	3816.6
M1	1388.3	1852.7	2572.2	3,308.8
M2	7749.0	8882.9	10784.0	13,125.9
V (M1)	10.3	7.9	6.6	5.8
V (M2)	1.871	1.693	1.575	1.449
Money Multiplier (M1)	1.628	0.8881	0.758	0.867

Since March 2008, the Fed has more than quadrupled the monetary base. This has not, however, resulted in significant inflation. Using the equation of exchange: $PY \equiv MV$, we see several reasons. First, because banks are holding excess reserves, the money multiplier has declined, it now is less than one (this is possible because electronic reserves are part of the monetary base but not the money supply). The increase in the money supply, though significant, is far less than the increase in the monetary base. Second, during the economic downturn, velocity has declined. Finally, slower growth has itself put downward pressure on prices.

An interesting exercise is to consider what would have happened had the Fed kept the monetary base at its March 2008 level while velocity and the money multiplier fell to their October 2012 levels. Obviously this is overly simplistic, the latter two variables are endogenous and would not have fallen by these amounts had the Fed not increased the monetary base. But the exercise is still instructive. Using M1, MV would then have fallen by about 70%. This would require that the price level and output collectively fall by the same amount. Again, this is not intended to be taken literally. But it is clear that the Fed risked serious deflation if it did not expand the monetary base.

Managing Expectations and Forward Guidance

The Federal Funds Rate is a short term, overnight, interest rate. Most major economic decisions, however, are based on longer term rates. It has been suggested that two year interest rates are the best measure of monetary policy. The following figure shows the yield for 2 year Treasury Bonds:



There are two ways that the Fed can affect this interest rate. First, it can buy longer term assets, an action that is left for the next set of notes. Second, it can influence this rate by affecting expectations of future short term rates. Suppose for example, that I wish to save for two years. I can either buy a two year bond, or I can continuously buy overnight debt. Setting the expected returns equal yields:

$$i_{2yr,t} = E_t \left[\prod_{i=0}^{2yr} i_{1day,t+i} \right] \quad (2)$$

Because longer term interest rates are the product of expected future short term rates, changing markets' expectations of the latter will affect the former. The Fed may do this through the state-

ments issued by the FOMC, or Fed officials can hint at future policy in interviews, in testimony before Congress, etc. Consider two examples of this policy.

1. When the FOMC target to near zero in early 2009, it expected this policy to remain in effect for an extended period of time. It did not, however, effectively communicate its intention. Financial markets seem to have expected rates to increase within a fairly short period of time. As a result, 2 year interest rates did not approach zero. Because the stimulus (ARRA) was being enacted at the same time, the Fed may have reduced the effectiveness of fiscal stimulus by allowing some crowding out to have occurred.

2. The FOMC is quite aware of #1. In its September 13, 2012 statement, it was usually explicit about future policy:

To support continued progress toward maximum employment and price stability, the Committee expects that a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the economic recovery strengthens. In particular, the Committee also decided today to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that exceptionally low levels for the federal funds rate are likely to be warranted at least through mid-2015.

This type of statement has come to be known as “forward guidance.” Faced with the inability of further lower short term interest rates, the Fed seeks to influence longer term rates by being more explicit about the future path of policy.

In December 2012, the Fed again used forward guidance. The FOMC stated:

In particular, the Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and currently anticipates that this exceptionally low range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no

more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored.

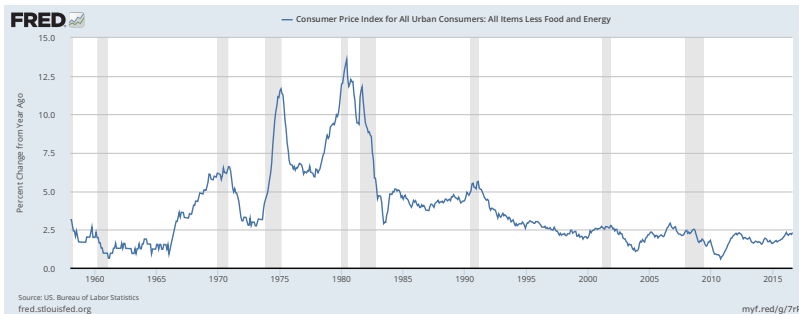
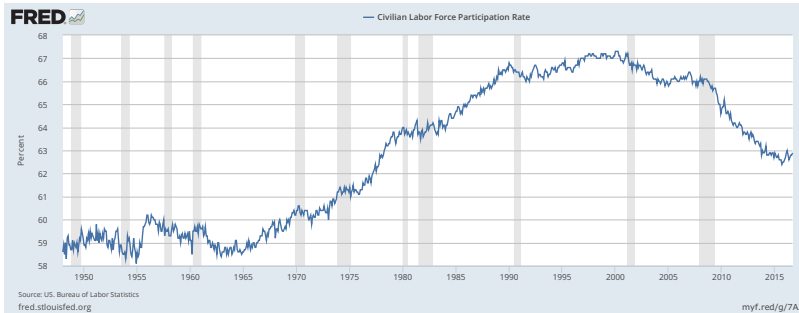
Forward guidance has had the desired short term effect, longer term interest rates have dropped as hoped for. It does, however, come with some costs. First, the policy possibly ties the Fed's hands going forward. Second, it is easy for these types of statements to be misinterpreted as a signal that the Fed is worried about the state of the economy. The Fed itself is skeptical, however, of this latter concern. It does not believe that its forecasts are much better than others that are available.

Lift Off

The Fed finally raised interest rates in December 2015 to a range between 0.25% and 0.50%. As of October 2016, the expectation is that the Fed will continue to raise rates over the next few years, with the main issue being how fast it will do so. Among the motivations for higher rates are:

1. The U-3 unemployment rate is close to its natural rate. Other measures, such as labor force participation, however, have exhibited a much more tepid recovery.
2. Core inflation (which removes energy and food) is below its 2% target, but has crept close. Combined with #1, these suggest that it may be time for monetary policy to return to more normal conditions with interest rates significantly above zero.
3. Other considerations such as foreign macroeconomic conditions (which are generally worse than those in the United States), financial stability, and commodity do not collectively present enough concerns to prevent the Fed from returning to more normal monetary policy.





In addition to choosing its Federal Funds rate target, the Fed must also decide what to do with its \$4.5 trillion dollar balance sheet. Currently, the Fed is maintaining its current mix of agency mortgage backed securities and longer term Treasuries (more on this when we discuss non-conventional monetary policy).

Finally, we consider two other Central Banks, the Bank of England and the European Central Bank. Their story is similar, if somewhat less aggressive, to that of the Fed. They also responded to the Great Recession by lowering rates.²

²Source: www.assetview.co.uk

