Kuttner (2018)

These notes discuss non-convetional monetary policy and loosely follow Kuttner (2018). We begin with a basic observation: the Federal Funds rate, by itself, is of minimal economic importance. It is an overnight rate at which banks lend to each other. Longer-term rates, such as corporate bonds yields, mortgages, small business loans, etc. are economically more important.

We will thus begin with a simple model of the 10-year Treasury yield. We are using this as a proxy for the long-term rates that matter.

Consider an agent looking to save over ten years. They have two options. They can issue 10 consecutive, one-year loans, or they can issue a single ten year loan. For now, lets assume that they are indifferent between the two options. Arbitrage then suggests that the two options should yield the same return:

$$(1 + i_{10,t})^{10} = E_t[\Pi_{i=1}^{10}(1 + i_{i,t})] \tag{1}$$

so that

$$i_{10,t} = (E_t[\Pi_{i=1}^{10}(1 + i_{i,t})])^{\frac{1}{10}} - 1 \tag{2}$$

In other words, the ten-year yield is similar to an average of current and expected short-term rates over the next ten years.

In practice, agents are not indifferent between these two options. We define the difference between them as the "term premium."

$$i_{10,t} = (E_t[\Pi_{i=1}^{10}(1 + i_{i,t})])^{\frac{1}{10}} - 1 + TP_{10,t} \tag{3}$$

The term premium is usually, but not always, positive. It captures all of the factors that cause savers, all else equal, to prefer shorter-duration debt. Some of the factors that drive the term premium are:

1. Volatility. By buying a ten-year bond, savers assume the risk of unexpected changes in interest rates. A 4% yield on the 10-year bond could be much different than future short-term rates. One major driver of volatility is inflation risk.

2. Default Risk. A government is more likely to default over the life of a ten year bond than a one-year bond. Some of the term premium is thus compensation for this risk.

3. Issuance. The government chooses which durations to auction off. If it chooses more 10-year debt, it may have to pay higher term premiums to sell its issuance.

4. Other demand factors.If any other factor causes more demand for ten year debt, then the term premium may fall.

We can further break down the yield by imagining a hypothetical yield if interest rates were always at their neutral level. The difference between this hypothetical interest rate and the actual one identifies the cyclical component of the 10-year yield. If monetary policy is accomodative (below neutral), then yields will be lower. Restrictive monetary policy yields to higher yields.

$$CY_t = (E_t[\Pi_{i=1}^{10}(1 + i_{i,t})])^{\frac{1}{10}} - (1 + i_n) \tag{4}$$

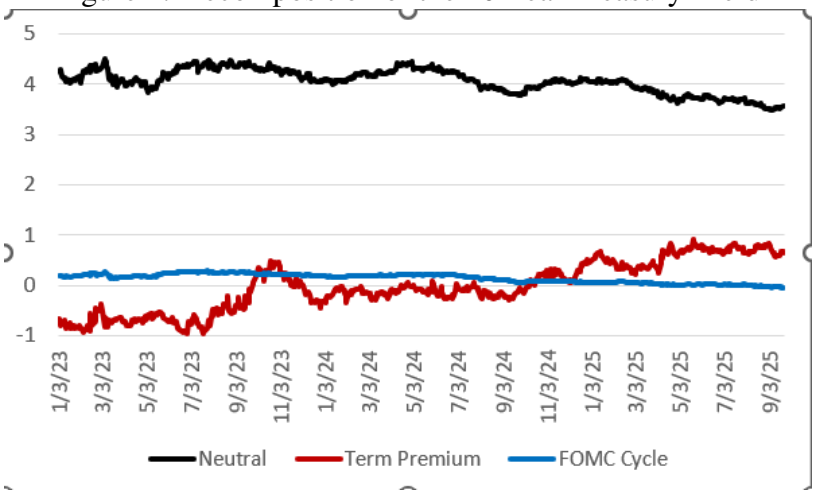
Equation $\mathring{2}$ shows a key mechanism about how conventional monetary policy work. Assume that i_1, t does closely follow the Federal Funds rate (we can think of this rate as the one-year Treasury yield). By lowering rates today, all else equal, the FOMC is able to lower long-term yields as well.

It is possible, however, that lowering the federal Funds rate could raise the 10-year Treasury. On way is if the Fed lowers rates by less than expected. Another is if a lower Fed Funds rate causes either future expected interest rates to rise or term premiums to increase. This might happen if bond markets believe that the Fed has made an error by lowering rates that risks higher inflation in the future. To minimize this concern, the Fed tries to be transparent in how it conducts monetary policy.

We can thus break the 10-year yield own into three parts 1) The cyclical part, 2) the term premium, 3) the neutral rate. This is actually an expectation (we will learn how to forecast neutral later). We will also assume that neutral is constant,

The following chart decomposes the 10-Year into its three parts. Estimates of the term premium are taken from the NY Fed. I estimated the expected neutral rate using my skillz.

Figure 1: Decomposition of the 10 Year Treasury Yield



The Effective Lower Bound

Our basic New Keynesian mode assumes that the Federal Funds rate (FFR) can equal any real number. In practice, however, the FFR has a lower bound.The FFR applies to loans made on electronic reserves held at the Fed. Suppose that the FFR and other interest rates on reserves were negative. Financial institutions would be free to convert their reserves to cash (there are no longer required reserve ratios in the U.S.) which then yields a better return. Because converting to and holding cash is costly, they may tolerate slightly negative rates, but they will not endure significantly negative rates.

It may be possible to charge significantly negative rates if banks were requires to hold reserves or if the economy were cashless.

The problem that the Fed faced in 2008 and 2020 is that when demand slows by a large amount, conventional monetary policy may run into the effective lower bound. In practice, this equated to

the 0-25 bps band for the FFR. In both cases, the Fed felt that this was not adequate to address the economic situation. It thus pursued non-conventional measures. It also partly motivated renewed interest in fiscal policy as a stabilization tool.

Forward Guidance

Forward guidance works by influencing expected future short term rates. Conventional monetary policy does this as well. The Fed's quarterly Summary of Economic Projections provides a three year forecast of interest rates. The FOMC maintains, however, that this is just a forecast and not a commitment. Forward guidance is usually taken to mean unusually explicit commitments about future interest rates.

When the FOMC first lowered the FFR to the effective lower bound in 2009, bond markets expected rates to stay that low for only a few quarters. As a result, long-term yields did not decline by as much as the Fed wanted. So the Fed switched to a policy of forward guidance by making promises about future FFRs. 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.

If the Fed is credible (believed by bond markets), then this forward guidance will pin down expectations in this example for the next three years.

$$i_{1,t} = E_t[i_{2,t}] = E_t[i_{3,t}] = 0 \tag{5}$$

Plugging $\mathring{4}$ into $\mathring{2}$ shows a clear mechanism for how this forward guidance will lower the 10-year yield. This, however, assumes that the forward guidance does not impact longer-term expectations or the term premium.Likewise, if bind markets already expected $\mathring{4}$, then it will not have an impact.

The downside of forward guidance is clear. If economic conditions change, and the Feds plan is no longer desirable, then it will have to choose between breaking its commitment (and risking its credibility) or sticking with a sub-optimal policy. To prevent this, the Fed switched to making its forward guidance conditional on economic conditions. In December 2012, 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.

The FOMC would next use forward guidance at the start of the covid-19 pandemic. In January 2021, the FOMC wrote:

> The Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and expects it will be appropriate to maintain this target range until labor market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time.

This language may have contributed to the Fed being too slow to eventually raise rates and the inflation in 2022. Theory suggests that when inflation is 2% and the labor market is at full employment, then FFR should be around neutral, not zero. The FOMC, however, committed to the latter.

The Fed's balance Sheet

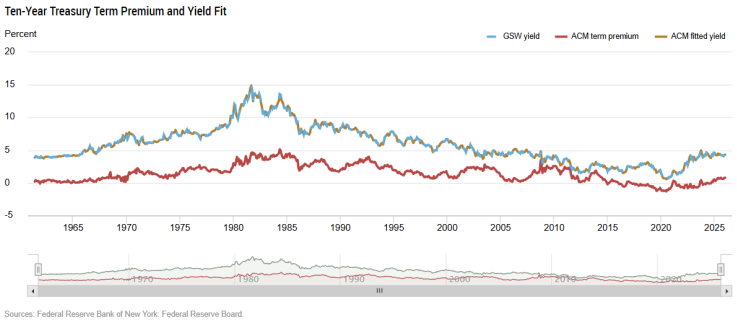
Recall how the Fed affects interest rates. When the Fed wants to lower the Federal Funds rate, it buys bonds, raising their price and lowering yields. Prior to 2008, the Fed conducted monetary policy in a manner that led to banks keeping relatively few reserves at the Fed. This system has some properties. First, the Fed bought as few assets as possible. Second, the Fed bought almost exclusively short-term Treasuries. The Fed's holdings of assets are known as its "balance sheet." Prior to 2008, the balance sheet consisted of about $700 billion

Under this policy, the FOMC did not think of its balance sheet as a distinct policy. The FOMC instead choose the FFR and the balance sheet adjusted accordingly.

Quantitative Easing (QE)

Quantitative easing is an effort to use the Fed's balance sheet as a separate policy tool. QE is the purchase of long-term debt. Many of these were longer-term Treasuries including 10-year bonds. QE can work like forward guidance if bond markets see it as a signal that the Fed is unlikely to raise rates until QE ends. The more direct channel, however, is through the term premium. QE has the effect of making the average Treasury sold to the non-Fed public of shorter duration. This may reduce term premiums. In other words, the Fed is providing extra demand for long-term debt, driving down yields.

Figure 2: NY Fed Estimated 10-Year Term Premium

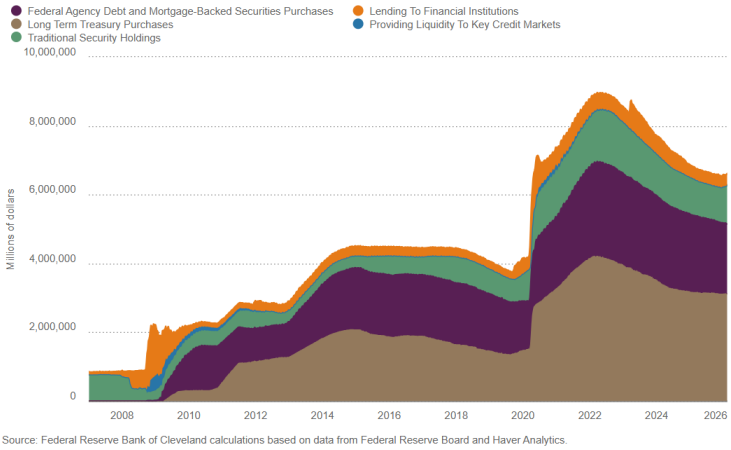


A look at the NY Fed's estimated term premiums suggests that term premiums id decline as the Fed implemented QE after the Global Financial crisis and covid-19.

The Credit Channel

So far, we have focused on Treasuries. QE also, however, purchased large amounts of mortgage backed securities, which are bundles of individual mortgages. The following chart shows the of teh Fed's balance sheet since 2007.

Figure 3: The Fed's Balance Sheet



Part of the motivation behind buying MBSs is similar to that of buying loner-term Tresuries, to dive down term premiums. Another motivation is the credit channel. Treasuries have a very low default risk. This is not the case with mortgage debt. Because of default risk, borrowers on risky loans have to pay a credit spread (aso known as a risk premium) to compensate lenders for default risk. default risk is, however, itself a function of the risk-free rate (the Treasury yield here). Lower risk free rates reduce default risk and therefore reduce term premiums.

Figure 4: Average 30-Year Fixed Mortgage rate

Both eras of QE led to extremely low mortgage rates. This was not without cost. One of the current

drivers of poor housing affordability is that households who refinanced or took new mortgages when rates were very low have been hesitant to sell.

Emergency Lending

During the past two recessions, the FOMC engaged in other policies unrelated to the FFR. One example was emergency lending. Because this was the original mission of teh Fed, I hesitate to describe it as non-conventional.