Inflation Targeting

On page 529, Blanchard has the following equation (where we replace the *'s with ^{T}'s):

$$(1)\ i_t = i^T + a\cdot(\pi_t - \pi^T) - b\cdot(u_t - u_n)$$

This equation goes by many names: interest rate rule, Taylor rule, or inflation targeting. The logic behind the equation is as follows:

1) The Fed has targets for the nominal interest rate (i^T), inflation (π^T), and unemployment (u_n).

2) The nominal interest rate target equals $r_n + \pi^T$ (the real natural interest rate + the inflation target). This is the only nominal interest rate that is consistent with medium run equilibrium (in the same way that u_n is the only unemployment rate that is consistent with medium run equilibrium).

3) The idea behind equation (1) is that the Fed adjusts the nominal interest rate above or below i^T based on how well it is hitting its inflation and unemployment targets.

4) All things being equal, the Fed raises the nominal interest rate (ie. decreases the nominal money supply and shifts the LM curve backwards) and cools off the economy when π is above its target and/or u is below its target (a boom, $u < u_n$).

5) All things being equal, the Fed lowers the nominal interest rate (ie. increases the nominal money supply and shifts the LM curve out) and expands the economy when π is below its target and/or u is above its target (a recession, $u > u_n$).

6) Because the Fed has only one instrument/arrow (ie. the nominal interest rate or the nominal money supply), it cannot hit both targets at once when there is a conflict between them, and it has to compromise. The 'a' and 'b' coefficients represent the degree to which the Fed "regrets" missing its targets. A value of 'a' that is substantially bigger than 'b' implies that the Fed cares much more about hitting its inflation target than it does about getting the economy to u_n. We formalize this with the following Loss Function:

$$(2)\ L = \frac{a}{2}(\pi_t - \pi^T)^2 + \frac{b}{2}(u_t - u_n)^2$$

The Fed chooses the inflation rate to minimize the Loss, L, in (2):

$$(3)\ \frac{dL}{d\pi} = a(\pi_t - \pi^T) + b(u_t - u_n)\frac{du_t}{d\pi} = 0$$

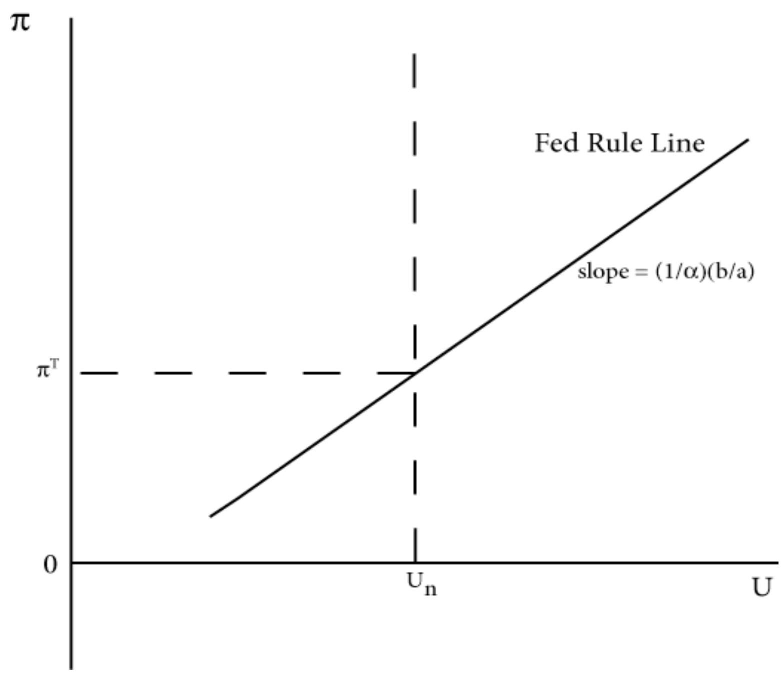
From the Phillips Curve:

(4) $\frac{du_t}{d\pi} = -\frac{1}{\alpha}$

Substituting (4) into (3) and solving for π yields:

(5) $\pi_t = \pi^T + \frac{1}{\alpha}\frac{b}{a}(u_t - u_n)$

which we call the Fed Rule Line. Following the Rule in (1), the Fed changes the interest rate by changing the money supply so that the economy's combination of π and u lie on the line described by equation (5). Equation (5) summarizes the results of the Fed's behavior – you cannot see the underlying values of the money supply or the interest rate. This makes the Rule simple to use, but it hides what the Fed is doing with the exogenous variable that it controls (the high powered money supply).

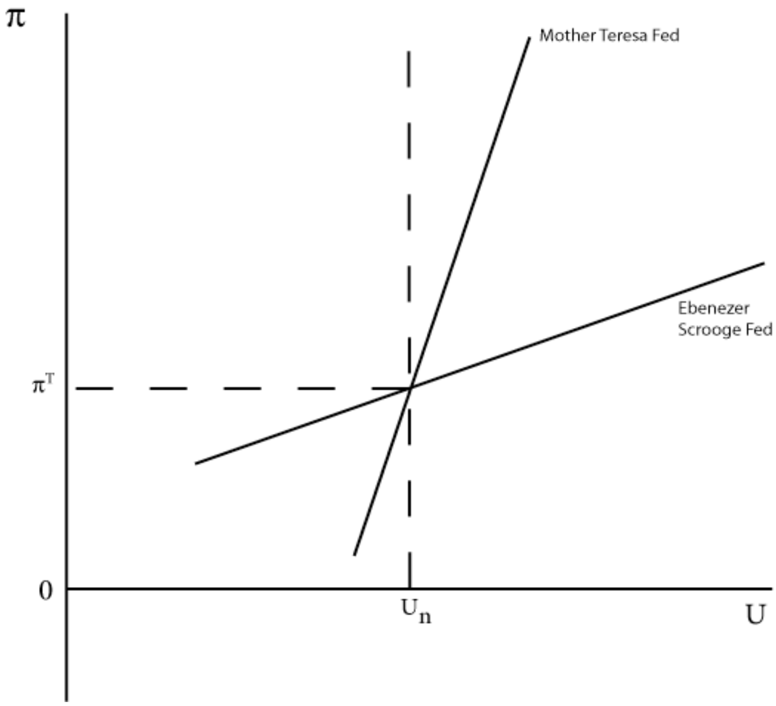


The Fed Rule Line makes our Inflation Model A LOT simpler **(though it only holds if the Fed is in fact following the rule)**. There is always an AO line behind the scenes, but you do not have to worry about it because the Fed is manipulating g_{mt} to assure that the economy is on the Fed Line. The Pinning Rule for the Fed Line is very simple:

Pinning Rule for Fed Line: The Fed Line goes through the intersection of π^T and u_n.

The line only shifts if the targets, π^T or u_n, change. Aside from these shifts, all that happens in this model is that the economy moves up and down the Fed Line as the Phillips Curve shifts as inflationary expectations (π^e) change.

We can, however, think of different types of Feds with different 'a's and 'b's:



The Mother Teresa Fed wants to keep u close to u_n (b/a big). The Scrooge Fed wants to keep π close to π^T (b/a small). When disinflating the economy, the Mother Teresa Fed pulls the Band-aid off slowly, while the Scrooge Fed goes Cold Turkey.

There are, of course, **Reduced Form Equations**. They are gotten by solving for the two endogenous variables, π and u_n, using the Phillips Curve and the Fed Rule Line:

$$(6)\ \pi_t = \left[\frac{\alpha^2 a}{\alpha^2 a + b}\right]\pi^T + \left[\frac{b}{\alpha^2 a + b}\right]\pi_t^e$$

$$(7)\ u_t = u_n + \left[\frac{\alpha \cdot a}{\alpha^2 a + b}\right]\left(\pi_t^e - \pi^T\right)$$

While the equations look a little complex, there are straightforward intuitions behind them. According to (6), inflation is a weighted average[1] of the inflation target and expected inflation. In medium run equilibrium, when expected inflation equals the target, inflation itself equals the target.

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1 A weighted average is any summation where the weights in the summation, sum to 1. A standard average has weights equal to 1/n where n is the number of entities in the average.

According to (7), unemployment is above the natural rate only to the extent that expected inflation is above the inflation target (ie. the extent to which the Phillips Curve intersects the vertical natural rate line at a point above π^T). So, a boom is characterized by expected inflation below the target and a recession by expected inflation above the target.

Dynamics enters the model once you make expected inflation adaptive:

$$\pi_t^e = \pi_{t-1} .$$