LECTURE 19: MONETARY POLICY*

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We have seen that monetary policy affects only the inflation rate in the long run. Thus, a central bank should adopt a target inflation rate based on the benefits and costs of inflation. In the short run, however, monetary policy also affects output, so the central bank must decide whether to deviate from its target to respond to economic shocks. Before the crisis, this decision depends on the degree to which the central bank cares about fluctuations in unemployment and inflation. This lecture provides a basis to think about this question in light of the long-run objectives of the central bank. The recent crisis has presented many countries with the challenge of the liquidity trap and new processes to achieve macroeconomic stability beyond stable inflation. Whether the central bank should change interest rates or offer new macroeconomic prudential tools are the preeminent macroeconomic policy issues. (Assigned reading: section 24-1 of required textbook)

1 THE OPTIMAL INFLATION RATE

The costs of inflation. Within the range of moderate inflation, say from 0% to 4% per year, economists identify four main costs of inflation:

- Shoe-leather costs. In the medium run, a higher inflation leads to a higher nominal interest rate and hence a higher opportunity cost of holding money. As a result, people decrease their money demand by making more trips to the bank.
- Money illusion. Causal evidence suggests that inflation often leads people and firms to make systematic mistakes in assessing nominal versus real changes in incomes and interest rates.
- Tax distortions. For example, taxes on capital gains are typically based on the difference between sale price and purchase price, both in dollars. This implies that the higher the inflation, the higher the taxes, even when the real capital gain is zero.[1]
- Inflation variability. Higher inflation is typically associated with more variability, making financial assets which promise fixed nominal payments in the future riskier. With

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These are notes that I used by myself to lecture from and for educational purposes only. The material presented here is largely based upon the undergraduate textbook by Blanchard and Johnson (2012), *Macroeconomics*, 6th Edition, Prentice Hall. Please do NOT circulate.

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[1] Another example is **bracket creep**, a situation where people are pushed into higher tax brackets as their nominal income—but not necessarily real income—increase over time.

constant inflation, the real values of the financial assets are known with certainty.[2]

The benefits of inflation. Inflation is not all bad. There are three benefits of inflation:

- Seignorage. Money creation is an alternative to borrowing from the public or raising taxes for the government to finance its spending. This is the case when the government issues and sells bonds, which are purchased by the central bank.[3]
- The option of negative real interest rates. An economy with a higher average inflation rate has more room to use monetary policy because, given unchanged expected inflation in the short run, it allows for a larger decrease in the nominal interest rate, leading to an even negative real interest rate.
- The interaction between money illusion and inflation in facilitating real wage adjustments. The presence of inflation allows for the downward real wage adjustments more easily than when there is no inflation.

The current debate on optimal inflation rate. For the time being, most central banks appear to be aiming for low but positive inflation rates of about 2%. This is, however, being challenged by two fronts:

- Those who want to achieve price stability argue that 0% inflation target simplifies a number of complicated decisions and eliminates the scope for money illusion. Also, given the time consistency problem facing central banks, credibility and simplicity of the inflation target are important.
- Those who want to aim for a higher inflation argue that 4% inflation target would be helpful to avoid falling in the liquidity trap in the future.

2 THE DESIGN OF MONETARY POLICY

Now we look at the evolution of monetary policy up to the crisis.

Money growth targets and target ranges. Until the 1990s, the design of monetary policy in advanced countries typically centered around nominal money growth.

- The central bank chose a target nominal money growth rate corresponding to the inflation rate it wanted to achieve in the medium run. For example, if the desired inflation

[2] A number of countries have introduced **indexed bonds**—bonds that promise a nominal amount adjusted after inflation—so people can better protect themselves against movements in inflation.

[3] The seignorage argument can be relevant in economies that do not have a good fiscal system in place, but hardly so for the OECD countries today given their inflation rates and ratios of the monetary base.

rate was 4% and the normal output growth rate was 3%, the target nominal money growth rate is chosen as

$$g_M = \pi + g_Y = 4\% + 3\% = 7\%$$

- In the short run, the central bank conducted monetary policy in terms of deviations of nominal money growth from the target. For example, it increased nominal money growth above the target in a recession and did the reverse in an expansion.
- To communicate to the public its objectives in the short and medium run, the central bank announced a range for the nominal money growth rate.

The above theory hinges on the assumption that there is a close relation between inflation and nominal money growth in the medium run. In practice, however, this relation is not tight enough that the central bank can achieve precisely its inflation target by choosing a nominal money growth rate, not even in the medium run. See Figure 1 below.[4]

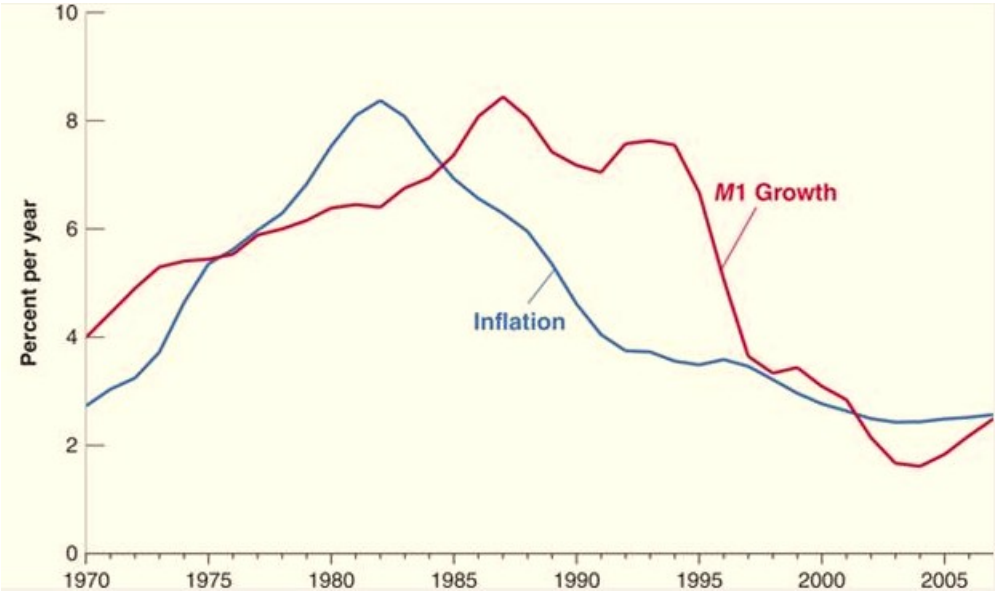

Figure 1. M1 growth and inflation: 10-year averages, 1970 to the crisis

Inflation targeting. Starting in the early 1990s, a dramatic rethinking of monetary policy took place, based instead on inflation targeting. The primary goal is to achieve a low inflation rate in both the short and medium run. There are two main reasons:

- In the medium run, the primary goal of monetary policy is to achieve a given inflation target. Targeting on the nominal money growth may not lead to that target.

[4] In the U.S., this is because the demand for money shifted frequently and largely throughout the 1970s and 1980s, creating serious problems for central banks. For example, the introduction of credit cards and money market funds led to a large negative shift in the demand for money.

- In the short run, inflation targeting leads the central bank to act in such a way as to eliminate all deviations of output from its natural level. To see why, recall the Phillips curve relation among inflation, lagged inflation, and the deviation of unemployment from its natural rate

$$\pi_t = \pi_{t-1} - \alpha(u_t - u_n) \tag{2.1}$$

  If the central bank could achieve its inflation target in every period, i.e. $\pi_t = \pi^*$, then $u_t = u_n$ and by implication, output would always stay at its natural level.[5]

Interest rate rules. Because inflation is not under the direct control of the central bank, John Taylor argued that, since the central bank affects spending through the interest rate, the central bank should think directly in terms of the choice of an interest rate.

- Let i^* be the target nominal interest rate associated with the target inflation rate π^* in the medium run. Taylor suggested a rule, now known as the **Taylor rule**, that the central bank should set the nominal interest rate according to

$$i_t = i^* + a(\pi_t - \pi^*) - b(u_t - u_n) \tag{2.2}$$

  where $a > 0$ and $b > 0$ are coefficients.

- If inflation is on its target $\pi_t = \pi^*$ and unemployment is at its natural rate $u_t = u_n$, then the central bank should set the nominal interest rate to its target $i_t = i^*$.

- The coefficient a reflects how much the central bank cares about inflation. The higher a, the more the central bank increases nominal interest rate in response to inflation, the more unemployment increases, and the faster inflation returns to its target. Because what matters for spending is the real interest rate, the central bank must increase nominal interest rate more than one-for-one, i.e. $a > 1$, with inflation.[6]

- The coefficient b reflects how much the central bank cares about unemployment. The higher b, the more the central bank is willing to deviate from target inflation to keep unemployment close to its natural rate.

- In reality, the central bank also adjusts the nominal interest rate in response to many events, e.g. exchange rate crisis, other than those included in (2.2).

[5] This result is too strong, however, for two reasons: first, the central bank cannot always achieve the inflation target in the short run; second, the Phillips curve relation does not hold exactly.

[6] Some economists argue that the increase in U.S. inflation in the 1970s was because the Fed increased the nominal interest rate less than one-for-one with inflation. The result was that higher inflation led to lower real interest rate and hence higher demand, which led to even higher inflation and even lower real interest rate.

3 CHALLENGES FROM THE CRISIS

Since 2007, the crisis has presented many central banks with two challenges: first, the liquidity trap has prevented them from decreasing the nominal interest rate as much as they wanted; second, stable inflation is not, by itself, a guarantee of macroeconomic stability.

The liquidity trap. When an economy falls into the liquidity trap, i.e. the short-term nominal interest rate on government bonds is down to zero, conventional monetary policy can no longer be used. This raises three issues:

- Avoiding falling into the trap. One way is to adopt a higher inflation target. The higher is average inflation, the higher is the average nominal interest rate, and the more room for the central bank to decrease the nominal interest rate in response to an adverse shock before falling into the trap.
- Getting out of the trap. If the central bank can lead people to expect higher inflation, given zero nominal interest rate, the real interest rate decreases, leading to an increase in demand and hence output, and thus help the economy to recover. One way is the use of **quantitative easing**, i.e. a large increase in the money stock.
- Dealing with the trap. The central bank can decrease many other interest rates that may still be positive by buying the corresponding assets directly. Such actions are called **credit/qualitative/targeted easing**.

While unconventional monetary policy tools can help when the economy is in the liquidity trap, they do not work as reliably as does conventional monetary policy, namely movements in the short-term nominal interest rate.

Macro prudential regulation. The crisis has forced the central bankers to reconsider the asset prices and the financial system, and the right instruments to deal with bubbles, credit booms, etc., are **macro prudential tools**, i.e. rules that aim directly at borrowers or lenders, rather than the interest rate, which affects the whole economy.

- Tools aimed at borrowers. For example, the central bank can tighten the conditions under which borrowers can obtain mortgages by lowering the maximum **loan-to-value ratio (LTV)**, i.e. a ceiling on the loan size borrowers can take relative to the house value, which is likely to decrease demand and slow down the price increases.
- Tools aimed at lenders. For example, the central bank can impose minimum capital ratios so as to limit leverage. High leverage was one of the main reasons why housing price declines led to the financial crisis.