Rules and Discretion in Monetary Policy

1 Rule-type and Discretionary Policy

If the expectations of the public about government policies are affected by the behavior of the government, then the agents' decisions, taking these expectations into account, will influence the success or failure of government policies. There are two issues involved. The first concerns how the government makes people believe that the government will pre-commit its policy announcements. The second concerns the distinction between rules and discretionary behavior.

Suppose the policy instrument of the monetary authority (MA) is the growth rate of money stock, $\triangle m_t$, where $m_t = \ln M_t$. Consider the monetary authority sets $\triangle m_t$ quarterly according to

$$\triangle m_t = 0.02 + 0.5(UN_{t-1} - 0.04), \tag{1}$$

where UN_t denotes the economy's unemployment rate for time t. That is, the growth rate of money is 2% quarterly if unemployment rate remains at 4%. This formula suggests that the MA is *activist*, that is, the monetary policy is set to reflect the current state of the economy.

By contrast, suppose the monetary authority sets

$$\triangle m = 0.03, \text{ or } 0.02 \leq \triangle m_t \leq 0.04,$$

then this specifies a constant value or rule for the growth rate of money supply. The formula does not contain any policy response to the state of the economy and thus *non-activist*.

Rule-type policymaking involves implementation in each period (or in each case) of a formula designed to apply to all periods (or cases) in general, while *discretionary* policymaking involves making decisions in each period (or case).

2 An Example

In the following, we consider an example by Kyland and Prescott (1977). According the short run Phillips curve, we know that a surprise increase in money growth will increase inflation rate but can temporarily reduce unemployment according to

$$UN_t = UN_n - \rho(\pi_t - \pi_t^e). \tag{2}$$

Suppose the MA's objective is to avoid inflation and unemployment. The objective function (Loss function) of the MA is

$$\Gamma = \sum_t L_t = \frac{a}{2}\sum_t(\triangle m_t - m^*)^2 - b\sum_t(\triangle m_t - \triangle m_t^e), \tag{3}$$

where $a > 0$ and $b > 0$. Suppose the agents form expectations rationally, then $\triangle m_t^e = E_{t-1}\triangle m_t$. The purpose here is to minimize Γ by choosing a value of $\triangle m_t$.

2.1 Rule

Firstly, suppose the MA is choosing a *rule* (a constant value of money growth rate) for all periods. *Since the MA takes into account the fact that on average rational agents will neither overpredict nor underpredict* $\triangle m_t$ (that is agents' expectations are rational), then the second term in the MA's objective function disappear. The minimum is achieved if the MA sets $\triangle m_t = m^*$ for all t. Thus, the monetary policy $\triangle m_t = m^*$ for all t is socially optimal.

2.2 Discretion – Time Consistent Policy

Next, let's turn to the choice under *discretion*, that is, *the choices are made on a period-by-period basis.* Suppose at period 3, $t = 3$, the MA chooses $\triangle m_3$ to minimize

$$L_3 = \frac{a}{2}(\triangle m_3 - m^*)^2 - b(\triangle m_3 - \triangle m_3^e). \tag{4}$$

Since $\triangle m_3^e$ *has been determined at the end of period 2 and thus fixed* when the MA chooses $\triangle m_3$ Thus, $\triangle m_3 - \triangle m_3^e$ may not equal to zero in the minimization calculation. The first order condition is

$$\frac{\partial L_3}{\partial \triangle m_3} = a(\triangle m_3 - m^*) - b = 0. \tag{5}$$

Thus, $\triangle m_3 = m^* + b/a$ is the optimal value for period 3. When it comes to period 4, $\triangle m_4^e$ has been determined at the end of period 3 and the optimal value is again $\triangle m_4 = m^* + b/a$. Therefore, the optimal value of money growth made in a discretionary period-by-period fashion is $\triangle m_t = m^* + b/a$ for all t. The government policy obtained taking the expectations of the public as given is called *time consistent policy.*

2.3 Which is Better?

To evaluate which regime of policymaking is better for the agents, we calculate the average value of the loss function L_t, that is Γ.

The first step is to recognize the fact that while the actual money growth rate $\triangle m_t$ can be chosen in a single period to differ from the expected money growth rate $\triangle m_t^e$, *on average* $\triangle m_t^e$ *and* $\triangle m_t$ *will be equal under both types of policymaking.* This result follows from the assumption that private agents are rational because rational agents will form their expectations of money growth and inflation in a manner that yields an average expectational error of zero. *Thus, no matter which regime of monetary policy is undertaken, the second term of the loss function is zero.*

Now calculate the average values of the loss function under the two regimes. We find that $\Gamma = 0$ under rule with $\triangle m_t = m^*$ for all t and $\Gamma = Nb^2/2a$ under discretion with $\triangle m_t = m^* + b/a$ for all $t = 1$ to N. *Thus, the outcome of the time consistent policy is suboptimal.* On average, the effect of monetary policy on unemployment will be zero (according to Phillips curve) and the difference between the two policy approaches is inflation rate. But rule-type policymaking leads to a lower inflation, while discretionary policymaking leads to a higher inflation.

2.3.1 The Intuition

The reason that discretion is inferior can be understood as follows. Given $\triangle m_t^e$, the MA can chooses a higher $\triangle m_t$ away from $\triangle m_t^e$ so that unemployment is reduced. Consequently, from the perspective of the period at hand, there is a tradeoff between the

reduced-unemployment benefits of faster monetary growth and the increased-inflation costs of faster monetary growth. *However, the MA fails to recognize the overall effects of the policy process. Specifically, it fails to recognize the value at which* $\triangle m_t^e$ *is "given" is itself determined by the ongoing process of policymaking.* The value of $\triangle m_t$ chosen each period will lead the agents to believe that $\triangle m_t$ will be $m^* + b/a$ and to form expectations $\triangle m_t^e = m^* + b/a$. This effect of policy on expectations is not taken into account in period-by-period decision making. The advantage of rule-type policymaking is that it views the problem not as a sequence of unrelated decisions, but as the choice of an ongoing process that has desirable properties.

2.3.2 Lessons Learnt

The example also explains why it is difficult for the government to commit to previously announced rules. To see this, suppose at time t the government announces that it will choose $\triangle m_t = m^*$ for all t. Thus, the public form expectations $\triangle m_t^e = m^*$. *Once the government perceives that the public's expectations of inflation equals* m^**, then it is optimal for the government to deviate from the previous commitment and inject unexpected money*, for example at time 5, $(\triangle m_5 = m^* + b/a)$ to achieve a lower level of unemployment and higher output. In this case, $L_5 = -b^2/(2a) < 0$.

However, once the public realize that inflation rate has been higher, they will optimally adjust the expectations: $\triangle m_{t+1}^e = \triangle m_t = m^* + b/a$. Hence the lower money supply growth rate (m^*) can no longer be sustained, even though it is socially optimal. If the government wants to raise output and lower unemployment next time, it has to engage in a much larger money supply growth, for example, $\triangle m_5 > m^* + b/a$. Since the government has incentives to deviate from the socially optimal policy when the public expect it to be followed, the socially optimal policy is also called the *time inconsistent policy.*

The above problem can be ruled out if the government can be compelled to adhere to its pre-set money supply growth target and does not have discretionary power.