Policy Discretion and Time Inconsistency

The basic case

Suppose the private sector sets wage inflation = w, and the government sets price inflation π. Normalise the natural rate of output (y) as equal to one. Define the government's loss function as

$$L = \alpha\pi^2 + (y-k)^2 \qquad (1)$$

where, k>1, because monopoly distortions make the natural rate too high. The relationship between output, wage inflation and price inflation is

$$y = 1 + \beta(\pi - w) \qquad (2)$$

Intuitively, if π>w then real wages are falling so output supply increases.

If the private sector and government co-operate, the first best solution is to set π=0 and w=(1-k)/β, to give L* = 0.

If co-operation is not possible, suppose instead the private sector sets wages equal to expected price inflation π^e. Equation (2) now becomes a familiar Phillips curve

$$\pi = \pi^e + (y-1)/\beta \qquad (3)$$

Assume the government sets π after π^e has been chosen, so it optimises L for given π^e. This yields

$$\pi = (\beta^2\pi^e + \beta(k-1))/(\alpha + \beta^2) \qquad (4)$$

If π^e is zero or positive, then it is best for the government to set positive inflation to get output above the natural rate.

Now consider a rational expectations equilibrium, where π^e=π. In this case from (3) output must equal the natural rate (=1), so there can be no output gain. Yet from (4) we have $\pi = \beta(k-1)/\alpha > 0$. This quantity is called the *inflation bias*. The loss function in this case is

$$L_{tc} = \beta^2(k-1)^2/\alpha + (1-k)^2$$

where the subscript tc stands for the *time consistent* solution.

The government could do better by not optimising, and instead committing itself to set π=0 whatever π^e. The rational expectations equilibrium would then have π^e=0, implying a loss function simply equal to the natural rate inefficiency:

$L_{ti} = (1-k)^2$

Here ti stands for the *time inconsistent* solution. Why inconsistent? Because once π^e has been set, $\pi=0$ is not the best the government could do. Instead it could set a positive inflation rate, and get output above the natural rate. In this case the loss function would be

$$L_f = \alpha(k-1)^2 / (\alpha + \beta^2)$$

Blanchard and Fischer call this the *fooling solution,* because the private sector has been fooled by the government's initial announcement that it would set inflation to zero. We can rank all four outcomes:

$L^* < L_f < L_{ti} < L_{tc}$

Note that if the private sector has the same loss function as the government, it would in a sense like to be fooled! But this is not an equilibrium, because inflation is not equal to expected inflation. The only two equilibria are the two inferior outcomes, and of these two the one where the government does not optimise *after expectations are formed* is the better. This is sometimes termed the *problem of time inconsistency.* How can the government commit itself not to reoptimise? Note that this problem arises *even if the government and private sector have the same preferences.*

Adding Shocks

Is the time inconsistent, or non-discretionary outcome always better? Not if we introduce uncertainty into the problem. Suppose the economy can be hit by some shock u, such that (2) becomes

$$y = 1 + \beta(\pi - w) + u \qquad (5)$$

Expectations are formed before the shock is observed. The optimal value of inflation given expectations and the realisation of the shock is

$$\pi = (\beta^2 \pi^e + \beta(k-1) - \beta u) / (\alpha + \beta^2) \qquad (6)$$

To find the rational expectations equilibrium, take expectations of (6) using an information set that excludes u:

$$\pi^e = \beta(k-1)/\alpha$$

Substituting this into (6) implies

$$\pi = \beta(k-1) / \alpha - \beta u / (\alpha + \beta^2)$$

The *expected value* of the loss function now becomes

$$E[L_{tc}] = (1-k)^2 (1 + \beta^2 / \alpha) + E[u^2]\alpha / (\alpha + \beta^2)$$

The expected value of the loss in the precommitment case (where inflation and expected inflation are zero) is

$$E[L_{ti}] = (1-k)^2 + E[u^2]$$

This is lower than the time consistent value iff

$$E[u^2]\alpha / (\alpha + \beta^2) < (1-k)^2$$

Thus rules will be preferred to discretion if

- the 'stabilisation problem' $E[u^2]$ is small
- the 'inflation bias' problem (related to (1-k)) is large
- inflation is not very important in the loss function (small α)
- β is large (significant nominal or real rigidity)

The last two results may seem surprising, but they both come from the influence on the size of the inflation bias problem.

Terminology: Reputation and commitment

The terminology in this area is not very intuitive. The key point to hang on to is that the time consistent policy involves a policy where policy makers consistently reoptimise. In contrast, time inconsistent policies do not attempt to reoptimise period by period.

Romer in his textbook uses slightly different terms: dynamic consistency and inconsistency. Matters get still more confusing, once we consider ways of avoiding the time inconsistency problem.

One way of avoiding the inflation bias problem is for the policy maker to commit themselves to not exploiting the short run Phillips curve. But why will they be believed? They have to establish a reputation for not doing so. Even then, they will only be believed by rational agents if the gain from maintaining their reputation exceeds the temptation to renege.

As a result of this, time inconsistent policy solutions are often called commitment solutions. Optimal policy that is time consistent is sometimes called the discretionary solution, I guess because policy makers have the discretion to reoptimise. One difficulty of establishing reputation is that political discount rates are likely to be high (governments may not get re-elected), which clearly makes commitment less credible.

Both solution concepts (time consistent=discretion, and time inconsistent=commitment) are widely used in the literature.

Delegation

An alternative solution to this problem is delegation. Delegation can attempt to solve this problem at least two different ways. The first involves delegation to a more conservative agent e.g. a conservative central bank. By more conservative, we mean that the agent dislikes inflation (relative to output) by more than either the policy maker or the public (i.e α is high). We saw above that this will reduce the inflation bias problem. It will also mean that the agent under reacts to shocks, but that could still produce a better outcome than the time inconsistent case.

The second involves designing optimal contracts for the delegated authority, using principle agent theory. (The key paper here is by Walsh.) By penalising the agent for inflation, we can reproduce to commitment policy.

Both ideas have been linked with the apparent success of countries with independent central banks to produce low inflation. However, a far simpler explanation is that policy makers have a utility function that differs from the publics i.e. policy makers are not benevolent. For example, policy makers may be partisan, and/or they may discount too heavily because of the chance of not being re-elected. Central banks may also find it easier to establish reputations.