Solutions to

Problems about

"Credibility and Time Consistency in Economic Policy"

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Problem 1

1. Two important things about this particular Loss function of the Central Bank (CB)

(i) The relationship between β and γ

$\beta = \gamma$, unemployment and inflation have the same importance for the Central Bank (CB)

$\beta = 0$, CB just worries about inflation

$\beta \gtrless \gamma$ ...

(ii) The fact that $(u - u^*)$ is linear while $(\pi - \pi^*)^2$ is not linear

$u - u^*$: CB looses only when $u > u^*$

$(\pi - \pi^*)$: CB looses whenever $\pi \neq \pi^*$

2. Assuming $u^* = 4$; $\pi^* = 0$, we can re-write the Phillips Curve as

$$u - 4 = u^n - 4 - \alpha(\pi - \pi^e)$$

Inserting this into the loss function

$$\mathcal{L} = \beta\left[u^n - 4 - \alpha(\pi - \pi^e)\right] + \gamma \pi^2$$

$$\frac{\partial \mathcal{L}}{\partial \pi} = 0 \Rightarrow -\beta\alpha + 2\gamma\pi = 0$$

$$\Rightarrow \pi = \frac{\beta\alpha}{2\gamma}$$

as $\alpha = 15$ we obtain

$$\pi^d = 7.5\frac{\beta}{\gamma}$$

3. Under commitment, $\pi^e = \pi$ and

$$\frac{\partial \mathcal{L}}{\partial \pi} = 0 \Rightarrow 2\gamma\pi = 0$$

$$\pi^c = 0.$$

4. Under commitment we have always lower inflation and so a lower loss.

$$\pi^d = 7.5\frac{\beta}{\gamma} < \pi^c = 0.$$

5. Notice that if $\beta = 0$ (CB does not care about unemployment; just about inflation) then

$$\pi^d = 0 = \pi^c = 0.$$

Problem 2

Totally similar to the previous one, with only a minor difference: we have supply shocks (e_t).

But notice that in order to simplify things, we are asked to determine the optimal level of inflation, by assuming $e_t = 0$, so you do not have to go through the entire derivation process.

(1), (2) and (3) do as we did in Problem 1.

As far as question (4) is concerned, the deterministic result would be under discretion

$$\pi^d = -\frac{aY}{2} = \frac{0.5Y}{2}$$

while the stochastic one would be

$$\pi^d = \frac{0,5Y}{2} + \phi e_t$$

(4)

with ϕ as a parameter. Obviously,

$$E_t \pi^d_{t+1} = \frac{0.5\,\gamma}{2} = \pi^d$$

So the only thing that changes is the volatility, that now is part of the model, while it was not in the deterministic case.

Problem 3

1. $\mathcal{L} = \left[u^n - \alpha(\pi - \pi^e)\right]^2 + \gamma\pi^2$

$$\frac{\partial \mathcal{L}}{\partial \pi} = 0 \Rightarrow -2\alpha\left[u^n - \alpha(\pi - \pi^e)\right] + 2\gamma\pi = 0$$

with RE we have $\pi^e = \pi$ and so

~~now~~ we will have

$$-2\alpha u^n + 2\gamma\pi = 0$$

$$\pi^d = \frac{\alpha u^n}{\gamma}.$$

2. Under commitment we will get

$$\pi^c = 0.$$

(6)

3. Already explained in previous problems.

4. The result we obtained in question (3) depends crucially on the assumption of Rational Expectations (RE).

If private agents do not follow RE, then no one can guarantee that commitment will lead to lower inflation and higher social wellfare, because agents do not follow the information provided by the "committed" Central Banker. They will simply keep using from the past in the formulation of their expectations.