Introduction to Macroeconomics

Fourth Homework Exercise

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This homework assignment considers the small dynamic model that was introduced in Chapter 9 of Blanchard's book to describe the process of disinflationary central bank policy. The central issue in this example is the effect of inflation expectations.

1. Start from Blanchard's example 9.3 that was solved in class. An economy obeys the three equations

$$u_t - u_{t-1} = -0.4(g_{yt} - 3\%), \quad (1)$$

$$\pi_t - \pi_{t-1} = -(u_t - 5\%), \quad (2)$$

$$g_{yt} = g_{mt} - \pi_t, \quad (3)$$

with $\pi_0 = 8\%$, such that the economy is in its medium-term equilibrium (or dynamic equilibrium) in the year $t = 0$. Remember that this implies $u_0 = u_n = 5\%$ and $g_{y0} = \bar{g}_y = 3\%$, and hence $g_{m0} = 11\%$. Inflation can be taken down to $\pi = 4\%$ within one year and kept at this level, such that formally $\pi_t = 4\%$ for all $t \geq 1$. We can draw the summary table

t	u	π	g_y	g_m
0	5%	8%	3%	11%
1	9%	4%	−7%	−3%
2	5%	4%	13%	17%
3	5%	4%	3%	7%
4	5%	4%	3%	7%

Also note the *sacrifice ratio* of exactly 1, remembering that this ratio is defined as the excess points in the unemployment rate beyond the natural rate divided by the totally achieved decrease in inflation, that is 4/4. Now try to pursue a more gradualist policy, by reducing π to 6% in year $t = 1$ and to 4% in $t \geq 2$. Construct a similar table and check that the sacrifice ratio is again one. This constancy of the ratio is a characteristic property of the expectation assumption in equation (2).

2. Now assume the model as in (1), however with equation (2) replaced by

$$\pi_t = 8\% - (u_t - 5\%),$$

for all t. Market participants do not believe the central bank's target. They still expect $\pi = 8\%$. Again, construct a table from the identical start year $t = 0$ to $t = 4$ for the shock strategy ($\pi_t = 4\%$ for $t \geq 1$) and the gradualist policy ($\pi_1 = 6\%$ and $\pi_t = 4\%$ for $t \geq 2$). Evaluate the disappointing sacrifice ratios (until $t = 4$: they get even worse afterwards).

3. Consider a more optimistic alternative reality, where participants trust in their central bank. The new equation (2) reads

$$\pi_t = \pi_t^a - (u_t - 5\%),$$

where π_t^a is the announced inflation target. This target is 8% for $t = 0$ and 4% for all succeeding years. Again construct a table of the four main variables and evaluate the sacrifice ratio. It should be zero for the shock strategy. What happens if $\pi_1 = 6\%$ and $\pi_t = 4\%$ for $t \geq 2$ although the announced rate is 4% for all $t \geq 1$? Evaluate the sacrifice ratio.