Macroeconomics A; EI056

Short problems

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1 Effectiveness of policy in IS-TR

1.1 Solution of IS-TR

Question: Consider the IS-TR model (in a simpler form):

$$Y = c_1 Y - i_1 i + G \qquad i = \bar{i} + bY$$

What are the slopes of the IS and TR curves (in a figure with output on the horizontal axis)? Write the solution for output?

1.2 Impact of fiscal policy

Question: How does the impact of fiscal policy on GDP depends on the slopes of IS and TR? Hint: think of how b and i_1 affect the results.

Provide a brief discussion in terms of economic intuition.

1.3 Impact of monetary policy

Question: How does the impact of monetary policy on GDP depends on the slopes of IS and TR? Again, provide a brief discussion in terms of economic intuition.

1.4 Constraint on monetary policy

Question: Can you see a case where the central bank becomes powerless to affect output (think of the situation central banks faced since the early 2010 until last year)?

What can be done do get around the issue?

2 Slope of SRAS

2.1 Sticky wages

Question: Consider that firms produces using labor. A firm's profitability is a function of its cost, where P_t is the log price and Ww_t the log wage:

$$Profit_t = \Omega + \gamma \left(P_t - W_t \right)$$

Wage for a year are set at the end of the previous year. Workers want to preserve their purchasing power (i.e. their expected real wage is set at $\bar{W}$). How does this link wages, prices and output?

2.2 Sticky prices

Question: Consider that n firms can always adjust their prices and keep output at a level $\bar{Y}$. If conditions are better than they expected yesterday, they increase their price above the level that they had expected yesterday: $P_t^{flex} = P_t^e (1+\kappa)$ where e superscript denotes expectations and κ is a measure of economic condition ($\kappa > 0$ is a boom), P_{t-1} is the price yesterday, and $flex$ denotes that we are talking about firms with a flexible price.

The other $1-n$ firms have set their price yesterday (based on the economic conditions they expected for today) and cannot change them:$P_t^{sticky} = P_t^e$. If conditions are better than expected, they are willing to produce more: $Y_t^{sticky} = \bar{Y}(1+\kappa)$.

Aggregate output and prices are:

$$P_t Y_t = n\bar{Y} + (1-n) Y_t^{sticky} \qquad P_t = nP_t^{flex} + (1-n) P_t^{sticky}$$

2.3 Signalling

Question: Consider that when firms see higher demand across the economy they choose to raise their prices, but if they see higher demand for just their product they take advantage of their special popularity to raise price a bit and also increase output.

Firms however do not know exactly what is going on in the economy. All they know is the probability that shocks are aggregate (consumers have more money) or specific (consumer like the particular product of a specific firm).

How can this give raise to a SRAS? Hint: when shocks are specific to firms, they cancel out overall (some are more popular, others less).

3 Adjusting to AD shocks

3.1 Long run equilibrium

Question: Consider a simple version of the AS-AD model:

$$\begin{aligned} AD &: Y_t = \bar{Y} - \pi_t + d_t \\ AS &: Y_t = \bar{Y} + (\pi_t - \pi_t^e) \\ Expectations &: \pi_t^e = \pi_{t-1}^e + \varsigma\left(\pi_{t-1} - \pi_{t-1}^e\right) \end{aligned}$$

where d is a demand shift. The parameter $\varsigma \in (0,1)$denotes the sensitivity of expectations to past errors.

What is the long term equilibrium?

3.2 A permanent AD shock

Question: Initially we have $d = 0$. Consider a permanent demand shock where at time $t = 0$ the demand increases to $\overline{d} > 0$ and stays there forever ($\overline{d} = d_0 = d_1 = d_2 = ...$).

Show that the system can be written in general as:

$$\begin{aligned}
\pi_t^e &= \pi_{t-1}^e + \varsigma\left(\pi_{t-1} - \pi_{t-1}^e\right) \\
\pi_t &= \frac{1}{2}\left(\pi_t^e + d_t\right) \\
Y_t &= \bar{Y} + \frac{1}{2}\left(d_t - \pi_t^e\right)
\end{aligned}$$

Show that from time $t = 1$ onwards, the solution takes the form:

$$\begin{aligned}
\left(\pi_t^e - \overline{d}\right) &= -\left(1 - \frac{\varsigma}{2}\right)^t \overline{d} \\
\left(\pi_t - \overline{d}\right) &= \frac{1}{2}\left(\pi_t^e - \overline{d}\right) \\
\left(Y_t - \bar{Y}\right) &= -\frac{1}{2}\left(\pi_t^e - \overline{d}\right)
\end{aligned}$$

How do inflation, inflation expectations, and output evolve?
What drives the speed of the adjustment process?