1 Readings (40)

Answer very briefly. Your answer to each question should not be more than 2 lines.

1. Is there a difference between “money growth rate” and “inflation rate” relationship for high inflation and low inflation countries in data? Why it is the case? Based on your answer, is quantity theory still alive?

2. What does fiat money mean? Is there any link between worldwide wars and fiat money in history?

3. Based on models that Lucas refer, decreasing inflation can make an increase in welfare which is noticeable. What is the reason behind that? Explain conceptually.

4. Based on McCandless & Weber (1995) paper on monetary facts, briefly mention three important facts about money and inflation?

5. There is a famous sentence about monetary policy by Friedman which says: monetary policy was a string. You could pull on it to stop inflation but you could not push on it to halt recession. What does it really mean?

7. According to Mishkin book: What does money transmission mechanism mean? What does Mishkin mean by Credit view? What is it contrast to?

8. Evaluate this sentence: "Banks can create money unbounded from nothing."

2 Short Questions (20)

Answer very briefly. Your answer to each question should not be more than 2 lines.

Using simple ISLM or AS/AD Analysis, draw a graph explaining your reasoning in addition to the 2 lines of explanation.

1. Evaluate this sentence: "Sanctions impose a negative shift to the Long-run aggregate supply, resulting in recession and inflation called stagflation."

2. Explain what happens to inflation, output and interest rate if the central bank lends money to Bank Melli for running a large-scale housing project. Do we get zero inflation?

3. Explain what happens to inflation and output if a large earthquake happens and we get a large capital destruction.

4. Explain what happens to inflation and output in Iran if the price of petrochemical drops internationally.

3 Exchange Rate Market Attack (40)

In this problem we want to study how an attack to the exchange rate market works.

All variables with hat sign, are the log of actual values. Define the nominal exchange rate as $z_t$. Aggregate price index and real GDP are $p, y$ respectively.

Demand for dollars is the sum of demand for imports and demand for speculation. Assume
that the total demand for dollar is

$$\hat{D} = \alpha (1 - \theta) (\hat{q}_t + \hat{z}_t - \hat{p}_t) + (1 - \alpha) \sigma E_t (\hat{z}_{t+1} - \hat{z}_t) + (\hat{p}_t + \hat{y}_t) - \hat{z}_t$$

where the first part is the log value of import to nominal GDP ratio. The second is the log of speculation to nominal GDP ratio and the third is the log value of nominal GDP. The fourth term is the log value of nominal exchange rates.

Suppose the supply of dollars are the supply by the central bank to manipulate the market \( f_t \) and the total supply by exporters. Therefore:

$$\hat{S} = \beta \hat{f}_t + (1 - \beta) (\hat{A}_{x,t} + \hat{p}_t + \hat{y}_t + (\theta - 1) (\hat{z}_t - \hat{p}_t))$$

In the equilibrium, Supply equals demand and the path for the exchange rate would be determined. (We know \( \theta > 1 > \alpha, \beta \))

1. Find the recursive forward looking equation that relates equilibrium \( \hat{z}_t \) (log of nominal exchange rate) with \( \hat{z}_{t+1}, \hat{p}_t, \hat{y}_t, \hat{f}_t \).

2. Take \( \hat{p}_t, \hat{y}_t, \hat{f}_t \) as exogenous and solve forward for \( \hat{z}_t \).

3. Suppose only \( f_2 \) drops for 10% unexpectedly. What happens to \( \hat{z}_0, \hat{z}_1, \hat{z}_2, \hat{z}_3 \)?

4. Suppose at time \( t = 0 \) people realize that \( f_t \) will drop for 10% from time \( t = 2 \) onward. What happens to \( \hat{z}_t \) for \( t \geq 0 \).

Now suppose that price level is not exogenous and it moves with nominal exchange rate. Specifically, \( \hat{p}_t = \delta + \gamma \hat{z}_t \).

5. Redo the above two questions (3,4)

6. How is your response different from the previous cases?

7. Now suppose due to sanctions, \( A_{x,t} \) is going to drop by 20% at time \( t = 2 \). What happens to \( \hat{z}_t \) for \( t \geq 0 \).
4 Seigniorage and government debt for Iran 1402 (20)

Due to the drop in oil income, the government is facing a large budget deficit which might be financed by debt or seigniorage from the central bank. Since the market would not hold too much government debt, these accumulating budget deficits would finally be financed by the central bank.

Assume that in the steady state, these deficits would be 9% of nominal GDP (py) in each year. Also assume that money base to nominal GDP is 12% in the steady state.

1. Using the money market equilibrium conditions, determine the steady state equilibrium inflation if the long-run economic growth is 2%. (Hint: Write the money demand equation at time t and t + 1, divide them, the calculate them in the steady state. I suggest you to firstly solve for the nominal GDP growth rate and then calculate the inflation.)

2. Suppose that in three years (T = 3), the economy reaches to this steady state. Also assume that the money growth rate is zero at times t < 3. Calculate the inflation for t ≥ 0 using the Cagan equation. (you can take money demand elasticity η = 1).

5 Solving the three-equation Macro model (40)

In this problem, we want to study what would happen in a simple macroeconomic framework; specially when the central bank decides to use an expansionary policy. To do so:

Consider an economy that follows these equations:

\[ m_t - p_t = -\frac{1}{2} \pi_t \]

\[ \tilde{y}_t = 1 - (i_t - E_t \pi_{t+1}) + w_t \]

\[ \tilde{y}_t = 1 + \frac{1}{3} (\pi_t - E_t \pi_{t+1}) + u_t \]

\[ i_t = \alpha + 2\pi_t + \varepsilon_t \]

where \( \pi_{t+1} = p_{t+1} - p_t \).

1. Interpret each equation.
2. Solve for the equilibrium output, price level consistent with rational expectations in this economy.

3. Suppose the central bank decides to unexpectedly run an expansionary policy by reducing the interest rate by 1% at time $T = 5$ (i.e. it sets $\epsilon_5 = -1$). What would happen to the aggregate price and output for $t \geq 0$?

4. Suppose people realizes at time 0 that there would be a sanction on the economy and the long-run aggregate supply is going to drop by 20% at time $t = 3$ (i.e. $u_t = -0.2$ for $t \geq 3$ expectedly from time 0). Use your solution and determine what would happen to the economy.

6 A Simple Neoclassical Growth Model (30)

In this problem, we want to see how an economy with labor and no capital behaves.

In our economy there is a representative agent which consumes $c_t$, supplies labor $n_t$, saves $s_t$ at rate $r_t$, and produces final goods $y_t = A_t n_t^{\sigma}$.

The agent maximizes the net present value of the utility over the consumption and leisure:

$$E_0 \left[ \sum_{t=0}^{\infty} \beta^t \left( \ln (c_t) + \ln (1 - n_t) \right) \right].$$

1. Setup the agent problem, write FOCs and simplify them to get the Euler equation and an equation equivalent to the labor market equilibrium condition.

2. Solve for the Steady State equilibrium.

3. Suppose $a_t = \log A_t = \rho \log A_{t-1} + \epsilon_t$. Solve for $y_t$ and $r_t$ in terms of $a_t$. 