NANYANG TECHNOLOGICAL UNIVERSITY
SCHOOL OF SOCIAL SCIENCES
SEMESTER 1 AY22-23

HE1002 MACROECONOMICS I

PROBLEM SET 9

Question 1

We have seen that short-run equilibrium output falls when the Fed raises the real interest rate. Suppose the relationship between short-run equilibrium output Y and the real interest rate r set by the Fed is given by $Y = 1{,}000 - 1{,}000r$.

(a) Suppose also that the Fed's reaction function is the one shown in the following table. For whole-number inflation rates between 0 and 4 percent, find the real interest rate set by the Fed and the resulting short-run equilibrium output. Graph the aggregate demand curve numerically.

Rate of inflation, π	Real interest rate, r
0.0	0.02
0.01	0.03
0.02	0.04
0.03	0.05
0.04	0.06

(b) Suppose that potential output $Y^* = 960$. From the policy reaction function in the table above, what can you infer about the Fed's objective for the inflation rate in the long term?

Question 2

This problem asks you to trace out the adjustment of inflation when the economy starts with an output gap. Suppose that the economy's aggregate demand curve is

$$Y = 1{,}000 - 1{,}000\pi,$$

where Y is short-run equilibrium output and π is the inflation rate, measured as a decimal. Potential output Y^* equals 950, and the initial inflation rate is 10 percent ($\pi = 0.10$).

(a) Find output for this economy in short-run equilibrium and inflation in long-run equilibrium.

(b) Suppose that, each quarter, inflation adjusts according to the following rule:

$$\text{This quarter's inflation} = \text{Last quarter's inflation} - 0.0004(Y^* - Y)$$

Starting from the initial value of 10 percent for inflation, find the value of inflation for each of the next five quarters. Remember, Y will continuously change as the current inflation rate change according to the given relationship $Y = 1{,}000 - 1{,}000\pi$. Does inflation come close to its long-run value?

Question 3

For each of the following, use an AD-AS diagram to show the short-run and long-run effects on output and inflation. Assume the economy starts in long-run equilibrium.

(a) An increase in consumer confidence that leads to higher consumption spending.

(b) An easing of monetary policy by the Fed (a downward shift in the policy reaction function).

(c) A sharp drop in oil prices.

Question 4

Suppose that a permanent increase in oil prices both creates an inflationary shock and reduces potential output. Use an AD-AS diagram to show the effects of the oil price increase on output and inflation in the short run and the long run, assuming that there is no policy response. What happens if the Fed responds to the oil price increase by tightening monetary policy?

Question 5

An economy is initially in recession. Using the AD-AS diagram, show the process of adjustment:

(a) If the Fed responds by easing monetary policy (moving its reaction function down).

(b) If the Fed takes no action.

What are the costs and benefits of each approach, in terms of output loss and inflation?

Question 6

An economy is described by the following equations:

$C = 1{,}600 + 0.6(Y - T) - 2{,}000r$

$I^p = 2{,}500 - 1{,}000r$

$G = \bar{G} = 2{,}000$

$NX = \overline{NX} = 50$

$T = \bar{T} = 2{,}000$

Suppose also that the central bank's policy reaction function is as follows:

Rate of inflation, π	Real interest rate, r
0.0	0.02
0.01	0.03
0.02	0.04
0.03	0.05
0.04	0.06

(a) Find an equation relating planned spending to output and the real interest rate.

(b) Complete the following table. Graph the aggregate demand curve of the economy.

Inflation Rate	Real Interest Rate	Autonomous Expenditure	SR Equilibrium Output
0.0	0.02		
0.01	0.03		
0.02	0.04		
0.03	0.05		
0.04	0.06		

(c) Repeat parts (a) and (b), assuming that government purchases have increased to 2,100. How does an increase in government purchases affect the AD curve?

Question 7

An economy is described by the following equations:

$C = 1{,}600 + 0.6(Y - T) - 2{,}000r$

$I^p = 2{,}500 - 1{,}000r$

$G = \bar{G} = 2{,}000$

$NX = \overline{NX} = 50$

$T = \bar{T} = 2{,}000$

Suppose also that the central bank's policy reaction function is as follows:

Rate of inflation, π	Real interest rate, r
0.0	0.04
0.01	0.045
0.02	0.05
0.03	0.055
0.04	0.06

(a) Complete the following table. Graph the aggregate demand curve of the economy.

Inflation Rate	Real Interest Rate	Autonomous Expenditure	SR Equilibrium Output
0.0	0.04		
0.01	0.045		
0.02	0.05		
0.03	0.055		
0.04	0.06		

(b) Suppose that the central bank decides to lower the real interest rate by 0.5 percentage point at each value of inflation. Repeat part (a). How does this change in monetary policy affect the aggregate demand curve?