III. Monetary policy in the medium run

Use the following IS-LM model to calculate the effect on various aggregates of an increase in the money supply.

- Consumption: \( C = 100 + 0.66Y_D \)
- Investment: \( I = 800 - 16.66i \)
- Tax: \( T = 600 \)
- Government expenditure: \( G = 500 \)
- Real money demand: \( L = Y - 100i \)
- Money supply: \( M = 1200 \)
- Price level: \( P = 1 \)

\( (Y \) is output, \( Y_D \) is disposable income and \( i \) the rate of interest expressed as a percentage)

The IS curve is: \( Y = 3000 - 50i \) and the LM curve: \( i = 0.01Y - 12 \) and the short run equilibrium of the economy is \( Y = 2400 \) and \( i = 12\% \) - let’s also assume that the economy is at its medium run equilibrium level.

a. Calculate the corresponding levels of consumption, investment and the real money supply.

\[
C = 1300 \\
I = 600 \\
\frac{M}{P} = 1200
\]

b. Very short term – chapter 5 – prices do not change in the very short run (i.e. the AS curve is horizontal in the very short run)

Now assume that the Fed doubles the nominal money supply.
Solve the model i.e. what are the equations for the IS and the LM curves and the corresponding equilibrium values of \( Y \) and \( i \) in the short run.

IS curve: \( Y = 3000 - 50i \)

LM curve: \( i = 0.01Y - 24 \)

\[
Y = 2800 \\
i = 4\%
\]
Calculate the corresponding levels of consumption, investment and the real money supply.

Replace the values of \( Y \) and/or \( i \) in the equations:

\[
C = 1566.66 \quad I = 733.33
\]
\[
M/P = 2400
\]

c. Is the economy now beyond or below its full employment level?

What happens to the price level in the medium run? \textit{It will increase}

What is the price level consistent with the medium run equilibrium: \( P = 2 \)

(note that the price level is proportional to the nominal money supply: so if the nominal money supply double, the price level must also double)

Now solve the model i.e. what are the equations for the \textit{IS} and the \textit{LM} curves and the corresponding equilibrium values of \( Y \) and \( i \) in the medium run.

\textit{IS} curve:
\[
Y = 3000 - 50i
\]

\textit{LM} curve:
\[
i = 0.01Y - 12
\]
\[
Y = 2400 \quad i = 12\%
\]

Calculate the corresponding levels of consumption, investment and the real money supply. (since \( Y \) and \( i \) are back to the original level, \( C \) and \( I \) must go back to original level)

\[
C = 1300 \quad I = 600
\]
\[
M/P = 2400/2 = 1200
\]
d. Compare the values of consumption and of investment in the 3 cases above i.e. the original position, the short run adjustment and the medium run adjustment.

Consumption has … increased and then decreased back to its original level

Investment has … increased and then decreased back to its original level

Is monetary policy neutral or non-neutral in the medium run

Because all the real variables: Y, i, C I go back to their original levels

b’. Alternative question: Assume the short run model of chapter 7 i.e. with an upward sloping AS curves.

As M doubles, Y expands and some bottlenecks appear resulting in an increase in the price level equal to 20%.

IS curve: \[ Y = 3000 - 50i \]

LM curve: \[ i = 0.01Y - 20 \] (from \( Y - 100i = 2400/1.2 \))

\[ Y = 2666.66 \quad i = 6.66\% \]

Calculate the corresponding levels of consumption, investment and the real money supply.

Replace the values of Y and/or i in the equations:

\[ C = 1477.77 \quad I = 688.88 \]

\[ M/P = 2400/1.2 = 2000 \]

The short run expansion is not as large because the price level has started to rise resulting in a smaller real money supply expansion. Eventually in the medium run, the results are the same as above