Econ 3010
Keeping-up-assignment (KUA) 8

The US Federal Reserve Bank usually lets the US money supply grow at a small annual rate, such as \( g_m = 0.04 \) or 4\%, in order to (i) provide liquidity for a growing economy and (ii) ensure a small positive inflation rate. Sustaining a positive inflation rate ensures that recessions can only decrease the rate of price growth rather than lead to negative price growth (known as deflation) which can lead to some special problems. In this exercise, nonetheless, we will assume that the Feds believe the US medium run inflation rate is too high. In order to decrease it, they decrease the growth rate of the money supply \( g_m \).

We will show that the falling growth rate of the money supply and the falling medium run inflation rate it induces will decrease the medium run nominal interest rate one for one, but it leaves the medium run real interest rate unchanged. In other words, we will show that the medium run effect will be \( \bar{r}_n = i - \pi^e \). This result is known as the Fisher Hypothesis. (Note: For more background on this problem and the Fisher hypothesis, see Chapter 14, Section 14-3)

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Y = Z = C + I(Y, i - \pi^e) + G + NX
\]

\[
IS: \quad Y = C + I(Y, i - \pi^e) + G + NX
\]

\[
LM
\]

\[
Z = C + I(Y, i - \pi^e) + G + NX
\]

\[
0.4Y - 200i
\]

\[
M/P
\]
(a) If you think of a fall in money growth as causing a short run fall in the money supply $M$, what will happen to the LM and AD curves in the short run? Show the answer graphically.

(b) How does the short run expected price level $P_e$ compare to the actual price level $P$? Therefore, what will happen to the expected price level, wage demands, the actual price level and the aggregate supply (AS) curve in the medium run?

(c) What will happen to $M/P$ for a given $M$ value in the medium run? Therefore, what will happen to the nominal interest rate and the LM curve in the medium run?

(d) Assuming people expect the slower growth rate of money to give a smaller medium run inflation rate (which you can show is rational to expect), the expected inflation level $\pi^e$ will fall in the medium run. When $\pi^e$ falls, what happens to the real interest rate, $r = i - \pi^e$ (notice you are now subtracting less)? Therefore, what happens to investment $I = I(Y, i - \pi^e)$? What happens to the IS curve $Y = C + I + G + NX$? Add the new (IS') curve into the diagram.

(e) The new medium run will be established when output is back to the natural level in the goods market, IS-LM and AS-AD diagrams. In this new medium run, what happened to the nominal interest rate $i$ compared to where it began (so comparing point C versus A, where C=new medium run, A=initial point)?

(f) Comparing across the new and original medium run points (C vs. A in the diagrams), $\bar{Y}_n = c_0 + c_t(\bar{Y}_n - \bar{T}) + I(Y, r) + \bar{G} + NX$, where the upper bar means “same”. Since everything is the same, the only way the equation can hold is if the real interest rate, $r$, also remains the same, so $r = \bar{r} = \bar{r}_n$. If $i = \bar{r}_n + \pi^e$, every percentage point change in expected inflation $\pi^e$ in the medium run must cause an equal percentage point change in the nominal interest rate. For instance, the economy may go from $i = 0.02 + 0.02 = 0.04 = 4\%$ nominal interest rate to $i = 0.02 + 0.01 = 0.03$ or 3% in the new medium run. Explain how your answer relates to the Fisher hypothesis.

(g) If the inflation rate falls to, say, 1% we may run the risk that a sudden demand decline will shift the AD curve left, causing a fall in prices negative inflation. Try to google “Why is deflation bad” or go to http://krugman.blogs.nytimes.com/2010/08/02/why-is-deflation-bad/ or http://www.bbc.com/news/business-28009477 and briefly discuss why central banks are often concerned with deflation risk.