Econ 522: Intermediate Macroeconomics, Spring 2018
Chapters 4 & 5 Monetary System and Inflation Practice Problems

1. ***Multiple Choice.*** **Which of the following most accurately describes the level of aggregate excess bank reserves in the U.S. over the last decade?**
   A. **initially it was lower than it had been previously, but in the last few years it increased to about what it was before 2007.**
   B. **substantially lower than it was prior to 2007.**
   C. **substantially higher than it was prior to 2007.**
   D. **similar to what it was during the early 90s recession.**

   C

2. ***Multiple Choice.*** **Which of the following most accurately describes the federal funds rate in the U.S. over the last decade?**
   A. **initially it was lower than it had been previously, but in the last few years it increased to about what it was before 2007.**
   B. **substantially lower than it was prior to 2007.**
   C. **substantially higher than it was prior to 2007.**
   D. **similar to what it was during the early 80s recession.**

   B

3. **What does 'monetary policy' refer to and who carries out monetary policy in the U.S.? Identify and describe tools used to carrying out monetary policy?**

   Monetary policy refers to control of the money supply. In the U.S., monetary policy is carried out by the Federal Reserve (Fed). Tools used by the Fed for monetary policy traditionally included open market operations, the required reserve ratio, and the discount rate. *See the textbook for descriptions of the Feds tools (starting at the Chapter 4, subsection titled "The Instruments of Monetary Policy").*

4. **Explain how each of the following events affects the money supply, and whether, holding all else constant and according to the classical model theory, each event would be expected to increase or decrease inflation in the long run.**
   (a) **The Fed buys Treasury bonds in an open-market operation.**

   Buying bonds increases the money supply. The Fed uses cash to buy the bonds. It takes the bonds out of the market and puts cash into the market. All else constant, this would tend to increase inflation.

   (b) **The Fed increases the target federal funds rate.**

   Higher interest rates will generally slow down borrowing. Less borrowing will decrease the money supply. This is because of the way lending and borrowing increase the money supply in a fractional reserve banking system. All else constant, this would tend to decrease inflation.

(c) **The Fed reduces its asset holdings by cutting back on security repurchases.**

Reducing asset purchases decreases the money supply. The reasoning is similar to that in part (a) but with reversed direction. By buying fewer assets, the Fed is putting less cash into the economy. All else constant, this would tend to decrease inflation.

5. **Write out and explain the quantity equation. Indicate whether the version you have written is in level or growth rate form.**

In level form: $M \times V = P \times Y$, where M = the money supply, V = income velocity of money (note if you replaced Y with a T in the equation, it would be the transactions velocity of money), P = price level, and Y = real GDP.

In growth form: $\%\triangle M + \%\triangle V = \%\triangle P + \%\triangle Y$. Here, $\%\triangle P$ could be replaced with π, the inflation rate (which by definition is the growth rate of price level). And, if you assume that velocity is constant (meaning it does not grow) as is commonly done, then $\%\triangle V$ equals 0 and can be omitted.

See Chapter 5, section 1 of the textbook for explanations of the quantity equations.

6. **If inflation rises from 6 to 8 percent, what happens to real and nominal interest rates according the the Fisher effect? Also, what is the Fisher effect?**

The Fisher effect expresses the nominal interest rate (i) as the sum of the real interest rate (r) and the inflation rate (π). From that equation, when π increases by 2 percentage points, i changes by 2 percentage points. Note: (i) we do not need to know what the value of i was to know it changes by 2 percentage points, and (ii) r doesn't change because the model is set up such that r is unaffected by π (r is whatever rate keeps S and I in equilibrium, and neither S nor I depend on π).

7. **In a given country, the velocity of money is constant. Real GDP grows by 5 percent per year, the money stock grows by 14 percent per year, and the nominal interest rate is 11 percent. What is the real interest rate?**

Fisher equation: nominal interest rate i = real interest rate r + inflation rate π

Quantity equation (in growth rates): money supply growth M_g = inflation rate π + real gdp growth rate Y_g

Using the given numbers $M_g = 14$, $Y_g = 5$ and the second equation, you can solve for $\pi = 9$. Then using the first equation and $i = 11$, you can solve for the real interest rate $r = 2$.

8. **Suppose a country has a money demand function $(M/P)^d = kY$, where k is a constant parameter. The money supply grows by 12 percent per year, and real income grows by 4 percent per year.**

(a) **What is the average inflation rate?**

From the question: $M_g = 12$, $Y_g = 4$. Using the quantity equation, those numbers the average inflation rate is $\pi = 8$.

(b) **How would inflation be different if real income growth were higher? Explain.**

You started with real income growth (Y_g) at 4 percent per year, and solved for the inflation rate in part (a). One way to figure out the answer to this part would be to resolve for π using a higher number for Y_g, and then comparing the new π to the one from part (a).

For example, if Y_g were 5, π would be 7. So with the higher real income growth, the inflation rate is lower.

(c) **How do you interpret the parameter k? What is its relationship to the velocity of money?**

Check Chapter 5 of the text book for an explanation of this. It will be with the part on money demand. If you can't find it let me know and I will check for the page number.

(d) **Suppose, instead of a constant money demand function, the velocity of money in this economy was growing steadily because of financial innovation. How would that affect the inflation rate? Explain.**

To see what would happen if velocity were positive use the quantity equation. Usually we assume velocity is constant, and therefore has a growth rate of 0. With positive velocity, the equation is:

$$\text{growth rate } M + \text{growth rate } V = \text{growth rate } P + \text{growth rate } Y$$

In symbols, (where the g subscript denotes growth rate and the inflation symbol is used for growth rate of price level)

$$M_g + V_g = \pi + Y_g$$

Use some made up numbers, or numbers from above with a positive number for V_g to see how the inflation rate changes. You should end up getting higher rates of inflation.