EC9012 Macroeconomics

Week 5 - Problem Set 3

Fatih Kansoy

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Email: f.kansoy@warwick.ac.uk
Web: warwick.ac.uk/fatihkansoy

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1. Question - 6 -

2. Question - 5 -

3. Question - 3 -

Question - 6 -

Question 6-A

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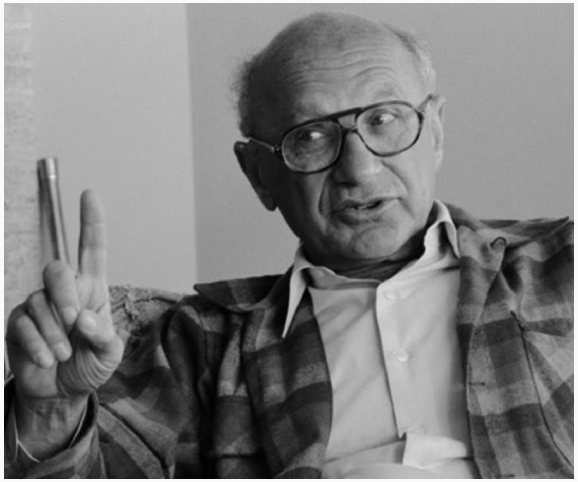
***"Inflation is always and everywhere a monetary phenomenon** in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output."*



Question - 1 -

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The left hand-side of the equation tells us about the money used to make these transactions. **M** represents the quantity of money in the economy. **V** represents the transactions velocity of the money, which is the rate at which money circulates in the economy.

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[►] If the velocity **V** is constant, then a change in the quantity of money (**M**) causes a proportionate change in nominal GDP (**PY**). If the output is determined by factors of production and the production technology, we can conclude that the quantity of money determines the price level.

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The quantity theory predicts one-to-one relationship between changes in money growth rate and inflation rate. In the money growth rate exceeds the economic growth in output then the price level will rise rapidly leading to inflation. Empirical evidence across countries also shows that the high inflation and high money growth rates move together as the quantity theory predicts.

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Nominal interest rate is the sum of real interest rate and the inflation. If real interest rates are unaffected by inflation but are only determined by savings and investment, then nominal interest rates change one-to-one with the inflation rate. If inflation increases by 1 percent, then nominal interest rates increase by 1 percent.

The empirical data across countries also show that in high inflation countries, nominal interest rates are also higher.

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If Change in V is zero, since velocity is constant:

% Change in M = % Change in P + % Change in Y

14 percent + % Change in P + 5 percent

% Change in P = 9 percent. Inflation is 9 percent.

Using the Fisher equation. $i = r + \pi$, $11\% = r + 9\%$ Real interest rate (r) equals 2%.

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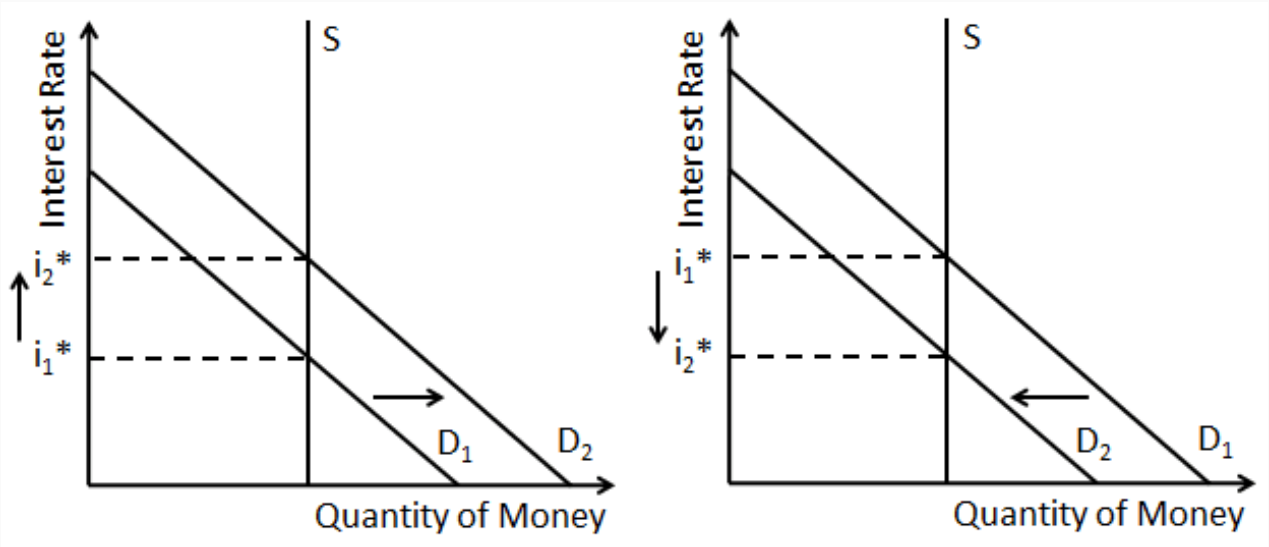

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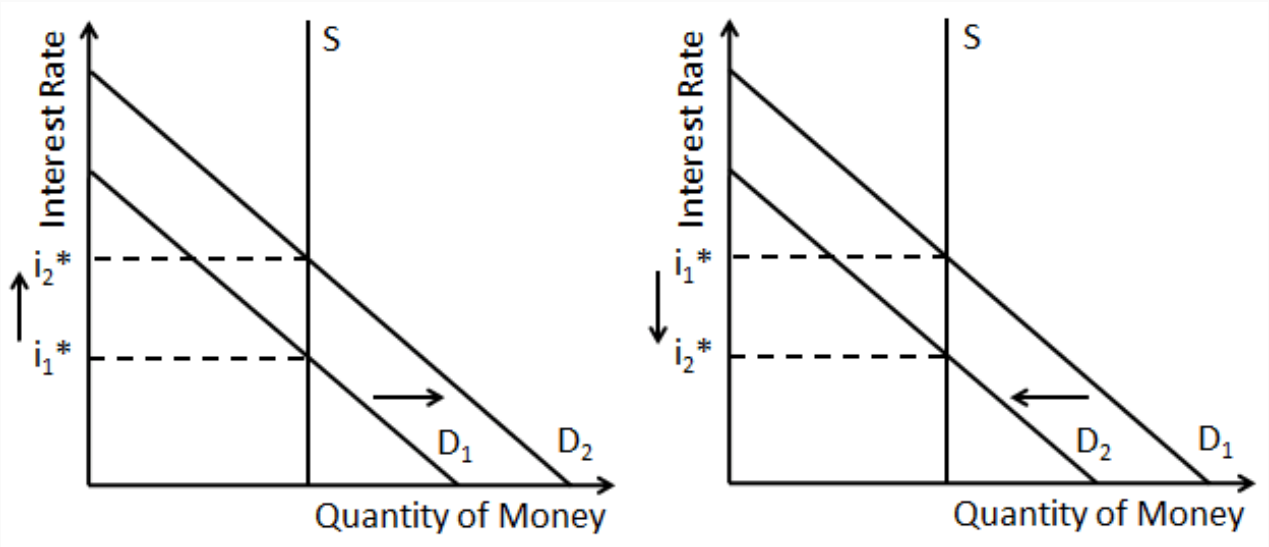

Any decrease in the interest rate will lead to an increase in the quantity of money demanded (a movement down the money demand curve) but no shift in the money demand curve.

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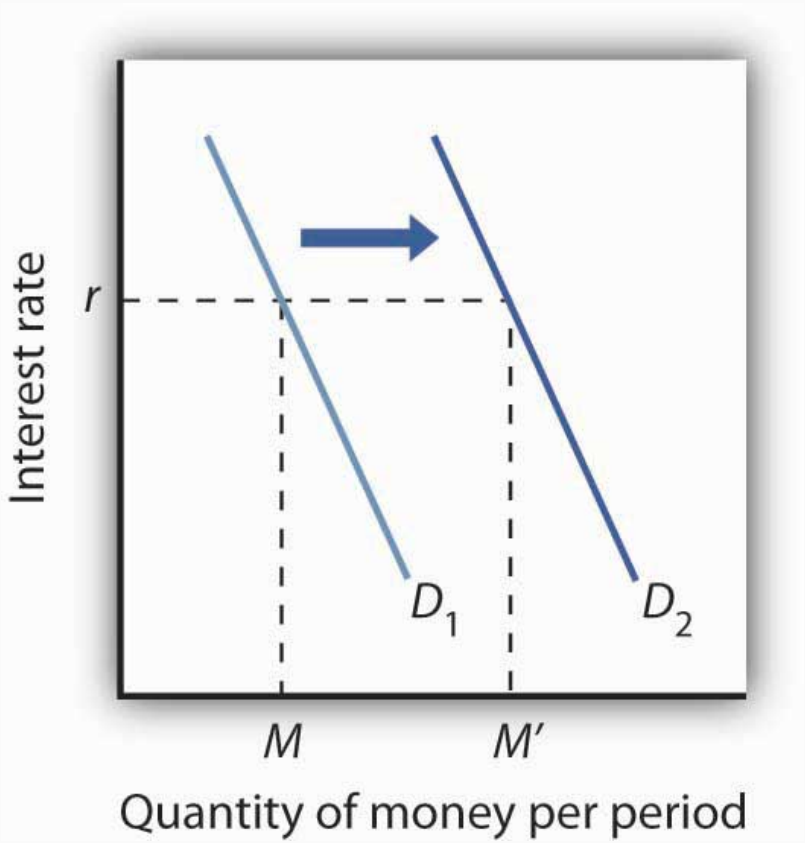

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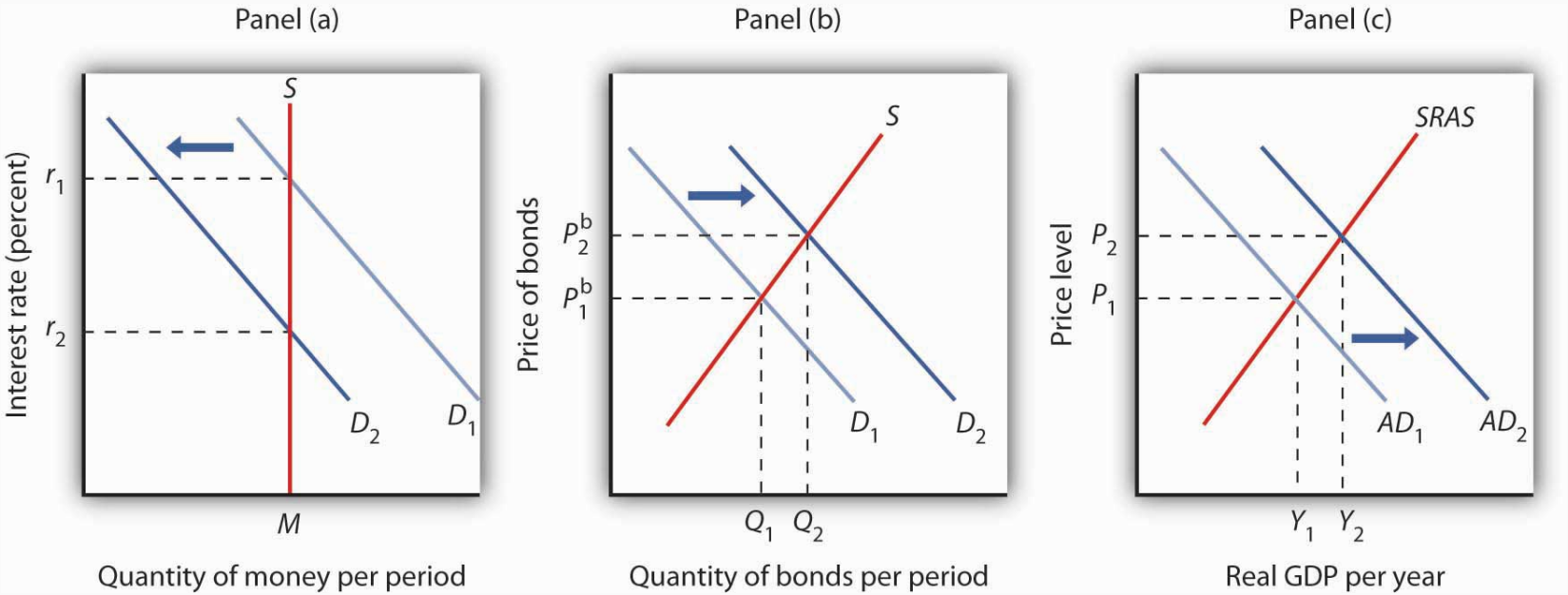

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When the Fed engages in open-market operations, it will change the money supply (the money supply curve will shift). This will affect the interest rate and consequently the quantity of money demanded. An open-market purchase of U.S. Treasury bills by the Fed will increase the money supply, lowering the interest rate and increasing the quantity of money demanded. This is a downward movement along the money demand curve.

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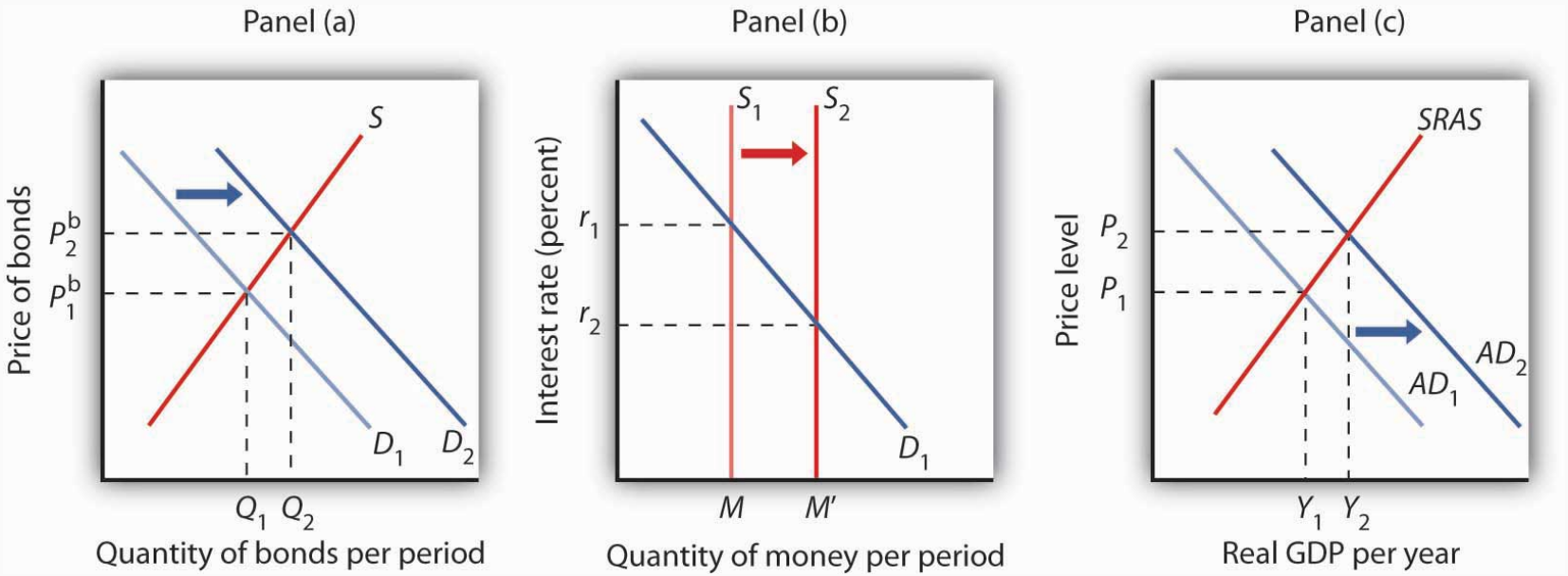

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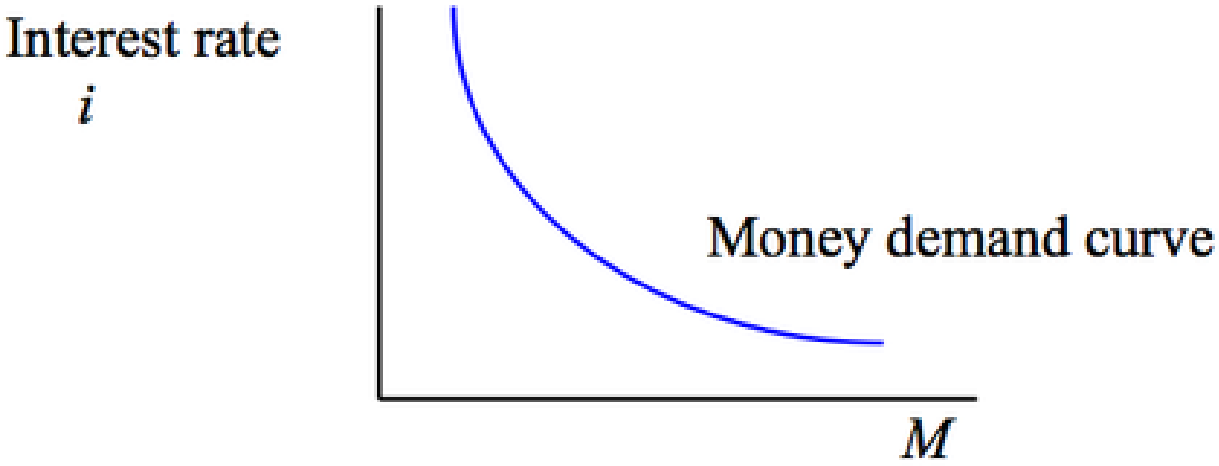
Money Demand Curve

Nominal Demand

$$M^D = P \times L(i, y)$$

Real Demand

$$\frac{M^D}{P} = L(i, y)$$



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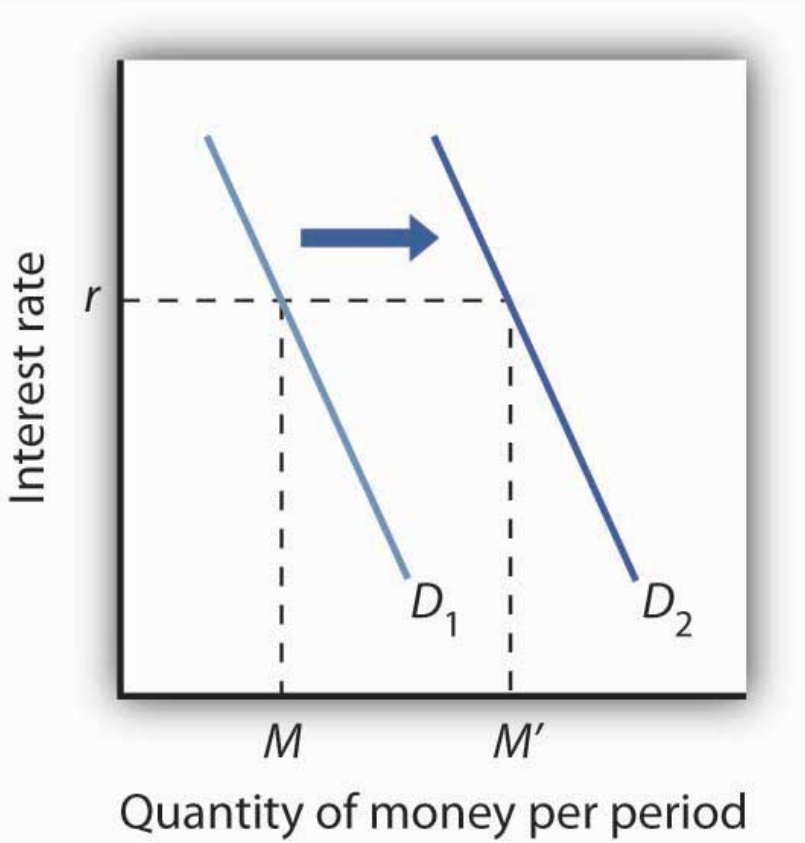

Question - 3 -

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Suppose a policymaker is in office for two periods. Output is given by

$$y = y^n + b(\pi - \pi^e), \qquad b > 0 \tag{1}$$

each period. There are two possible types of policymaker, **type-1** and **type-2**. A type-1 policymaker, which occurs with probability p, maximizes social welfare, which for simplicity is given by

$$(y_1 - \frac{a}{2}\pi_1^2) + (y_2 - \frac{a}{2}\pi_2^2), \qquad a > 0 \tag{2}$$

A type-2 policymaker, which occurs with probability $1p$, cares only about inflation, and so sets inflation to zero in both periods. Assume $0 < p < \frac{1}{2}$

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Substituting eq-1 $\left(y = y^n + b(\boldsymbol{\pi} - \pi^e) \right)$ we get

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$$\boldsymbol{W} = 2y^2 - b\pi_1^e \tag{5}$$

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Therefore, substituting $\pi_1 = 0$, $\pi_2 = b/a$, and $\pi_2^e = p(b/a)$ into equation-4, we get

$$W = 2y^n - b\pi_1^e + \frac{b^2}{a}\left(\frac{1}{2} - p\right) \tag{7}$$

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In light of your answers to (b) and (**c**), what is the equilibrium? In what sense, if any, does concern about reputation lower average inflation in this environment?

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Since $0 < p < 1/2$, the value of **W** given by equation-7 is larger than the value of **W** given by equation-5 because the term $(b2/a)[(1/2)p]$ is positive.

Thus, a type 1 policymaker would select $\pi_1 = 0$. Notice also that as p gets smaller, **W** gets larger.

This implies that a strong reputation as a policymaker who is tough on inflation can allow a type 1 policymaker to achieve higher social welfare by first selecting $\pi_1 = 0$