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 - 2 -

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Question 6-A

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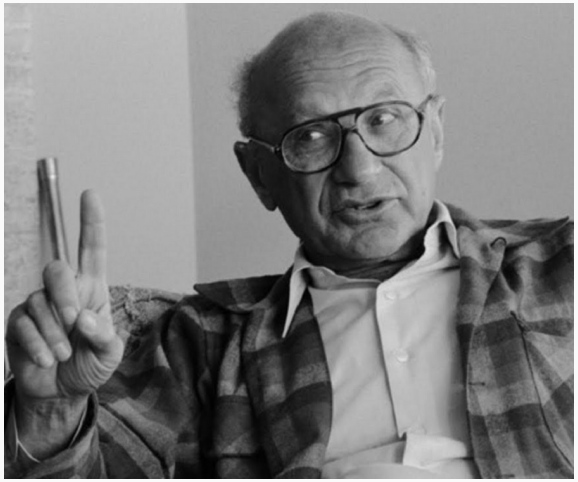
***"Inflation is always and everywhere a monetary phenomenon** in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output."*



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 ($\Delta V = 0$) in V is zero, since velocity is constant:

$$\Delta M = \Delta P + \Delta Y \quad \longrightarrow \quad 14\% = \Delta P + 5\%$$

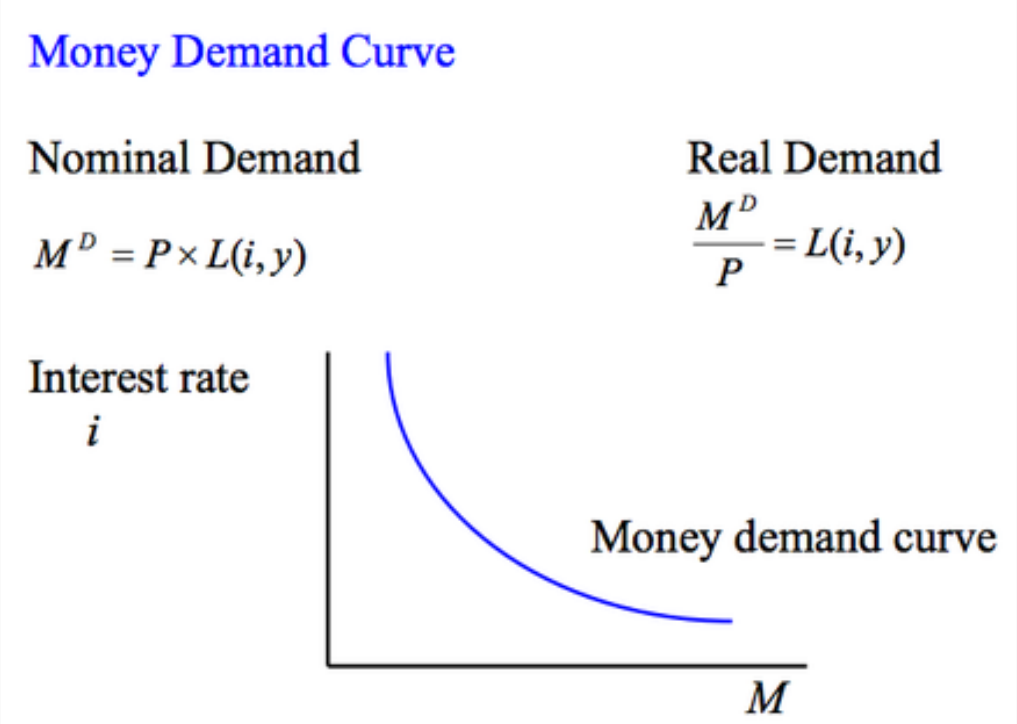
$\Delta P = 9\%$ and thus Inflation is 9 percent.

Using the Fisher equation $i = r + \pi \quad \longrightarrow \quad 11\% = r + 9\%$

Real interest rate (r) equals 2%.

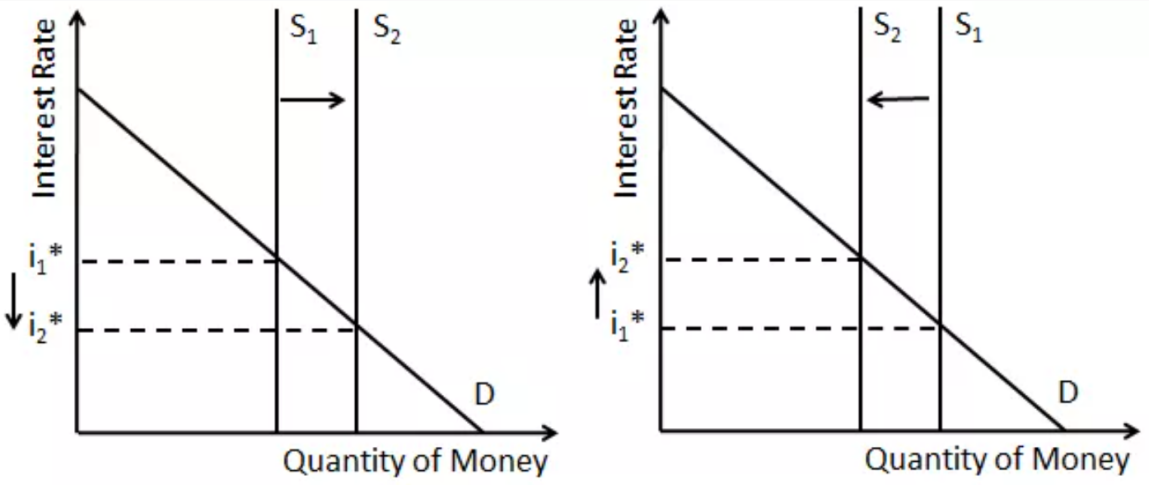
Question - 5 -

[►] The supply and demand for money is plotted with the price of money on the vertical axis and the quantity of money in the economy on the horizontal axis. **But what is the ”price” of money?**



[►] The price of money is the opportunity cost of holding money. Since cash doesn’t earn interest, the opportunity cost of money is the price of money, which is **the nominal interest rate.**

Figure 1: Money Supply Changes



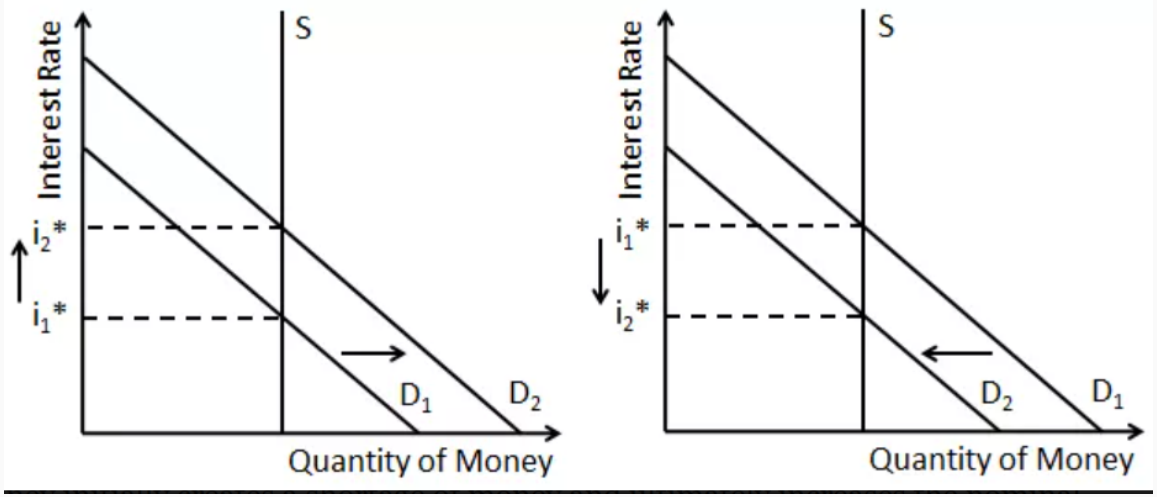


Figure 2: Money Demand Changes

Question - 5 -

How will the following events affect the demand for money? In each case, specify whether there is a shift of the demand curve or a movement along the demand curve and its direction.

Question 5-A

There is a fall in the interest rate from 12% to 10%.

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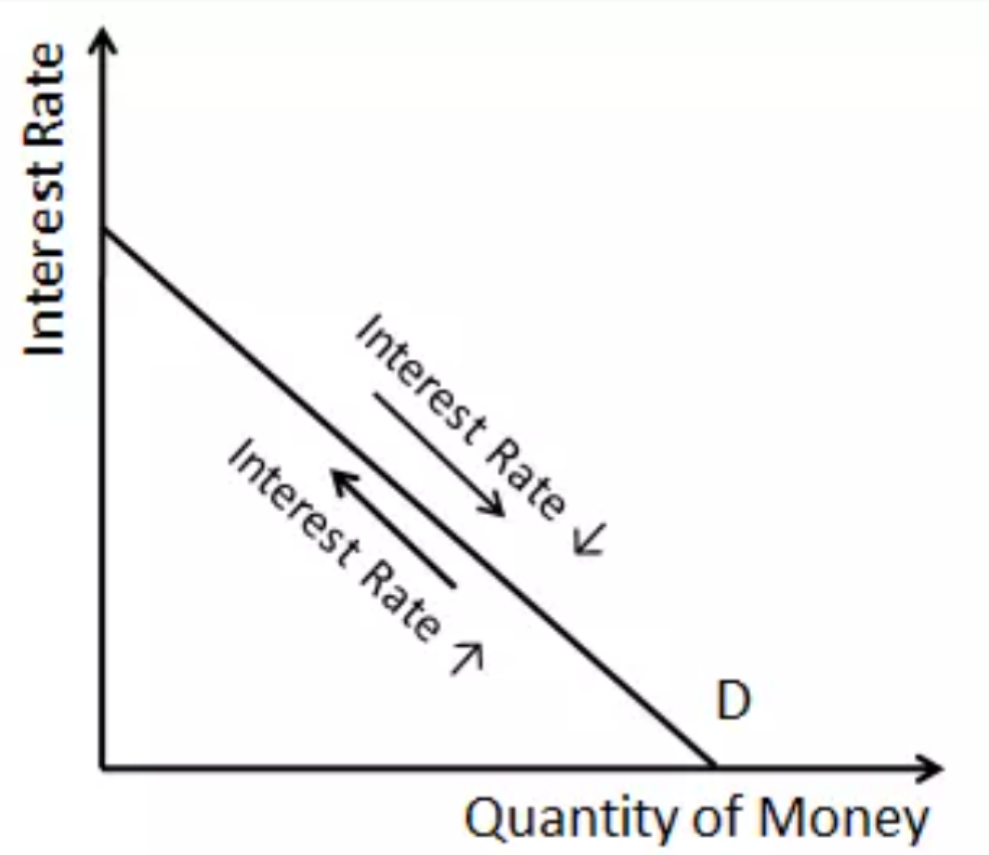
Any decrease in the interest rate will lead to an increase in the quantity of money demanded (a movement down the money demand curve) but no shift in the money demand curve.



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Christmas arrives and, with it, the beginning of the holiday shopping season.

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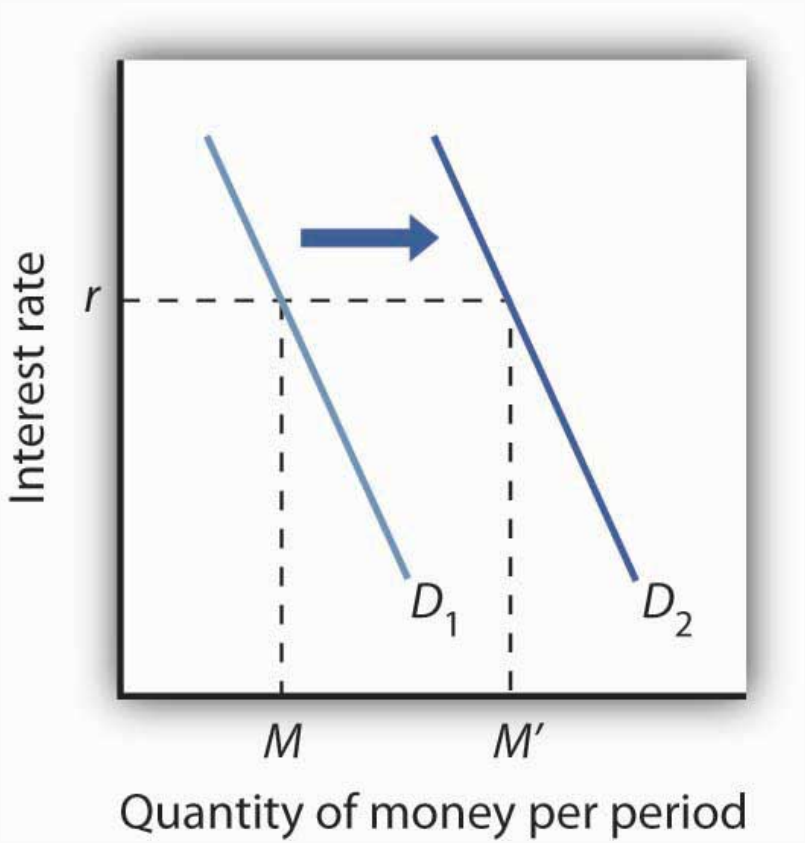

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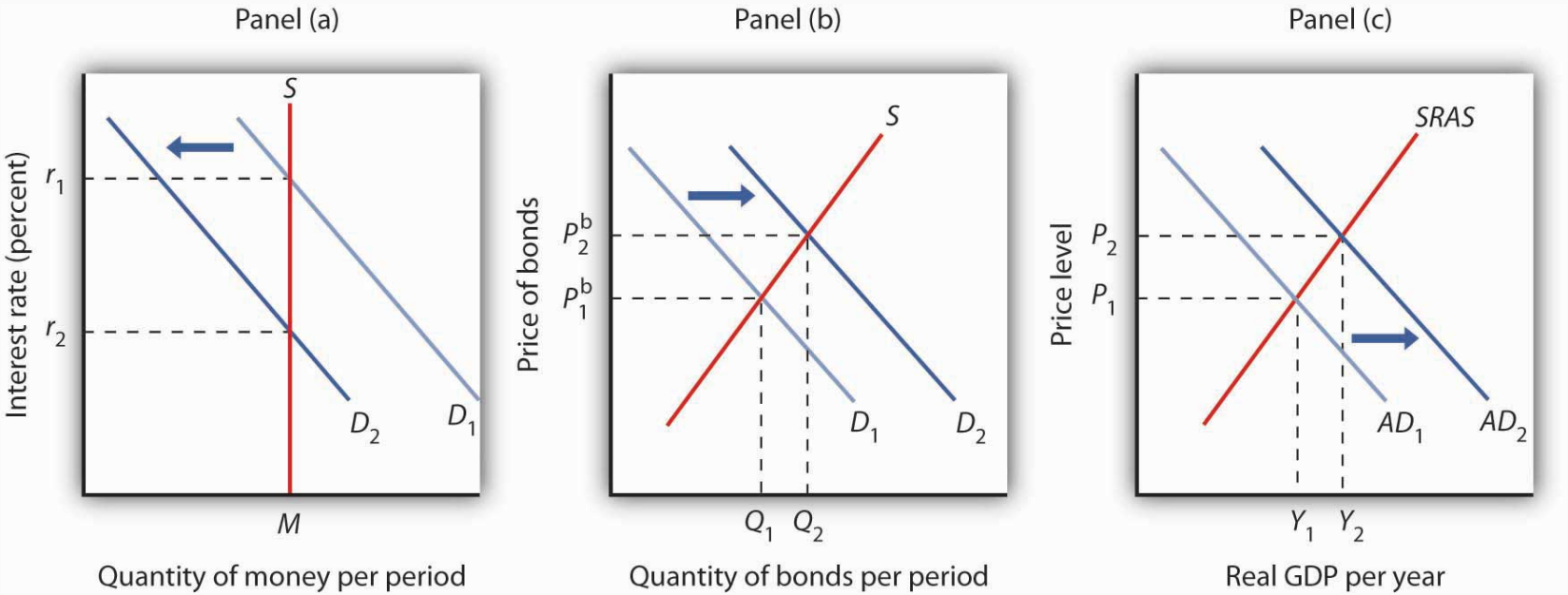

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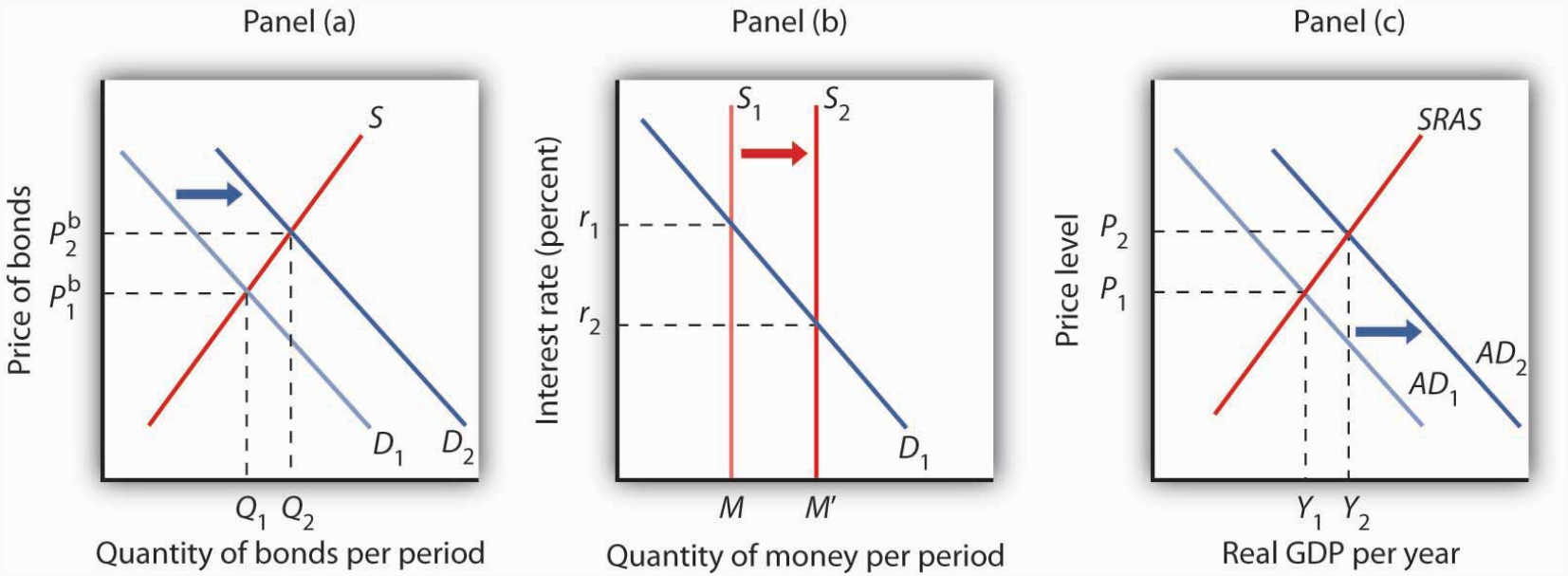

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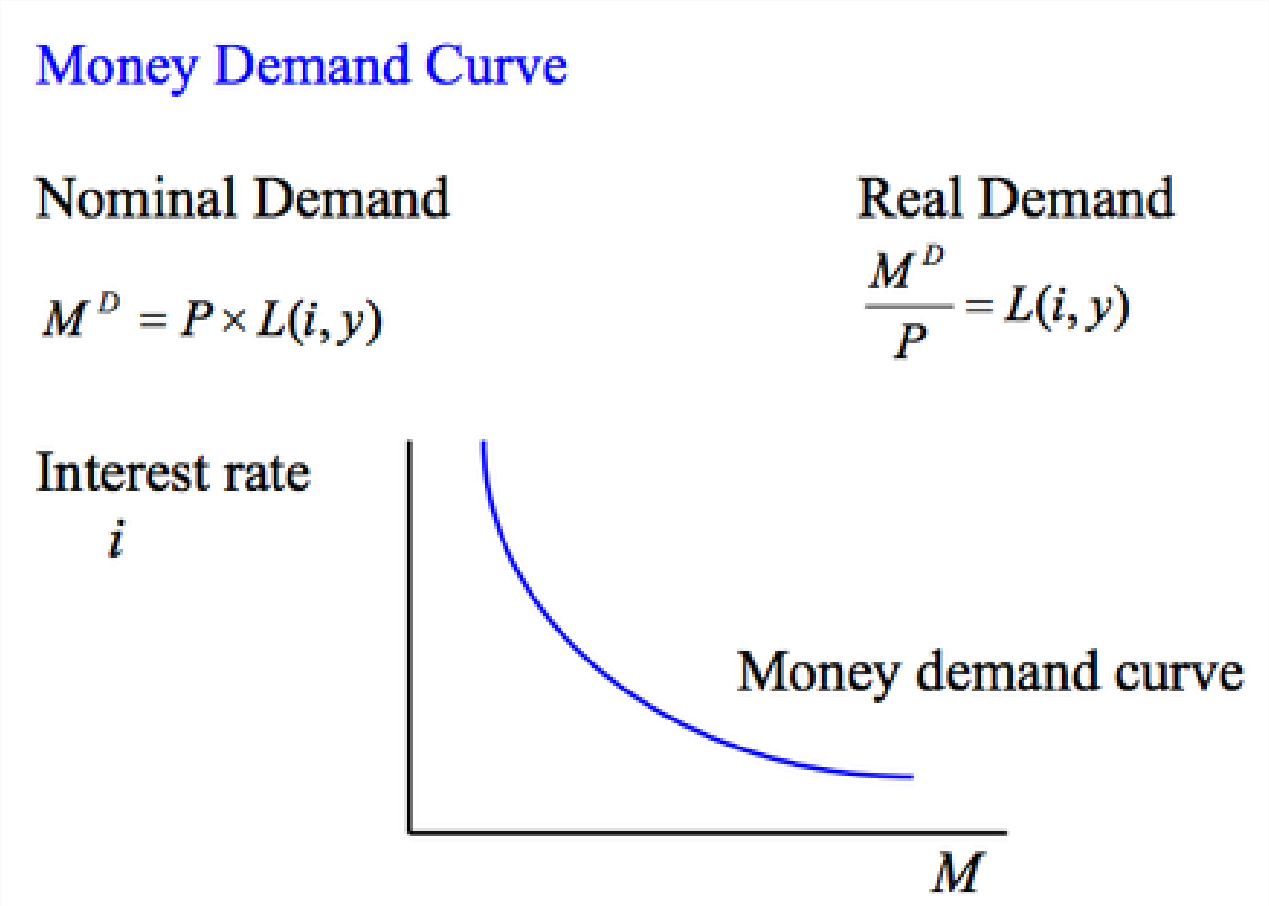

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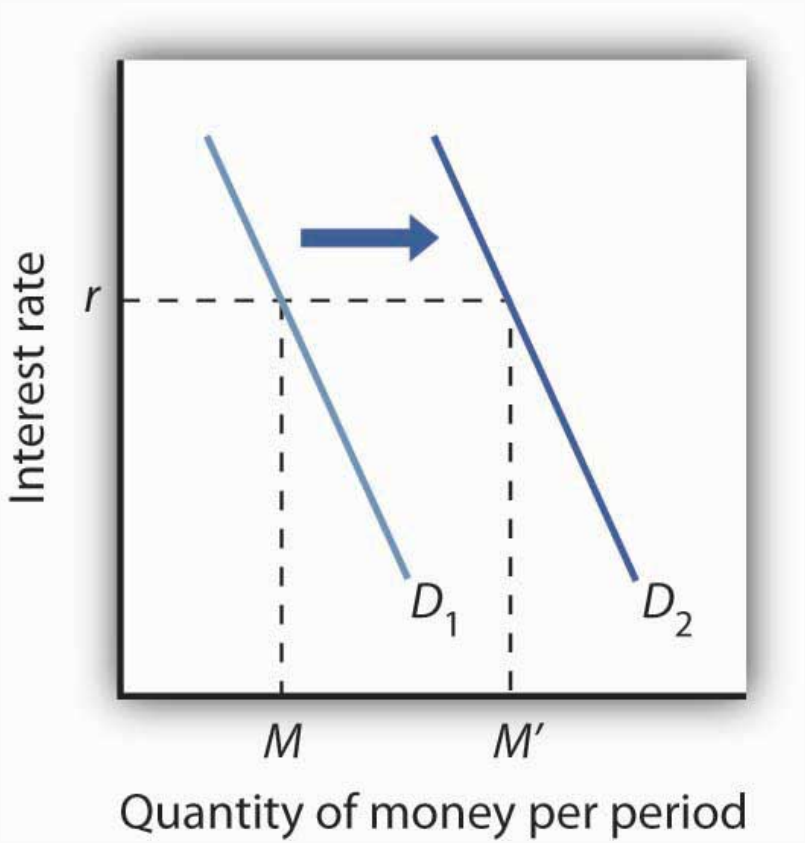

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Suppose a policymaker is in office for two periods. Output is given by

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

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 $1 - p$, 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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Question 2-B

Consider a possible equilibrium where a type-1 policymaker always chooses $\pi_1 \neq 0$. In this situation, what is π_2^e if $\pi_1 \neq 0$? What value of π_1 does a type-1 policymaker choose? What is the resulting level of social welfare over the two periods?

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

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$$\pi_2^e = p(b/a) + (1 - p)0 = p(b/a) \tag{6}$$

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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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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 $\frac{b^2}{a}\left(\frac{1}{2} - p\right)$ 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 $\pi_1 = 0$