

MIDTERM TEST OF MACROECONOMICS

Q1 (50%)

Consider the economy of Hicksonia.

- a. The consumption function is given by

$$C = 200 + 0.75(Y - T).$$

The investment function is

$$I = 200 - 25r.$$

Government purchases and taxes are both 100. For this economy, graph the *IS* curve for r ranging from 0 to 8.

- b. The money demand function in Hicksonia is

$$(M/P)^d = Y - 100r.$$

The money supply M is 1,000 and the price level P is 2. For this economy, graph the *LM* curve for r ranging from 0 to 8.

- c. Find the equilibrium interest rate r and the equilibrium level of income Y .
- d. Suppose that government purchases are raised from 100 to 150. How does the *IS* curve shift? What are the new equilibrium interest rate and level of income?
- e. Suppose instead that the money supply is raised from 1,000 to 1,200. How does the *LM* curve shift? What are the new equilibrium interest rate and level of income?
- f. With the initial values for monetary and fiscal policy, suppose that the price level rises from 2 to 4. What happens? What are the new equilibrium interest rate and level of income?
- g. Derive and graph an equation for the aggregate demand curve. What happens to this aggregate demand curve if fiscal or monetary policy changes, as in parts (d) and (e)?

Q2 (30%)

Assume that people have rational expectations and that the economy is described by the sticky-price model. Explain why each of the following propositions is true.

- a. Only unanticipated changes in the money supply affect real GDP. Changes in the money

supply that were anticipated when prices were set do not have any real effects.

- b. If the Fed chooses the money supply at the same time as people are setting prices, so that everyone has the same information about the state of the economy, then monetary policy cannot be used systematically to stabilize output. Hence, a policy of keeping the money supply constant will have the same real effect as a policy of adjusting the money supply in response to the state of the economy. (This is called the *policy irrelevance proposition*.)

Q3 (20%)

- a. Why does the aggregate demand curve slope downward?
- b. Why does the short-run aggregate supply curve slope upward?

Give one or two explanations.

1 Mankiw CH12

- a. The *IS* curve is given by:

$$Y = C(Y - T) + I(r) + G.$$

We can plug in the consumption and investment functions and values for G and T as given in the question and then rearrange to solve for the *IS* curve for this economy:

$$\begin{aligned} Y &= 200 + 0.75(Y - 100) + 200 - 25r + 100 \\ Y - 0.75Y &= 425 - 25r \\ (1 - 0.75)Y &= 425 - 25r \\ Y &= (1/0.25)(425 - 25r) \\ Y &= 1,700 - 100r. \end{aligned}$$

This *IS* equation is graphed in Figure 12-12 for r ranging from 0 to 8.

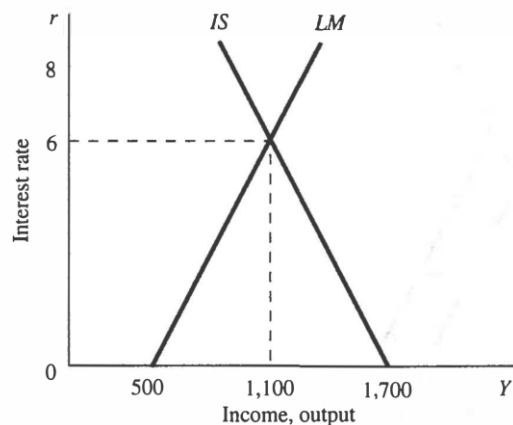


Figure 12-12

- b. The *LM* curve is determined by equating the demand for and supply of real money balances. The supply of real balances is $1,000/2 = 500$. Setting this equal to money demand, we find:

$$\begin{aligned} 500 &= Y - 100r. \\ Y &= 500 + 100r. \end{aligned}$$

This *LM* curve is graphed in Figure 12-11 for r ranging from 0 to 8.

- c. If we take the price level as given, then the *IS* and the *LM* equations give us two equations in two unknowns, Y and r . We found the following equations in parts (a) and (b):

$$\begin{aligned} IS: Y &= 1,700 - 100r. \\ LM: Y &= 500 + 100r. \end{aligned}$$

Equating these, we can solve for r :

$$\begin{aligned} 1,700 - 100r &= 500 + 100r \\ 1,200 &= 200r \\ r &= 6. \end{aligned}$$

Now that we know r , we can solve for Y by substituting it into either the *IS* or the *LM* equation. We find

$$Y = 1,100.$$

Therefore, the equilibrium interest rate is 6 percent and the equilibrium level of output is 1,100, as depicted in Figure 12-11.

- d. If government purchases increase from 100 to 150, then the *IS* equation becomes:

$$Y = 200 + 0.75(Y - 100) + 200 - 25r + 150.$$

Simplifying, we find:

$$Y = 1,900 - 100r.$$

This *IS* curve is graphed as IS_2 in Figure 12-13. We see that the *IS* curve shifts to the right by 200.

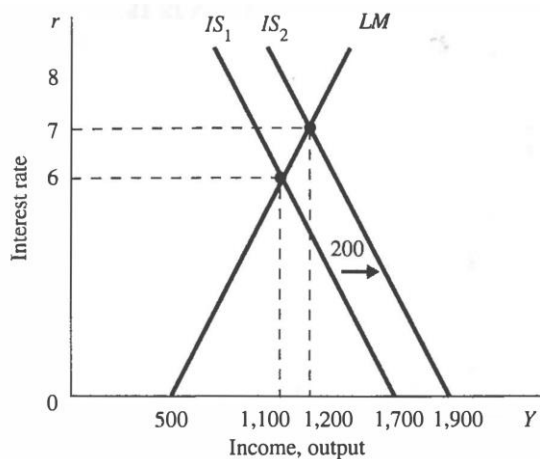


Figure 12-13

By equating the new IS curve with the LM curve derived in part (b), we can solve for the new equilibrium interest rate:

$$\begin{aligned} 1,900 - 100r &= 500 + 100r \\ 1,400 &= 200r \\ 7 &= r. \end{aligned}$$

We can now substitute r into either the IS or the LM equation to find the new level of output. We find

$$Y = 1,200.$$

Therefore, the increase in government purchases causes the equilibrium interest rate to rise from 6 percent to 7 percent, while output increases from 1,100 to 1,200. This is depicted in Figure 12-13.

- e. If the money supply increases from 1,000 to 1,200, then the LM equation becomes:

$$(1,200/2) = Y - 100r,$$

or

$$Y = 600 + 100r.$$

This LM curve is graphed as LM_2 in Figure 12-14. We see that the LM curve shifts to the right by 100 because of the increase in real money balances.

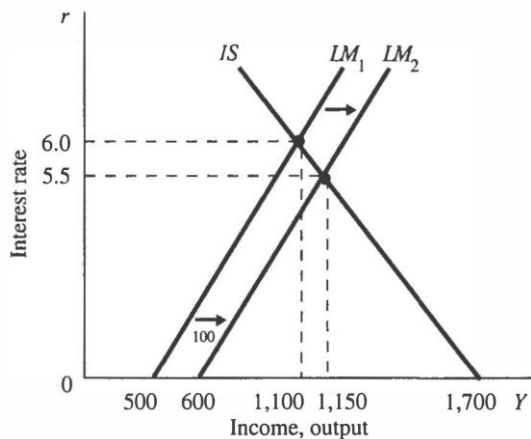


Figure 12-14

To determine the new equilibrium interest rate and level of output, equate the IS curve from part (a) with the new LM curve derived above:

$$\begin{aligned} 1,700 - 100r &= 600 + 100r \\ 1,100 &= 200r \\ 5.5 &= r. \end{aligned}$$

Substituting this into either the IS or the LM equation, we find

$$Y = 1,150.$$

Therefore, the increase in the money supply causes the interest rate to fall from 6 percent to 5.5 percent, while output increases from 1,100 to 1,150. This is depicted in Figure 12-14.

- f. If the price level rises from 2 to 4, then real money balances fall from 500 to $1,000/4 = 250$. The LM equation becomes:

$$Y = 250 + 100r.$$

As shown in Figure 12-15, the LM curve shifts to the left by 250 because the increase in the price level reduces real money balances.

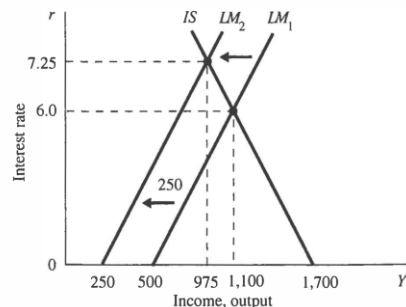


Figure 12-15

To determine the new equilibrium interest rate, equate the IS curve from part (a) with the new LM curve from above:

$$1,700 - 100r = 250 + 100r$$

$$1,450 = 200r$$

$$7.25 = r.$$

Substituting this interest rate into either the IS or the LM equation, we find

$$Y = 975.$$

Therefore, the new equilibrium interest rate is 7.25, and the new equilibrium level of output is 975, as depicted in Figure 12-15.

- g. The aggregate demand curve is a relationship between the price level and the level of income. To derive the aggregate demand curve, we want to solve the IS and the LM equations for Y as a function of P . That is, we want to substitute out for the interest rate. We can do this by solving the IS and the LM equations for the interest rate:

$$IS: Y = 1,700 - 100r$$

$$100r = 1,700 - Y.$$

$$LM: (M/P) = Y - 100r$$

$$100r = Y - (M/P).$$

Combining these two equations, we find

$$1,700 - Y = Y - (M/P)$$

$$2Y = 1,700 + M/P$$

$$Y = 850 + M/2P.$$

Since the nominal money supply M equals 1,000, this becomes

$$Y = 850 + 500/P.$$

This aggregate demand equation is graphed in Figure 12-16.

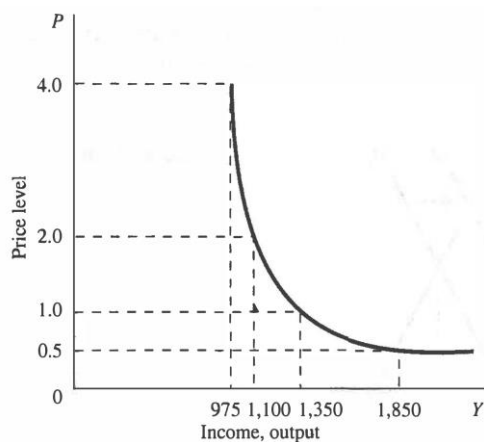


Figure 12-16

How does the increase in fiscal policy of part (d) affect the aggregate demand curve? We can see this by deriving the aggregate demand curve using the IS equation from part (d) and the LM curve from part (b):

$$\begin{aligned}
IS: \quad Y &= 1,900 - 100r \\
100r &= 1,900 - Y \\
LM: \quad (1,000/P) &= Y - 100r \\
100r &= Y - (1,000/P).
\end{aligned}$$

Combining and solving for Y :

$$1,900 - Y = Y - (1,000/P),$$

or

$$Y = 950 + 500/P.$$

By comparing this new aggregate demand equation to the one previously derived, we can see that the increase in government purchases by 50 shifts the aggregate demand curve to the right by 100.

How does the increase in the money supply of part (e) affect the aggregate demand curve? Because the AD curve is $Y = 850 + M/2P$, the increase in the money supply from 1,000 to 1,200 causes it to become

$$Y = 850 + 600/P.$$

By comparing this new aggregate demand curve to the one originally derived, we see that the increase in the money supply shifts the aggregate demand curve to the right.

2 MANKIW CH14

In this question we consider several implications of rational expectations—the assumption that people optimally use all of the information available to them in forming their expectations—for the model of sticky prices that we considered in this chapter. This model implies an aggregate supply curve in which output varies from its natural rate only if the price level varies from its expected level:

$$\bar{Y} = Y + \alpha(P - EP).$$

Based on this model, monetary policy can affect real GDP only by affecting $(P - EP)$ —that is, causing an unexpected change in the price level.

- a. Only unanticipated changes in the money supply can affect real GDP. Since people take into account all of the information available to them, they already take into account the effects of anticipated changes in money when they form their expectations of the price level EP . For example, if people expect the money supply to increase by 10 percent and it actually does increase by 10 percent, then there is no effect on output since there is no price surprise— $(P - EP) = 0$. On the other hand, suppose the Fed increases the money supply more than expected, so that prices increase by 15 percent when people expect them to increase by only 10 percent. Since $P > EP$, output rises. But it is only the unanticipated part of money growth that increases output.
- b. The Fed often tries to stabilize the economy by offsetting shocks to output and unemployment. For example, it might increase the money supply during recessions in an attempt to stimulate the economy, and it might reduce the money supply during booms in an attempt to slow it down. The Fed can only do this by surprising people about the price level: during a recession, they want prices to be higher than expected, and during booms, they want prices to be lower than expected. If people have rational expectations, however, they will *expect* the Fed to respond this way. So if the economy is in a boom, people expect the Fed to reduce the money supply; in a recession, people expect the Fed to increase the money supply. In either case, it is impossible for the Fed to cause $(P - EP)$ to vary systematically from zero. Since people take into account the systematic, anticipated movements in money, the effect on output of systematic, active policy is exactly the same as a policy of keeping the money supply constant, assuming the Fed chooses the level of the money supply at the same time people set prices so everyone has the same information.

3a (回答对一种算对) MANKIW CH10

有多种答案回答：1.从货币数量论方程推导（如下）；2.三种效应：利率效应、财富效应、汇率效应；3.从 IS-LM 公式推导；4.从 IS-LM 图形推导等。

Aggregate demand is the relation between the quantity of output demanded and the aggregate price level. To understand why the aggregate demand curve slopes downward, we need to develop a theory of aggregate demand. One simple theory of aggregate demand is based on the quantity theory of money. Write the quantity equation in terms of the supply and demand for real money balances as

$$M/P = (M/P)^d = kY,$$

where $k = 1/V$. This equation tells us that for any fixed money supply M , a negative relationship exists between the price level P and output Y , assuming that velocity V is fixed: the higher the price level, the lower the level of real balances and, therefore, the lower the quantity of goods and services demanded Y . In other words, the aggregate demand curve slopes downward, as in Figure 10-1.

One way to understand this negative relationship between the price level and output is to note the link between money and transactions. If we assume that V is constant, then the money supply determines the dollar value of all transactions:

$$MV = PY.$$

An increase in the price level implies that each transaction requires more dollars. For the above identity to hold with constant velocity, the quantity of transactions and thus the quantity of goods and services purchased Y must fall.

3b(回答一种计算对，下面是其中两种，答要点即可) MANKIW CH 14

有不完全信息模型，粘性工资模型、粘性价格模型三种理论

In this chapter we looked at two models of the short-run aggregate supply curve. Both models attempt to explain why, in the short run, output might deviate from its long-run “natural rate”—the level of output that is consistent with the full employment of labor and capital. Both models result in an aggregate supply function in which output deviates from its natural rate \bar{Y} when the price level deviates from the expected price level:

$$Y = \bar{Y} + \alpha(P - EP).$$

The first model is the sticky-price model. The market imperfection in this model is that prices in the goods market do not adjust immediately to changes in demand conditions—the goods market does not clear instantaneously. If the demand for a firm’s goods falls, some respond by reducing output, not prices.

The second model is the imperfect-information model. This model assumes that there is imperfect information about prices, in that some suppliers of goods confuse changes in the price level with changes in relative prices. If a producer observes the nominal price of the firm’s good rising, the producer attributes some of the rise to an increase in relative price, even if it is purely a general price increase. As a result, the producer increases production. In both models, there is a discrepancy between what is