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**Principles of Economics**

**Model #3: An open economy in the short run  
with fixed prices and flexible Interest Rates**

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Introduction

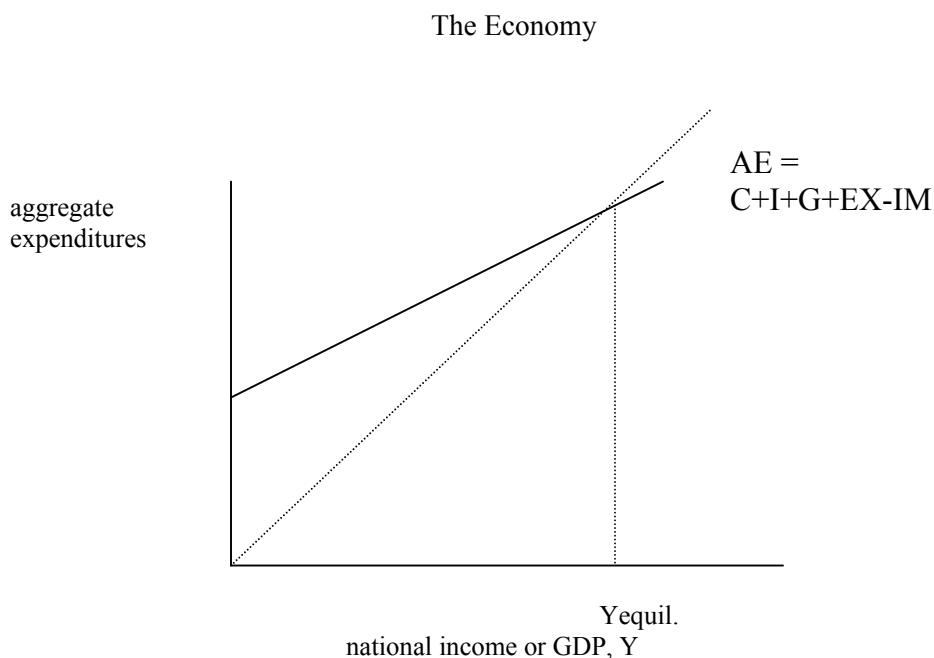
Recall that model #2 assumes fixed interest rates—an unrealistic simplification. In this model, we allow interest rates to change. We do this by explicitly adding the money market into our model, while retaining all of the other characteristics of the model.

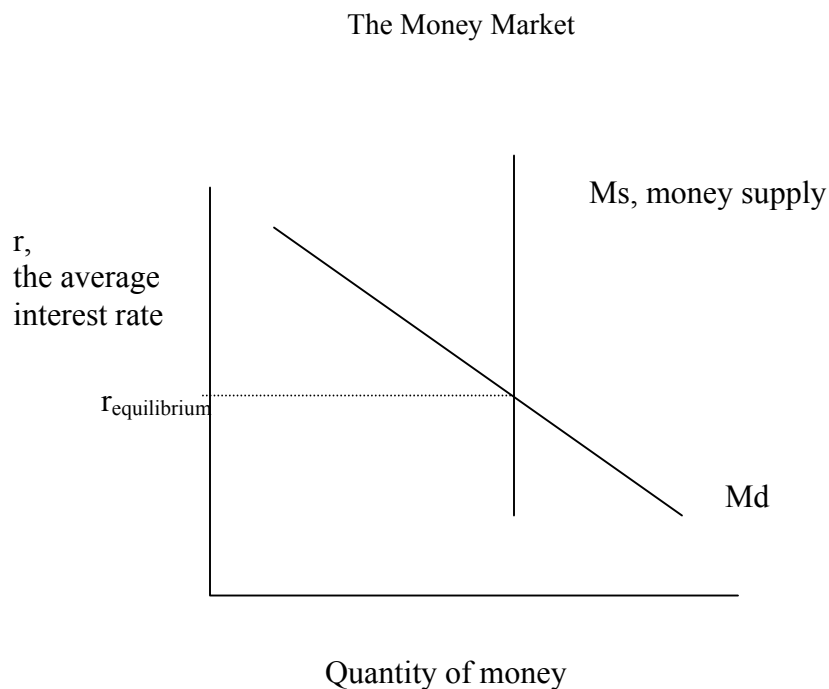
Model #3 is a short run model of an open economy with fixed prices and flexible interest rates.

Let's get to it!

Model #3: Graphical Representation

Perhaps the best way to introduce our model is to view the two graphs that represent it. Both of these graphs are familiar; they work in tandem to represent our new model. They are our aggregate expenditures graph of the economy and our graph of the money market. I repeat them here:





We have 3 curves to consider in our model—the AE curve, the Ms curve, and the Md curve. Let's review the things that affect each of the curves.

**The AE curve:** Recall that these events affect aggregate expenditures.

- level of disposable income
- level of household taxes
- level of transfer payments
- level of consumer confidence
- level of household wealth
- level of interest rates
- level of producer confidence
- level of government purchases, set by government officials
- value of U.S. dollar relative to foreign currency
- level of incomes in foreign countries

**The Ms curve:** Recall that these events affect the money supply

- the Central Bank's monetary policy
  - discount rate, required reserve ratio, open market operations
- the amount of loans made by banks and other financial institutions

**The Md curve:** Recall that these events affect money demand

- the average level of prices
- the level of real national income, Y

Since we assume that prices are fixed in model #3, we ignore the effects of changing prices on money demand in this model. (We'll return to it in model #4.)

### Links Between the Economy and the Money Market

There are two important links between the economy and the money market:

--An event that changes the money supply (such as a change in monetary policy) affects interest rates ( $r$ ), and this change in interest rates affects aggregate expenditures (AE) by changing investment and net exports.

--An event that changes aggregate expenditures (such as fiscal policy) affects real national income ( $Y$ ), and this change in  $Y$  causes a change in money demand ( $M_d$ ) resulting in a change in interest rates.

### Equilibrium in the model

Model #3 is in equilibrium when both of the following are true:

- aggregate expenditures = real GDP ( $AE = Y$ )
- money demand = money supply ( $M_d = M_s$ )

### Equilibrium Graphed

We've already looked at this. We need two graphs to illustrate equilibrium. The graphs are on pages one and two of these notes. Whoopee!

### Forecasting Future Economic Performance in the short run: Events changing equilibrium

Here's a list of things. If one of them occurs, then all kinds of things change in the economy, including  $Y$  and  $r$ .

#### **If one or more of these things changes, then equilibrium in the economy changes**

- level of disposable income
  - level of household taxes
  - level of transfer payments
- level of consumer confidence
- level of household wealth
- level of producer confidence
- level of government purchases, set by government officials
- level of incomes in foreign countries
- the Central Bank's monetary policy
  - discount rate, required reserve ratio, open market operations
- the amount of loans made by banks and other financial institutions

### Graphing changes in equilibrium

We want to be able to use our 2 graphs to illustrate how an event changes equilibrium  $Y$  and  $r$ . There are many ways that this could be done. But to keep things as uncomplicated as possible, we will ALWAYS assume that

A change in equilibrium is illustrated by shifting two of the three curves in our model: the AE curve and one of the other curves—the  $M_s$  or  $M_d$  curve

### Events Changing Equilibrium: Examples

#### Example 1 (Contractionary Monetary Policy): The Central Bank raises the discount rate

Sequence of effects:

*First:* This is an example of monetary policy; the higher discount rate discourages lending, shrinking the money supply. **The  $M_s$  curve shifts leftward.** In the money market, the average interest rate,  $r$ , rises.

*Second:* The higher interest rates reduce investment, because it is now more expensive to borrow to buy a house or a piece of capital equipment. In addition, net exports are reduced, because a higher interest rate makes the economy's currency appreciate relative to foreign currencies.

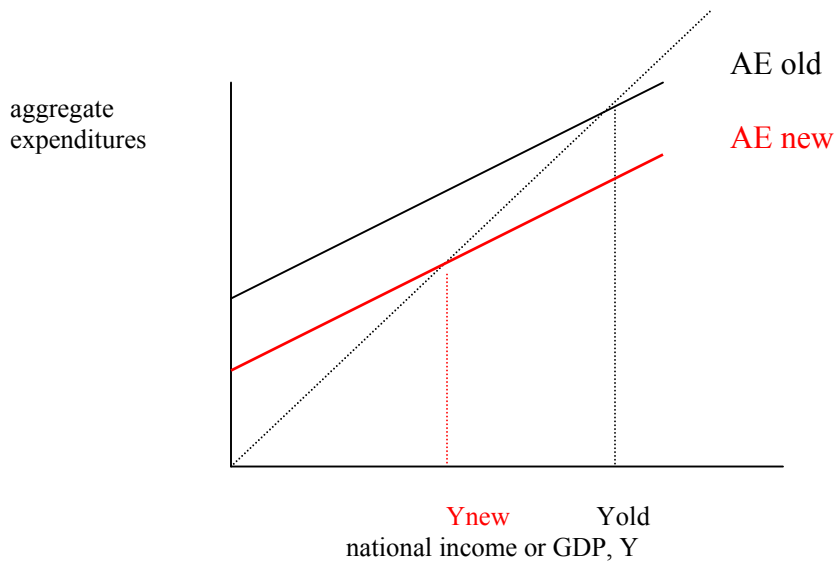
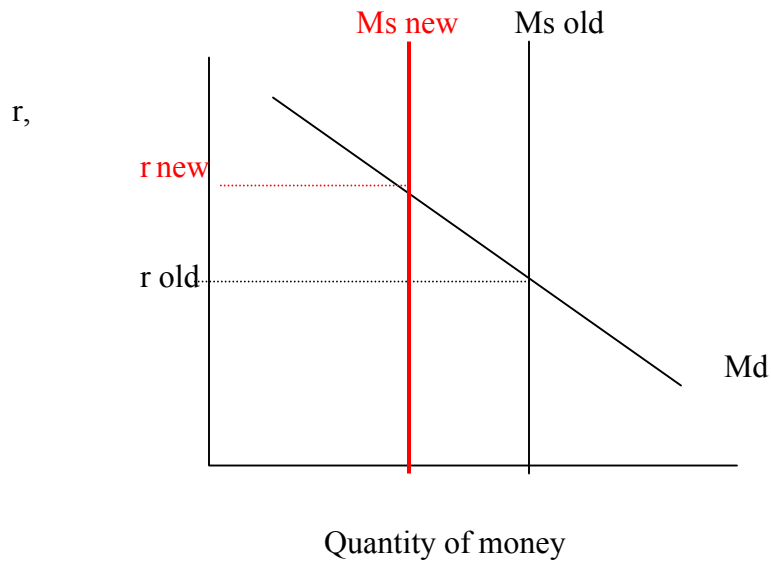
*Third:* Since both investment,  $I$ , and net exports,  $EX - IM$ , have fallen, aggregate expenditures have fallen. **The AE curve shifts down.** As a result of the lower AE, producers reduce production, so  $Y$  falls.

Graphs of the changes in  $Y$  and  $r$  resulting from the contractionary monetary policy are on the next page of notes.

Some bonus forecasts of other effects of contractionary monetary policy:

- Since production has shrunk, there are fewer workers employed
- Since national income has fallen, household consumption and savings have fallen.

Contractionary Monetary Policy Graphed



Example 2 (Expansionary Monetary Policy): The Central Bank buys government securities

Sequence of effects:

*First:* This is an example of monetary policy; the purchase of government securities injects currency into the economy, increasing the money supply. **The Ms curve shifts rightward.** In the money market, the average interest rate,  $r$ , falls.

*Second:* The lower interest rates increase investment, because it is now cheaper to borrow to buy a house or a piece of capital equipment. In addition, net exports rise, because a lower interest rate make the economy's currency depreciate relative to foreign currencies.

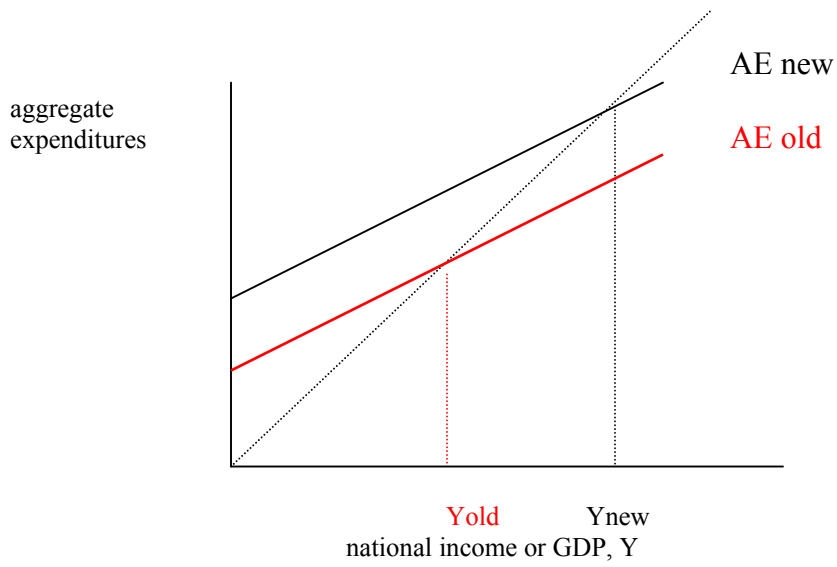
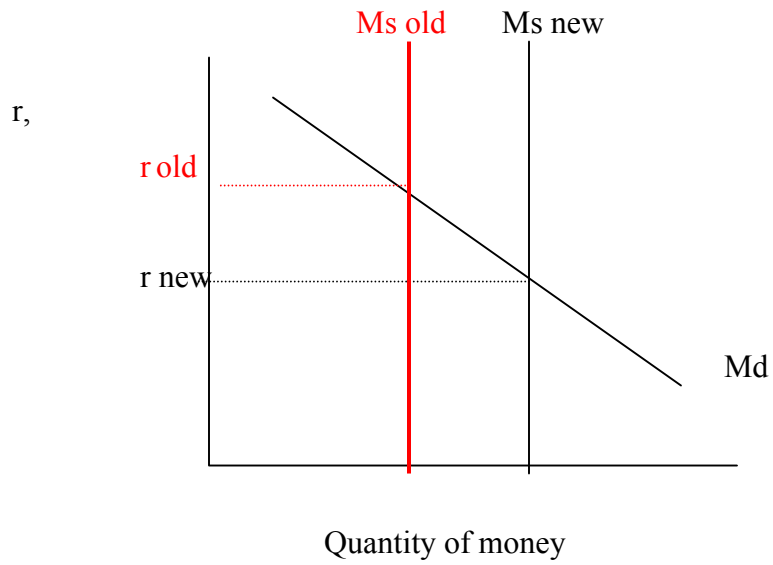
*Third:* Since both investment,  $I$ , and net exports,  $EX - IM$ , have risen, aggregate expenditures have risen. **The AE curve shifts up.** As a result of the higher AE, producers raise production, so  $Y$  rises.

Graphs of the changes in  $Y$  and  $r$  resulting from the expansionary monetary policy are on the next page of notes.

Some bonus forecasts of other effects of expansionary monetary policy:

- Since production has risen, there are more workers employed
- Since national income has risen, household consumption and savings have risen.

### Expansionary Monetary Policy Graphed



Example 3 (Contractionary fiscal policy): Government officials reduce military spending

*First:*  $G$  falls. Since  $G$  is a component of  $AE$ ,  $AE$  falls. **The  $AE$  curve shifts down.** As a result,  $Y$  falls.

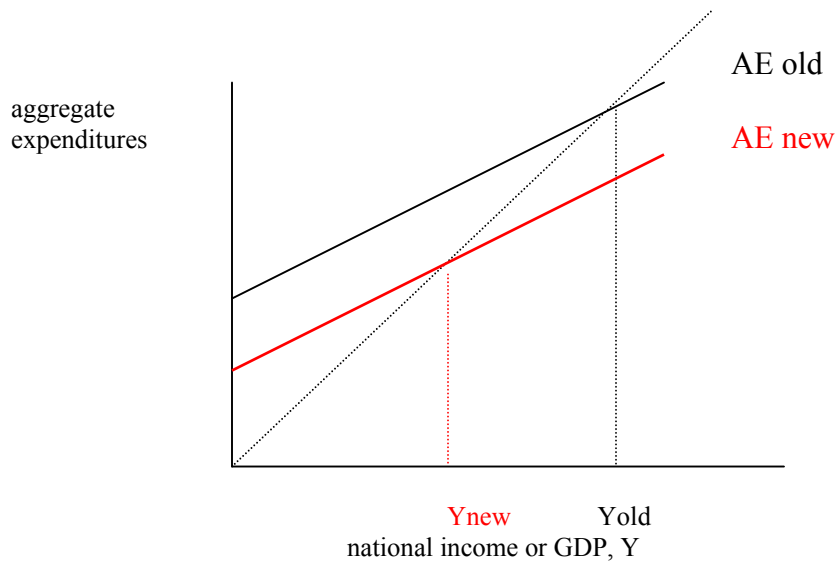
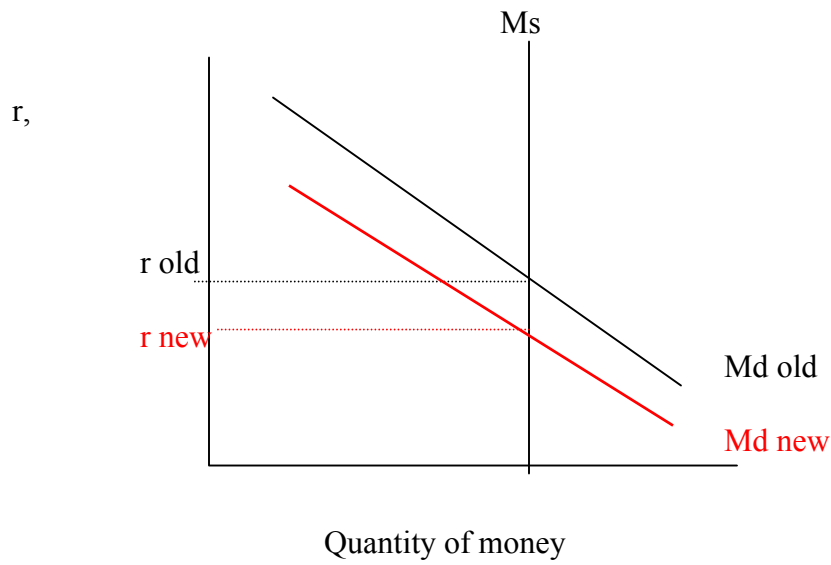
*Second:* When  $Y$  falls, demand for money falls. **The  $Md$  curve shifts down.** As a result,  $r$  falls.

The effects of contractionary fiscal policy on  $Y$  and  $r$  are illustrated on the next page.

Some bonus forecasts of the reduction in  $G$ :

- Since total production,  $Y$ , is lower, fewer people are working
- Since  $r$  is lower, it is less expensive to borrow to buy a house or capital, so investment is higher.
- Since  $r$  is lower, the economy's currency has depreciated relative to foreign currencies, causing net exports to be higher.
- Since earned income,  $Y$ , is lower, both consumption and savings are lower.
- Since the government has cut  $G$  without cutting taxes, the budget deficit is lower.

### Contractionary Fiscal Policy Graphed



Example 4 (Expansionary fiscal policy): Government officials raise transfer payments

*First:* Disposable income rises, causing consumption,  $C$ , to rise. Since  $C$  is a component of  $AE$ ,  $AE$  rises. **The  $AE$  curve shifts up.** As a result,  $Y$  rises.

*Second:* When  $Y$  rises, demand for money rises. **The  $Md$  curve shifts up.** As a result,  $r$  rises.

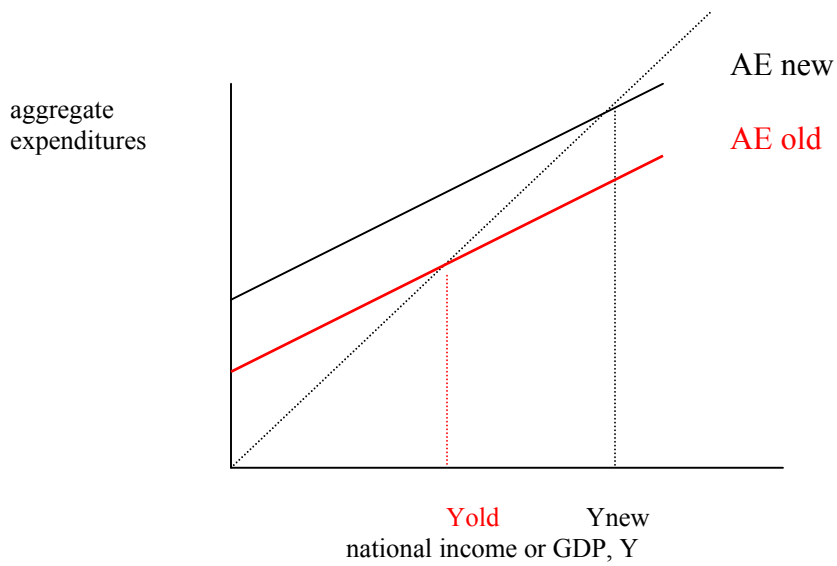
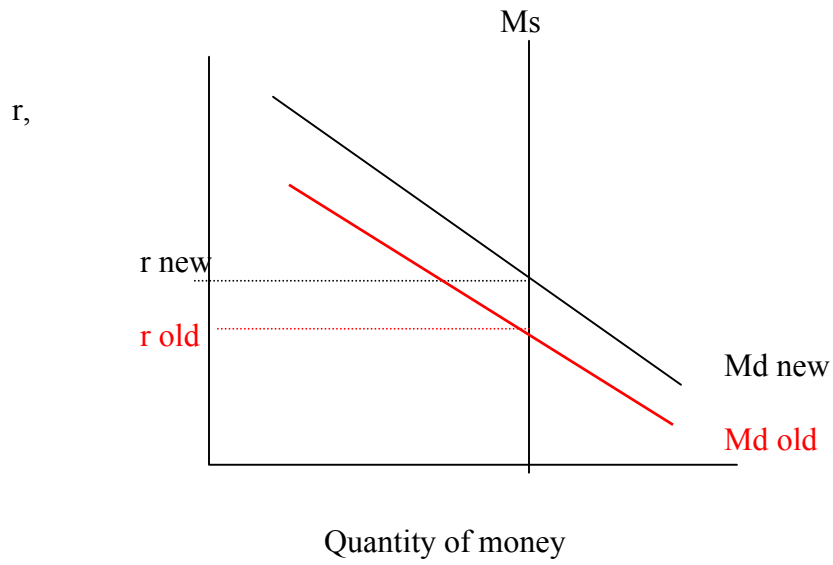
The effects of expansionary fiscal policy on  $Y$  and  $r$  are illustrated on the next page.

Some bonus forecasts of the increase in transfer payments:

- Since total production,  $Y$ , is higher, more people are working
- Since  $r$  is higher, it is more expensive to borrow to buy a house or capital, so investment is lower.
- Since  $r$  is higher, the economy's currency has appreciated relative to foreign currencies, causing net exports to be lower.
- Since earned income,  $Y$ , is higher, savings is higher.
- Since the government has raised its spending without raising taxes, the budget deficit is higher.

“Crowding out”  
is the term used  
when fiscal  
policy causes  
investment to  
fall.

### Expansionary Fiscal Policy Graphed



Well, we're done with our examples. Of course, many other events could affect  $Y$ ,  $r$ , and lots of other things. You should be able to draw graphs and do forecasts for those events. (Such events would include a change in consumer confidence, economic growth in other countries, a tax cut, etc. See the complete list on page 3 of these notes.)