

## IS/LM Model (Ch 9)

1. The *FE* (Full employment)Line: Equilibrium in the Labor Market
2. The *IS* (Investment – Saving) Curve: Equilibrium in the Goods Market
3. The *LM* Curve: Asset Market Equilibrium
4. General Equilibrium in the Complete *IS-LM* Model
5. Price Adjustment and the Attainment of General Equilibrium
6. Aggregate Demand and Aggregate Supply

### 1. The *FE* (Full employment)Line: Equilibrium in the Labor Market

- In the discussion of the labor market in Chapter 3, we showed how equilibrium in the labor market leads to employment at its full-employment level and output at  $Y^*$
- If we plot output against the real interest rate, we get a vertical line at  $Y^*$ , since labor market equilibrium is unaffected by changes in the real interest rate (Figure 9.1)

Factors that shift the *FE* line

is determined by the full-employment level of employment and the current levels of capital and productivity; any change in these variables shifts the *FE* line

- (1) a beneficial supply shock ( $A$ )
- (2) an increase in labor supply ( $N$ )
- (3) an increase in the capital stock ( $K$ )

The full-employment line shifts left when the opposite happens to the three factors above

### 2. The *IS* (Investment – Saving) Curve: Equilibrium in the Goods Market

The goods market clears when desired investment equals desired national saving – real interest rate will change to bring about the equilibrium

The *IS* curve shows the relationship between the real interest rate and output for which investment equals saving (or equivalently, for which the goods market is in equilibrium)

## Derivation of the $IS$ curve from the saving-investment diagram (Figure 9.2)

Consider two different levels of output

$Y$  increases –  $S^d$  shifts to the right.

Result:  $r$  decreases

Conclusion: increase in  $Y$ , decrease in  $r$  – downward sloping  $IS$  curve.

Alternative interpretation in terms of goods market equilibrium

Suppose  $r$  increases –  $S^d$  increases,  $C^d$  decreases,  $I^d$  decreases

So the quantity of goods demanded declines

To restore equilibrium, the quantity of goods supplied would have to decrease.

So higher real interest rates are associated with lower output, that is, the  $IS$  curve slopes downward

Factors that shift the  $IS$  curve

Any change that reduces desired national saving relative to desired investment shifts the  $IS$  curve up and to the right

With constant output if  $S$  decreases there is more investment relative to saving; the interest rate must rise to reduce investment and increase saving (Figure 9.3)

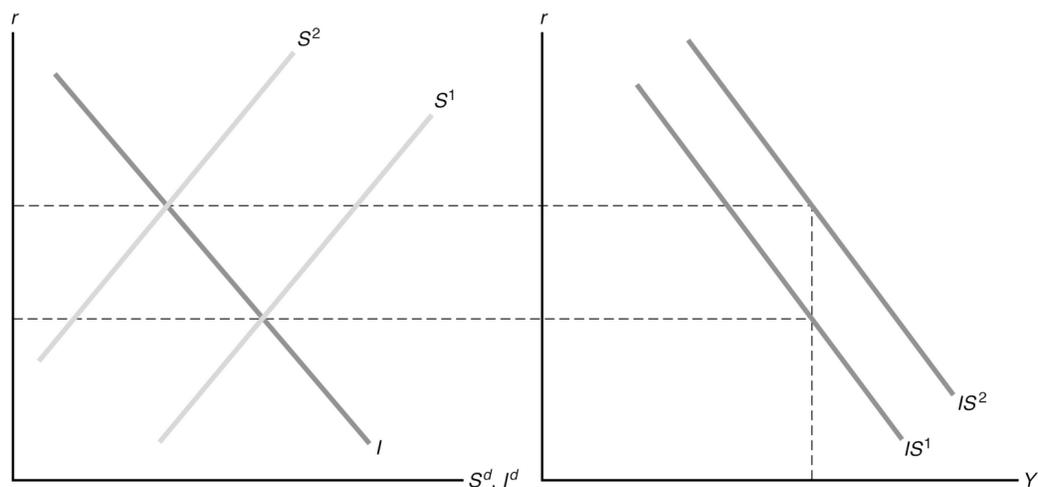


Figure 9.3

$IS$  curve shifts up (and to the right)

- any factor that decreases  $S$  would shift  $IS$  up

- (1) an increase in expected future output
- (2) an increase in wealth
- (3) a temporary increase in government purchases

(4) a decline in taxes (if Ricardian equivalence doesn't hold)

- any factor that increases  $I$  would shift  $IS$  up

(5) an increase in the expected future marginal product of capital

(6) a decrease in the effective tax rate on capital

An alternative way of stating this is that a change that increases aggregate demand for goods shifts the  $IS$  curve up and to the right

- In this case, the increase in aggregate demand for goods exceeds the supply

- The real interest rate must rise to reduce desired consumption and investment and restore equilibrium

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Numerical Problem 1 asks students to find the  $IS$  curve, given equations for consumption and investment, and looks at how a change in government purchases shifts the curve.

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### 3. The $LM$ Curve: Asset Market Equilibrium

The (nominal) interest rate and the price of a nonmonetary asset move in the opposite direction

Example:

For a given level of expected inflation, the price of a nonmonetary asset is inversely related to the real interest rate

Money Market

Equilibrium when

$$M/P = L/P$$

Real money supply = real money demand

Real money supply - determined by the central bank

Real money demand falls as the real interest rate rises

Shifts in  $M/P$

1. Output  $Y$  increases

The  $LM$  curve is derived by plotting real money demand for different levels of output and looking at the resulting equilibrium

By what mechanism is equilibrium restored?

- Starting at equilibrium, suppose output rises, so real money demand increases
- The rise in people's demand for money makes them sell nonmonetary assets, so the price of those assets falls and the real interest rate rises
- As the interest rate rises, the demand for money declines until equilibrium is reached

The *LM* curve shows the combinations of the real interest rate and output that clear the asset market

- Intuitively, for any given level of output, the *LM* curve shows the real interest rate necessary to equate real money demand and supply
- Thus the *LM* curve slopes upward from left to right

Factors that shift the *LM* curve

Any change that reduces real money supply relative to real money demand shifts the *LM* curve up

- For a given level of output, the reduction in real money supply relative to real money demand causes the equilibrium real interest rate to rise
- The rise in the real interest rate is shown as an upward shift of the *LM* curve

The *LM* curve shifts down and to the right because of

- (1) an increase in the nominal money supply
- (2) a decrease in the price level
- (3) an increase in expected inflation
- (4) a decrease in the nominal interest rate on money
- (5) a decrease in wealth
- (6) a decrease in the risk of alternative assets relative to the risk of holding money
- (7) an increase in the liquidity of alternative assets
- (8) an increase in the efficiency of payment technologies

Drop in real money supply shifts the  $LM$  curve up and to the left  
- The real money supply changes when the nominal money supply changes at a different rate than the price level

Changes in real money demand

An increase in real money demand shifts the  $LM$  curve up and to the left

Similarly, a drop in real money demand shifts the  $LM$  curve down and to the right