

Review

Chapter 20 : The IS Curve

A. Aggregate Demand

$$Y^{ad} = C + I + G + NX$$

1. C : consumption expenditure, the total demand for consumer goods and services.

(a) Consumption function

$$C = \bar{C} + mpc \times Y_D$$

(b) \bar{C} : autonomous consumer expenditure, the amount of consumer expenditure that is independent of disposable income (how much to spend when $Y_D = 0$, the intercept of consumption function);

(c) mpc : marginal propensity to consume.

i. the change in consumer expenditure C that results from an additional dollar of disposable income Y_D .

ii. Assume $0 < mpc < 1$

(d) Y_D : disposable income, the total income available for spending equal to aggregate income minus taxes. $Y_D = Y - T$

2. I : planned investment spending

(a) I = fixed investment (on equipment and residential housing) + planned inventory investment (additional holdings of raw materials, parts, and finished goods).

(b) Investment function

$$\begin{aligned} I &= \bar{I} - dr_c \\ r_c &= r + \bar{f} \end{aligned}$$

i. r_c = Real cost of borrowing

ii. r = Real default-free interest rate

iii. \bar{f} = financial frictions

3. G : government purchases, the spending by all levels of governments on goods and services.

(a) Government purchase $G = \bar{G}$

(b) Taxes $T = \bar{T}$

4. NX : net exports, the net foreign spending on domestic goods and services, equal to exports minus imports.

(a) Net export Function

$$NX = \overline{NX} - xr$$

i. x = sensitivity of net exports NX to the real interest rate r

(b) $r \uparrow \Rightarrow E \uparrow \Rightarrow NX \downarrow$

B. Equilibrium

The equilibrium would occur in the economy when total quantity of output supplied Y equals quantity of output demanded Y^{ad} , $Y = Y^{ad}$

$$Y = \frac{1}{1 - mpc} [\bar{C} + \bar{I} - d\bar{f} + \bar{G} + \overline{NX} - mpc \times \bar{T}] - \frac{d + x}{1 - mpc} r \quad (1)$$

Multiplier effect: for a unit change in quantities of ..., the resulted change in equilibrium output level is...

1. $\bar{C}, \bar{I}, \bar{G}, \overline{NX}$: $\frac{1}{1 - mpc}$
2. T : $-\frac{mpc}{1 - mpc}$
3. \bar{f} : $-\frac{d}{1 - mpc}$
4. r : $-\frac{d + x}{1 - mpc}$

C. The IS Curves

1. Shows combinations of r and Y that the **goods market** is in equilibrium
2. The IS curve is shifted to the right (\rightarrow) by
 - (a) Autonomous consumer spending \uparrow
 - (b) Planned investment spending related to business confidence \uparrow
 - (c) Government spending \uparrow
 - (d) Taxes \downarrow
 - (e) Autonomous net exports \uparrow
 - (f) Financial frictions \downarrow

Chapter 21 : The Monetary Policy and Aggregate Demand Curves

A. The Federal Reserve and Monetary Policy

1. Fed's primary policy tool is very short-term nominal interest rates, i . (controlled by adding and draining reserves from banking system).

2. Recall Fisher Equation

$$r = i - \pi^e$$

The federal funds rate is a nominal interest rate i , but it is the real interest rate r that affects net exports NX and investment spending I , thereby determine the level of equilibrium output.

Assume π and π^e are constant in the short-run (sticky prices). By changing i , the Fed controls r in the short run.

B. The Monetary Policy Curve

1. monetary policy(MP) curve – indicates the relationship between real interest rate r the Fed sets and the inflation rate π . We can write this curve as follows:

$$r = \bar{r} + \lambda\pi \tag{2}$$

\bar{r} = autonomous component of the real interest rate set by the monetary policy authorities, unrelated to the current level of the inflation rate.

λ = parameter showing responsiveness of real interest rate r to the inflation rate π .

2. MP Curve has an upward slope which is explained by the Taylor Principle .

Assume Fed's goal is for stable inflation π . The monetary policy authorities will increase i more than any increase in $\pi^e \Rightarrow$ increase in r .

3. Shifts in the MP Curve

- (a) autonomous tightening of monetary policy
- (b) autonomous easing of monetary policy

C. The Aggregate Demand Curve

1. Aggregate Demand (AD) Curve – indicates the relationship between the inflation rate and aggregate output when the goods market is in equilibrium.

2. Deriving the Aggregate Demand Curve

Substitute the MP Curve $r = \bar{r} + \lambda\pi$ into the IS curve $Y = \frac{1}{1-mpc} [\bar{C} + \bar{I} - d\bar{f} + \bar{G} + \overline{NX} - mpc \times T] - \frac{d+x}{1-mpc}r$, we have the aggregate demand curve:

$$Y = \frac{1}{1-mpc} [\bar{C} + \bar{I} - d\bar{f} + \bar{G} + \overline{NX} - mpc \times \bar{T}] - \frac{d+x}{1-mpc} (\bar{r} + \lambda\pi)$$

3. Factors that Shift the Aggregate Demand Curve

- Any factor that shifts the IS curve shifts the aggregate demand curve in the same direction.
- An autonomous tightening of monetary policy - that is, a rise in the real interest rate at any given inflation rate - shifts the aggregate demand curve to the left. Similarly, an autonomous easing of monetary policy shifts the aggregate demand curve to the right.

Appendix:

IS-LM model

IS-LM model explains how i and Y are determined given a fixed price level (makes sense only in the SR).

IS curve: ($AD = AS$) Equilibrium in the goods market.

IS curve slopes **downward** because as

(a) Investment : $i \uparrow \Rightarrow$ cost of borrowing $\uparrow \Rightarrow$ Expected return on Investments $\downarrow \Rightarrow I \downarrow \Rightarrow Y^{ad} \downarrow \Rightarrow Y^* \downarrow$.

(b) Net Export : $i \uparrow \Rightarrow$ Demand for US denominated assets relative to foreign assets $\uparrow \Rightarrow$ Appreciation of \$ ($E \uparrow$) \Rightarrow Domestic goods relatively more expensive than foreign goods $\uparrow \Rightarrow NX \downarrow \Rightarrow Y^{ad} \downarrow \Rightarrow Y^* \downarrow$.

From (a) and (b), $i \uparrow \Rightarrow Y^* \downarrow$, thus the **negative** slope of IS curve.

LM curve: ($M^D = M^S$) Equilibrium in the money market.

LM curve slopes **upward** because as aggregate output Y goes up, wealth effect and level of transactions increase, therefore increasing money demand, which results in a higher interest rate i (M^D slopes downward as interest rate is the opportunity cost of holding money). (Keyne's Liquidity Preference Theory).

Shifts in IS and LM curves

1. The IS curve is shifted to the right (\rightarrow) by

- (a) Autonomous consumer spending \uparrow
- (b) Planned investment spending related to business confidence \uparrow
- (c) Government spending \uparrow
- (d) Taxes \downarrow
- (e) Autonomous net exports \uparrow

2. The LM curve is shifted to the right (\rightarrow) by

- (a) Real money supply \uparrow
- (b) Autonomous money demand (not related to Y or i) \downarrow

Practice questions:

[Q1] (Spring 2009) If the economy is on the LM curve, but is to the right of the IS curve, then the _____ market is in equilibrium, but aggregate _____ exceeds aggregate _____.

- A) goods; output; demand
- B) goods; demand; output
- C) money; output; demand
- D) money; demand; output

[Q2] An increase in government spending causes the equilibrium level of aggregate output to _____ at any given interest rate and shifts the _____ curve to the _____, everything else held constant.

- A) rise; LM; right
- B) rise; IS; right
- C) fall; IS; left
- D) fall; LM; left

[Q3] If the Federal Reserve conducts open market _____, the money supply _____, shifting the LM curve to the left, everything else held constant.

- A) purchases; decreases
- B) sales; decreases
- C) purchases; increases
- D) sales; increases

[Q4] An autonomous increase in money demand, other things equal, shifts the _____ curve to the _____.

- A) IS; right
- B) IS; left
- C) LM; left
- D) LM; right

[Q5] (Fall 2010 Qn 19) Which of the following statements concerning Keynesian IS-LM analysis is true?

- A) Expansionary fiscal policy will cause the interest rate to fall.
- B) A fall in the money supply shifts the LM curve to the right.
- C) Changes in net exports arising from a change in interest rates causes a shift in the IS curve.
- D) For a given change in taxes, the IS curve will shift less than for an equal change in government spending.

[Q6] (Fall 2010 Qn 35) A decrease in autonomous consumer expenditure causes the equilibrium level of aggregate output to _____ at any given interest rate and the shifts the _____ curve to the _____, everything else held constant.

- A) rise; IS; right
- B) fall; LM; left
- C) rise; LM; right
- D) fall; IS; left

[Q7] (Fall 2010 Qn 40) When the central bank _____ the money supply, the LM curve shifts to the right, interest rates _____, and equilibrium aggregate output _____, everything else held constant.

- A) Increases; fall; increases
- B) decreases; rise; decreases
- C) Increases; rise; decreases
- D) decreases; fall; increases

[Q8] (Fall 2010 Qn 45) Aggregate output and the interest rate are _____ related to government spending and are _____ related to taxes.

- A) negatively; negatively

- B) positively; positively
- C) positively negatively
- D) negatively; positively