

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:

$$r = \bar{r} + \lambda\pi \tag{1}$$

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

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

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

Chapter 22 : Aggregate Demand and Supply Analysis

Aggregate Demand Curve

1. A downward sloping curve: the total quantity of final goods and services demanded in an economy is negatively correlated with the inflation rate.
2. Why downward sloping?

Deriving the Aggregate Demand Curve

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

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

- $\pi \downarrow \Rightarrow r \downarrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$
- $\pi \downarrow \Rightarrow r \downarrow \Rightarrow NX \uparrow \Rightarrow Y^{ad} \uparrow$

3. Factors that shifts the AD curve to the RIGHT:

Any factor that shifts the IS curve shifts the aggregate demand curve in the same direction $\bar{C} \uparrow, \bar{I} \uparrow, \bar{G} \uparrow, \bar{T} \downarrow, \bar{NX} \uparrow, \bar{f} \downarrow$

An autonomous easing of monetary policy - that is, a fall in the real interest rate at any given inflation rate - shifts the aggregate demand curve to the right. $\bar{r} \downarrow$

Aggregate Supply Curve

1. Long-Run Aggregate Supply Curve

- Natural rate of unemployment: to which the economy gravitates in the long run at which demand for labor equals supply (assumed 5%).
- Natural rate of output (Potential Output Y^P) : the level of aggregate output produced at the natural rate of unemployment.
- Depends on
 - Capital (K)

- Labor (L)
- Technology
- Shifts RIGHT when
 - $K \uparrow$, $L \uparrow$, Technology \uparrow , Natural rate of unemployment \downarrow

2. Short-Run Aggregate Supply Curve

$$\pi = \pi^e + \gamma(Y - Y^P) + \rho$$

- An upward sloping curve: the total quantity of final goods and services offered for sale is positively correlated with the inflation rate.
- Depends on
 - Expected inflation (π^e)
 - Output Gap ($Y - Y^P$)
 - Price (Supply) Shocks (ρ)
- Shifts UPWARD and to the LEFT (increase in cost of production) when
 - Expected inflation $\pi^e \uparrow$: When the economy is booming or we there is a rise in expected price level
 - Price (Supply) Shocks $\rho \uparrow$: negative supply shock (increase in oil prices)
 - output gap $Y - Y^P \uparrow$: labor market gets tight or workers demand higher wages

Long-run equilibrium

1. It occurs when $AD = AS$ at $Y = Y^P$.
2. Self-correcting mechanism: an economy always returns to the natural rate level of output and unemployment.

Example:

$$Y > Y^P$$

- \Rightarrow Unemployment is lower than the natural rate of unemployment
- \Rightarrow Excessive tightness in a labor market
- \Rightarrow Wage goes up
- \Rightarrow Production cost increases
- \Rightarrow AS shifts to the left until $AD = AS$ at $Y = Y^P$

Applications

1. Negative Demand shocks (Figure 10, Figure 11 in the textbook)

- SR: $Y \downarrow, \pi \downarrow$
- LR: Y doesn't change, $\pi \downarrow$

2. Temporary Negative Supply shocks (Figure 12 in the textbook)

- SR: $Y \downarrow, \pi \uparrow$
- LR: Y and π do NOT change

Practice questions: Chapter 20 and 21

[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

Practice questions: Chapter 22

[Q1] Everything else held constant, aggregate demand increases when

- A) taxes are cut.
- B) government spending is reduced.
- C) animal spirits decrease.
- D) the money supply is reduced.

[Q2] Everything else held constant, when output is _____ the natural rate level, wages will begin to _____, increasing short-run aggregate supply.

- A) above; fall
- B) above; rise
- C) below; fall
- D) below; rise

[Q3] Suppose the economy is producing at the natural rate of output. An open market purchase of bonds by the Fed will cause _____ in real GDP and _____ in the inflation in the short run, everything else held constant.

- A) an increase; an increase
- B) a decrease; a decrease
- C) no change; an increase
- D) no change; a decrease

[Q4] Suppose the U.S. economy is operating at potential output. A negative supply shock that is accommodated by an open market purchase by the Federal

Reserve will cause _____ in real GDP and _____ in the inflation in the long run, everything else held constant.

- A) no change; an increase
- B) no change; a decrease
- C) an increase; an increase
- D) a decrease; a decrease

[Q5] (Fall 2010 Qn 10) A shift in tastes toward American goods _____ net exports in the US and causes the quantity of aggregate output demanded to _____ in the US, everything else held constant.

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

[Q6] (Fall 2010 Qn 22) Everything else held constant, a change in workers' expectations about the aggregate price level will cause _____ to change.

- A) long-run aggregate supply
- B) aggregate demand
- C) short-run aggregate supply
- D) the production function

[Q7] (Fall 2010 Qn 24) In the Keynesian cross diagram, a decrease in investment spending because companies become more pessimistic about investment profitability causes the aggregate demand function to shift _____ and the equilibrium level of aggregate output to _____, everything else held constant.

- A) down; fall
- B) up; rise
- C) up; fall
- D) down; rise