Unit 8
Policy Effects and Cost Shocks in the AS – AD Model

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Learning Objectives

- Derive the aggregate demand curve and explain why the AD curve is downward sloping.
- Define the aggregate supply curve and discuss shifts in the short-run AS curve.
- Explain why the intersection of the AD and AS curves is an equilibrium point.
- Discuss the shape of the long-run aggregate supply curve and explain long run market adjustment to potential GDP.
- Use the AS/AD model to analyze the short-run and long-run effects of fiscal policy.
- Use the AS/AD model to analyze the short-run and long-run effects of monetary policy.
- Explain how economic shocks affect the AS/AD model.

Contents

The Model of Aggregate Demand and Supply

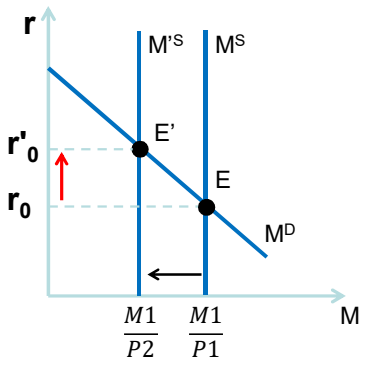
- the paradigm most mainstream economists and policymakers use to think about economic fluctuations and policies to stabilize the economy
- shows how the price level and aggregate output are determined
- shows how the economy's behavior is different in the short run and long run

The Aggregate Demand (AD) Curve

- The aggregate demand (AD) curve is derived from the IS - LM model:
  - IS curve Relationship between aggregate output and the interest rate for which the goods market is in equilibrium.
    - $Y = AE \rightarrow Y = C + I(r) + G$
  - LM curve The combinations of interest rates and levels of real income for which the money market is in equilibrium.
    - $M^S = M^D \rightarrow M1 = C_M - c_r r + c_Y Y$
    - ➢ M^S = M1 (nominal amount of transactions money)

Money market with real money balances

- Supply of real money balances:
  - M^S = M1/P: real amount of transaction money



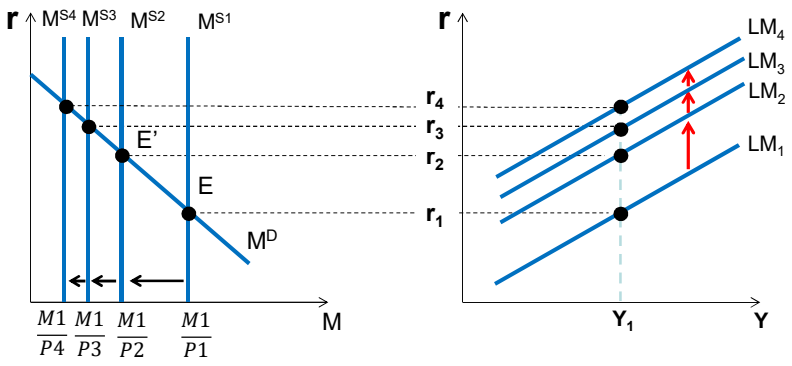
When price level rises from P1 to P2, supply of real money balances falls.

Real supply curve shifts to the left.

Equilibrium real interest rate rises

The Aggregate Demand Curve

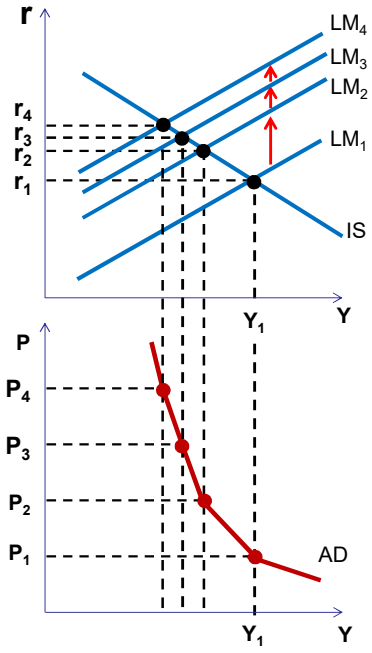
- LM curve changes with price level



Derive Aggregate Demand Curve

IS - LM

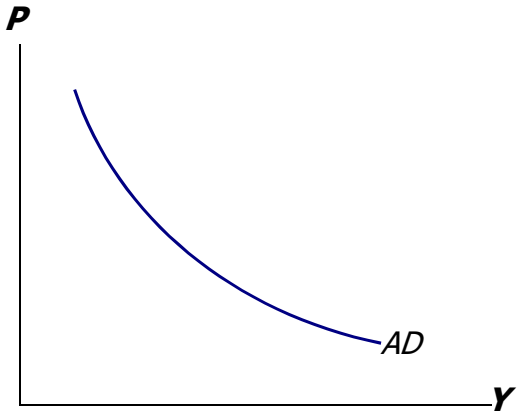
Aggregate Demand Curve



The downward-sloping *AD* curve

An increase in the price level causes a fall in real money balances (***M/P***),

causing a decrease in the demand for goods & services.



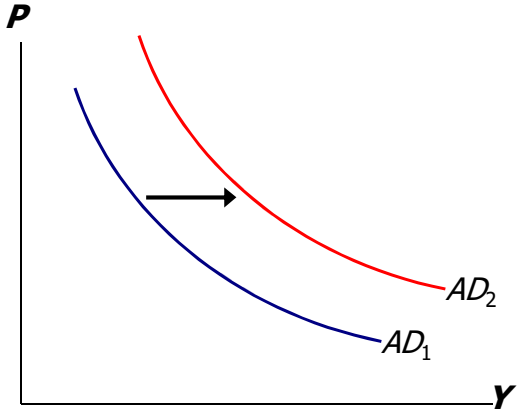
Shifting the *AD* curve

An increase in the money supply (M1) shifts:

- The LM curve downward
- the *AD* curve to the right.

An increase: C, I, G or reduce T (exogenous) shifts:

- The AE curve upward;
- The *AD* curve to the right.



The Aggregate Supply (AS) Curve

- **aggregate supply** The total supply of all goods and services in an economy.
- **aggregate supply (*AS*) curve** A graph that shows the relationship between the aggregate quantity of output supplied by all firms in an economy and the overall price level.
- Although it is called an aggregate *supply* curve, it is better thought of as a "price/output response" curve—a curve that traces out the price decisions and output decisions of all firms in the economy under different levels of aggregate demand.

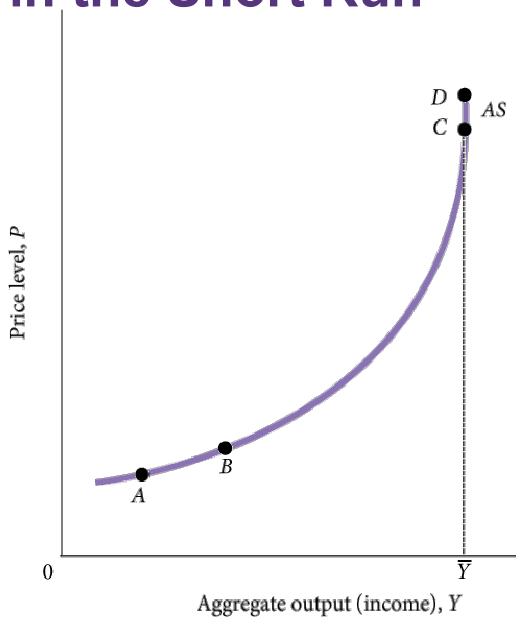
Aggregate Supply in the Short Run

In the short run, the aggregate supply curve (the price/output response curve) has a positive slope.

At low levels of aggregate output, the curve is fairly flat.

As the economy approaches capacity, the curve becomes nearly vertical.

At capacity, $\bar{Y}$, the curve is vertical.



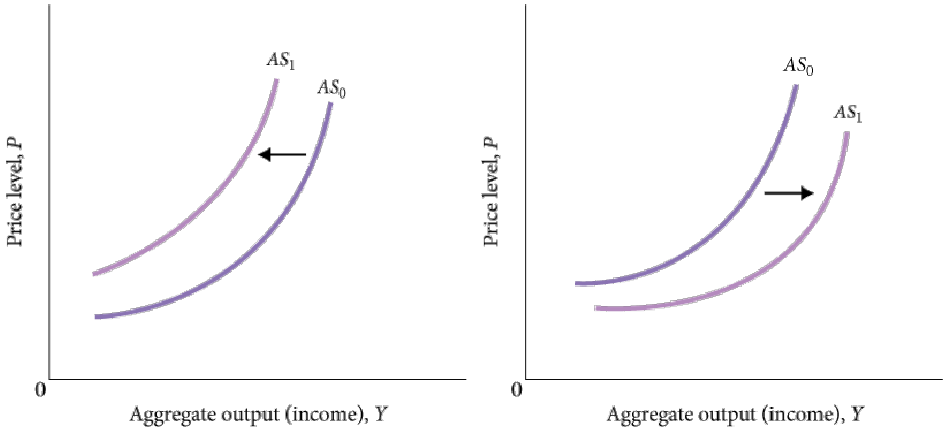
Why an Upward Slope?

- Wages are a large fraction of total costs and wage changes lag behind price changes. This gives us an upward sloping short-run AS curve.
- Why the Particular Shape?
  - Consider the vertical portion of the AS curve. At some level the overall economy is using all its capital and all the labor that wants to work at the market wage. At this level ($\bar{Y}$), increased demand for labor and output can be met only by increased prices. Neither wages nor prices are likely to be sticky.
  - At low levels of output, the AS curve is flatter. Small price increases may be associated with relatively large output responses. We may observe relatively sticky wages upward at this point on the AS curve.

Shifts of the Short-Run Aggregate Supply Curve

- The vertical part of the short-run AS curve represents the economy's maximum (capacity) output, which is determined by the economy's existing resources, like the size of its labor force, capital stock, and the current state of technology.
- New discoveries of oil or problems in the production of energy can also shift the AS curve through effects on the marginal cost of production in many parts of the economy.
- **cost shock, or supply shock** A change in costs that shifts the short-run aggregate supply (AS) curve.

Shifts of the Short-Run Aggregate Supply Curve



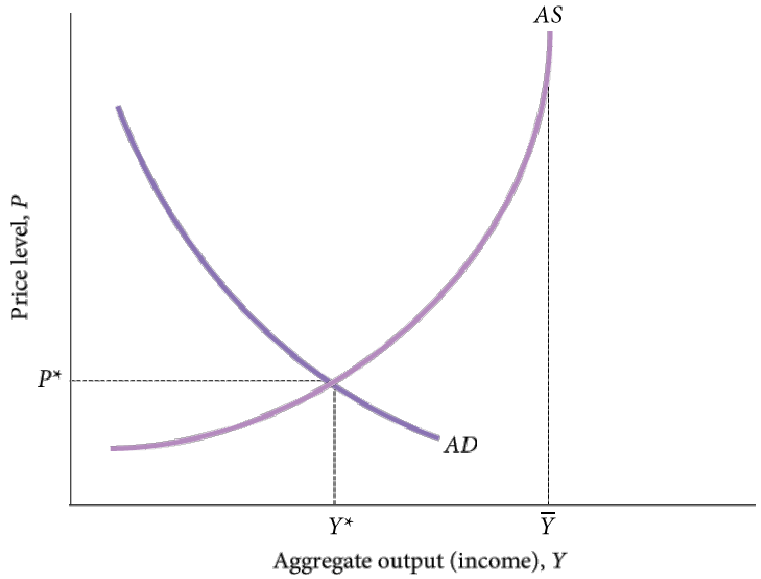
a. A decrease in aggregate supply

A leftward shift of the AS curve from AS_0 to AS_1 could be caused by an increase in costs—for example, an increase in wage rates or energy prices.

b. An increase in aggregate supply

A rightward shift of the AS curve from AS_0 to AS_1 could be caused by a decrease in costs—for example, a decrease in wage rates or energy prices or technical change.

The Short-run Equilibrium



Aggregate supply in the long run

- In the long run, output is determined by factor supplies and technology

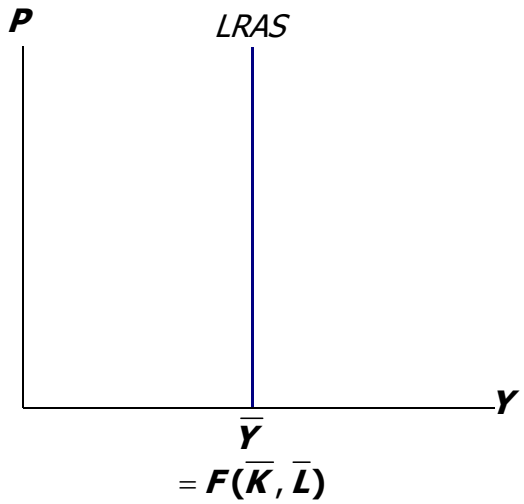
$$\overline{Y} = F(\overline{K}, \overline{L})$$

$\overline{Y}$ is the full-employment or natural level of output, the level of output at which the economy's resources are fully employed.

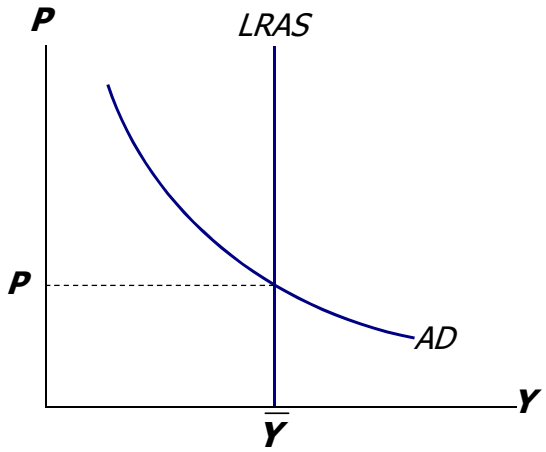
  - *"Full employment" means that unemployment equals its natural rate (not zero).*

The Long-run Aggregate Supply Curve

$\overline{Y}$ does not depend on P, so *LRAS* is vertical.



Long-run equilibrium



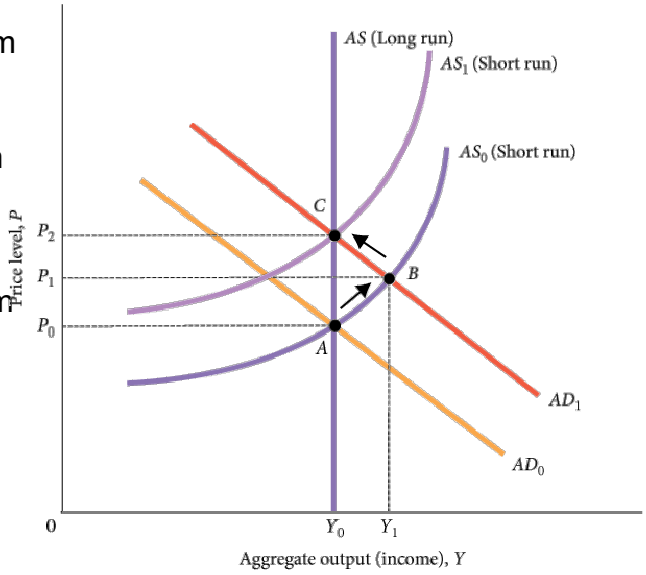
Long-run Market Adjustment to Potential GDP

When the *AD* curve shifts from AD_0 to AD_1, the equilibrium price level initially rises from P_0 to P_1 and output rises from Y_0 to Y_1.

Wages respond in the longer run, shifting the *AS* curve from AS_0 to AS_1.

If wages fully adjust, output will be back to Y_0.

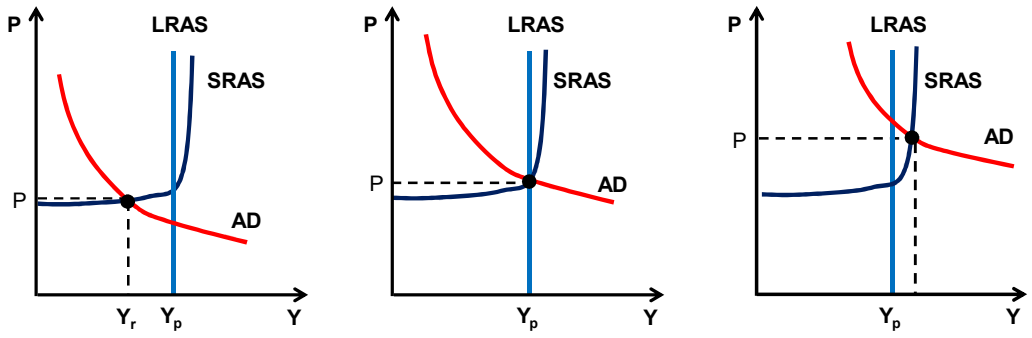
Y_0 is sometimes called ***potential GDP***.



Potential GDP (Y_P)

- **potential output,** *or* **potential GDP** The level of aggregate output that can be sustained in the long run without inflation.
- Although different economists have different opinions on how to determine whether an economy is operating at or above potential output, there is general agreement that there is a maximum level of output (below the vertical portion of the short-run aggregate supply curve) that can be sustained without inflation.

Different Short-run Equilibrium



Short-run equilibrium with negative output gap Recession

Long-run equilibrium Full employment

Short-run equilibrium with positive output gap Inflationary

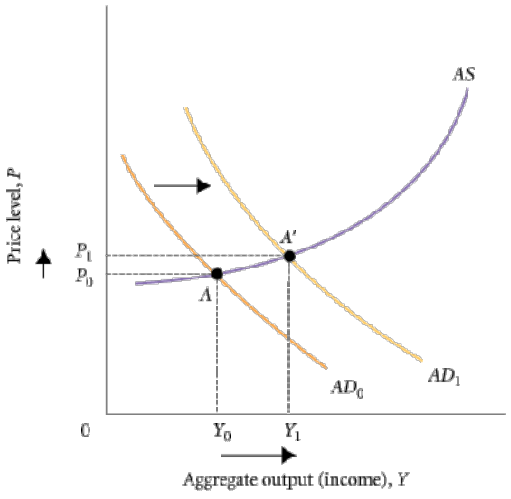
Fiscal Policy Effects

- The level of net taxes, *T* (taxes minus transfer payments) is an important fiscal policy variable along with government spending.
- Earlier, we learned that the tax multiplier is smaller in absolute value than is the government spending multiplier.
- The main point is that both a decrease in net taxes and an increase in government spending increase output (*Y*). Both result in a shift of the *AD* curve to the right.

Fiscal Policy Effects

- A Shift of the AD Curve When the Economy is on the Nearly Flat Part of the AS Curve

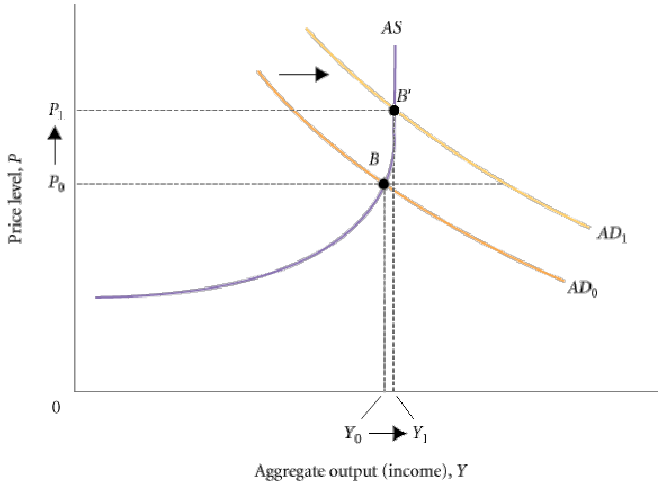
This is the case in which an expansionary fiscal policy works well. There is an increase in output with little increase in the price level. When the economy is producing on the nearly flat portion of the *AS* curve, firms are producing well below capacity, and they will respond to an increase in demand by increasing output much more than they increase prices.



Fiscal Policy Effects

- A Shift of the AD Curve When the Economy is Operating at or Near Capacity

Here, an expansionary fiscal policy does not work well. The output multiplier is close to zero. Output is initially close to capacity, and attempts to increase it further mostly lead to a higher price level.
With a higher price level, the CB increases the interest rate (*r*), and in this case, there is almost complete crowding out of planned investment.



Fiscal Policy Effects

- If the shift in the AD curve in the case of nearly capacity is caused by a decrease in net taxes, it is consumption, not government spending that causes the crowding out of investment.
- When the economy is on the flat part of the AS curve, there is very little crowding out of planned investment. Output expands to meet the increased demand. Because the price level increases very little, the central bank does not raise the interest rate much, and so there is little change in planned investment.

Fiscal Policy Effects in the Long Run

- If wages adjust fully to match higher prices, then the long-run AS curve is vertical. In this case it is easy to see that fiscal policy will have no effect on output.
- The key question, much debated in macroeconomics, is how fast wages adjust to changes in prices. If wages are slower to adjust, the AS curve might retain some upward slope for a long period and one would be more confident about the usefulness of fiscal policy. While most economists believe that wages are slow to adjust in the short run and therefore that fiscal policy has potential effects in the short run, there is less consensus about the shape of the long-run AS curve.
- New classical economists believe, for example, that wage rate changes do not lag behind price changes. The new classical view is consistent with the existence of a vertical AS curve, even in the short run. At the other end of the spectrum is what is sometimes called the simple "Keynesian" view of aggregate supply. Those who hold this view believe there is a kink in the AS curve at capacity output

Monetary Policy Effects

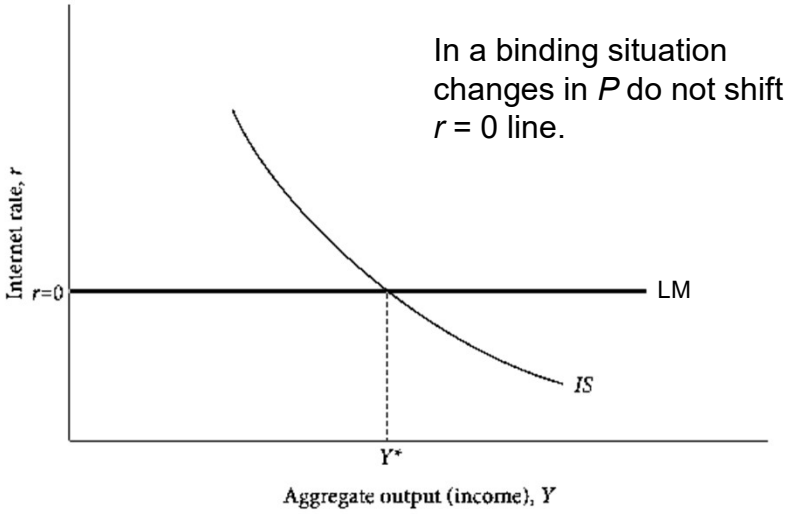
- Easing monetary policy
  - Central bank increases in M1
  - AD curve shift to the right
  - Impact would be same as expansionary fiscal policy
- Tightening monetary policy
  - Central bank reduces in M1
  - AD curve shift to the left
  - Impact would be same as contractionary fiscal policy

Zero Interest Rate Bound

- Suppose the conditions of the economy in terms of output, the price level are such that the Central Bank wants a negative interest rate. In this case, the best that the Central bank can do is to choose zero for the value of r.
- **zero interest rate bound** The interest rate cannot go below zero.
- **binding situation** State of the economy in which the Central Bank rule calls for a negative interest rate.

Equilibrium When the Interest Rate is Zero

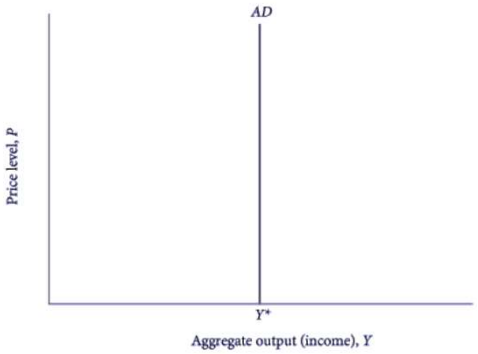
In a binding situation changes in *P* do not shift the *r* = 0 line.



Binding Situation

- In a binding situation the AD curve is vertical. In order for the AD curve to have a slope, the interest rate must change when the price level changes, which does not happen in the binding situation.

You should note that changes in government spending (*G*) and net taxes (*T*) still shift the *AD* curve even if it is vertical. In fact, since there is no crowding out of planned investment or consumption when *G* increases or *T* decreases because the interest rate does not increase, the shift is even greater. With a vertical *AD* curve, fiscal policy can be used to increase output, but monetary policy cannot.

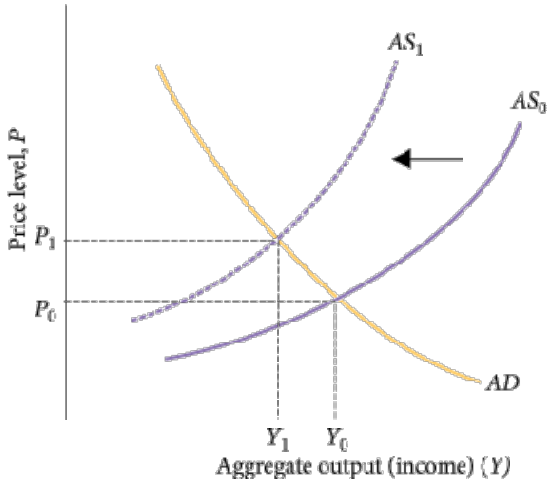


Cost Shocks

- Suppose we have a sudden and severe cold spell that kills off a large fraction of the feeder-fish stock in the world. Or suppose that war breaks out in the Middle East and oil supplies from the region are cut off. How do events like these affect aggregate output and the price level in an economy?

➢ The *AS* curve shifts to the left as firms who experience these new costs raise their prices to cover their new higher costs.

Cost Shocks Effect



The shift of the *AS* curve to the left leads to lower output and a higher price level. The increase in *P* leads the Central Bank to raise the interest rate, which lowers planned investment and thus output. The extent of the changes in output and the price level depend on the shape of the *AD* curve.

Cost Shocks Effect

- **cost-push**, or **supply-side**, **inflation**
  - Inflation caused by an increase in costs.
- **stagflation**
  - Occurs when output is falling at the same time that prices are rising.

Demand-Side Shocks

- When macroeconomics was just beginning, John Maynard Keynes introduced the idea of “animal spirits” of investors. Keynes’ animal spirits were his way of describing a kind of optimism about the economy that helped propel it forward.
- Within the present context, an improvement in animal spirits—for example, a rise in consumer confidence—can be thought of as a “demand-side shock.”
- Instead of being triggered by a fiscal or monetary policy change, the demand increase is triggered by something outside of the model. Any price increase that results from a demand-side shock is also considered demand-pull inflation.

Demand-Side Shocks

- **demand-pull inflation**
  - Inflation that is initiated by an increase in aggregate demand.

Expectations

- Animal spirits can be considered expectations of the future. They are hard to predict or to quantify. However formed, firms' expectations of future prices may affect their current price decisions.
- An increase in future price expectations may shift the *AS* curve to the left and thus act like a cost shock.
- Expectations can get "built into the system." If every firm expects every other firm to raise prices by 10 percent, every firm will raise prices by about 10 percent. Every firm ends up with the price increase it expected.
- If prices have been rising and if people's expectations are *adaptive*—that is, if they form their expectations on the basis of past pricing behavior—firms may continue raising prices even if demand is slowing or contracting.
- Given the importance of expectations in inflation, the central banks of many countries survey consumers about their expectations.

Inflation Targeting

- **inflation targeting** When a monetary authority chooses its interest rate values with the aim of keeping the inflation rate within some specified band over some specified horizon.
- If a monetary authority behaves this way, it announces a *target* value of the inflation rate.
- There has been much debate about whether inflation targeting is a good idea. It can lower fluctuations in inflation, but possibly at a cost of larger fluctuations in output.