Knowledge Enrichment Seminar for the NSS Economics Curriculum

Series 1

Macroeconomics:
National Income Determination (AS-AD model) and Price Level

by

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Lecture Outline

1. Aggregate demand and its characteristics
2. Aggregate supply and its characteristics
3. Factors and policies shifting AD and AS
4. Determination of income and price level by AD-AS

1. Aggregate demand and its characteristics - Outline

Reasons for a downward sloping AD curve

- The wealth effect
- The interest rate effect
- The exchange rate effect

1. Aggregate demand and its characteristics

Teaching advice

- Remind the students not to mix up the AS and AD in microeconomics and macroeconomics
- Make it clear that the microeconomic variables of price and quantity can be aggregated into a price level (either the GDP deflator or the Consumer Price Index) and total output (real GDP).

The Aggregate-Demand Curve

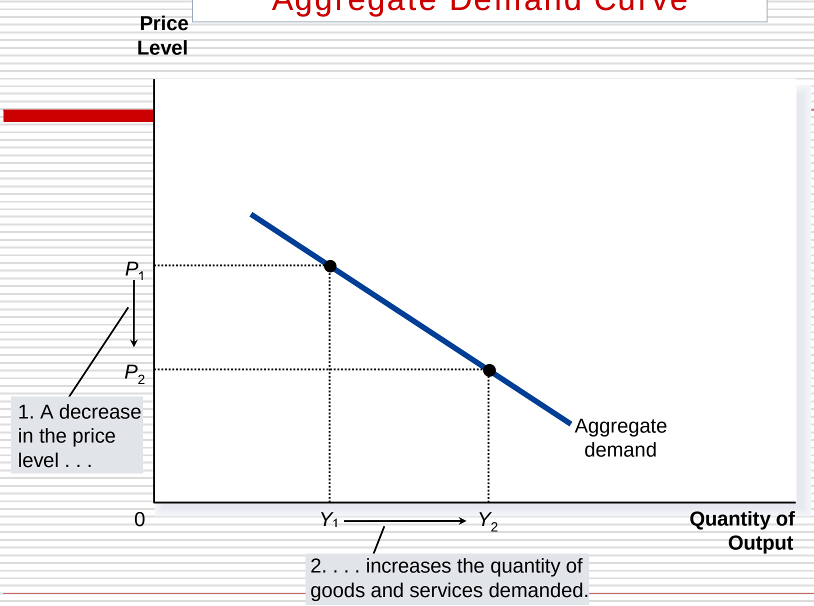
Why is the Aggregate-Demand Curve Downward Sloping?

- Recall that GDP (*Y*) is made up of four components: consumption (*C*), investment (*I*), government purchases (*G*), and net exports (*NX*).

$$Y = C + I + G + NX$$

- Each of the four components is a part of aggregate demand.
  - Government purchases are assumed to be fixed by policy.
  - This means that to understand why the aggregate-demand curve **slopes downward**, we must understand how changes in the price level affect consumption, investment, and net exports. G is not included in the analysis at this stage.

Aggregate Demand Curve



The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Slopes Downward

- **Reason 1** - The Price Level and Consumption: The **Wealth Effect**
  - A decrease in the price level makes consumers feel wealthier, which in turn encourages them to spend more.
  - The increase in consumer spending means a larger quantity of goods and services demanded.

The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Slopes Downward

- **Reason 2** - The Price Level and Investment: The **Interest-Rate Effect**
  - The lower the price level, the less money households need to buy goods and services.
  - When the price level falls, households try to reduce their holdings of money by lending some out (either in financial markets or through financial intermediaries).
  - As households try to convert some of their money into interest-bearing assets, the interest rate will drop.
  - Lower interest rates encourage borrowing by firms that want to invest in new plants and equipment and by households who want to invest in new housing.
  - Thus, a lower price level reduces the interest rate, encourages greater spending on investment goods, and therefore increases the quantity of goods and services demanded.

The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Slopes Downward

- **Reason 3** - The Price Level and Net Exports: The **Exchange-Rate Effect**
  - A lower price level in the United States lowers the U.S. interest rate.
  - American investors will seek higher returns by investing abroad, increasing U.S. net capital outflow.
  - The increase in net capital outflow raises the supply of dollars, lowering the real exchange rate.
  - U.S. goods become relatively cheaper to foreign goods. Exports rise, imports fall, and net exports increase.
  - Therefore, when a fall in the U.S. price level causes U.S. interest rates to fall, the real exchange rate depreciates, and U.S. net exports rise, thereby increasing the quantity of goods and services demanded.

1. Aggregate demand and its characteristics

Teaching advice

- Highlight the fact that all three of these effects begin with a decrease (or increase) in the price level and end with an increase (decrease) in aggregate quantity demanded.
- Remind students that the aggregate demand curve (like all demand curves) is drawn assuming that all else is held constant.

Lecture Outline

1. Aggregate demand and its characteristics
2. Aggregate supply and its characteristics
3. Factors and policies shifting AD and AS
4. Determination of income and price level by AD-AS

2. Aggregate supply and its characteristics - Outline

- Reasons for an upward sloping short run AS curve
  - The sticky wage theory
  - The sticky price theory
  - The misperceptions theory
- Reasons for a vertical long run AS curve
  - The meaning of potential output or full employment output or natural rate of output

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Sticky-Wage Theory**
  - Nominal wages are often **slow to adjust** in the economy due to long-term contracts between workers and firms.
  - Therefore, because wages **do not** immediately adjust to the price level, a lower price level makes employment and production less profitable, leading firms to **lower the quantity of goods and services supplied.**

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Sticky-Wage Theory**

  Example
  - Suppose a firm has agreed in advance to pay workers a certain amount and then the price level falls unexpectedly.
  - This implies that the firm is now paying a real wage (wage/price) that is larger than it intended, raising the costs of production. Thus, the firm hires less labor and produces a smaller quantity of goods and services.

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Sticky-Price Theory**
  - The prices of some goods and services are also sometimes **slow to respond** to changes in the economy. This is often blamed on menu costs.
  - If the price level falls unexpectedly, and a firm does not change the price of its product quickly, its relative price will rise and this will lead to a loss in sales.

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Sticky-Price Theory**
  - Thus, when sales decline, firms will produce a lower quantity of goods and services.
  - Conclusion: Because not all prices adjust instantly to changing conditions, an unexpected fall in the price level leaves some firms with higher-than-desired prices, which depress sales and cause firms to lower the quantity of goods and services supplied.

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Misperceptions Theory**
  - Changes in the overall price level can **temporarily mislead** suppliers about what is happening in the markets in which they sell their output.
  - As a result of these misperceptions, suppliers respond to changes in the level of prices and thus, the short-run aggregate-supply curve is upward sloping.

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Misperceptions Theory**

Example

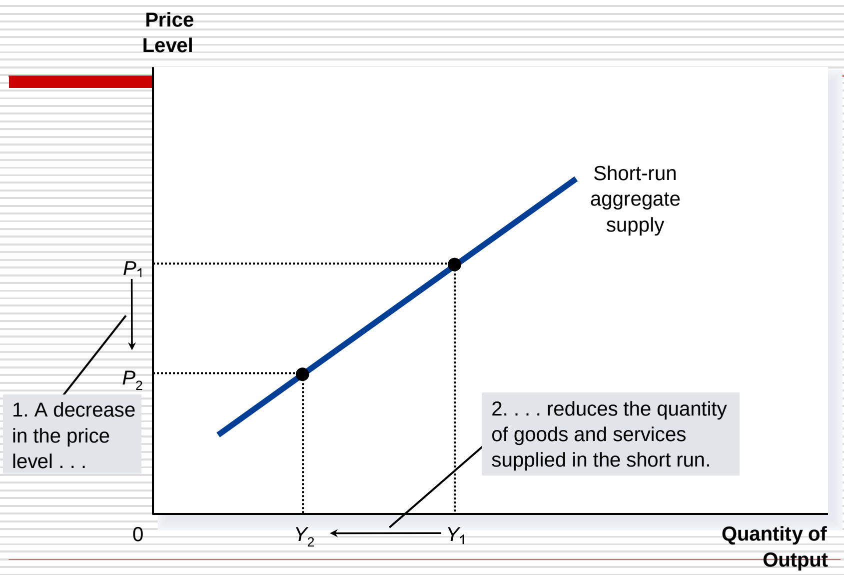
  - The price level falls **unexpectedly**. Suppliers **mistakenly** believe that as the price of their product falls, it is a drop in the relative price of their product.
  - Suppliers may then believe that the reward of supplying their product has fallen, and thus they decrease the quantity that they supply.

The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

- The **Misperceptions Theory**
  - Thus, a lower price level causes misperceptions about relative prices, and these misperceptions lead suppliers to respond to the lower price level by decreasing the quantity of goods and services supplied.

Aggregate Supply Curve



The Aggregate-Supply Curve

Why the Aggregate-Supply Curve Is Upward Sloping in the Short Run

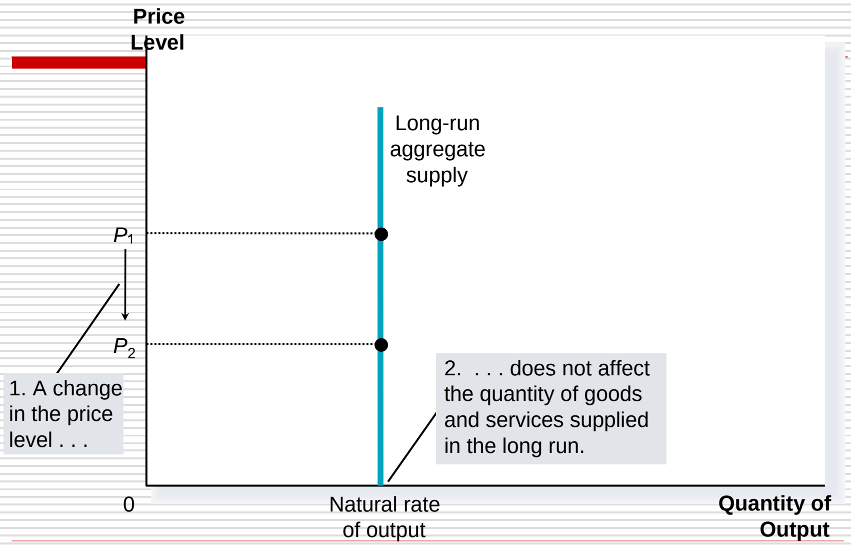
- Note that each of these theories suggest that output deviates from its natural rate when the price level deviates from the price level that people expected.
- Note also that the effects of the change in the price level on output level will be **temporary**.
- **Eventually** people will adjust their price level expectations and output will return to its natural level; thus, the aggregate-supply curve will be vertical in the long run.

The Aggregate-Supply Curve

- The relationship between the price level and the quantity of goods and services supplied depends on the time horizon being examined.
- Why the Aggregate-Supply Curve Is **Vertical** in the Long Run
  - In the long run, an economy's production of goods and services depends on its supplies of resources along with the available production technology.

    Y = AF(L, K, H, N)
  - Because the price level does not affect these determinants of output in the long run, the long-run aggregate-supply curve is **vertical**.

The Long-Run Aggregate-Supply Curve



Lecture Outline

1. Aggregate demand and its characteristics
2. Aggregate supply and its characteristics
3. Factors and policies shifting AD and AS
4. Determination of income and price level by AD-AS

3. Factors and policies shifting AD and AS Curves - Outline

- Determinants of aggregate demand
  - Private consumption expenditure, which in turn depends on disposable income, the desire to save, wealth (value of assets), interest rate, etc.
  - Investment expenditure, which in turn depends on business prospect, interest rate, etc.
  - Government expenditure
  - Net export, which in turn depends on the economic conditions of trading partners, exchange rate, etc.
- Determinants of long run AS
  - Changes in labor
  - Changes in capital
  - Changes in natural resources
  - Changes in technological knowledge
- Determinants of short run AS
  - Changes in labor
  - Changes in capital
  - Changes in natural resources
  - Changes in technological knowledge
  - Expected price level

3. Factors and policies shifting AD and AS Curves

Teaching advice

- Get the students involved in suggesting factors that might shift the aggregate demand curve.
- Relate changes in aggregate demand to changes in consumption, investment, government purchases, and net exports.
- Show students that, if any of these four components of GDP change (for reasons other than a change in the price level), the aggregate demand curve will shift.

The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Might Shift

- Shifts Arising from Consumption
  - If Hong Kong people become more concerned with saving for retirement and reduce current consumption, aggregate demand will decline.
  - If the government cuts taxes, it encourages people to spend more, resulting in an increase in aggregate demand.

The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Might Shift

- Shifts Arising from Investment
  - Suppose that the computer industry introduces a faster line of computers and many firms decide to invest in new computer systems. This will lead to an increase in aggregate demand.
  - If firms become pessimistic about future business conditions, they may cut back investment spending, shifting aggregate demand to the left.
  - An investment tax credit increases the quantity of investment goods that firms demand, which results in an increase in aggregate demand.
  - An increase in the supply of money lowers the interest rate in the short run. This lead to more investment spending, which causes an increase in aggregate demand.

The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Might Shift

- Shifts Arising from Government Purchases
  - If Hong Kong government decides to reduce purchases of new office equipment, aggregate demand will fall.
  - If Hong Kong government decides to build more highways, aggregate demand will shift to the right.

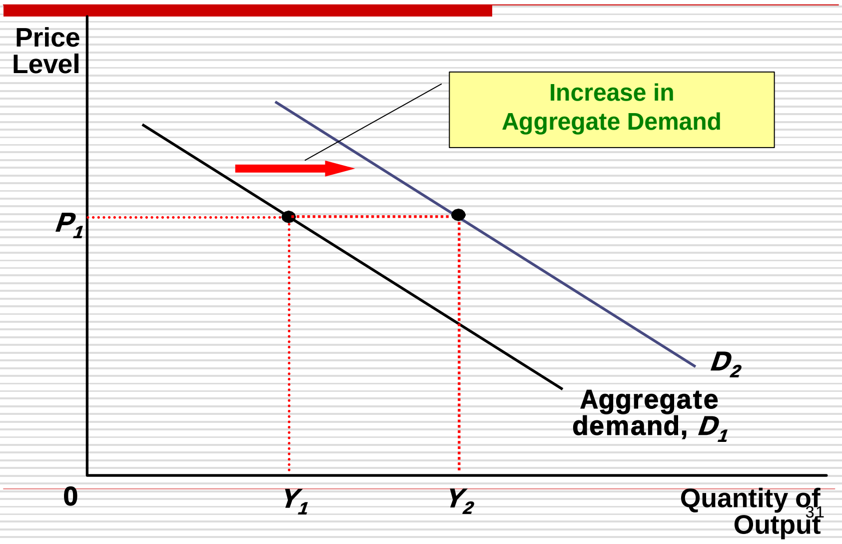
The Aggregate-Demand Curve

Why the Aggregate-Demand Curve Might Shift

- Shifts Arising from Net Exports
  - When Europe experiences a recession, it buys fewer Hong Kong goods, which lowers net exports. Aggregate demand will shift to the left.
  - If the exchange rate of the Hong Kong dollar increases, Hong Kong goods become more expensive to foreigners. Net exports fall and aggregate demand shifts to the left.

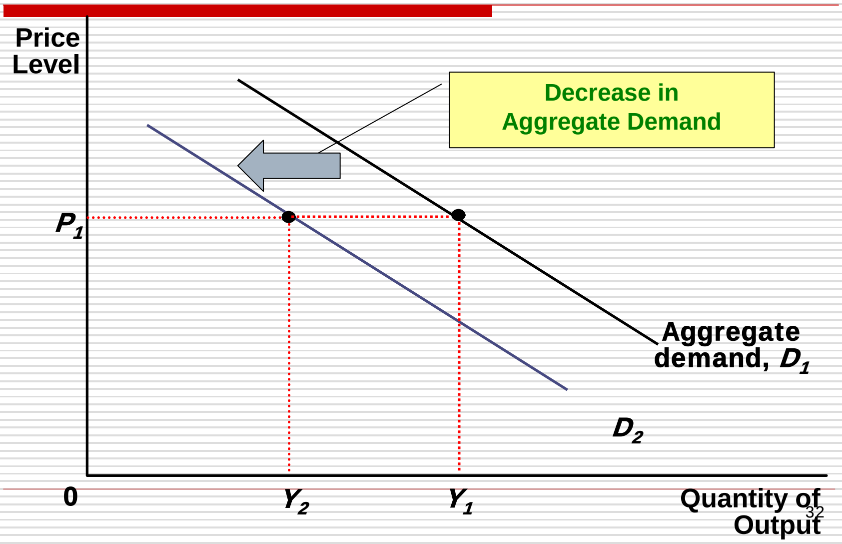
The Aggregate-Demand Curve

- Shifts in the Aggregate Demand Curve



The Aggregate-Demand Curve

- Shifts in the Aggregate Demand Curve



The Aggregate-Supply Curve

Why the Long-Run Aggregate-Supply Curve Might Shift

- The position of the LR aggregate supply curve occurs at an output level sometimes referred to as *potential output* or *full-employment output*.
- This is the level of output that the economy produces when unemployment is at its **natural rate.**
- Any change in the economy that alters the natural rate of output shifts the long-run aggregate-supply curve.

The Aggregate-Supply Curve

Why the Long-Run Aggregate-Supply Curve Might Shift

- Shifts Arising from **Labor (L)**
  - Increases in immigration increase the number of workers available. The long-run aggregate-supply curve would shift to the right.
  - Any change in the natural rate of unemployment will alter long-run aggregate supply as well.

The Aggregate-Supply Curve

Why the Long-Run Aggregate-Supply Curve Might Shift

- Shifts Arising from **Capital (K)**
  - An increase in the economy's capital stock raises productivity and thus shifts long-run aggregate supply to the right.
  - This would also be true if the increase occurred in human capital rather than physical capital.

The Aggregate-Supply Curve

Why the Long-Run Aggregate-Supply Curve Might Shift

- Shifts Arising from **Natural Resources (N)**
  - A discovery of a new mineral deposit increases long-run aggregate supply.
  - A change in weather patterns that makes farming more difficult shifts long-run aggregate supply to the left (recent case in China).
  - A change in the availability of imported resources can also affect long-run aggregate supply.

The Aggregate-Supply Curve

Why the Long-Run Aggregate-Supply Curve Might Shift

- Shifts Arising from **Technological Knowledge (A)**
  - The invention of the computer has allowed us to produce more goods and services from any given level of resources. As a result, it has shifted the long-run aggregate-supply curve to the right.
  - Opening up international trade has similar effects to inventing new production processes. Therefore, it also shifts the long-run aggregate-supply curve to the right.

The Aggregate-Supply Curve

Why the Short-Run Aggregate-Supply Curve Might Shift

- **Events that shift the long-run aggregate-supply curve will shift the short-run aggregate-supply curve as well**.
- Examples
  - Shifts Arising from Labor
  - Shifts Arising from Capital
  - Shifts Arising from Natural Resources
  - Shifts Arising from Technological Knowledge

The Aggregate-Supply Curve

Why the Short-Run Aggregate-Supply Curve Might Shift

- However, people's expectations of the price level will affect the position of the **short-run** aggregate-supply curve even though it has no effect on the long-run aggregate-supply curve.
- A higher expected price level (workers likely negotiate higher nominal wages) decreases the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the left.
- A lower expected price (workers likely accept lower nominal wages) level increases the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the right.

Lecture Outline

1. Aggregate demand and its characteristics
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4. Determination of income and price level by AD-AS - Outline

- Determination of the equilibrium output level and price level in the AS-AD model
- Changes in the equilibrium level of output and price level caused by change(s) in the AD and/or AS
  - A contraction in Aggregate Demand

Case study 1: The Great Depression and World War II

Case study 2: The Recession of 2001

Case study 3: Global financial crisis in 2008

  - A contraction in Aggregate Supply – occurrence of stagflation

Case study 4: Oil and the economy

- Recessionary gap and inflationary gap

4. Determination of income and price level by AD-AS

Teaching advice

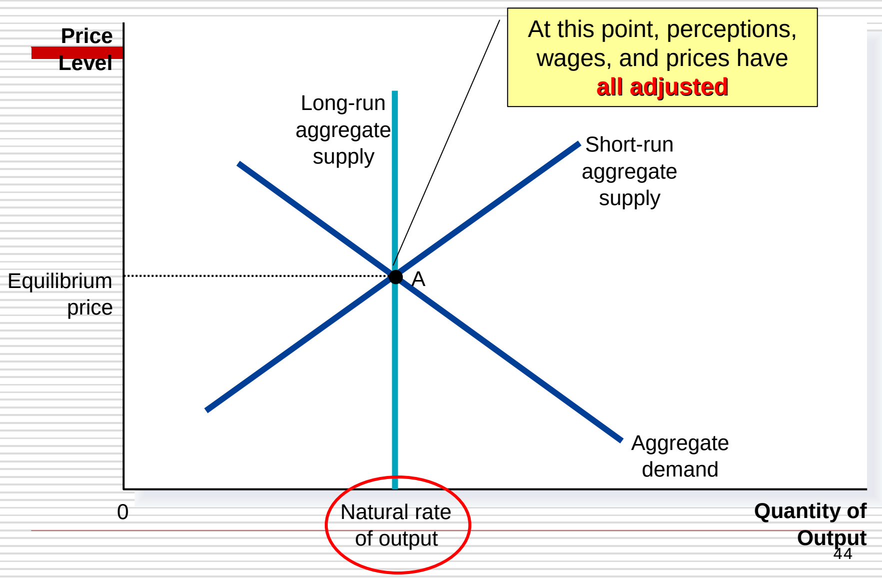
- Students will be confused by the graphs showing the adjustment process that occurs when aggregate demand shifts.
- Take the time to walk them through step-by-step several times, summarizing what moves the economy from one point to the next.

Two Causes of Economic Fluctuations

Long-Run Equilibrium

- Long-run equilibrium is found where the aggregate-demand curve intersects with the long-run aggregate-supply curve.
- Output is at its natural rate.
- Also at this point, perceptions, wages, and prices have **all adjusted** so that the short-run aggregate-supply curve intersects at this point as well.

The Long-Run Equilibrium



Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- Example: Pessimism causes household spending and investment to decline.
- This will cause the aggregate demand curve to shift to the left.

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

Short Run Effect

- In the short run, both output and the price level fall. This drop in output means that the economy is in a **recession.**

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

Adjustment If policymakers do nothing

- However, even if policymakers do nothing, the **economy will eventually move back to the natural rate of output**.
  - Sticky wages, sticky prices and misconceptions cause the aggregate-supply curve to be upward sloping in the short run.
  - The expected price level will fall, **shifting the short-run aggregate-supply curve to the right**.

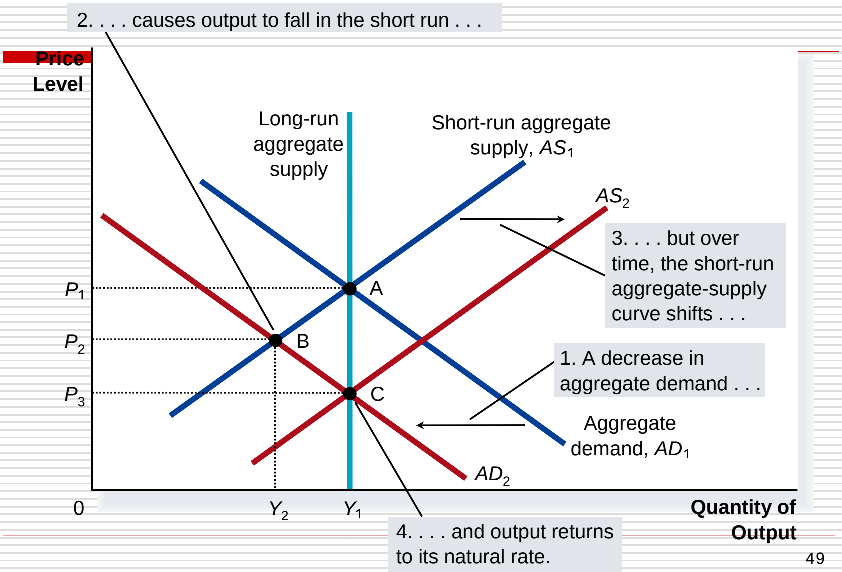
Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

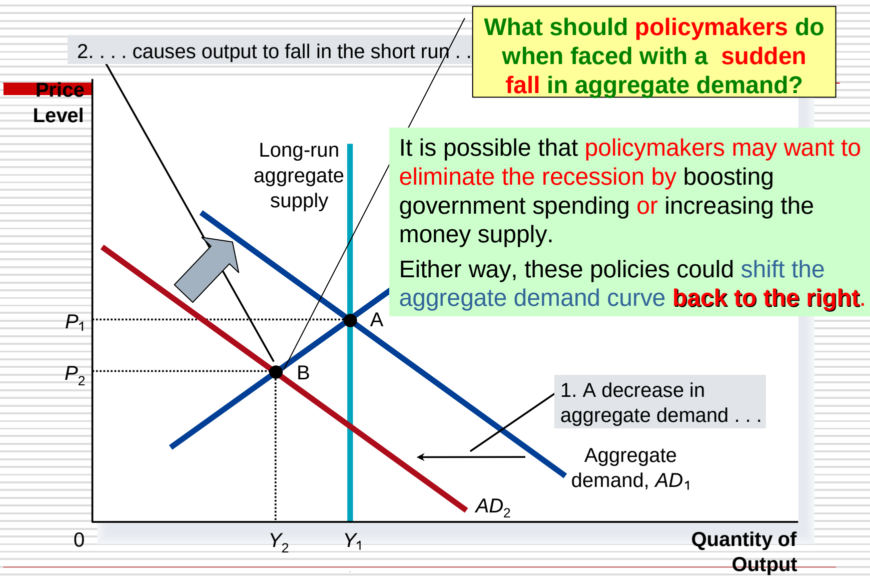
Long Run Effect

- In the **long run**, the decrease in aggregate demand can be seen solely by the drop in the equilibrium price level.
- Thus, the long-run effect of a change in aggregate demand is a nominal change (in the price level) but not a real change (output is the same).

A Contraction in Aggregate Demand



A Contraction in Aggregate Demand



Two Causes of Economic Fluctuations

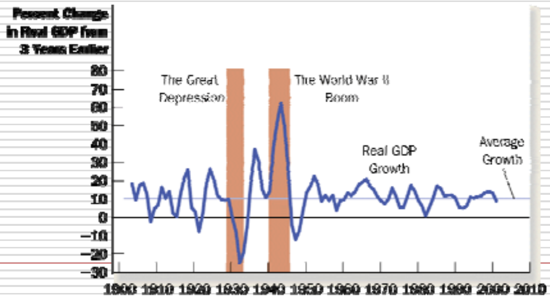
The Effects of a Shift in Aggregate Demand

- *Case Study 1: Two Big Shifts in Aggregate Demand: The Great Depression and World War II*
  - *Figure 9 shows real GDP for the United States since 1900.*
  - *Two time periods of economic fluctuations can be seen dramatically in the picture. These are the early 1930s (the Great Depression) and the early 1940s (World War II).*
  - *From 1929 to 1933, GDP fell by 27 percent. From 1939 to 1944, the economy's production of goods and services almost doubled.*

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 1: Two Big Shifts in Aggregate Demand: The Great Depression and World War II*
  - *The following figure shows real GDP for the United States since 1900.*



Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 2: The Recession of 2001*
  - *The U.S. experienced a recession in 2001 where unemployment rose from 3.9 percent in October 2000 to 6 percent in April 2002.*
  - *The recession has been attributed to three aggregate demand shocks.*
    - ***First, the dot.com bubble in the stock market ended.***
    - ***Second, the terrorist attack in September 2001 led to increased uncertainty.***
    - ***Third, several corporate accounting scandals were revealed.***
  - *The federal government passed tax cuts to improve consumer spending, while the Fed responded by keeping interest rates low.*

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 3: The Financial Crisis of 2008*
- The subprime mortgage triggered a big drop in AD and a rapid rise in unemployment in the US (around 9.8 percent in the past two years).
- The AD curve shifts to the left and a recessionary gap opens.
- The US Federal Reserve increases money supply and interest rate drops. AD curve shifts to the right. The prices in the US go up gradually, but the inflationary pressure is not huge as its recessionary gap has not yet been closed.

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 3: The Financial Crisis of 2008*
  - However, when liquidity flows to other countries in Asia, through trade and financial flows, the AD curves of these countries shifts near or beyond the natural output level (from 1 to 1').
  - Prices rise in Asian countries, in particular China and India. The CPI in China is 5.1% in Nov 2010. When workers expect prices to rise, they bargain for higher wages, which in turn results in high costs. The SRAS shifts leftward and reaches back to the natural output level, resulting in higher prices (from 1' to 2).

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 3: The Financial Crisis of 2008*
  - When the US continue to use quantitative easing (QE, increase in money supply) to boom its domestic economy, liquidity will continue to shift AD curves of other countries rightward. The process mentioned in the previous point will repeat (from 2 to 2' to 3).
  - Finally, repeating QE leads to sustaining inflation in Asian countries that have close trade and investment relationship with the US.
  - Inflationary pressure in the US will eventually rise when the economy is approaching its natural output level.

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Demand

- *Case Study 3: The Financial Crisis of 2008*

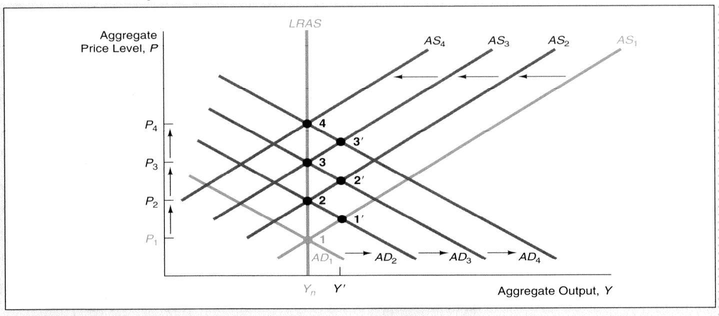


FIGURE 10 **Response to a Continually Growing Money Supply**
A continually growing money supply shifts the aggregate demand curve to the right from AD_1 to AD_2 to AD_3 to AD_4, while the short-run aggregate supply curve shifts to the left from AS_1 to AS_2 to AS_3 to AS_4. The result is that the price level rises continually from P_1 to P_2 to P_3 to P_4.

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

- Example: Firms experience a sudden increase in their costs of production.
- This will cause the short-run aggregate-supply curve to shift to the left. (Depending on the event, long-run aggregate supply may also shift. We will assume that it does not.)

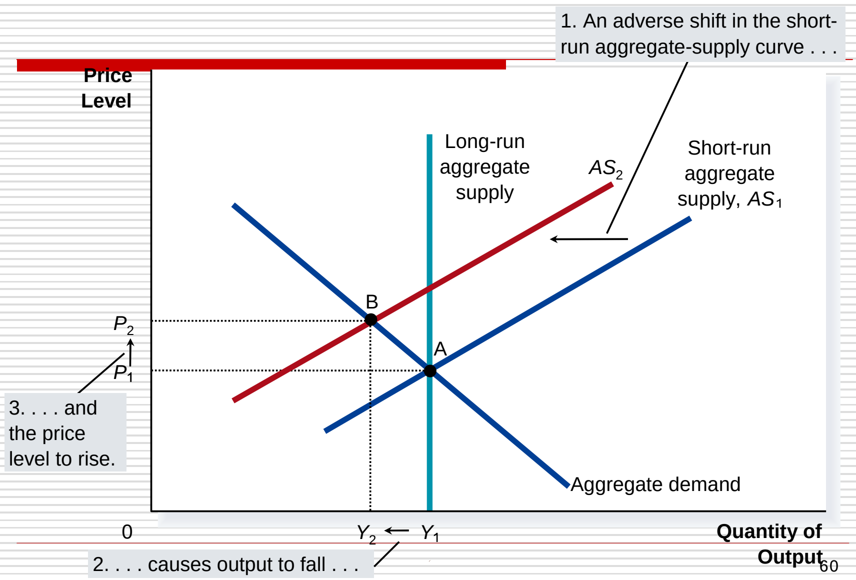
Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

Short Run Effect

- In the **short run**, output will fall and the price level will rise. The economy is experiencing stagflation.
- Definition of **stagflation:** **a period of falling output (Recession) and rising prices (Inflation)**.

An Adverse Shift in Aggregate Supply



Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

- If policymakers **do nothing**, price expectations will adjust, causing the short-run aggregate-supply curve to shift back to the right.

Why?

Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

Adjustment Process

- The key issue is how stagflation affects nominal wages.
- Firms and workers may at first respond to the higher level of prices by raising their expectations of the price level and setting higher nominal wages.
- In this case, firms' cost will rise yet again, and the SRAS will shift further to the left, making the problem of stagflation even worse.
- This phenomenon of higher prices leading to higher wages, in turn leading to even higher prices, is called ***wage-price spiral.***

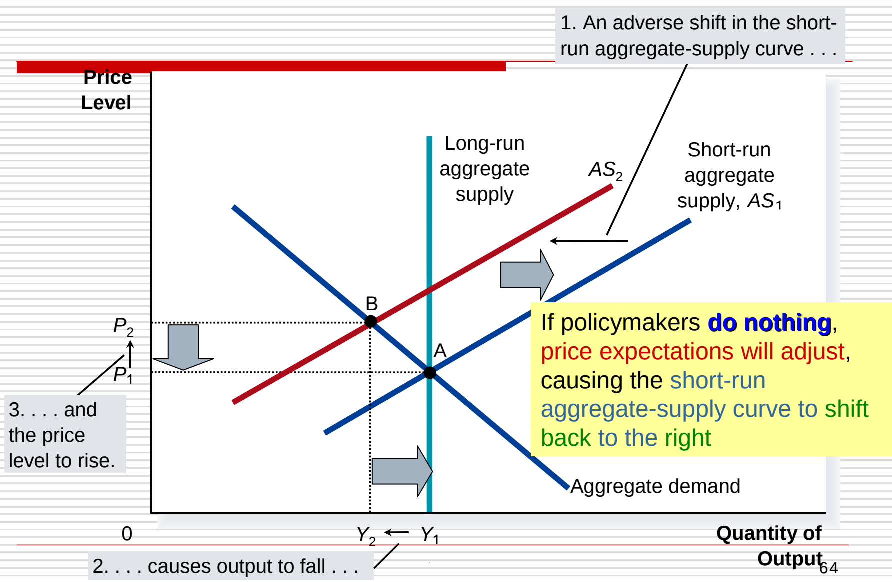
Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

Adjustment Process

- This spiral of ever-rising wages and prices will slow at some point.
- The low level of output and employment will **put downward pressure** on workers' wages because workers have less bargaining power when unemployment is high.
- As nominal wages fall, producing goods and services becomes more profitable, and the SRAS shifts to the right.

An Adverse Shift in Aggregate Supply

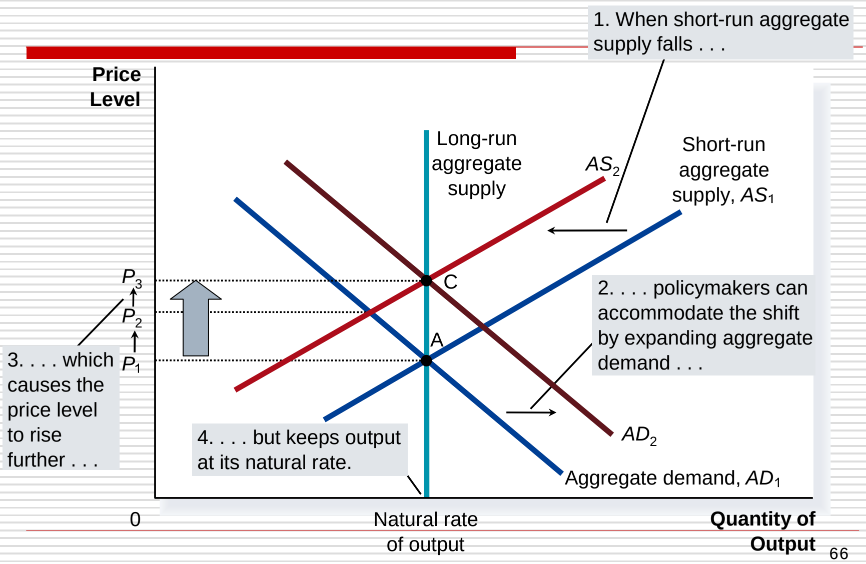


Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

- Policymakers will have a more difficult time with this situation.
- Policymakers can shift the aggregate-demand curve, but cannot simultaneously offset the drop in output and the rise in the price level.
- If they increase aggregate demand, the recession will end, but the price level will be permanently higher.

Accommodating an Adverse Shift in Aggregate Supply



Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

- *Case Study 4: Oil and the Economy*
  - Crude oil is a key input in the production of many goods and services.
  - When some event (often political) leads to a rise in the price of crude oil, firms must endure higher costs of production and the short-run aggregate-supply curve shifts to the left.
  - In the mid-1970s, OPEC lowered production of oil and the price of crude oil rose substantially. The inflation rate in the United States was pushed to over 10 percent. Unemployment also grew from 4.9 percent in 1973 to 8.5 percent in 1975.

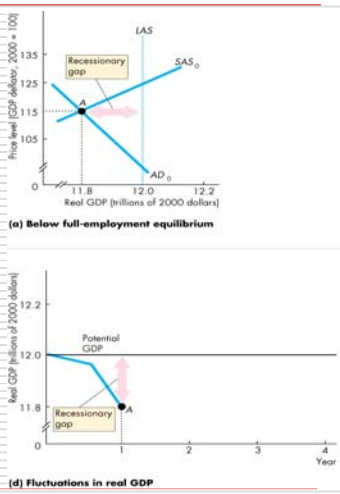
Two Causes of Economic Fluctuations

The Effects of a Shift in Aggregate Supply

- *Case Study: Oil and the Economy*
  - This occurred again in the late 1970s. Oil prices rose, output fell, and the rate of inflation increased.
  - In the late 1980s, OPEC began to lose control over the oil market as members began cheating on the agreement.
  - Oil prices fell, which led to a rightward shift of the short-run aggregate supply curve. This caused both unemployment and inflation to decline.

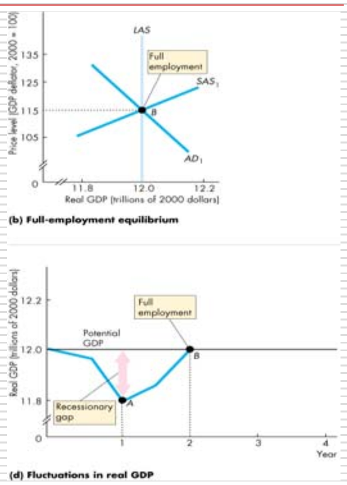
Macroeconomic Equilibrium

- Figures (a) and (d) illustrate below full-employment equilibrium. The amount by which potential GDP exceeds real GDP is called a **recessionary gap**.



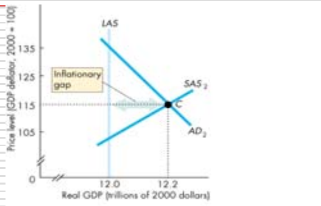
Macroeconomic Equilibrium

- Figures (b) and (d) illustrate full-employment equilibrium.

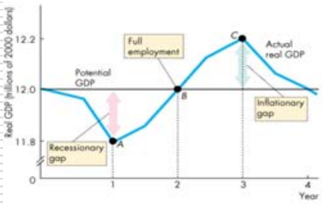


Macroeconomic Equilibrium

- Figures (c) and (d) illustrate above full-employment equilibrium. The amount by which real GDP exceeds potential GDP is called an **inflationary gap**.



(c) Above full-employment equilibrium



(d) Fluctuations in real GDP

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