33

Aggregate Demand and Aggregate Supply

PowerPoint Slides prepared by:
Andreea CHIRITESCU
Eastern Illinois University

Economic Fluctuations, Part 1

- Economic activity
  - Fluctuates from year to year
- Recession
  - Economic contraction
  - Period of declining real incomes and rising unemployment
- Depression
  - Severe recession

"You're fired. Pass it on."

Economic Fluctuations, Part 2

- Three key facts about economic fluctuations

1. Economic fluctuations are irregular and unpredictable
   - The business cycle
2. Most macroeconomic quantities fluctuate together
   - Recessions: economy-wide phenomena
3. As output falls, unemployment rises

Figure 1

A Look at Short-Run Economic Fluctuations (a)

This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in pane (c) for the U.S. economy using quarterly data since 1965. Recessions are shown as the shaded areas. Notice that real GDP and investment spending decline during recessions, while unemployment rises.

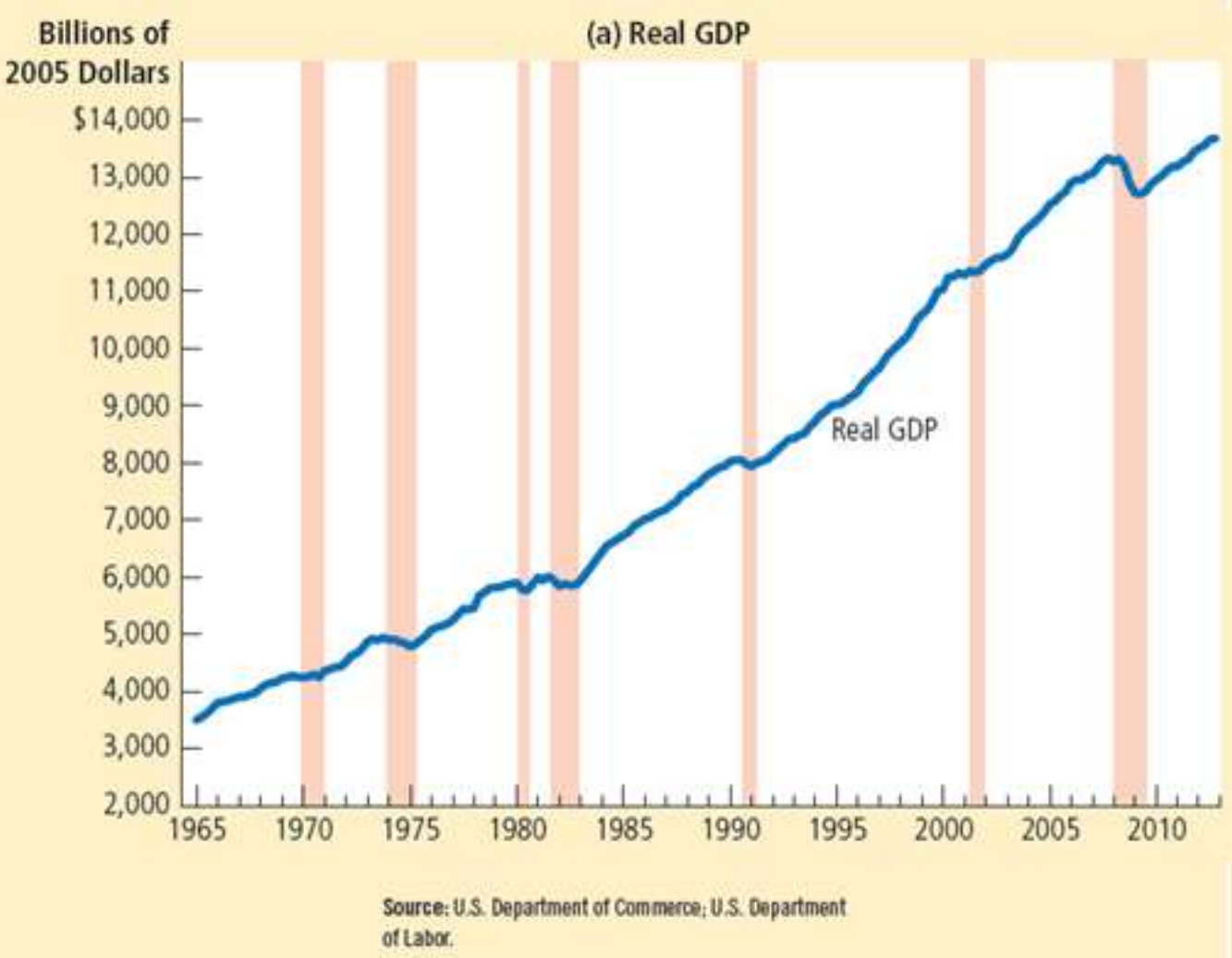


Figure 1

A Look at Short-Run Economic Fluctuations (b)

This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in panel (c) for the U.S. economy using quarterly data since 1965. Recessions are shown as the shaded areas. Notice that real GDP and investment spending decline during recessions, while unemployment rises.

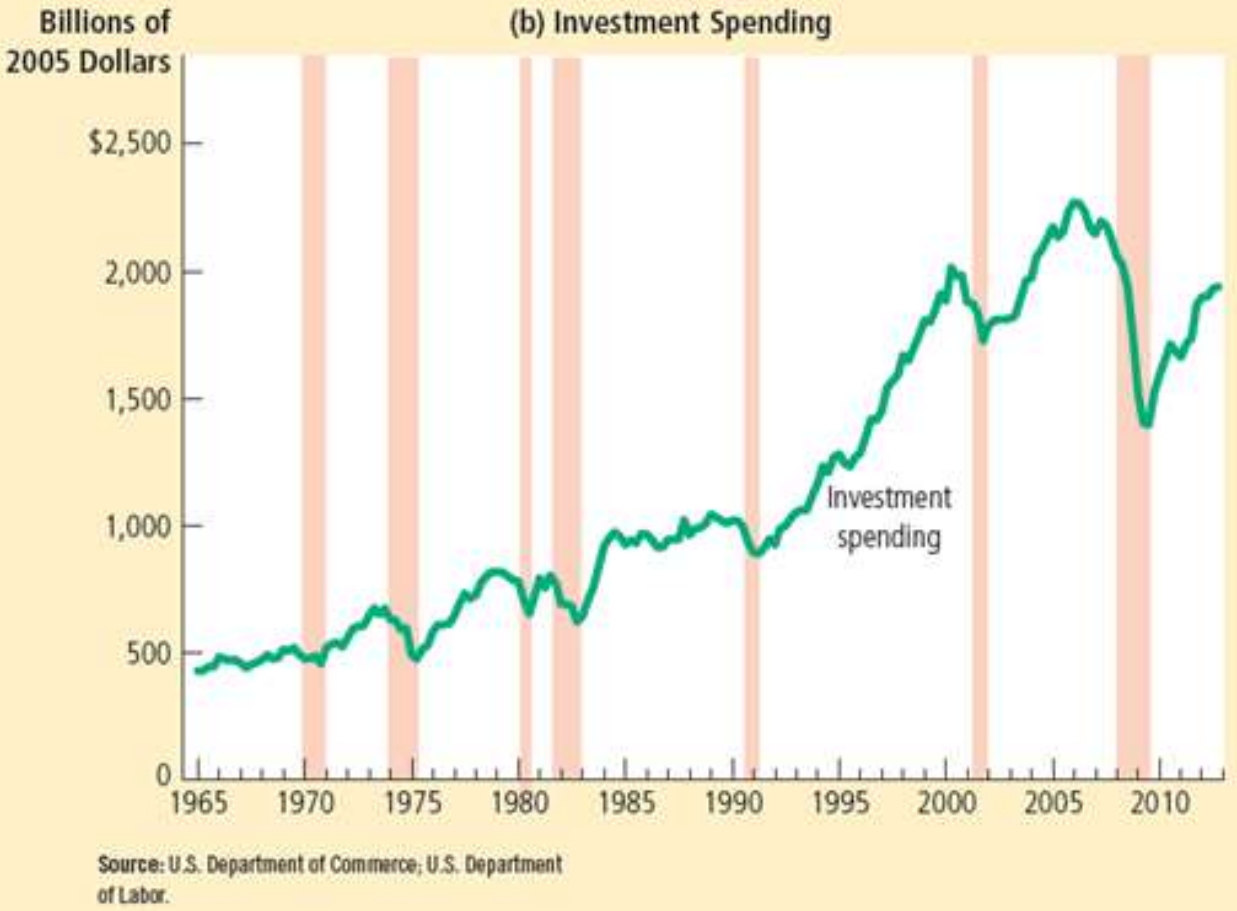
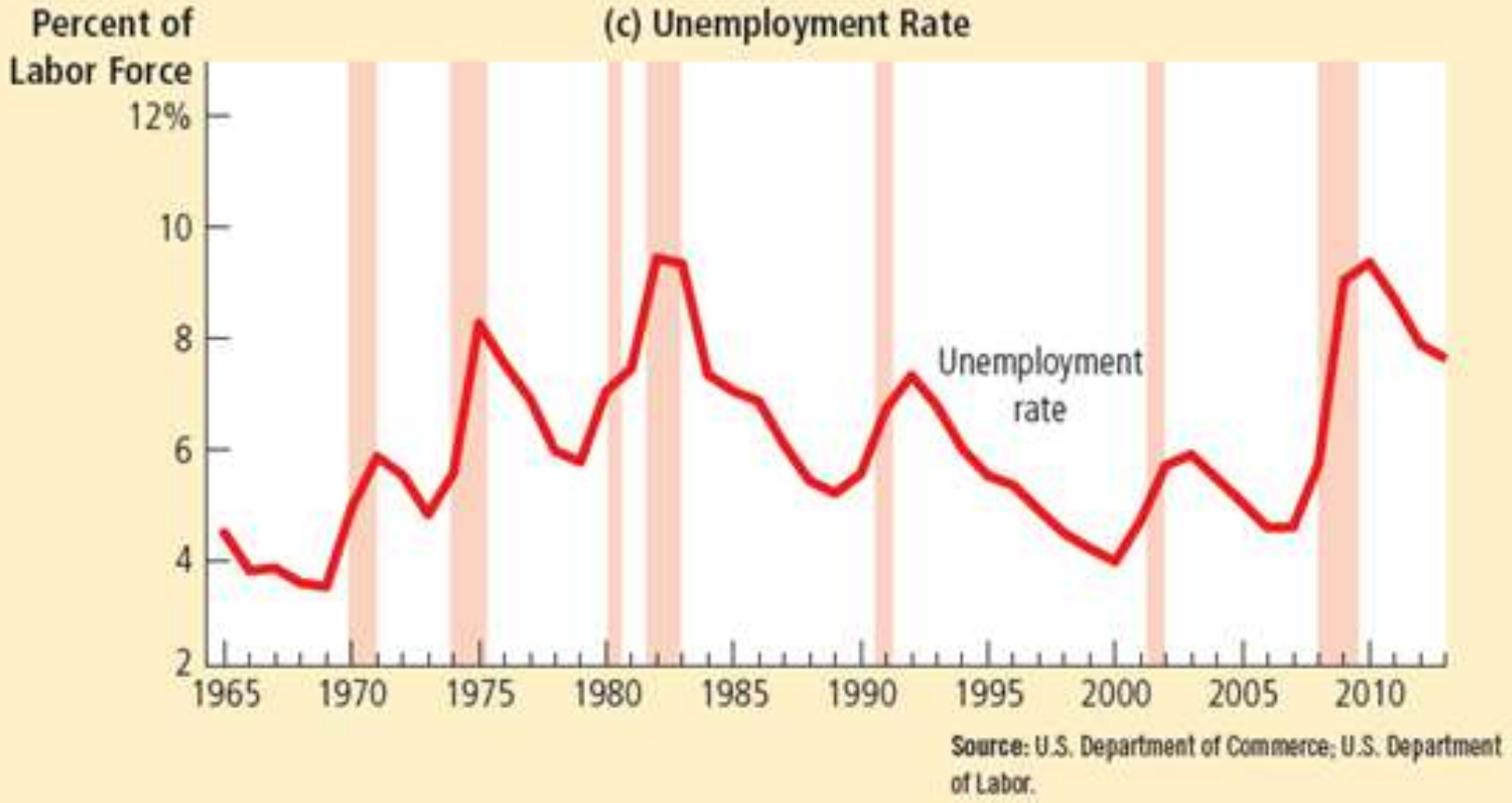


Figure 1

A Look at Short-Run Economic Fluctuations (c)



This figure shows real GDP in panel (a), investment spending in panel (b), and unemployment in panel (c) for the U.S. economy using quarterly data since 1965. Recessions are shown as the shaded areas. Notice that real GDP and investment spending decline during recessions, while unemployment rises.

Short-Run Economic Fluctuations, Part 1

- Classical dichotomy
  - Separation of variables into:
    - Real variables
    - Nominal variables
- Monetary neutrality
  - Changes in the money supply
    - Affect nominal variables
    - Do not affect real variables

Short-Run Economic Fluctuations, Part 2

- Classical theory holds in the long-run
  - Changes in money supply
    - Affect prices, and other nominal variables
    - Do not affect real GDP, unemployment, or other real variables

Short-Run Economic Fluctuations, Part 3

- Short-run
  - Assumption of monetary neutrality: no longer appropriate
  - Real and nominal variables are highly intertwined
  - Changes in the money supply
    - Can temporarily push real GDP away from its long-run trend

Short-Run Economic Fluctuations, Part 4

- AD-AS model
  - Model of aggregate demand (AD) and aggregate supply (AS)
  - Most economists use it to explain short-run fluctuations in economic activity
    - Around its long-run trend

Short-Run Economic Fluctuations, Part 5

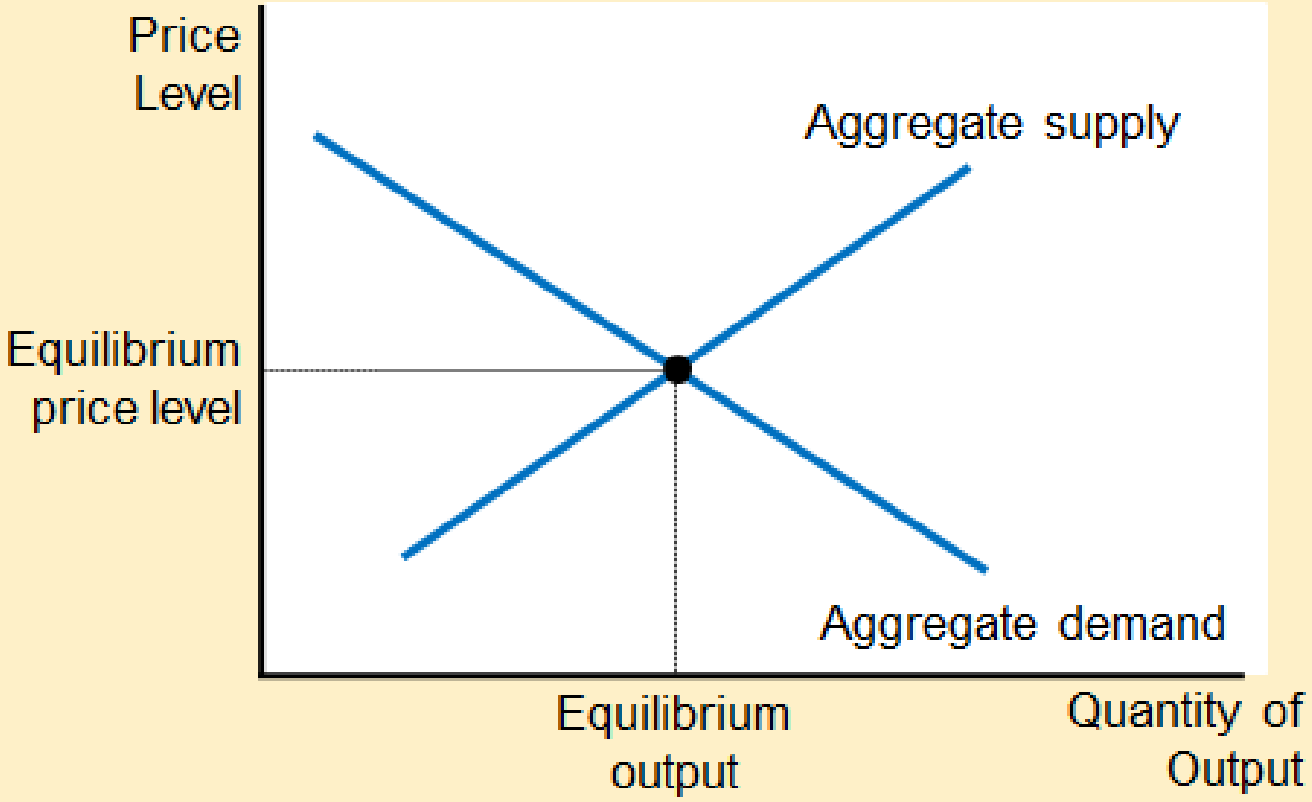
- Aggregate-demand curve
  - Shows the quantity of goods and services
  - That households, firms, the government, and customers abroad
  - Want to buy at each price level
  - Downward sloping

Short-Run Economic Fluctuations, Part 6

- Aggregate-supply curve
  - Shows the quantity of goods and services
  - That firms choose to produce and sell
  - At each price level
  - Upward sloping

Figure 2

Aggregate Demand and Aggregate Supply



Economists use the model of aggregate demand and aggregate supply to analyze economic fluctuations. On the vertical axis is the overall level of prices. On the horizontal axis is the economy's total output of goods and services. Output and the price level adjust to the point at which the aggregate-supply and aggregate-demand curves intersect.

The Aggregate-Demand Curve, Part 1

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

- Three effects explain why AD curve slopes downward:
  - Wealth effect (C)
  - Interest-rate effect (I)
  - Exchange-rate effect (NX)
- Assumption: government spending (G)
  - Fixed by policy

The Aggregate-Demand Curve, Part 2

- Price level and consumption (C): the wealth effect
  - Decrease in price level
    - Increase in the real value of money
    - Consumers are wealthier
    - Increase in consumer spending
    - Increase in quantity demanded of goods and services

The Aggregate-Demand Curve, Part 3

- Price level and investment (I): the interest-rate effect
  - Decrease in price level
    - Decrease in the interest rate
    - Increase spending on investment goods
    - Increase in quantity demanded of goods and services

The Aggregate-Demand Curve, Part 4

- Price level and net exports (NX): the exchange-rate effect
  - Decrease in U.S. price level
    - Decrease in the interest rate
    - U.S. dollar depreciates
    - Stimulates U.S. net exports
    - Increase in quantity demanded of goods and services

The Aggregate-Demand Curve, Part 5

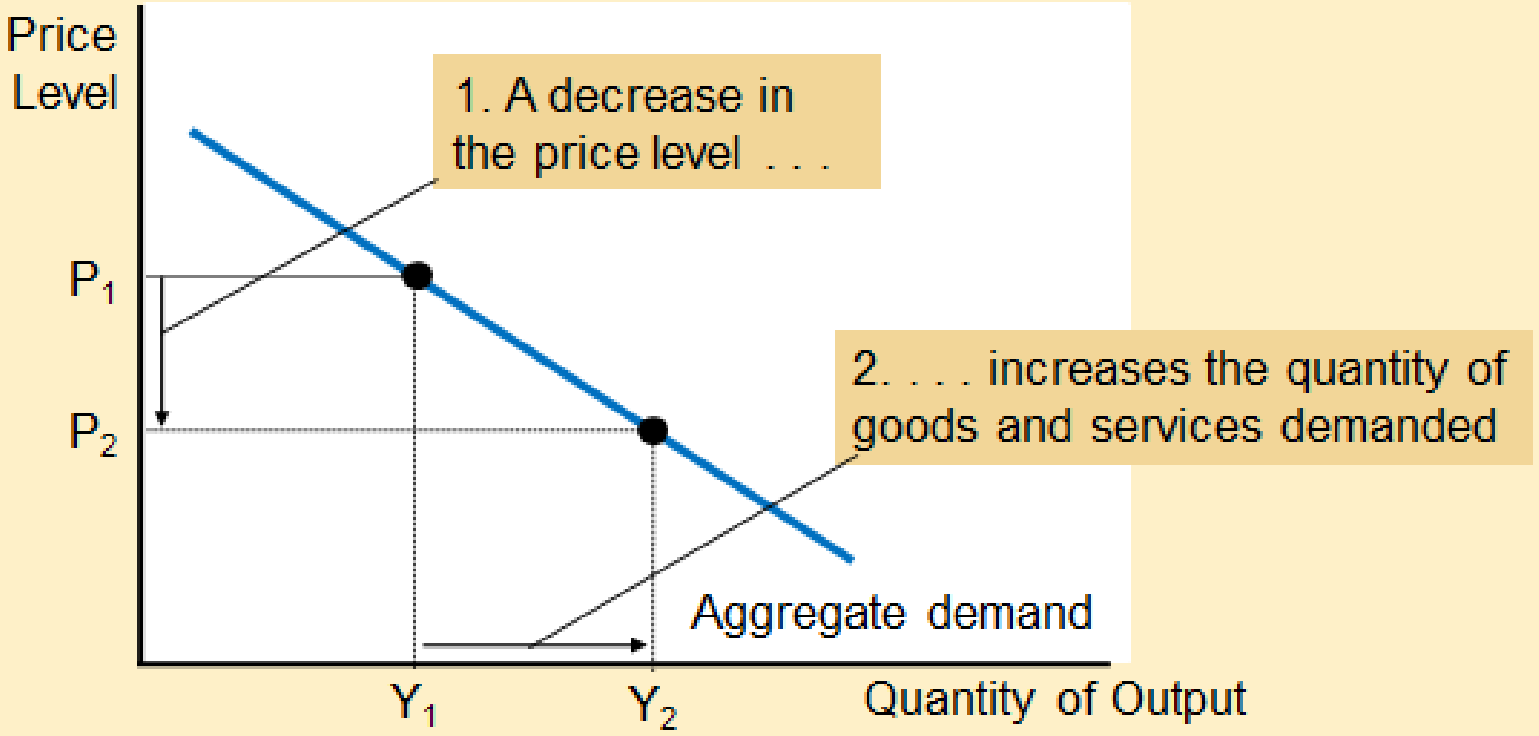
- A fall in price level
  - Increases quantity of goods and services demanded
  - Because:
    1. Consumers are wealthier: stimulates the demand for consumption goods
    2. Interest rates fall: stimulates the demand for investment goods
    3. Currency depreciates: stimulates the demand for net exports

The Aggregate-Demand Curve, Part 6

- A rise in price level
  - Decreases the quantity of goods and services demanded
  - Because:
    1. Consumers are poorer: depress consumer spending
    2. Higher interest rates fall: depress investment spending
    3. Currency appreciates: depress net exports

Figure 3

The Aggregate-Demand Curve



A fall in the price level from P_1 to P_2 increases the quantity of goods and services demanded from Y_1 to Y_2. There are three reasons for this negative relationship. As the price level falls, real wealth rises, interest rates fall, and the exchange rate depreciates. These effects stimulate spending on consumption, investment, and net exports. Increased spending on any or all of these components of output means a larger quantity of goods and services demanded.

The Aggregate-Demand Curve, Part 7

- The AD curve might shift:
  - Changes in consumption, C
  - Changes in investment, I
  - Changes in government purchases, G
  - Changes in net exports, NX

The Aggregate-Demand Curve, Part 8

- Changes in consumption, C
  - Events that change how much people want to consume at a given price level
    - Changes in taxes, wealth
  - Increase in consumer spending
    - Aggregate-demand curve: shift right

The Aggregate-Demand Curve, Part 9

- Changes in investment, I
  - Events that change how much firms want to invest at a given price level
    - Better technology
    - Tax policy
    - Money supply
  - Increase in investment
    - Aggregate-demand curve: shift right

The Aggregate-Demand Curve, Part 10

- Changes in government purchases, G
  - Policy makers – change government spending at a given price level
    - Build new roads
  - Increase in government purchases
    - Aggregate-demand curve: shift right

The Aggregate-Demand Curve, Part 11

- Changes in net exports, NX
  - Events that change net exports for a given price level
    - Recession in Europe
    - International speculators – change in exchange rate
  - Increase in net exports
    - Aggregate-demand curve: shift right

Table 1

The Aggregate-Demand Curve: Summary, Part 1

Why does the Aggregate-Demand Curve Slope Downward?

1. *The Wealth Effect:* A lower price level increases real wealth, which stimulates spending on consumption.
2. *The Interest-Rate Effect:* A lower price level reduces the interest rate, which stimulates spending on investment.
3. *The Exchange-Rate Effect:* A lower price level causes the real exchange rate to depreciate, which stimulate spending on net exports.

Table 1

The Aggregate-Demand Curve: Summary

Why Might the Aggregate-Demand Curve Shift?

1. *Shifts Arising from Changes in Consumption:* An event that causes consumers to spend more at a given price level (a tax cut, a stock market boom) shifts the aggregate-demand curve to the right. An event that causes consumers to spend less at a given price level (a tax hike, a stock market decline) shifts the aggregate-demand curve to the left.
2. *Shifts Arising from Changes in Investment:* An event that causes firms to invest more at a given price level (optimism about the future, a fall in interest rates due to an increase in the money supply) shifts the aggregate-demand curve

to the right. An event that causes firms to invest less at a given price level (pessimism about the future, a rise in interest rates due to a decrease in the money supply) shifts the aggregate-demand curve to the left.

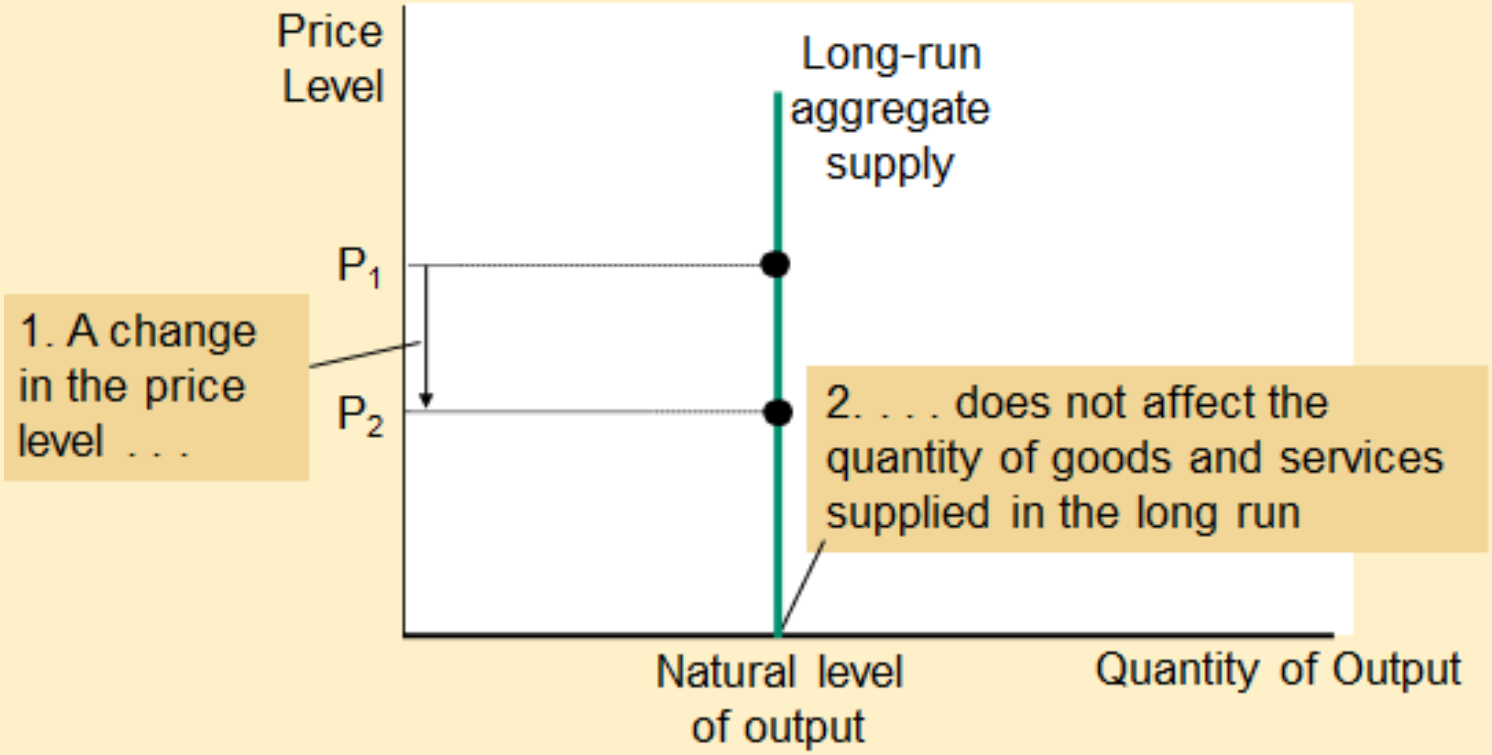
3. *Shifts Arising from Changes in Government Purchases:* An increase in government purchases of goods and services (greater spending on defense or highway construction) shifts the aggregate-demand curve to the right. A decrease in government purchases on goods and services (a cutback in defense or highway spending) shifts the aggregate-demand curve to the left.
4. *Shifts Arising from Changes in Net Exports:* An event that raises spending on net exports at a given price level (a boom overseas, speculation that causes an exchange-rate depreciation) shifts the aggregate-demand curve to the right. An event that reduces spending on net exports at a given price level (a recession overseas, speculation that causes an exchange-rate appreciation) shifts the aggregate-demand curve to the left.

The Aggregate-Supply Curve, Part 1

- Long run aggregate-supply curve, LRAS
  - Aggregate-supply curve is vertical
    - Price level does not affect the long-run determinants of GDP:
      - Supplies of labor, capital, and natural resources
      - Available technology
- Short run
  - Aggregate-supply curve is upward sloping

Figure 4

The Long-Run Aggregate-Supply Curve



In the long run, the quantity of output supplied depends on the economy's quantities of labor, capital, and natural resources and on the technology for turning these inputs into output. Because the quantity supplied does not depend on the overall price level, the long-run aggregate-supply curve is vertical at the natural level of output.

The Aggregate-Supply Curve, Part 2

- Natural level of output
  - Production of goods and services
  - That an economy achieves in the long run
    - When unemployment is at its normal rate
  - Potential output
  - Full-employment output

The Aggregate-Supply Curve, Part 3

- The LRAS curve might shift
  - Any change in natural level of output
  - Changes in labor
  - Changes in capital
  - Changes in natural resources
  - Changes in technological knowledge

The Aggregate-Supply Curve, Part 4

- Changes in labor
  - Quantity of labor – increases
    - Aggregate-supply curve: shifts right
  - Natural rate of unemployment – increases
    - Aggregate-supply curve: shifts left
- Changes in capital
  - Capital stock – increase
    - Aggregate-supply curve: shifts right
  - Physical and human capital

The Aggregate-Supply Curve, Part 5

- Changes in natural resources
  - New discovery of natural resource
    - Aggregate-supply curve: shifts right
  - Weather
  - Availability of natural resources

The Aggregate-Supply Curve, Part 6

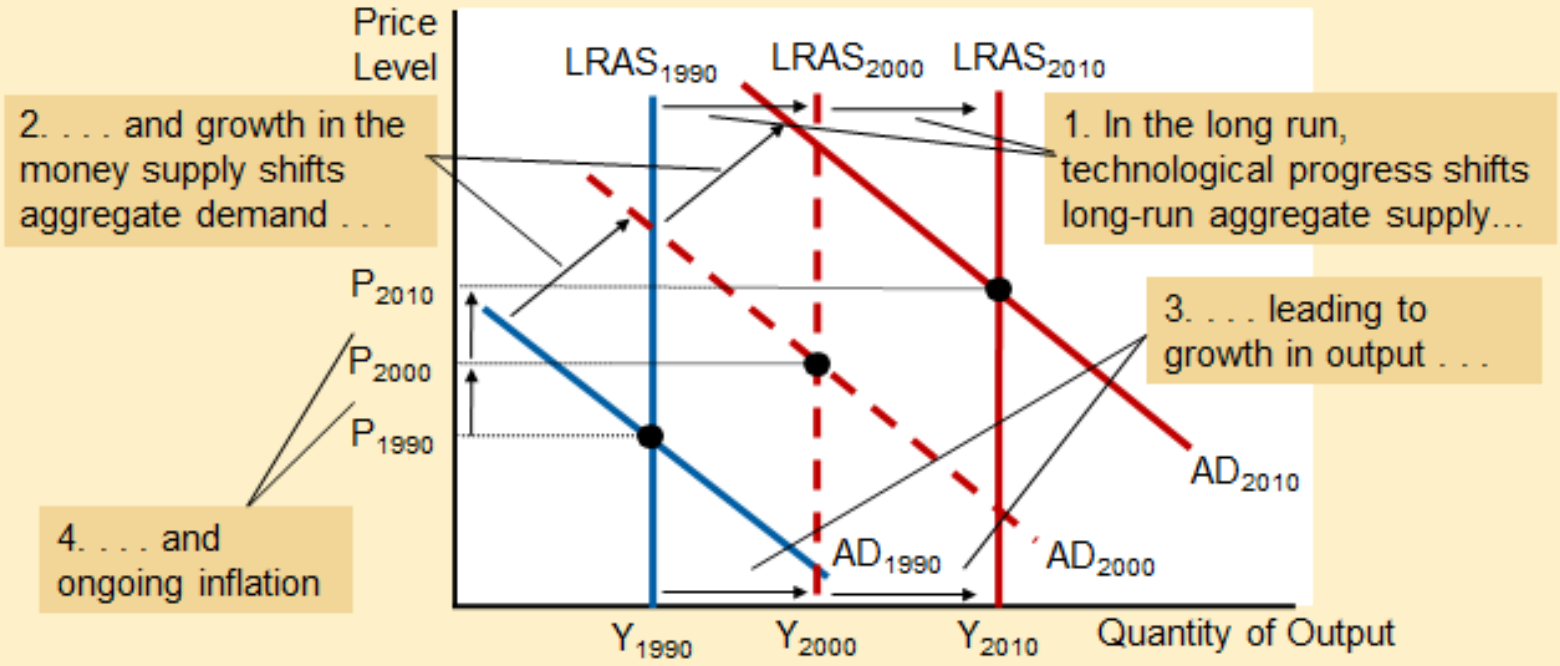
- Changes in technology
  - New technology, for given labor, capital and natural resources
    - Aggregate-supply curve: shifts right
  - International trade
  - Government regulation

Long-Run Growth and Inflation

- In long run: both AD and LRAS curve shift
  - Continual shifts of LRAS curve to right
    - Technological progress
  - AD curve shifts to right
    - Monetary policy
    - The Fed increases money supply over time
  - Result:
    - Continuing growth in output
    - Continuing inflation

Figure 5

Long-Run Growth and Inflation in the Model of Aggregate Demand and Aggregate Supply



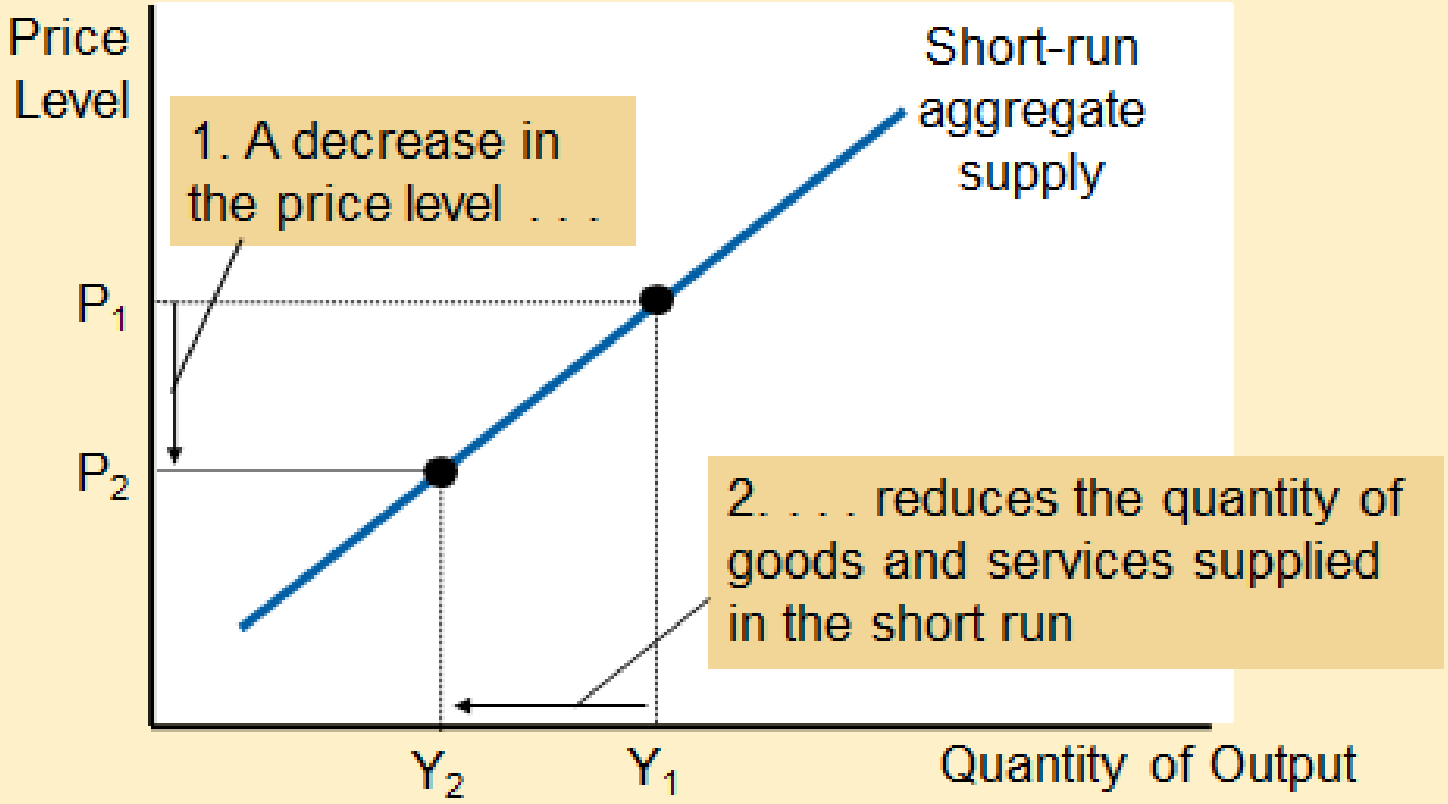
As the economy becomes better able to produce goods and services over time, primarily because of technological progress, the long-run aggregate-supply curve shifts to the right. At the same time, as the Fed increases the money supply, the aggregate-demand curve also shifts to the right. In this figure, output grows from Y_{1990} to Y_{2000} and then to Y_{2010}, and the price level rises from P_{1990} to P_{2000} and then to P_{2010}. Thus, the model of aggregate demand and aggregate supply offers a new way to describe the classical analysis of growth and inflation.

The Aggregate-Supply Curve, Part 7

- In the short-run:
  - Increase in overall level of prices in economy
    - Tends to raise the quantity of goods and services supplied
  - Decrease in level of prices
    - Tends to reduce quantity of goods and services supplied

Figure 6

The Short-Run Aggregate-Supply Curve



In the short run, a fall in the price level from P_1 to P_2 reduces the quantity of output supplied from Y_1 to Y_2. This positive relationship could be due to sticky wages, sticky prices, or misperceptions. Over time, wages, prices, and perceptions adjust, so this positive relationship is only temporary.

The Aggregate-Supply Curve, Part 8

- Theories that explain why the AS curve slopes upward in short-run:
  - Sticky-wage theory
  - Sticky-price theory
  - Misperceptions theory

The Aggregate-Supply Curve, Part 9

- Sticky-wage theory
  - Nominal wages - slow to adjust to changing economic conditions
    - Long-term contracts: workers and firms
    - Slowly changing social norms
    - Notions of fairness - influence wage setting
  - Nominal wages - based on expected prices
    - Don’t respond immediately when actual price level – different from what was expected

The Aggregate-Supply Curve, Part 10

- Sticky-wage theory
  - If price level < expected
    - Firms – incentive to produce less output
  - If price level > expected
    - Firms – incentive to produce more output

The Aggregate-Supply Curve, Part 11

- Sticky-price theory
  - Prices of some goods and services
    - Slow to adjust to changing economic conditions
    - Menu costs
      - Costs to adjusting prices

The Aggregate-Supply Curve, Part 12

- Misperceptions theory
  - Changes in the overall price level
    - Can temporarily mislead suppliers
      - About changes in individual markets
      - Changes in relative prices
    - Suppliers - respond to changes in level of prices
      - Change - quantity supplied of goods and services

The Aggregate-Supply Curve, Part 13

- Quantity of output supplied =

  = Natural level of output +

  + *a*(Actual price level – Expected price level)

  - Where *a* - number that determines how much output responds to unexpected changes in the price level

The Aggregate-Supply Curve, Part 14

- The short-run AS curve might shift:
  - Changes in labor, capital, natural resources, or technological knowledge
  - Expected price level increases
    - Aggregate-supply curve: shifts left

Table 2

The Short-Run Aggregate-Supply Curve: Summary, Part 1

Why Does the Short-Run Aggregate-Supply Curve Slope Upward?

1. *The Sticky-Wage Theory:* An unexpectedly low price level raises the real wage, which causes firms to hire fewer workers and produce a smaller quantity of goods and services.
2. *The Sticky-Price Theory: An* unexpectedly low price level leaves some firms with higher-than-desired prices, which depresses their sales and leads them to cut back production.
3. *The Misperceptions Theory:* An unexpectedly low price level leads some suppliers to think their relative prices have fallen, which induces a fall in production.

Table 2

The Short-Run Aggregate-Supply Curve: Summary, Part 2

Why Might the Short-Run Aggregate-Supply Curve Shift?

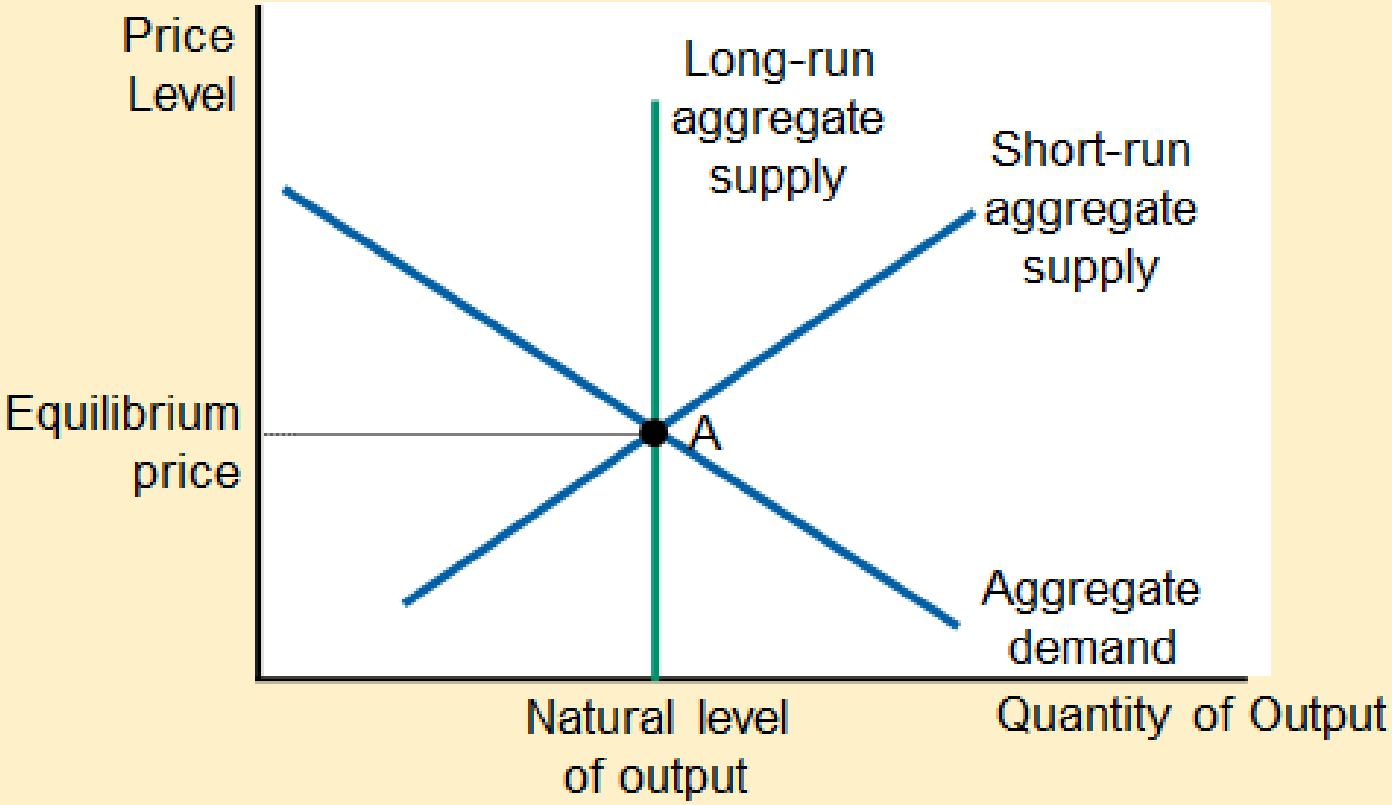
1. *Shifts Arising from Changes in Labor:* An increase in the quantity of labor available (perhaps due to a fall in the natural rate of unemployment) shifts the aggregate-supply curve to the right. A decrease in the quantity of labor available (perhaps due to a rise in the natural rate of unemployment) shifts the aggregate-supply curve to the left.
2. *Shifts Arising from Changes in Capital: An* increase in physical or human capital shifts the aggregate-supply curve to the right. A decrease in physical or human capital shifts the aggregate-supply curve to the left.
3. *Shifts Arising from Changes in Natural Resources:* An increase in the availability of natural resources shifts the aggregate-supply curve to the right. A decrease in the availability of natural resources shifts the aggregate-supply curve to the left.
4. *Shifts Arising from Changes in Technology:* An advance in technological knowledge shifts the aggregate-supply curve to the right. A decrease in the available technology (perhaps due to government regulation) shifts the aggregate-supply curve to the left.
5. *Shifts Arising from Changes in the Expected Price Level:* A decrease in the expected price level shifts the short-run aggregate-supply curve to the right. An increase in the expected price level shifts the short-run aggregate-supply curve to the left.

Causes of Economic Fluctuations, Part 1

- Assumption
  - Economy begins in long-run equilibrium
- Long-run equilibrium:
  - Intersection of AD and LRAS curves
    - Natural level of output
    - Actual price level
  - Intersection of AD and short-run AS curve
    - Expected price level = Actual price level

Figure 7

The Long-Run Equilibrium



The long-run equilibrium of the economy is found where the aggregate-demand curve crosses the long-run aggregate-supply curve (point A). When the economy reaches this long-run equilibrium, the expected price level will have adjusted to equal the actual price level. As a result, the short-run aggregate-supply curve crosses this point as well.

Causes of Economic Fluctuations, Part 2

- Shift in aggregate demand
  - Wave of pessimism: AD shifts left
  - Short-run
    - Output falls
    - Price level falls
  - Long-run
    - Short-run aggregate-supply curve shifts right
    - Output – natural level
    - Price level – falls

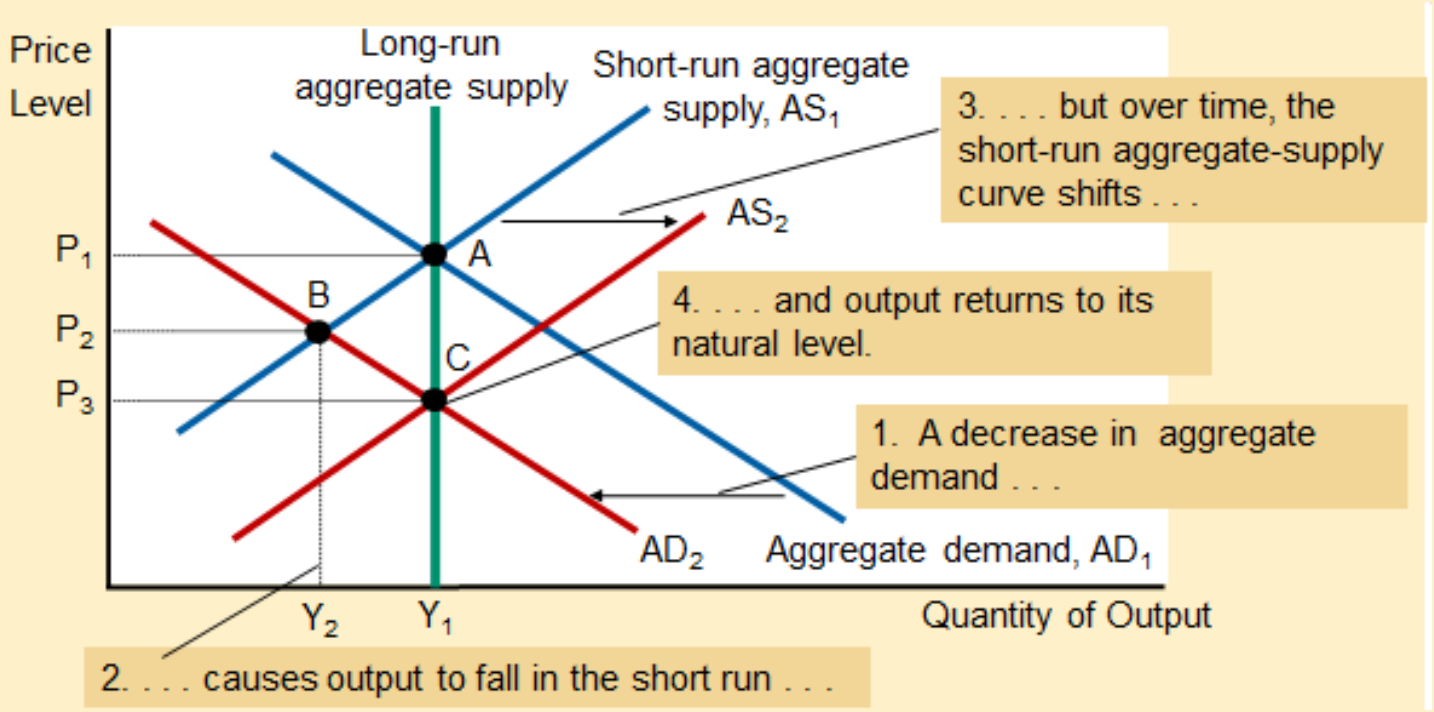
Table 3

Four Steps for Analyzing Macroeconomic Fluctuations

1. Decide whether the event shifts the aggregate-demand curve or the aggregate-supply curve (or perhaps both).
2. Decide the direction in which the curve shifts.
3. Use the diagram of aggregate demand and aggregate supply to determine the impact on output and the price level in the short run.
4. Use the diagram of aggregate demand and aggregate supply to analyze how the economy moves from its new short-run equilibrium to its long-run equilibrium.

Figure 8

A Contraction in Aggregate Demand



A fall in aggregate demand is represented with a leftward shift in the aggregate-demand curve from AD_1 to AD_2. In the short run, the economy moves from point A to point B. Output falls from Y_1 to Y_2, and the price level falls from P_1 to P_2. Over time, as the expected price level adjusts, the short-run aggregate-supply curve shifts to the right from AS_1 to AS_2, and the economy reaches point C, where the new aggregate-demand curve crosses the long-run aggregate-supply curve. In the long run, the price level falls to P_3, and output returns to its natural level, Y_1.

case study

Two Big Shifts in Aggregate Demand: The Great Depression and World War II, Part 1

- Early 1930s: large drop in real GDP
  - The Great Depression
    - Largest economic downturn in U.S. history
  - From 1929 to 1933
    - Real GDP fell by 27%
    - Unemployment rose from 3 to 25%
    - Price level fell by 22%

case study

Two Big Shifts in Aggregate Demand: The Great Depression and World War II, Part 2

- Early 1930s: large drop in real GDP
  - Cause: decrease in aggregate demand
    - Decline in money supply (by 28%)
    - Decreasing: *C* and *I*

The outcome of a massive decrease in aggregate demand

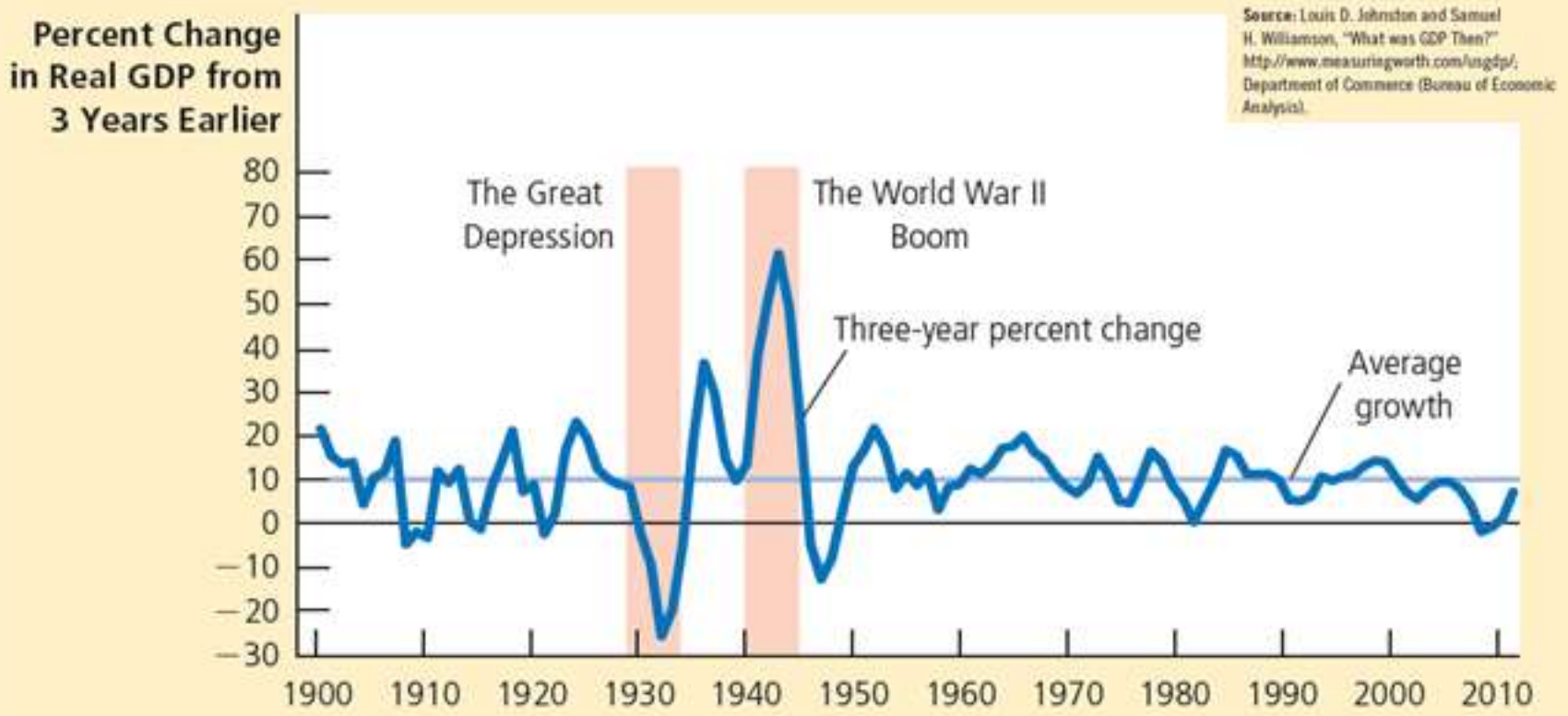
case study

Two Big Shifts in Aggregate Demand: The Great Depression and World War II, Part 3

- Early 1940s: large increase in real GDP
  - Economic boom
  - World War II
    - More resources to the military
    - Government purchases increased
    - Aggregate demand – increased 1939 to 1944
    - Doubled the economy's production of goods and services
    - 20% increase in the price level
    - Unemployment fell from 17 to 1%

Figure 9

U.S. Real GDP Growth since 1900



Over the course of U.S. economic history, two fluctuations stand out as especially large. During the early 1930s, the economy went through the Great Depression, when the production of goods and services plummeted. During the early 1940s, the United States entered World War II, and the economy experienced rapidly rising production. Both of these events are usually explained by large shifts in aggregate demand.

case study

The Recession of 2008–2009, Part 1

- 2008-2009, financial crisis, severe downturn in economic activity
  - Worst macroeconomic event in more than half a century
- A few years earlier: a substantial boom in the housing market
  - Fueled by low interest rates
    - Rise in housing prices
  - Developments in the mortgage market
  - Other issues

case study

The Recession of 2008–2009, Part 2

- Developments in the mortgage market
  - Easier for subprime borrowers to get loans
    - Borrowers with a higher risk of default (income and credit history)
  - Securitization
    - Process by which a financial institution (mortgage originator) makes loan
    - Then (investment bank) bundles them together mortgage-backed securities

case study

The Recession of 2008–2009, Part 3

- Developments in the mortgage market
  - Mortgage-backed securities
    - Sold to other institutions, which may not have fully appreciated the risks in these securities
- Other issues
  - Inadequate regulation for these high-risk loans
  - Misguided government policy
    - Encouraged this high-risk lending

case study

The Recession of 2008–2009, Part 4

- 1995-2006
  - Increase in housing demand
  - Increase in housing prices
    - More than doubled
- 2006-2009, housing prices fell 30%
  - Substantial rise in mortgage defaults and home foreclosures
  - Financial institutions that owned mortgage-backed securities
    - Huge losses

case study

The Recession of 2008–2009, Part 5

- Large contractionary shift in AD
  - Real GDP fell sharply
    - By 4% between the forth quarter of 2007 and the second quarter of 2009
  - Employment fell sharply
    - Unemployment rate rose from 4.4% in May 2007 to 10.1% in October 2009

case study

The Recession of 2008–2009, Part 6

- Three policy actions aimed in part at returning AD to its previous level
  - The Fed
    - Cut its target for the federal funds rate
      - From 5.25% in September 2007 to about zero in December 2008
    - Started buying mortgage-backed securities and other private loans
      - In open-market operations
      - Provided banks with additional funds

case study

The Recession of 2008–2009, Part 7

- Three policy actions
  - October 2008, Congress appropriated $700 billion
    - For the Treasury to use to rescue the financial system
    - To stem the financial crisis on Wall Street
    - To make loans easier to obtain
    - Equity injections into banks
    - U.S. government – temporarily became a part owner of these banks

case study

The Recession of 2008–2009, Part 8

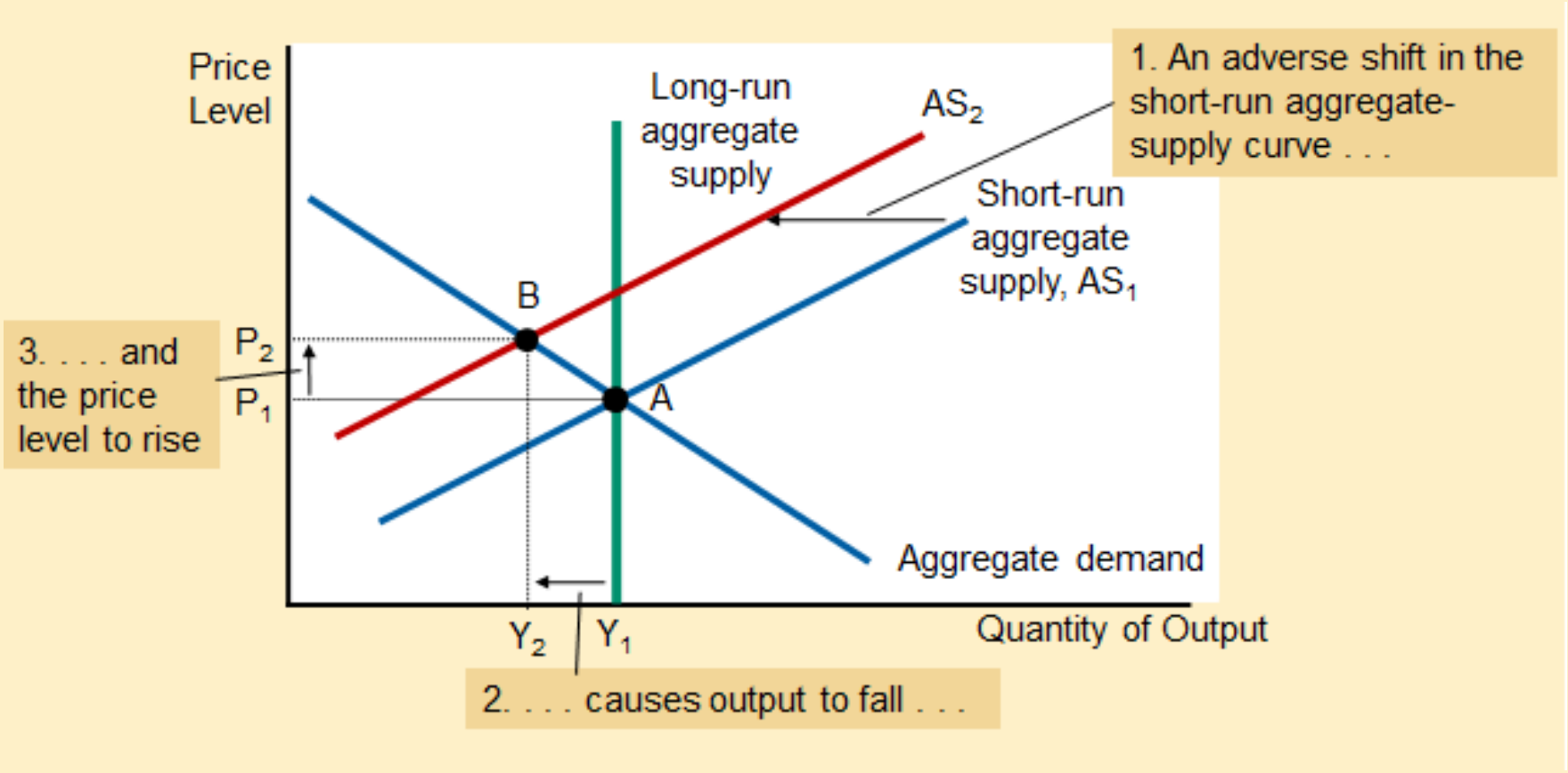
- Three policy actions
  - January 2009, Barack Obama
    - Large increase in government spending
    - $787 billion stimulus bill, February 17, 2009
- June 2009, the meager recovery began
  - From 2010 through 2012
    - Real GDP growth averaged 2.1% per year
  - Unemployment fell, but remained high
    - 7.5% in April 2013

Causes of Economic Fluctuations, Part 3

- Shift in aggregate supply
  - Firms – increase in production costs
    - Aggregate-supply curve: shifts left
  - Short-run - stagflation
    - Output falls
    - Price level rises
  - Long-run, if AD is held constant
    - Short-run AS shifts back to right
    - Output – natural level
    - Price level - falls

Figure 10

An Adverse Shift in Aggregate Supply



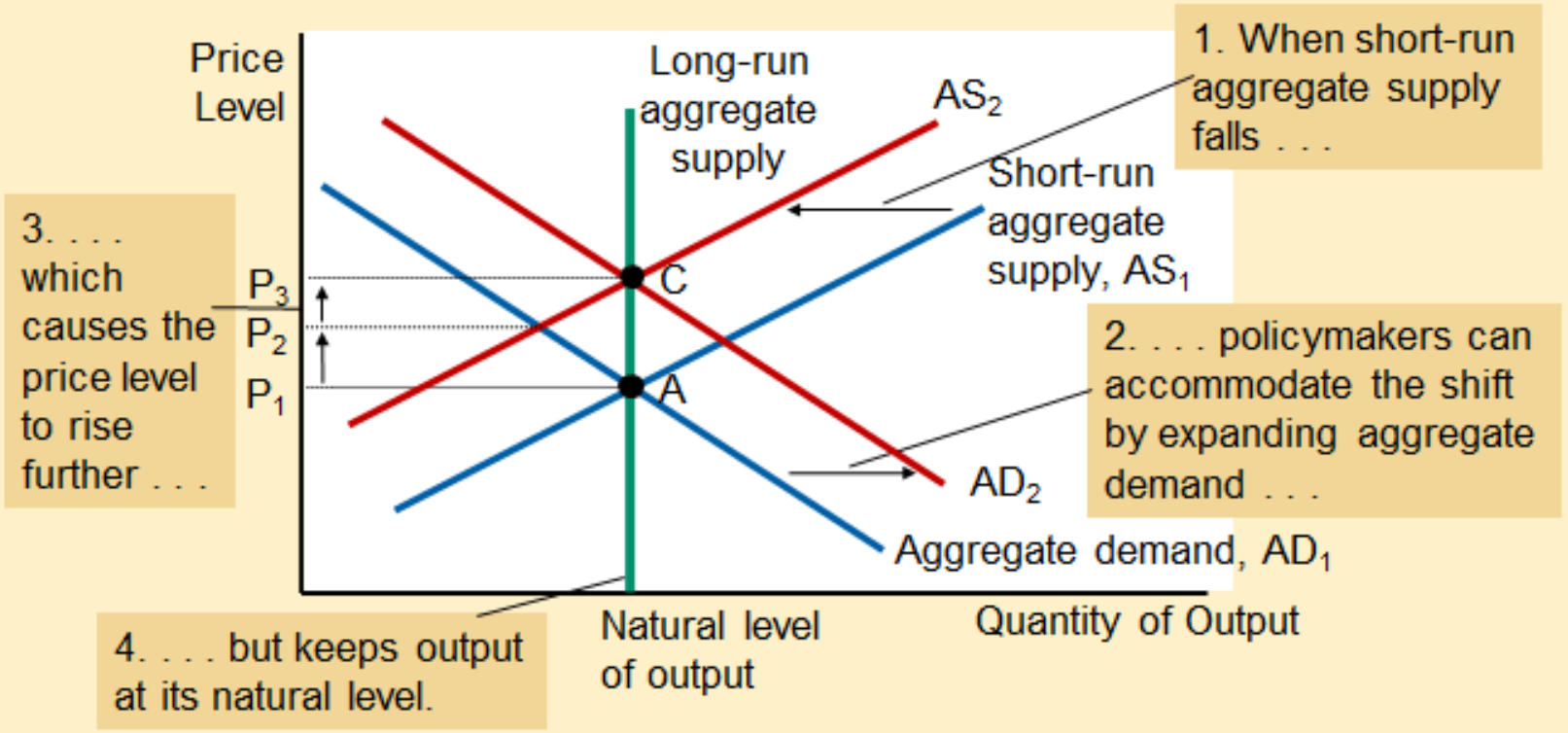
When some event increases firms' costs, the short-run aggregate-supply curve shifts to the left from AS_1 to AS_2. The economy moves from point A to point B. The result is stagflation: Output falls from Y_1 to Y_2, and the price level rises from P_1 to P_2.

Causes of Economic Fluctuations, Part 4

- Shift in aggregate supply
  - Firms – increase in production costs
    - Aggregate-supply curve: shifts left
  - Short-run
    - Output falls
    - Price level rises
  - Long-run, policymakers – shift AD to right
    - Output – natural level
    - Price level – rises

Figure 11

Accommodating an Adverse Shift in Aggregate Supply



Faced with an adverse shift in aggregate supply from AS_1 to AS_2, policymakers who can influence aggregate demand might try to shift the aggregate-demand curve to the right from AD_1 to AD_2. The economy would move from point A to point C. This policy would prevent the supply shift from reducing output in the short run, but the price level would permanently rise from P_1 to P_3.

case study

Oil and the Economy, Part 1

- Economic fluctuations in the U.S.
  - Since 1970, originated in the oil fields of the Middle East
- Some event - reduces the supply of crude oil flowing from Middle East
  - Price of oil rises around the world
  - Aggregate-supply curve shifts left
  - Stagflation
    - Mid-1970s
    - Late-1970s

case study

Oil and the economy, Part 2

- Some event – increases the supply of crude oil from Middle East, 1986
  - Price of oil decreases
  - Aggregate-supply curve – shifts right
    - Output – rapid growth
    - Unemployment – falls
    - Inflation rate – falls

Changes in Middle East oil production are one source of U.S. economic fluctuations.

AP PHOTO/IMF/EUGENE SALAZAR

case study

Oil and the economy, Part 3

- Recent years
  - World market for oil – not an important source of economic fluctuations
  - Conservation efforts
  - Changes in technology
- Amount of oil used to produce a unit of real GDP
  - Declined 40% since the OPEC shocks of the 1970s