

UNIT 3

National Income and Price Determination



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AP EXAM WEIGHTING

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NATIONAL INCOME AND PRICE DETERMINATION

M1: Aggregate Demand and Aggregate Supply

I. Economic Fluctuations

A. Definition of **recession**: a period of declining real incomes and rising unemployment.

B. Definition of **depression**: a severe recession.

C. Three Key Facts about Economic Fluctuations

1. Fact 1: Economic Fluctuations Are Irregular and Unpredictable

- a. Fluctuations in the economy are often called the business cycle.
- b. Economic fluctuations correspond to changes in business conditions.
- c. These fluctuations are not at all regular and are almost impossible to predict.

2. Fact 2: Most Macroeconomic Quantities Fluctuate Together

- a. Real GDP is the variable that is most often used to examine short-run changes in the economy.
- b. However, most macroeconomic variables that measure some type of income, spending, or production fluctuate closely together.

3. Fact 3: As Output Falls, Unemployment Rises

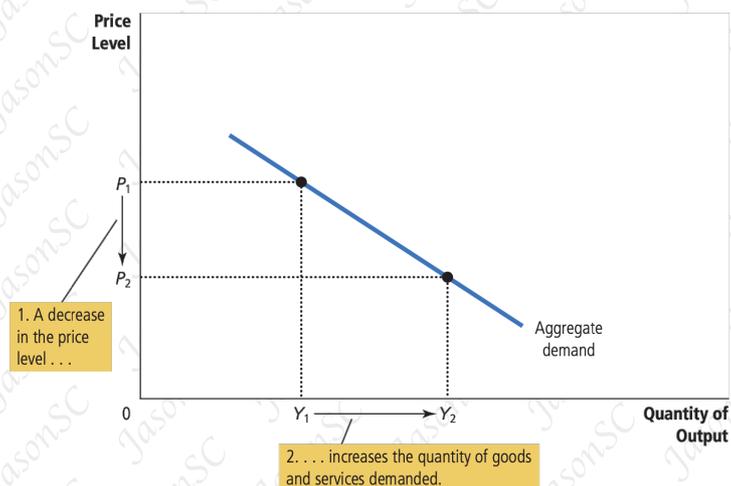
- a. Changes in the economy's output level will have an effect on the economy's utilization of its labor force.
- b. When firms choose to produce a smaller amount of goods and services, they lay off workers, which increases the unemployment rate.

II. The Aggregate-Demand Curve

A. Definition of **aggregate-demand curve**: a curve that shows the quantity of goods and services that households, firms, and the government want to buy at each price level.

B. Why the Aggregate-Demand Curve Slopes Downward

Figure 1 The Aggregate-Demand Curve



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

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

2. Each of the four components is a part of aggregate demand.

a. Government purchases are assumed to be fixed by policy.

b. 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.

3. The Price Level and Consumption: The Wealth Effect

a. A decrease in the price level raises the real value of money and makes consumers feel wealthier, which in turn encourages them to spend more.

b. The increase in consumer spending means a larger quantity of goods and services demanded.

4. The Price Level and Investment: The Interest-Rate Effect

a. The lower the price level, the less money households need to buy goods and services.

b. 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).

c. As households try to convert some of their money into interest-bearing assets, the interest rate will drop.

d. Lower interest rates encourage borrowing firms to borrow more to invest in new plants and equipment, and it encourages households to borrow more to invest in new housing.

e. 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.

5. The Price Level and Net Exports: The Exchange-Rate Effect

- a. A lower price level in the United States lowers the U.S. interest rate.
- b. Some U.S. investors will seek higher returns by investing abroad, increasing U.S. net capital outflow.
- c. The increase in net capital outflow raises the supply of dollars, lowering the real exchange rate.
- d. U.S. goods become relatively cheaper to foreign goods. Exports rise, imports fall, and net exports increase.
- e. 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.

6. All three of these effects imply that, all else being equal, there is an inverse relationship between the price level and the quantity of goods and services demanded.

B. Why the Aggregate-Demand Curve Might Shift

1. Shifts Arising from Changes in Consumption

- a. If Americans become more concerned with saving for retirement and reduce current consumption, aggregate demand will shift to the left.
- b. If the government cuts taxes, it encourages people to spend more, resulting in a shift to the right in aggregate demand.

2. Shifts Arising from Changes in Investment

- a. Suppose that the computer industry introduces a faster line of computers and many firms decide to invest in new computer systems. This will cause aggregate demand to shift to the right.
- b. If firms become pessimistic about future business conditions, they may cut back on investment spending, shifting aggregate demand to the left.
- c. An **investment tax credit** increases the quantity of investment goods that firms demand, which shifts aggregate demand to the right.
- d. An increase in the supply of money lowers the interest rate in the short run. This leads to more investment spending, which causes aggregate demand to shift to the right.

3. Shifts Arising from Changes in Government Purchases

- a. If Congress decides to reduce purchases of new weapon systems, aggregate demand will shift to the left.
- b. If state governments decide to build more highways, aggregate demand will shift to the right.

4. Shifts Arising from Changes in Net Exports

- a. When Europe experiences a recession, it buys fewer American goods, which lowers U.S. net exports at every price level. Aggregate demand for the U.S. economy will shift to the left.

b. If the exchange rate of the U.S. dollar increases, U.S. goods become more expensive to foreigners. Net exports fall and aggregate demand shifts to the left.

III. The Aggregate-Supply Curve

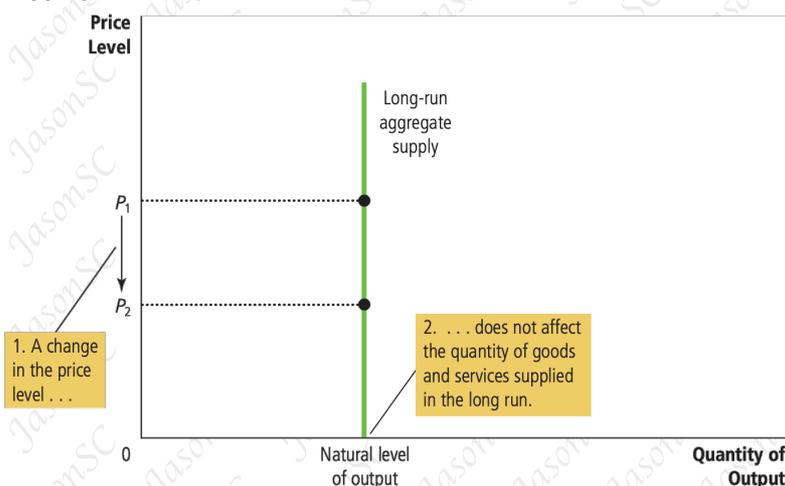
A. Definition of **aggregate-supply curve**: a curve that shows the quantity of goods and services that firms choose to produce and sell at each price level.

B. The relationship between the price level and the quantity of goods and services supplied depends on the **time horizon** being examined.

C. Why the Aggregate-Supply Curve Is Vertical in the Long Run

1. In the long run, an economy's production of goods and services depends on its supplies of resources along with the available production technology.
2. Because the **price level does not affect these determinants of output in the long run, the long-run aggregate-supply curve is vertical.**

Figure 2 The Long-Run Aggregate-Supply Curve



D. Why the Long-Run Aggregate-Supply Curve Might Shift

1. The position of the aggregate-supply curve occurs at an output level sometimes referred to as **potential output** or **full-employment output**.
2. Definition of **natural level of output**: the production of goods and services that an economy achieves in the long run when unemployment is at its natural rate.

3. Any change in the economy that **alters the natural level of output** shifts the long-run aggregate-supply curve.

4. Shifts Arising from Changes in Labor

- a. Increases in immigration increase the number of workers available. The long-run aggregate-supply curve would shift to the right.
- b. Any change in the natural rate of unemployment will alter long-run aggregate supply as well.

5. Shifts Arising from Changes in Capital

- a. An increase in the economy's capital stock raises productivity and thus shifts long-run aggregate supply to the right.
- b. This would also be true if the increase occurred in **human capital** rather than **physical capital**.

6. Shifts Arising from Changes in Natural Resources

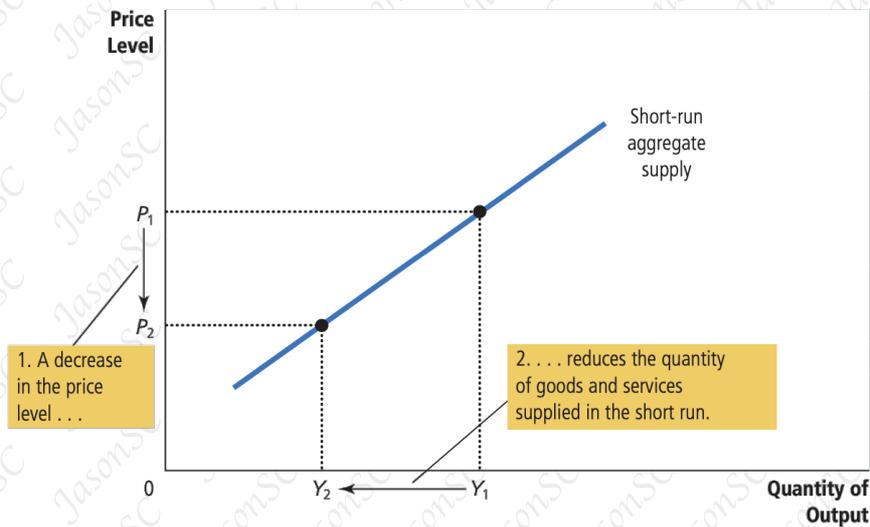
- a. A discovery of a new mineral deposit shifts the long-run aggregate-supply curve to the right.
- b. A change in weather patterns that makes farming more difficult shifts the long-run aggregate-supply curve to the left.
- c. A change in the availability of imported resources (such as oil) can also affect long-run aggregate supply.

7. Shifts Arising from Changes in 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.
- b. 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.

E. Why the Aggregate-Supply Curve Slopes Upward in the Short Run

Figure 3 The Short-Run Aggregate-Supply Curve



- 1. In the short run, the price level does affect the economy's output. An increase in the overall level of prices tends to raise the quantity of goods and services supplied.
- 2. The quantity of output supplied deviates from its natural level when the actual price level deviates from the expected price level.

3. The Sticky-Wage Theory

- a. Nominal wages are often slow to adjust to changing economic conditions due to long-term contracts between workers and firms along with social norms and notions of fairness that influence wage setting and are slow to change over time.

- b. Example: Suppose a firm has agreed in advance to pay workers an hourly wage of \$20 based on the expectation that the price level will be 100. If the price level is actually 95, the firm receives 5% less for its output than it expected and its labor costs are fixed at \$20 per hour.
- c. Production is now less profitable, so the firm hires fewer workers and reduces the quantity of output supplied.
- d. Nominal wages are based on expected prices and do not adjust immediately when the actual price level differs from what is expected. This makes the short-run aggregate-supply curve upward sloping.
- e. This theory of short-run aggregate supply is emphasized in the text.

4. The Sticky-Price Theory

- a. The prices of some goods and services are also sometimes slow to respond to changing economic conditions. This is often blamed on menu costs.
- b. 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.
- c. Thus, when sales decline, firms will produce a lower quantity of goods and services.
- d. 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 reduce the quantity of goods and services supplied.

5. The Misperceptions Theory

- a. Changes in the overall price level can temporarily mislead suppliers about what is happening in the markets in which they sell their output.
 - b. 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.
 - c. 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 same misperception may happen if workers see a decline in their nominal wage (caused by a fall in the price level).
 - d. 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.
6. Note that each of these theories suggests that output deviates from its natural level when the price level deviates from the price level that people expected.
7. Note also that the effects of the change in the price 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.
8. Because the sticky-wage theory is the simplest of the three theories, it is the one that is emphasized in the text.

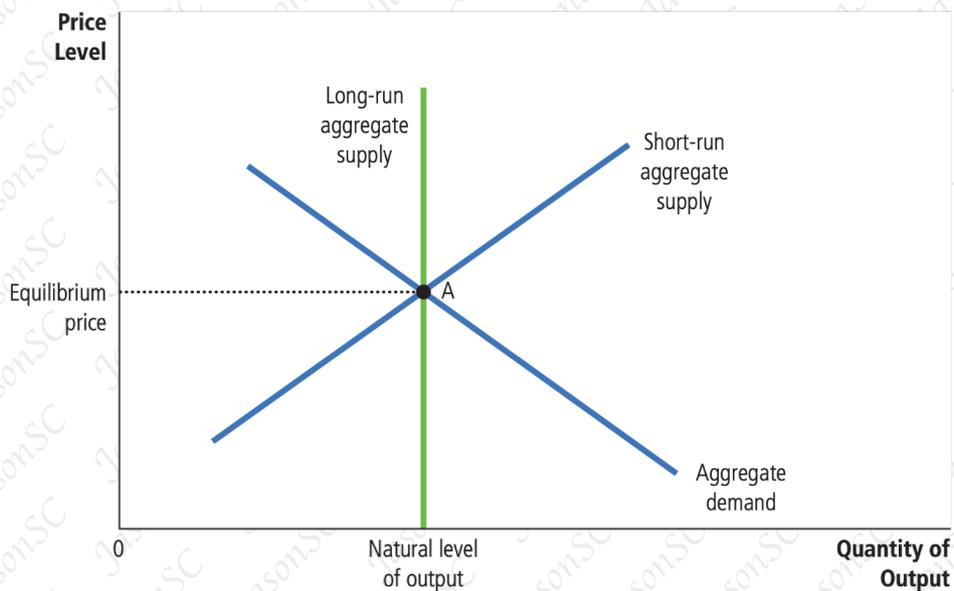
G. Why the Short-Run Aggregate-Supply Curve Might Shift

1. Events that shift the long-run aggregate-supply curve will shift the short-run aggregate-supply curve as well.
2. However, 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.
3. An increase in the expected price level decreases the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the left. A decrease in the expected price level increases the quantity of goods and services supplied and shifts the short-run aggregate-supply curve to the right.

IV. Two Causes of Economic Fluctuations

A. Long-Run Equilibrium

Figure 4 The Long-Run Equilibrium



1. Long-run equilibrium is found where the aggregate-demand curve intersects with the long-run aggregate-supply curve.
2. Output is at its natural level.
3. 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.

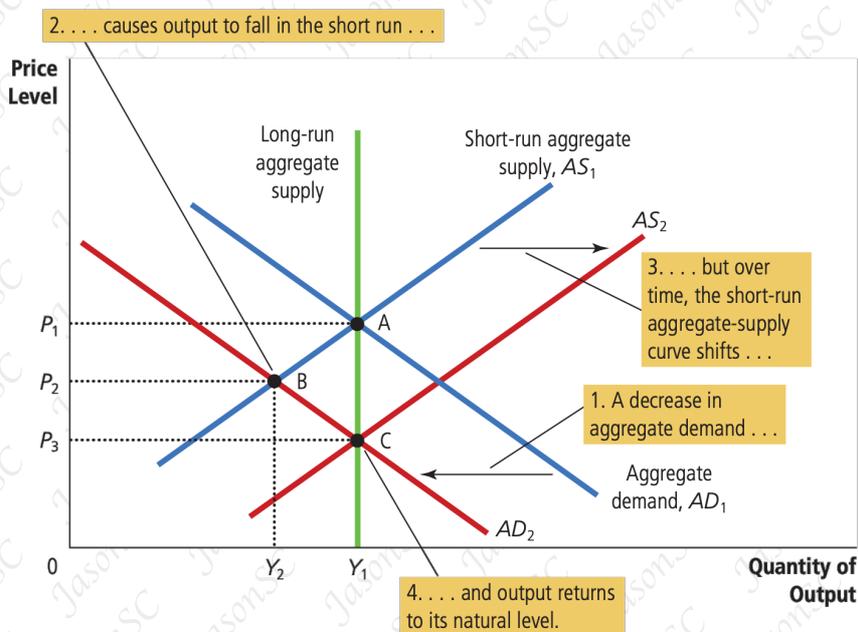
B. The Effects of a Shift in Aggregate Demand

1. Example: Pessimism causes household spending and investment to decline.
2. This will cause the aggregate-demand curve to **shift to the left**.
3. In the short run, **both output and the price level fall**. This drop in output means that the economy is **in a recession**.

4. In the long run, the economy will move back to the natural rate of output.

- a. People will correct the misperceptions, sticky wages, and sticky prices that cause the aggregate-supply curve to be upward sloping in the short run.
- b. The expected price level will fall, shifting the short-run aggregate-supply curve to the right.

Figure 5 A Contraction in Aggregate Demand



5. 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).

6. Instead of waiting for the economy to adjust on its own, policymakers may want to eliminate the recession by boosting government spending or increasing the money supply. Either way, these policies could shift the aggregate demand curve back to the right.

C. The Effects of a Shift in Aggregate Supply

1. Example: Firms experience a sudden increase in their costs of production.
2. 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.)
3. In the short run, output will fall and the price level will rise. The economy is experiencing **stagflation**.
4. Definition of **stagflation**: a period of falling output and rising prices.
5. The result over time may be a wage-price spiral.
6. Eventually, the low level of output will put downward pressure on wages.
 - a. Producing goods and services becomes more profitable.
 - b. Short-run aggregate supply shifts to the right until the economy is again producing at the natural level of output.

7. If policymakers want to end the stagflation, they can shift the aggregate-demand curve. Note that they 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.

Figure 6 An Adverse Shift in Aggregate Supply

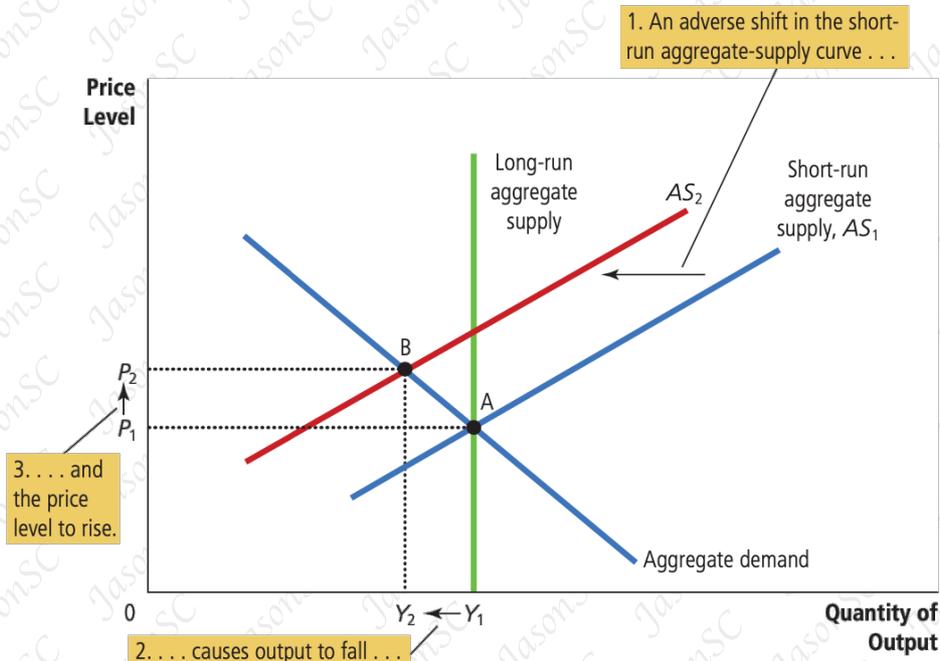
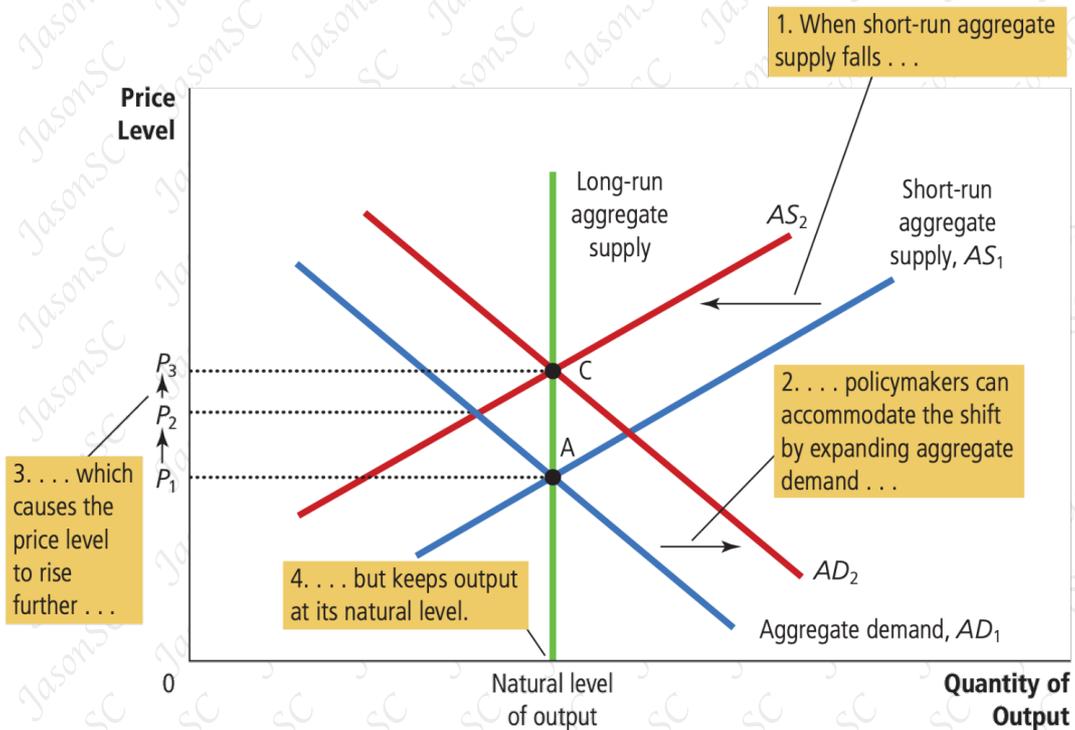


Figure 7 Accommodating an Adverse Shift in Aggregate Supply



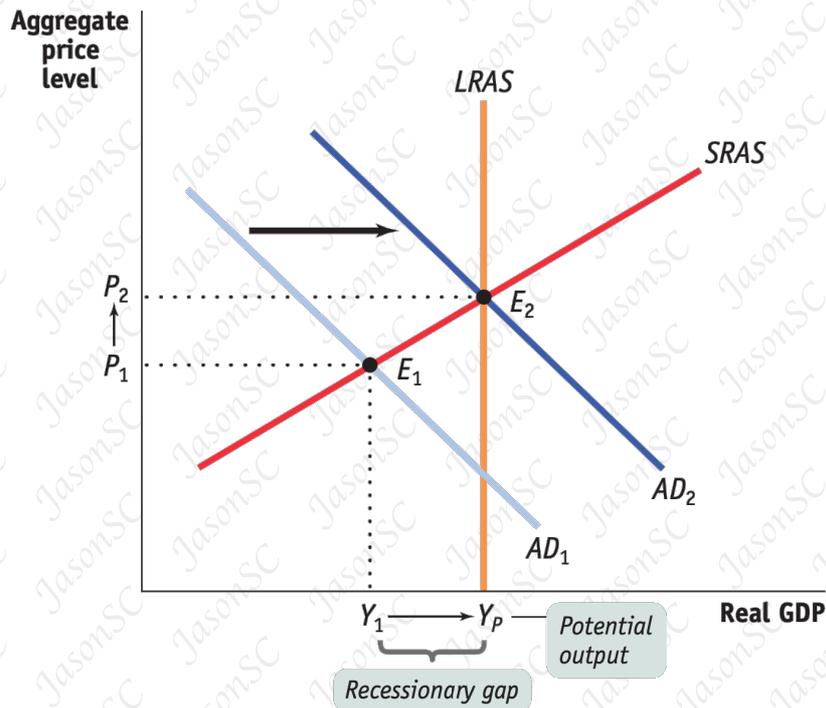
M2: Fiscal Policy

I. How Fiscal Policy Influences Aggregate Demand

A. Definition of **fiscal policy**: the setting of the level of government spending and taxation by government policymakers.

B. Expansionary Fiscal Policy Can Close a Recessionary Gap

Figure 8 Recessionary Gap



- Figure 8 shows the case of an economy facing a recessionary gap.
- At the initial short-run macroeconomic equilibrium, E_1 , aggregate output is Y_1 , below potential output, Y_P .
- What the government would like to do is increase aggregate demand, shifting the aggregate demand curve rightward to AD_2 . This would increase aggregate output, making it equal to potential output.
- Fiscal policy that increases aggregate demand, called expansionary fiscal policy, normally takes one of three forms:
 - an increase in government purchases of goods and services
 - a cut in taxes

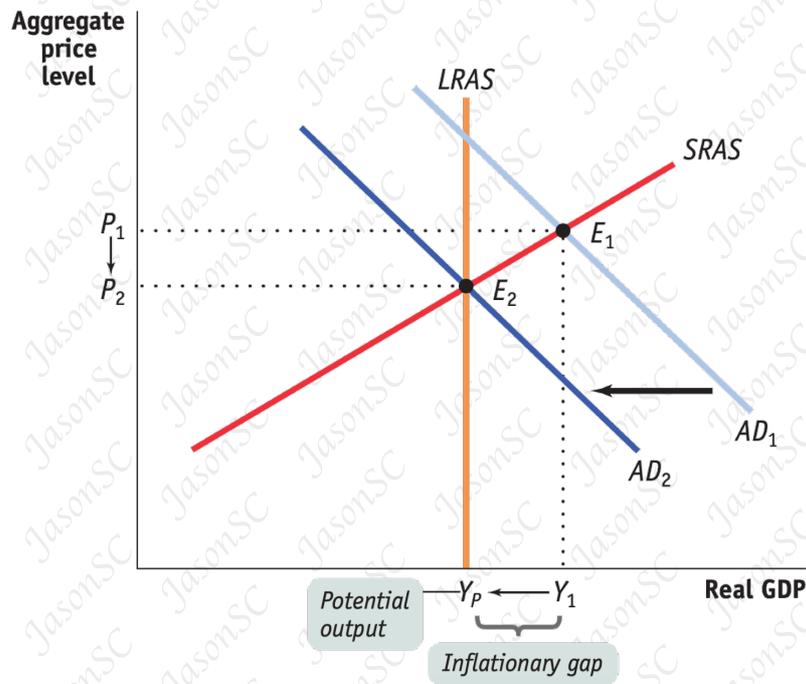
C. Contractionary Fiscal Policy Can Close an Inflationary Gap

- Figure 9 shows the opposite case—an economy facing an inflationary gap.
- At the initial equilibrium, E_1 , aggregate output is Y_1 , above potential output, Y_P .
- To eliminate the inflationary gap, fiscal policy must reduce aggregate demand and shift the aggregate demand curve leftward to AD_2 . This reduces aggregate output and makes it equal to potential output.

4. Fiscal policy that reduces aggregate demand, called contractionary fiscal policy, is the opposite of expansionary fiscal policy. It is implemented by:

- a reduction in government purchases of goods and services
- an increase in taxes

Figure 9 Inflationary Gap



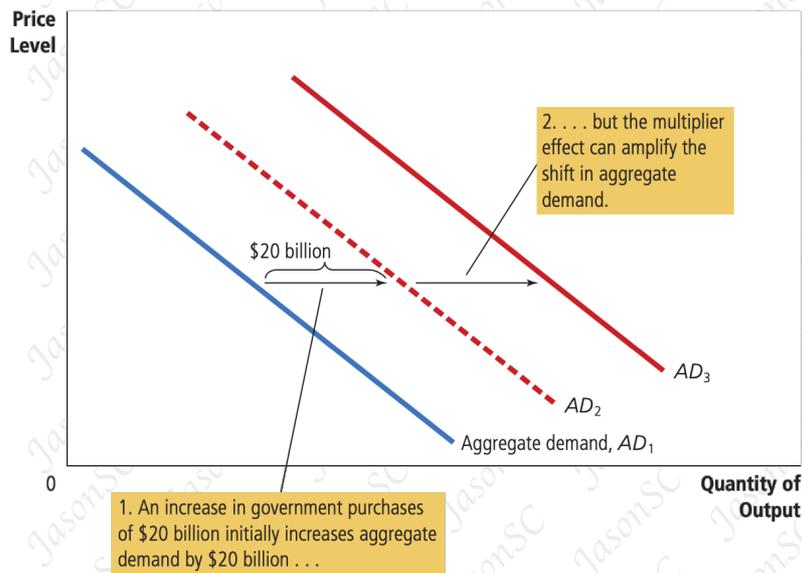
D. Changes in Government Purchases

1. When the government changes the level of its purchases, it influences aggregate demand directly. An increase in government purchases shifts the aggregate-demand curve to the right, while a decrease in government purchases shifts the aggregate-demand curve to the left.
2. There are two macroeconomic effects that cause the size of the shift in the aggregate-demand curve to be different from the change in the level of government purchases. They are called the **multiplier effect** and the **crowding-out effect**.

E. The Multiplier Effect

1. Suppose that the government buys a product from a company.
 - a. The immediate impact of the purchase is to raise profits and employment at that firm.
 - b. As a result, owners and workers at this firm will see an increase in income, and will therefore likely increase their own consumption.
 - c. Thus, total spending rises by more than the increase in government purchases.
2. Definition of **multiplier effect**: the additional shifts in aggregate demand that result when expansionary fiscal policy increases income and thereby increases consumer spending.

Figure 10 The Multiplier Effect



3. The multiplier effect continues even after the first round.

- a. When consumers spend part of their additional income, it provides additional income for other consumers.
- b. These consumers then spend some of this additional income, raising the incomes of yet another group of consumers.

4. A Formula for the Spending Multiplier

- a. **The marginal propensity to consume (MPC)** is the fraction of extra income that a household consumes rather than saves.
- b. Example: The government spends \$20 billion on new planes. Assume that $MPC = 3/4$.
- c. Incomes will increase by \$20 billion, so consumption will rise by $MPC \times \$20$ billion. The second increase in consumption will be equal to $MPC \times (MPC \times \$20$ billion) or $MPC^2 \times \$20$ billion.
- d. To find the total impact on the demand for goods and services, we add up all of these effects:

Change in government purchases	= \$20 billion
First change in consumption	= $MPC \times \$20$ billion
Second change in consumption	= $MPC^2 \times \$20$ billion
Third change in consumption	= $MPC^3 \times \$20$ billion
...	...
...	...
...	...
Total change in demand	
= $(1 + MPC + MPC^2 + MPC^3 + \dots) \times \20 billion	

e. This means that the multiplier can be written as:

$$\text{Multiplier} = (1 + MPC + MPC^2 + MPC^3 + \dots).$$

f. Because this expression is an infinite geometric series, it also can be written as:

$$\text{Multiplier} = \frac{1}{1 - \text{MPC}} = \frac{1}{\text{MPS}}$$

g. Note that the size of the multiplier depends on the marginal propensity to consume.

$$\text{Change in GDP} = \text{initial Change in Spending} \times \text{Multiplier}$$

5. Other Applications of the Multiplier Effect

- The multiplier effect applies to any event that alters spending on any component of GDP (consumption, investment, government purchases, or net exports).
- Examples include a reduction in net exports due to a recession in another country or a stock market boom that raises consumption.

F. Changes in Taxes

1. Changes in taxes affect a household's take-home pay.

- If the government reduces taxes, households will likely spend some of this extra income, shifting the aggregate-demand curve to the right.
- If the government raises taxes, household spending will fall, shifting the aggregate-demand curve to the left.

2. The size of the shift in the aggregate-demand curve will also depend on the sizes of **the multiplier**.

- When the government lowers taxes and consumption increases, earnings and profits rise, which further stimulate consumer spending. This is the multiplier effect.
- The tax multiplier:

$$\text{Tax Multiplier} = \frac{-\text{MPC}}{1 - \text{MPC}} = \frac{-\text{MPC}}{\text{MPS}}$$

3. Another important determinant of the size of the shift in aggregate demand due to a change in taxes is whether people believe that the tax change is permanent or temporary. A permanent tax change will have a larger effect on aggregate demand than a temporary one.

II. Using Policy to Stabilize the Economy

A. Definition of **automatic stabilizers**: changes in fiscal policy that stimulate aggregate demand when the economy goes into a recession without policymakers having to take any deliberate action.

B. The most important automatic stabilizer is the tax system.

- When the economy falls into a recession, incomes and profits fall.
- The personal income tax depends on the level of households' incomes and the corporate income tax depends on the level of firm profits.

3. This implies that the government's tax revenue falls during a recession. This tax cut stimulates aggregate demand and reduces the magnitude of this economic downturn.

C. Government spending is also an automatic stabilizer.

1. More individuals become eligible for transfer payments during a recession.

2. These transfer payments provide additional income to recipients, stimulating spending.

3. Thus, just like the tax system, our system of transfer payments helps to reduce the size of short-run economic fluctuations.