Aggregate Demand

Is a schedule or curve that shows the amounts of real output (real GDP) that payers collectively desire to purchase at each possible price level.

The relationship between the price level and the amount of real GDP demanded is inverse or negative. When the price level rises, the quantity of real GDP demanded decreases; when the price level falls, the quantity of real GDP demanded increase.

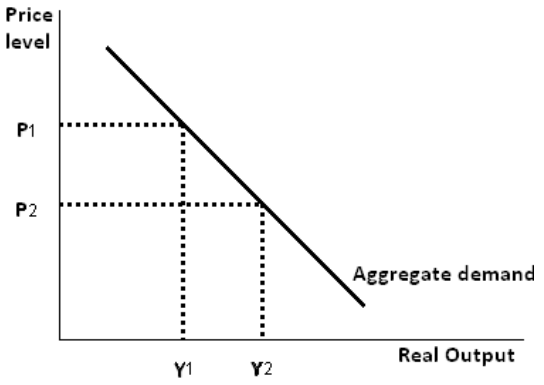
P ↑ ⇨ output (real GDP) ↓ and when P ↓ ⇨ output (real GDP) ↑

يوضح المنحنى الطلب الكلي العلاقة بين المستوى العام للأسعار (General Price Level)، وهو عبارة عن متوسط سعري لأسعار السلع والخدمات المنتجة في الاقتصاد، وبين الكمية المطلوبة في الاقتصاد.

Aggregate Demand Curve (AD)

The AD slopes downward because, the inverse relationship between the price level and the real GDP. When the price level rises, the quantity of real GDP demanded decreases; when the price level falls, the quantity of real GDP demanded increase.

وينحدر منحنى الطلب الكلي من الأعلى إلى الأسفل وله ميل سالب وذلك بسبب وجود العلاقة العكسية بين السعر (المستوى العام للأسعار) وبين الكمية المطلوبة الكلية. فعند انخفاض المستوى العام للأسعار من (P1) إلى (P2)، ترتفع الكمية المطلوبة من (Y1) إلى (Y2)، مما يعني ارتفاع القوة الشرائية للأفراد (Purchasing Power)، أي إمكانية حصولهم على كميات أكبر من السلع والخدمات عن السابق. أما ارتفاع المستوى العام للأسعار فيعني انخفاض القوة الشرائية للقطاعات الاقتصادية، مما يعني انخفاض الطلب الكلي



Why the AD downward slope?

The explanation rests on three effects of a price level change.

1. Real Balances Effect

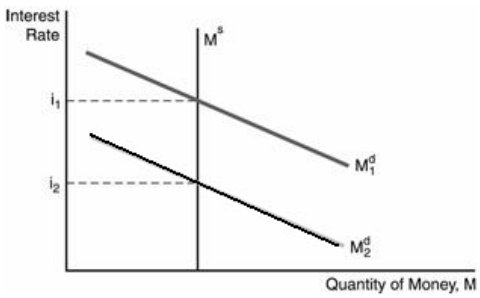
   A higher price level reduces the real value or purchasing power of assets with fixed money values, this leads to reduce its consumption spending and real GDP

   P ↑ ⇨ purchasing power of assets ↓ ⇨ C ↓ ⇨ GDP↓

2. Interest- Rate Effect

   When the price level rises, consumers need more money for purchases and businesses need more money to meet their payroll and to buy other resources. A higher price level increases the demand for money. So, given a fixed supply of money, an increase in money demand will drive up the interest rate. Higher interest rate lower investment and then GDP.

   P ↑ ⇨ M^d ↑ ⇨ i ↑ ⇨ I ↓ ⇨ GDP ↓



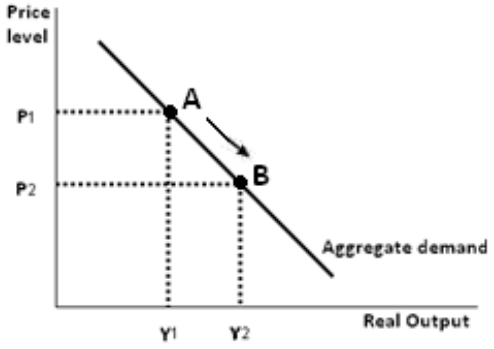
3. Foreign Purchases Effect

   When the domestic price level rises relative to foreign price levels, foreigners buy fewer domestic goods and domestic individual buy more foreign goods. Therefore, domestic exports fall and domestic imports rise. This leads to decrease net exports and GDP.

   P ↑ ⇨ X ↓ and M ↑ ⇨ X_n ↓ ⇨ GDP ↓

Change in Aggregate Demand

Change the amount of real GDP demanded



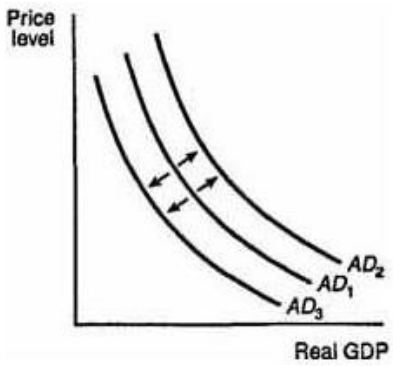
The movement along a fixed AD curve that is caused by a change in the price level

P ↑ ⇨ decrease the amount of real GDP demanded

P↓ ⇨ increase the amount of real GDP demanded

Change in the Aggregate Demand

A change in one or more of the determinates of AD will shift the AD curve.



- The rightward shift from AD_1 to AD_2 represents an increase in AD.
- The leftward shift from AD_1 to AD_3 shows a decrease in AD.

*Change in GDP = m * change in spending*

For example, if the economy's MPC is 0.75 and the initial decrease in spending is $5 billion.

The multiplier equal (1 / 0.25) = 4

Change in GDP = 4 x 5 = $20 billion decrease in GDP

Determinants of Aggregate Demand: Factors That Shift the Aggregate Demand Curve.

1. Change in consumer spending (C).

   If the consumers decide to buy more output at each price level, the aggregate demand curve will shift to the right.

   C ↑ ⇨ GDP ↑ at each price level ⇨ shift AD curve to the right.

   C ↓ ⇨ GDP ↓ at each price level ⇨ shift AD curve to the left.

   Several factors may change consumer spending (C) and therefore shift the AD curve. Those factors are:

a. *Consumer Wealth: Wealth* ↑ ⇨ C ↑ ⇨ GDP↑ ⇨ shift AD curve to the right

b. *Consumer Expectations on Real Income and Prices*: The expectation about future incomes to rise, they tend to spend more of their current incomes ⇨ consumption ↑ ⇨ GDP ↑ ⇨ shift AD curve to the right

c. *Household Borrowing*: consumer can increase their consumption spending by borrowing ⇨ shift AD curve to the right.

d. *Taxes:* increase in personal taxes lower the disposable income and decrease consumer spending at each price level ⇨ shift AD curve to the left.

2. Change in Investment Spending (Ig).

An increase in investment spending will shift the AD curve to the right.

A decline in investment spending will shift the AD curve to the left.

Ig ↑ ⇨ GDP ↑ at each price level ⇨ shift AD curve to the right.

Ig ↓ ⇨ GDP ↓ at each price level ⇨ shift AD curve to the left.

Investment spending depends on the real interest rate (i) and the expected rate of return (r).

a. *Interest rate (i)*: other things equal, an increase in real interest rate will lower investment and reduce AD ⇨ shift AD to the left.

b. *Expected returns (r):* higher expected returns on investment projects will increase AD ⇨ shift AD to the right.

3. Change in Government Spending (G).

An increase in government spending will shift the AD curve to the right.
A decrease in government spending will shift the AD curve to the left.

G ↑ ⇨ GDP ↑ at each price level ⇨ shift AD curve to the right.
G ↓ ⇨ GDP ↓ at each price level ⇨ shift AD curve to the left.

4. Change in Net Exports Spending (X_n).

Other thing equal, higher domestic exports rise in net exports, shift the AD curve to the right.

A decrease in net exports shift the AD curve leftward.

X_n ↑ ⇨ GDP ↑ at each price level ⇨ shift AD curve to the right.

X_n ↓ ⇨ GDP ↓ at each price level ⇨ shift AD curve to the left.

Change in national income abroad and change in exchange rate will cause net exports to change at each price level.

a. *National Income Abroad*: rising national income abroad encourages foreigners to buy more domestic goods ⇨ exports increase ⇨ net exports increase ⇨ GDP increase ⇨ shift AD curve to the right.

b. *Exchange Rate:* a depreciates in domestic currency leads to increases net exports ⇨ GDP increase ⇨ shift AD curve to the right.

An appreciate in domestic currency leads to decreases net exports ⇨ decrease GDP ⇨ shift AD curve to the left.

Example: Choose the correct answer:

1. The aggregate demand curve shows the:
   A) Inverse relationship between the price level and real GDP purchased
   B) Direct relationship between the price level and real GDP produced
   C) Inverse relationship between interest rates and real GDP produced
   D) Direct relationship between real-balances and real GDP purchased

2. Which of the following effects best explains the downward slope of the aggregate demand curve?
   A) A multiplier effect
   B) An expectations effect
   C) A substitution effect
   D) An interest-rate effect

3. The foreign purchases effect suggests that a:
   A) Fall in our domestic price level will increase our imports and reduce our exports, thereby reducing the net exports component of aggregate demand
   B) Fall in our domestic price level will decrease our imports and increase our exports, thereby reducing the net exports component of aggregate demand
   C) Rise in our domestic price level will increase our imports and reduce our exports, thereby reducing the net exports component of aggregate demand
   D) Rise in our domestic price level will decrease our imports and increase our exports, thereby reducing the net exports component of aggregate demand

4. The interest rate effect indicates that a(n):
   A) Decrease in the price level will increase the demand for money, increase interest rates, and decrease consumption and investment spending
   B) Decrease in the price level will decrease the demand for money, decrease interest rates, and increase consumption and investment spending
   C) Increase in the price level will increase the demand for money, reduce interest rates, and decrease consumption and investment spending
   D) Increase in the supply of money will increase interest rates and decrease interest-sensitive consumption and investment spending

Aggregate Supply (AS)

Is a schedule or curve showing the relationship between the price level and the amount of real domestic output that firms in the economy produce.

العرض الكلي : مجموعة السلع والخدمات التي ينتجها المجتمع في فترة زمنية معينة. وهو علاقة بين المستوى العام للاسعار وكمية السلع والخدمات التي يتم إنتاجها.

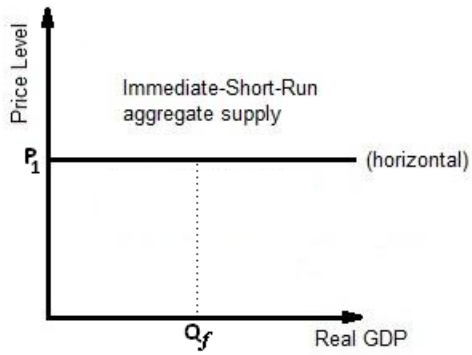
The relationship between price and real output varies depending on the time horizon and how quickly output prices and input prices can change.

We will define three time horizons:

- *In the immediate short run:* both input prices as well as output prices are fixed.
- *In the short run:* input prices are fixed, but output prices can vary.
- *In the long run:* input prices as well as output prices can vary.

Aggregate Supply in the Immediate Short Run

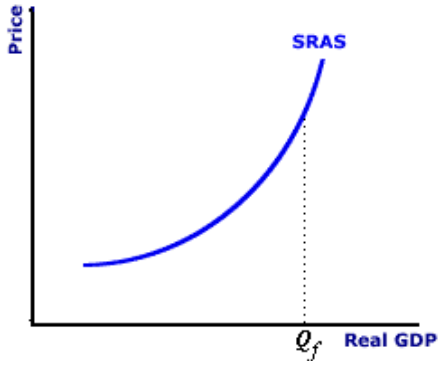
- The immediate short run can last anywhere from a few days to a few months.
- In immediate short run both input prices and output prices stay fixed (In particular, 75 percent of the average firm's costs are wages and salaries, and these are almost always fixed by labor contract for months or years at a time).
- Output prices are also fixed in the immediate short run. This is caused by firms setting fixed prices for their customers and then agreeing (المُوَافَقَة) to supply whatever quantity demanded results at those fixed prices.



- With output prices fixed and firms selling however much customers want to purchase at those fixed prices, *the immediate short run aggregate supply curve (AS_{ISR}) is a horizontal line.*
- If total spending is low at price level P_1, firms will supply a small amount to match the low level of spending. If total spending is high at price level P_1, they will supply a high level of output to match the high level of spending.
- The amount of output that results may be higher than or lower than the economy's full employment output level (Q_f).

Aggregate Supply in the Short Run العرض الكلي في المدى القصير

- The short run begins after the immediate short run ends. The short run is a period of time during which output prices are flexible, but input prices are fixed or highly inflexible.
- The AS curve in the short run is upward sloping. The upsloping AS curve indicates a direct (positive) relationship between the price level and the amount of real output that the firms will offer to sale.
- The AS curve is relatively flat below the full employment output (Q_f) because unemployed resources and unused capacity allow firms to respond to price level rises with large increase in real output.



العرض الكلي في المدى القصير:
يمكن تعريف المدى القصير بالفترة الزمنية التي يتغير فيها الناتج المحلي الإجمالي الحقيقي وبصفة مؤقتة فيزيد أو ينقص عن مستوى الناتج المحلي الإجمالي الكامل. وفي الوقت نفسه، يرتفع أو ينخفض معدل البطالة عن المعدل الطبيعي.
في المدى القصير ، يرتفع أو ينخفض معدل البطالة عن معدل البطالة الطبيعي، نتيجة لجهل العمال بالتغيرات في مستوى الأسعار والأجور الحقيقية. يفسر ذلك بتوفر المعلومات عن زيادة مستوى الأسعار للمنشآت، وعدم توفرها للعمال، فتزيد الأرباح الحقيقية ويزيد الناتج مع زيادة الأسعار، والعكس في حالة انخفاضها.

- The AS curve is relatively steep (حـادّ) beyond the full employment output (Q_f) because resources shortages and capacity limitation make it difficult to expand real output as the price level rises.

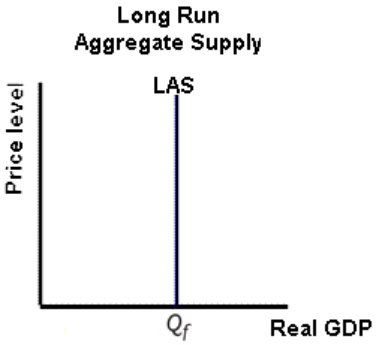
- As the economy expands in the short run, per unit production costs generally rise because of reduced efficiency. When the economy is operating below its full employment output, it has larger amounts of unemployed workers.

Aggregate Supply in the Long Run

- The long run is the time horizon over which both input prices as well as output prices are flexible.

- The *long-run aggregate supply curve* AS_{LR} is vertical at the economy's full employment output Q_f. The vertical curve means that in the long run the economy will produce the full employment output level no matter what the price level is.

- The long run supply curve is vertical at the full employment level of real GDP because in the long run wages and other input prices rise and fall to match changes in the price level. So price level changes do not affect firms' profits and thus they create no incentive for firms to alter their output.



منحنى العرض الكلي في المدى البعيد (الطويل) (LRAS):
منحنى العرض الكلي في الأمد البعيد (LRAS) يعكس العلاقة بين كمية الناتج المحلي الإجمالي الحقيقي ومستوى الأسعار في المدى البعيد عندما يتساوى الناتج المحلي الإجمالي الحقيقي (RGDP) مع الناتج المحلي الإجمالي الكامل (Q_f) ويكون المنحنى خطاً عمودياً، حيث يبقى الناتج الإجمالي الحقيقي عند مستوى الناتج المحلي الإجمالي الكامل، فلا يتأثر بتغير مستوى الأسعار.

الناتج في المدى البعيد مستقل عن مستوى الأسعار، نتيجة لتغير الأسعار والأجور بذات النسبة، ففي الأمد البعيد، يتمكن العمال ومالكو عناصر الإنتاج الأخرى من الحصول على المعلومات الكاملة عن أي زيادة في الأسعار، مما يمكنهم من المطالبة بزيادة في الأجور وأسعار عناصر الإنتاج الأخرى بنسبة مماثلة لنسبة الزيادة في الأسعار مما يجعل الأرباح الحقيقية ثابتة رغم تغير مستوى الأسعار. ويكون معدل البطالة مساوياً لمعدل البطالة الطبيعي.

Example

Answer the following questions on the basis of the three sets of data for the country of North Vaudeville:

(A)		(B)		(C)	
Price Level	Real GDP	Price Level	Real GDP	Price Level	Real GDP
110	275	100	200	110	225
100	250	100	225	100	225
95	225	100	250	95	225
90	200	100	275	90	225

Which set of data illustrates aggregate supply in the immediate short-run in North Vaudeville? The short run? The long run?

The data in B. The price level does not have time to adjust in the immediate short-run. Only output can change.

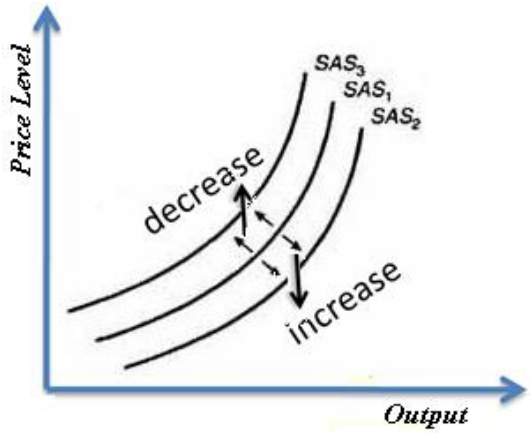
The data in A. The price level only has time to partially adjust in the short-run. Both the price level and output can change.

The data in C. The price level has time to completely adjust in the long-run. Only price will change.

Changes in Aggregate Supply:

- The rightward shift of the AS curve from AS_1 to AS_2 represents an increase in AS, indicating that firms are willing to produce and sell more real output at each price level.

- The leftward shift of the AS curve from AS_1 to AS_3 represents a decrease in AS, indicating that firms are willing to produce and sell less real output at each price level.



Determinants of AS or AS shifters:

1. *Input (Resources) Prices:*

   a. Domestic Resources Prices:
   Other thing equal, decrease in wages reduces per unit production cost ⇨ AS curve will shift to the right.

   Resources prices ↑ (wage, rent, interest, or profit) ⇨ cost per unit ↑ ⇨ AS ↓ (shift to the left).

   b. Prices of Imported Resources:

   Increase in the prices of resources imported from abroad (for example, oil), increase per unit production cost ⇨ AS↓ ⇨ AS shift to the left.

2. *Productivity*

   Productivity measure of the relationship between a nation's level of real output and the amount of resources used to produce that output.

   Productivity = $\frac{Total\ output}{Total\ input}$

   An increase in productivity enables the economy to obtain more real output from its limited resources.

   For example, that real output is 10 units that 5 units of input are needed to produce that quantity, and the price of each unit of input is $2.

   Productivity = $\frac{10}{5}$ = 2

Per unit production cost = $\frac{Total\ input\ cost}{Total\ output} = \frac{2\ x\ 5}{10}$ = $1

If real output doubles to 20 units, while the price and the quantity of the input remain constant, then productivity increase to 4 (20 / 5 = 4). Per unit production cost falls from $1 to $0.5 (2x5/20 = 0.5).

Productivity increase ⇨ per unit production cost ↓ ⇨ shift AS curve to the right.

3. *Legal Institutional Environment*

   a. Business Taxes الضرائب الانتاجية والدعم الحكومي

   Higher business taxes, such as sales, excise, and payroll taxes, increase per unit costs and reduce short run AS.

   ارتفاع الضرائب الانتاجية مثل ضريبة المبيعات، ضرائب الانتاج وضريبة الدخل يؤدي الى ارتفاع تكلفة انتاج الوحدة وهذا يؤدي الى انخفاض العرض الكلي على السلع (ازاحة منحنى العرض على السلعة الى الخلف).

   T ↑ ⇨ per unit production cost ↑ ⇨ AS ↓ ⇨ shift AS curve to the left.

   b. Business Subsidies (الدعم الحكومي او الإعانات)

   A payment or tax break by government to producers. هي عبارة عن مدفوعات تقدمها الحكومة للمنتجين او من خلال انخفاض الضرائب على المنتجين

   Business Subsidies ⇨ decreases per unit production cost ⇨increase AS (shift to the right).

   زيادة الدعم المقدم من الحكومة للمنتجين (انخفاض الضرائب) يؤدي الى انخفاض تكلفة انتاج الوحدة وهذا يؤدي الى زيادة العرض الكلي على السلع (ازاحة منحنى العرض على السلعة الى اليمين).

4. *Government Regulation:*

   More regulation tends to increase per unit production cost and shift the AS curve to the left. Deregulation of the economy by increasing efficiency will reduce per unit costs and shift AS curve to the right.

   يميل المزيد من الضوابط الحكومية إلى زيادة تكلفة الإنتاج لكل وحدة وتحويل منحنى AS إلى اليسار. يؤدي تحرير الاقتصاد من كثير من الضوابط الحكومية عن طريق زيادة الكفاءة إلى تقليل تكاليف الوحدة ويحول منحنى AS إلى اليمين.

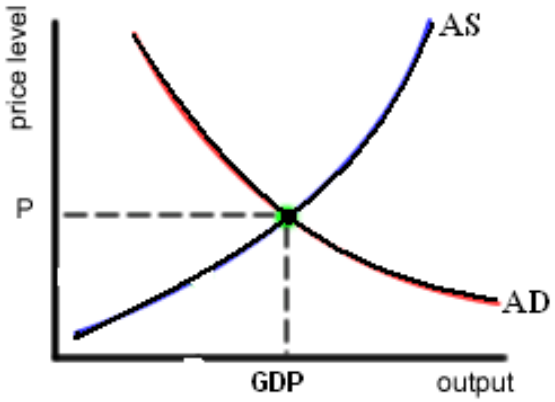
Equilibrium and Changes in Equilibrium

Equilibrium price and real GDP

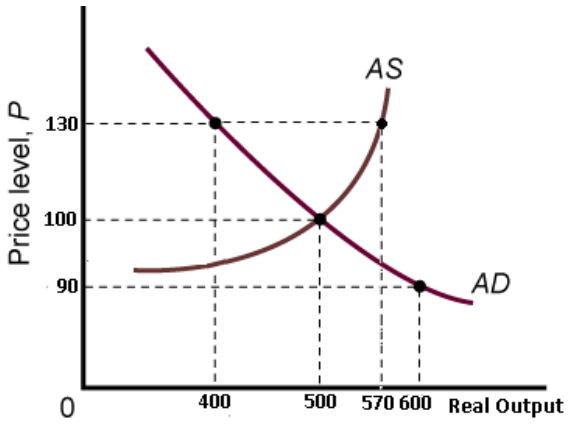
The intersection of the AD curve and the AS curve determines the economy's equilibrium price level.

At equilibrium price: AD = AS

- *If at a price level AD > AS ⇨ a GDP shortage*
- *If at a price level AD < AS ⇨ a GDP surplus*



Example
Using the following figure to answer the below questions:



1. What is the equilibrium price and real output?

   At equilibrium price: AD curve intersect the AS curve

   P = $100, real GDP = 500

2. At price level 130, is a GDP shortage or GDP surplus? What is the amount of shortage or surplus?

   At P = 130, output demanded = 400, and output supplied = 570 ⇨ AS > AD ⇨ GDP surplus by (570 - 500 = 70)

Example
Suppose that the aggregate demand and aggregate supply schedules for a hypothetical economy are as shown below:

Amount of Real GDP Demanded, Billions	Price Level (Price Index)	Amount of Real GDP Supplied, Billions
$100	300	$450
200	250	400
300	200	300
400	150	200
500	100	100

A. Use these sets of data to graph the aggregate demand and aggregate supply curves. What is the equilibrium price level and the equilibrium level of real output in this hypothetical economy?

Equilibrium price level = 200, which occurs where aggregate supply equals aggregate demand, Thus the equilibrium real output = $300 billion.

B. If the price level in this economy is 150, will quantity demanded equal, exceed, or fall short of quantity supplied? By what amount? If the price level is 250, will quantity demanded equal, exceed, or fall short of quantity supplied? By what amount?

At a price level of 150, real GDP supplied is $200 billion, less than the real GDP demanded of $400 billion. Thus, quantity demanded exceeds the quantity supplied by $200 billion.

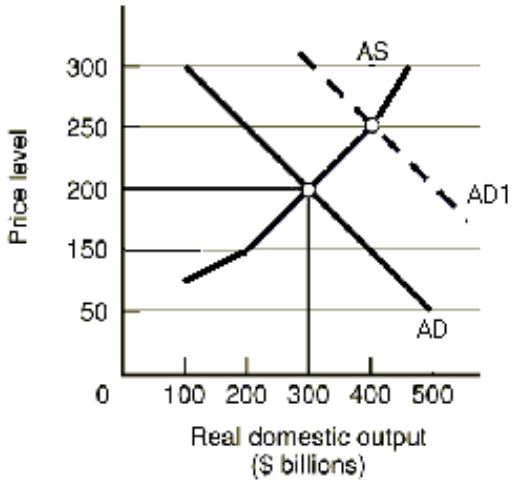
At a price level of 250, real GDP supplied is $400 billion, which is more than the real GDP demanded of $200 billion. Thus, quantity demanded falls short of the quantity supplied by $200 billion.

C. Suppose that buyers desire to purchase $200 billion of extra real output at each price level. Sketch in the new aggregate demand curve as AD1. What is the new equilibrium price level and level of real output?

Increases in consumption, investment, government, or net export spending might shift the AD curve rightward. The new values for the aggregate demand schedule are:

Amount of Real GDP Demanded, Billions	Price Level (Price Index)	Amount of Real GDP Supplied, Billions
$300 (=$100 + $200)	300	$450
$400 (=$200 + $200)	250	400
$500 (=$300 + $200)	200	300
$600 (=$400 + $200)	150	200
$700 (=$500 + $200)	100	100

The new equilibrium price level = 250 where aggregate supply equals aggregate demand. The new equilibrium GDP = $400 billion.

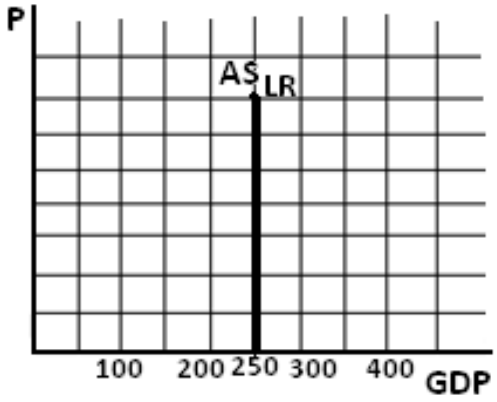


Example

The following table contains information about real GDP (billions of dollars) and the price level (P):

AD	P	AS
50	150	200
100	125	200
150	100	150
200	75	100
250	50	50

1. Suppose the level of full-employment real GDP is $250 billion. Plot (ارسم) the Long run AS curve.



2. What is the equilibrium level of GDP? The price level?

   GDP = 150

   P = $100

3. At price level 125, is a GDP shortage or GDP surplus? What is the amount of shortage or surplus?

   At a price level of 125, real GDP supplied is $200 billion and real GDP demanded is $100

   Real GDP supplied > real GDP demanded ⇨ GDP surplus by 200 – 100 = 100

4. Suppose the level of full-employment real GDP is $250 billion. By how much should government spending be increased or decreased to reach full employment if MPS = 0.1?

   $\Delta\ GDP = m\ x\ \Delta G \quad \Rightarrow (250 - 150) = \frac{1}{0.1}\ x\ \Delta G \quad \Rightarrow\ \Delta G = \frac{100}{10} = 10$ *(Increase G by 10)*

Changes in Equilibrium:

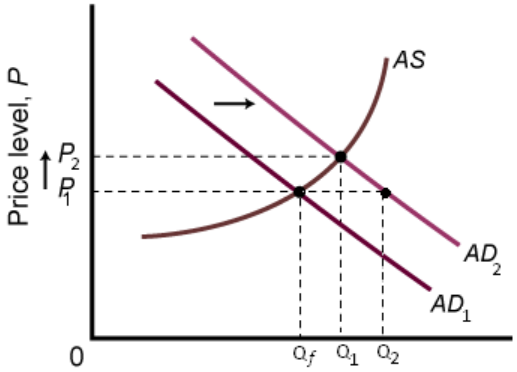
- **Increase in AD: Demand- Pull Inflation**

  The increase of AD from AD_1 to AD_2 causes demand pulls inflation, shown as the rise in the price from P_1 to P_2. It also causes an inflationary GDP gap of Q1 minus Qf.

  If the price level had remained at P, the increase in the AD from AD_1 to AD_2 would increase output from Q_f to Q_2 and the multiplier would have been at full strength.

  Because the increase in the price level, real output increase only from Q_f to Q_1 and the multiplier effect is reduced.

  The rise of the price level reduces the size of the multiplier effect.

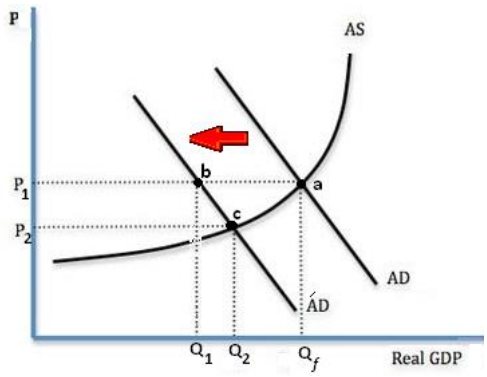


- **Decrease in AD: Recession and Cyclical Unemployment:**

  A decrease in AD that causes a recession and cyclical unemployment

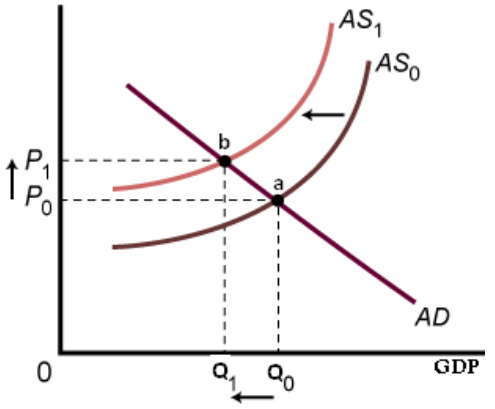
  If the price level is downwardly inflexible at P, a decline in AD from AD_1 to AD_2 will move the economy leftward from a to b along the horizontal line segment and reduce real output from Q_f to Q_1. Idle production capacity, cyclical unemployment, and a recessionary GDP gap (of Q_1 minus Q_f) will result.

  If the price level were flexible downward, the decline in AD would move the economy from a to c, that result in a decline in output from Q_f to Q_2 (recession and cyclical unemployment).



- **Decreases in AS: Cost- Push Inflation**

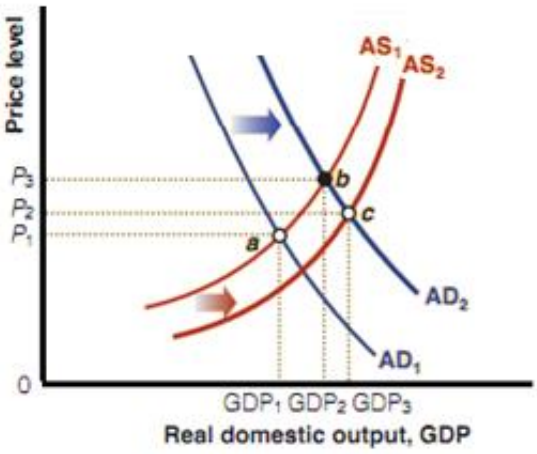
  A decrease in AS will causes cost push inflation. A leftward shift of AS from AS_0 to AS_1 raises the price level from P_0 to P_1 and produces cost push inflation. Real output declines and a recessionary GDP gap (of Q_1 minus Q_0) occur.



- **Increase in AS: Full Employment with Price Level Stability:**

  An increase in AD from AD_1 to AD_2 would move the economy from a to b along AS_1. Real output would expand to Q, and inflation would result (P_1 to P_3).

  Increase in the real output lead to increase in productivity that would shifted the AS curve from AS_1 to AS_2. The economy moved from a to c. It experienced strong economic growth (Q1 to Q_3, full employment, and only very mild inflation (P1 to P_2).

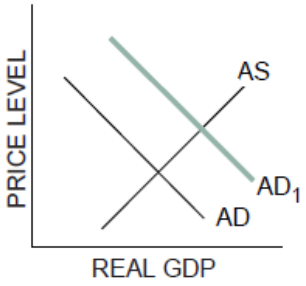


Example

For each situation described below, illustrate the change on the AD and AS graph and describe the effect on the equilibrium price level and real GDP by circling the correct symbol: ↑for increase, ↓ for decrease, or – for unchanged.

1. Government passes a tax cut for the middle class

   Income tax cut ⇨ consumption ↑ ⇨ shift AD to the right

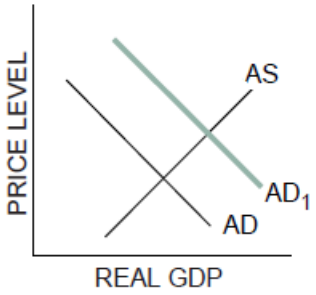


Price level: ↑

Real GDP: ↑

2. During a recession, the government increases spending on schools, highways and other public works.

   increases government spending ⇨ ⇨ shift AD to the right

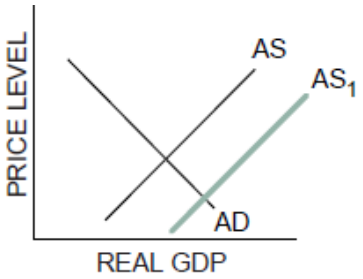


Price level: ↑

Real GDP: ↑

3. New oil discoveries cause large decreases in energy prices.

   Decreases in energy prices ⇨ production cost ↓ ⇨ shift AS to the right

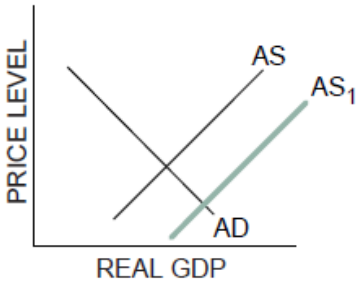


Price level ↓

Real GDP ↑

4. New technology and better education used in production

   New technology and better education used in production leads to increase productivity of employees and this leads to increase AS



Price level ↓

Real GDP ↑