

Actual Expenditure, Planned Expenditure, and Real GDP

Actual aggregate expenditure is always equal to real GDP.

Aggregate planned expenditure may differ from actual aggregate expenditure because firms can have unplanned changes in inventories.

Equilibrium expenditure is the level of aggregate expenditure that occurs when aggregate *planned* expenditure equals real GDP.

Suppose:

$$C = 0 + 0.7 (Y - T)$$

$$T = 0$$

$$I = 240$$

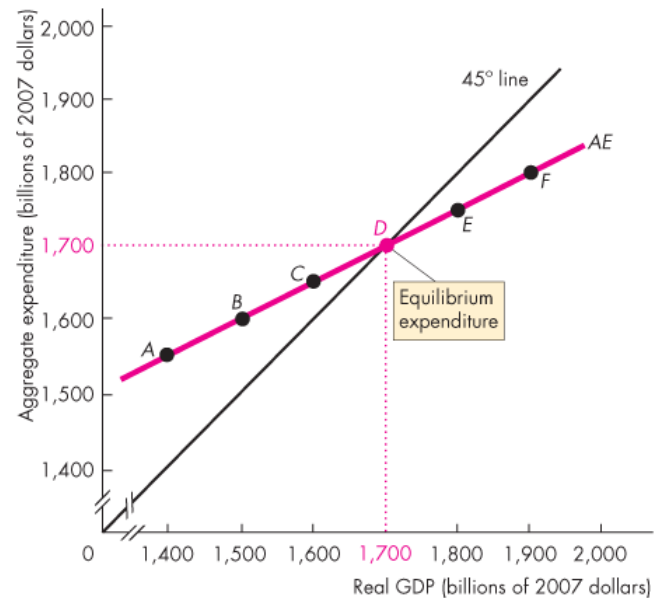
$$G = 270$$

$$X = 340$$

$$M = 0 + 0.2 (Y - T)$$

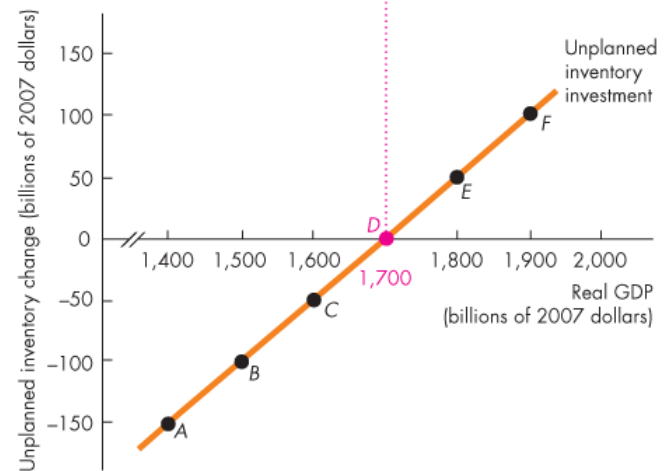
$$\text{Aggregate planned expenditure (AE)} = C + I + G + X - M = 850 + 0.5 Y$$

	<u>Real GDP</u>	<u>AE</u>	<u>Unplanned Inventory Change ($Y - AE$)</u>
A	1400	1550	-150
B	1500	1600	-100
C	1600	1650	-50
D	1700	1700	0
E	1800	1750	50
F	1900	1800	100



(a) Equilibrium expenditure

- Equilibrium occurs at the point at which the AE curve crosses the 45° line in part (a).
- Equilibrium occurs when there are no unplanned changes in business inventories in part (b).



(b) Unplanned inventory changes

Aggregate planned expenditure (AE) = C + I + G + X - M

=

What is the equilibrium Y?

- *Equilibrium condition: $Y = AE$*

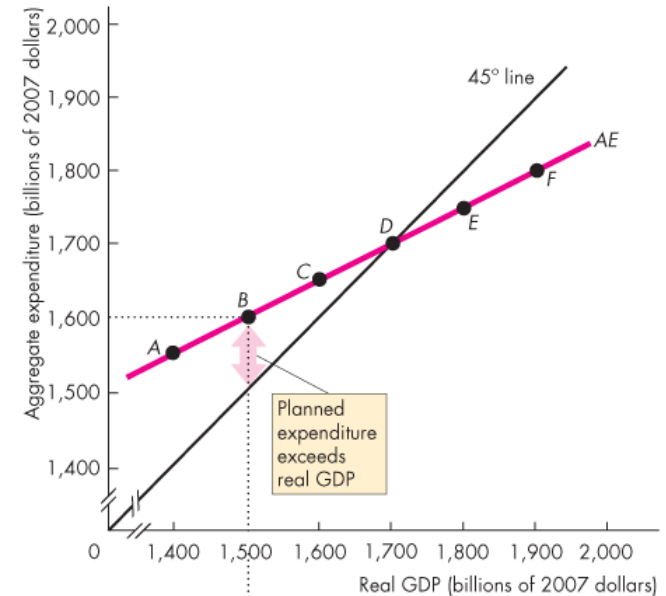
Convergence to Equilibrium

From Below Equilibrium

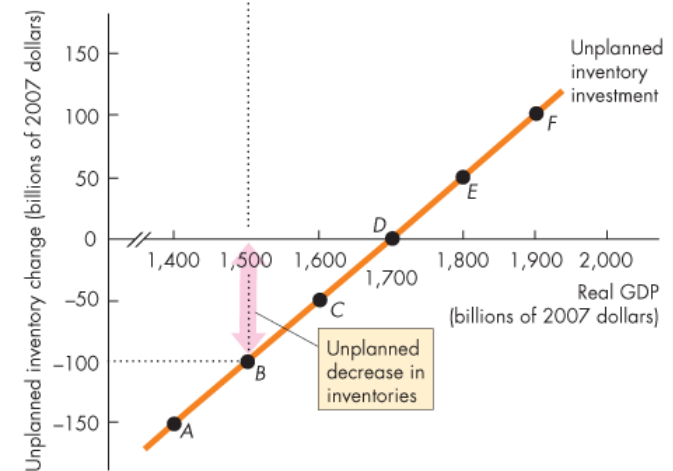
If aggregate planned expenditure exceeds real GDP,
then there is an unplanned decrease in inventories.

To restore inventories, firms hire workers and increase production.

Real GDP increases.



(a) Equilibrium expenditure

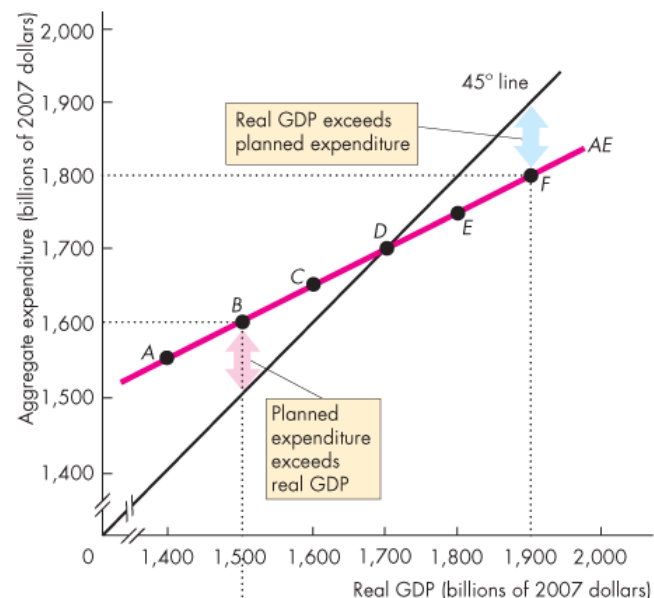


(b) Unplanned inventory changes

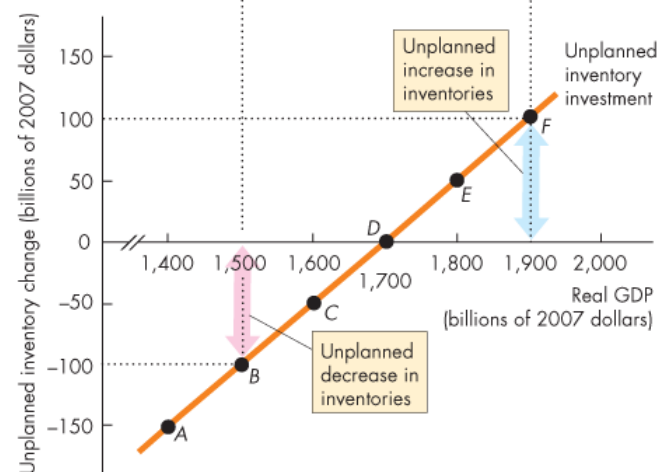
If aggregate planned expenditure is less than real GDP (the AE curve is below the 45° line), then there is an unplanned increase in inventories.

To reduce inventories, firms fire workers and decrease production.

Real GDP decreases.



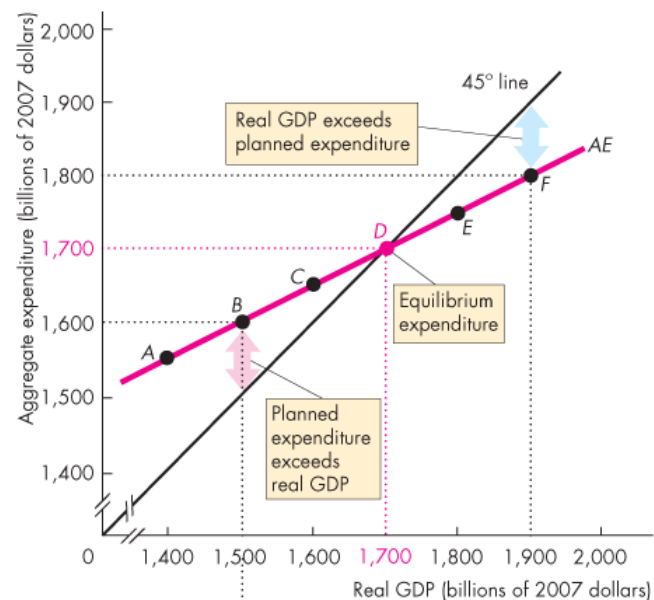
(a) Equilibrium expenditure



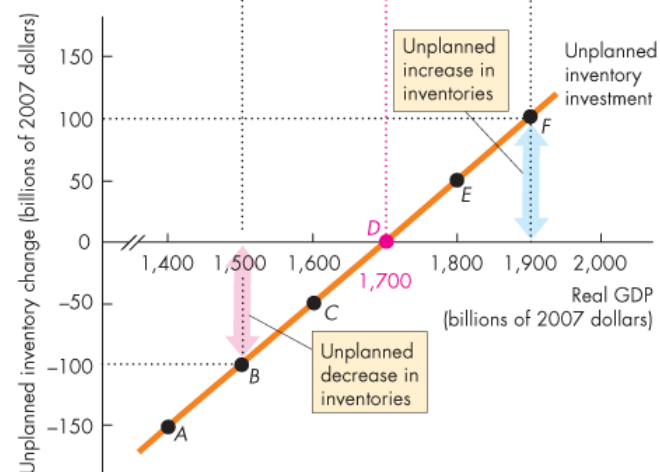
(b) Unplanned inventory changes

If aggregate planned expenditure equals real GDP (the AE curve intersects the 45° line), then there is no unplanned change in inventories.

And firms maintain their current production.
Real GDP remains constant.



(a) Equilibrium expenditure



(b) Unplanned inventory changes

The Multiplier

- When autonomous expenditure changes, so does equilibrium expenditure and real GDP.
- But the change in equilibrium expenditure is *larger* than the change in autonomous expenditure.
- The **multiplier** is the amount by which a change in autonomous expenditure is magnified or multiplied to determine the change in real GDP.

The Basic Idea of the Multiplier

Suppose that

$$\begin{aligned}C &= C_a + MPC \cdot (Y - T) \\I &= I_a \\G &= G_a = 0 \\X &= X_a = 0 \\M &= MPI \cdot YD = 0 \cdot (Y - T)\end{aligned}$$

Equilibrium:

$$Y = C + I + G + X - M$$

- An increase in autonomous investment increases aggregate expenditure and real GDP.
- The increase in real GDP leads to an increase in induced expenditure.
- The increase in induced expenditure leads to a further increase in aggregate expenditure and real GDP.
- So real GDP increases by more than the initial increase in autonomous expenditure.

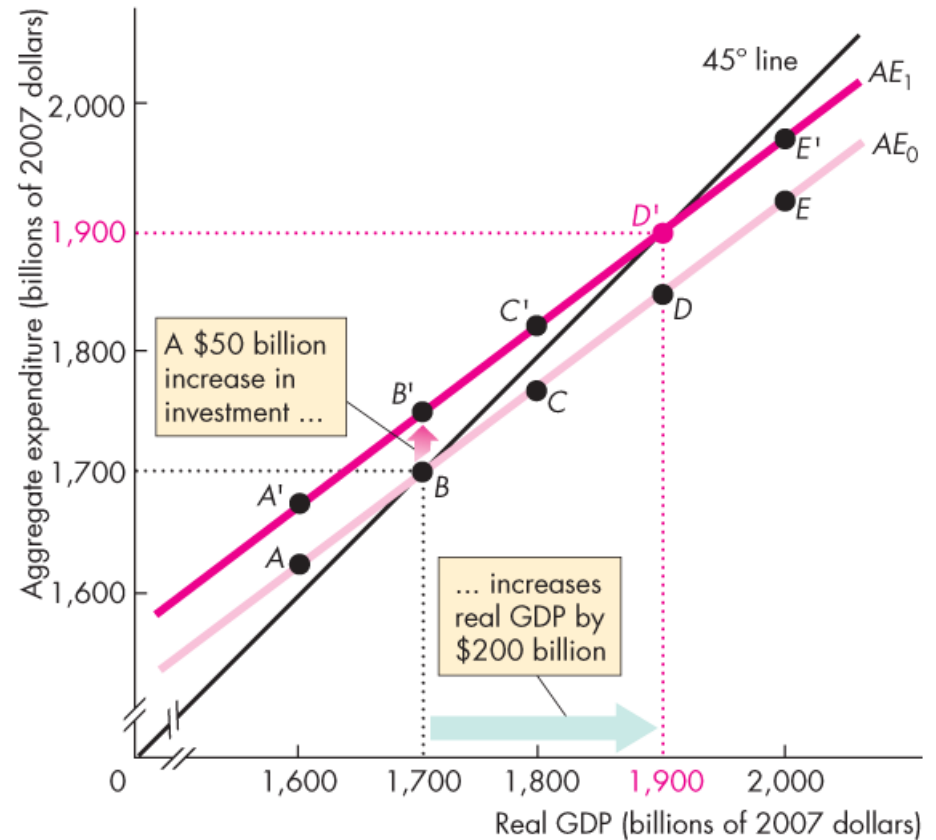
$$\Delta Y = \Delta I + MPC \cdot \Delta I + MPC^2 \cdot \Delta I + MPC^3 \cdot \Delta I + MPC^4 \cdot \Delta I + MPC^5 \cdot \Delta I + \dots$$

$$\Delta Y = \Delta I \cdot (1 + MPC + MPC^2 + MPC^3 + MPC^4 + MPC^5 + \dots)$$

$$\Delta Y = \Delta I \cdot \left(\frac{1}{1 - MPC} \right)$$

Graphical illustration of the multiplier effect:

An increase in autonomous expenditure



Why Is the Multiplier Greater than 1?

The Size of the Multiplier

Another example.

Suppose:

$$C = 0 + 0.7 (Y - T)$$

$$T = 0$$

$$I = 100$$

$$G = 200$$

$$X = 0$$

$$M = 0 + 0.2 (Y - T)$$

Find the AE.

Find the equilibrium Y.

Suppose G increases by 50. Find the new equilibrium Y.

What is the size of the multiplier?

How does an increase in the *MPI* (marginal propensity to import) affects the size of the multiplier?

Aggregate Expenditure and Aggregate Demand

The **aggregate expenditure curve** is the relationship between aggregate planned expenditure and real GDP, with all other influences on aggregate planned expenditure remaining the same.

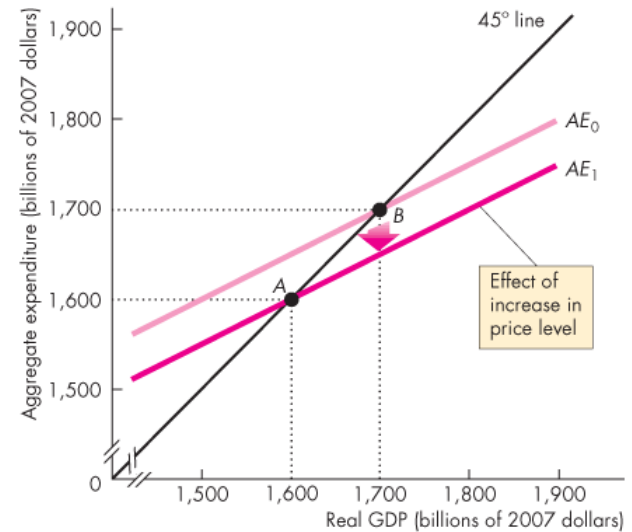
The **aggregate demand curve** is the relationship between the quantity of real GDP demanded and the price level, with all other influences on aggregate demand remaining the same.

Deriving the Aggregate Demand Curve

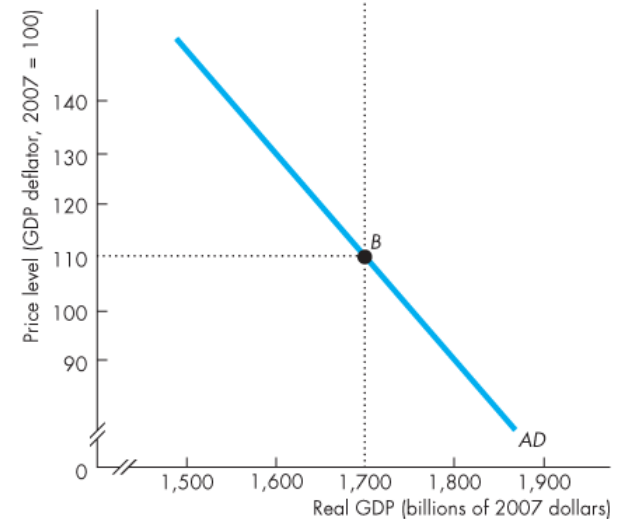
When the price level changes, a wealth effect and substitution effects change aggregate planned expenditure and change the quantity of real GDP demanded.

The next slide illustrates the effects of a change in the price level on the *AE* curve, equilibrium expenditure, and the quantity of real GDP demanded.

A rise in price level from 110 to 130 ...
shifts the AE curve from AE_0 downward
to AE_1 and ...
decreases equilibrium expenditure from
\$1,700 billion to \$1,600 billion.



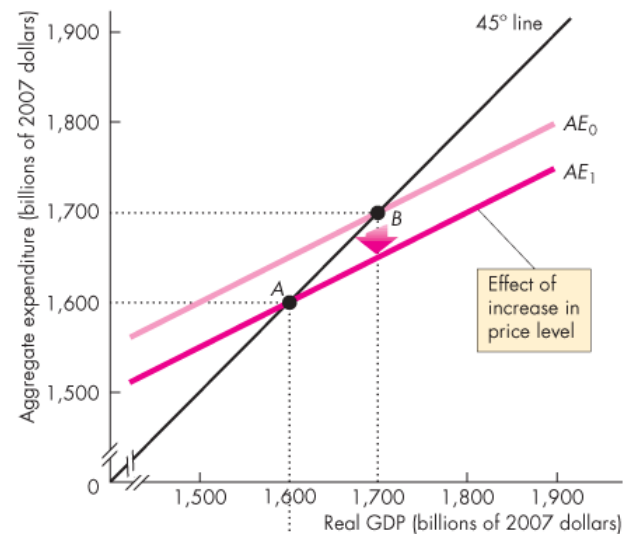
(a) Equilibrium expenditure



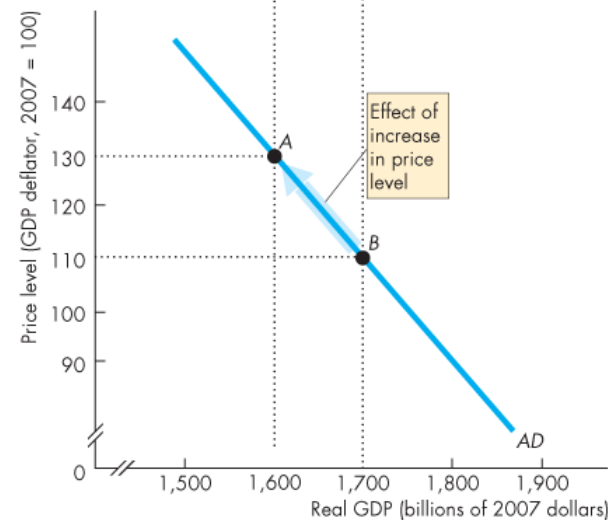
(b) Aggregate demand

The same rise in the price level that lowers equilibrium expenditure ...

brings a movement along the *AD* curve from point *B* to point *A*.

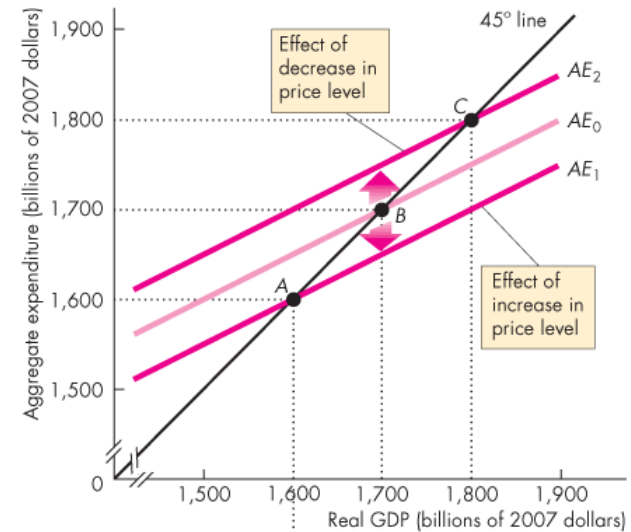


(a) Equilibrium expenditure

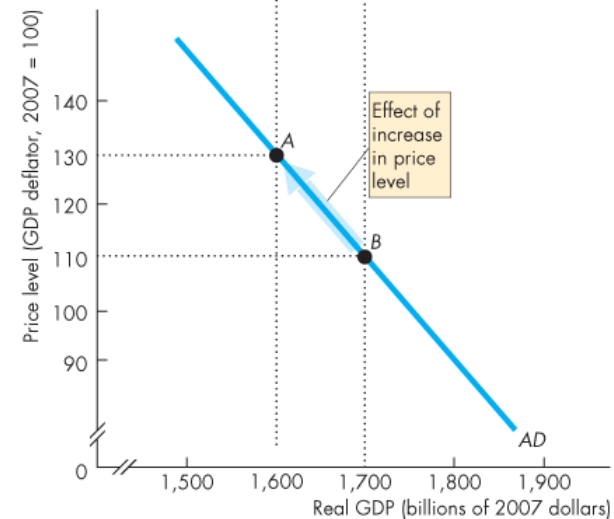


(b) Aggregate demand

A fall in price level from 110 to 90 ...
 shifts the AE curve from AE_0 upward
 to AE_2 and ...
 increases equilibrium expenditure
 from
 \$1,700 billion to \$1,800 billion.

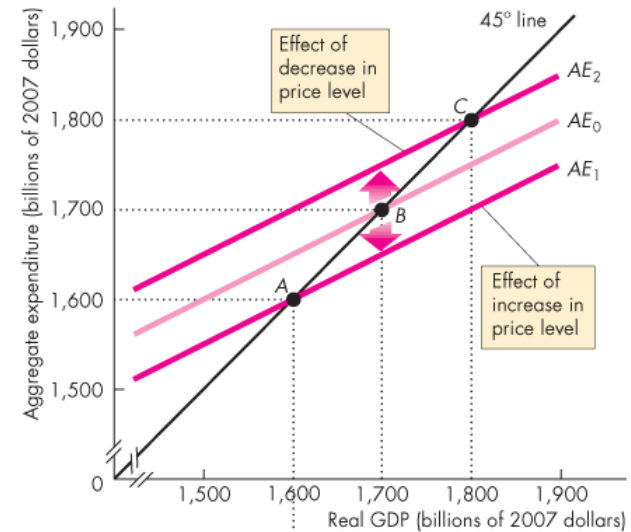


(a) Equilibrium expenditure

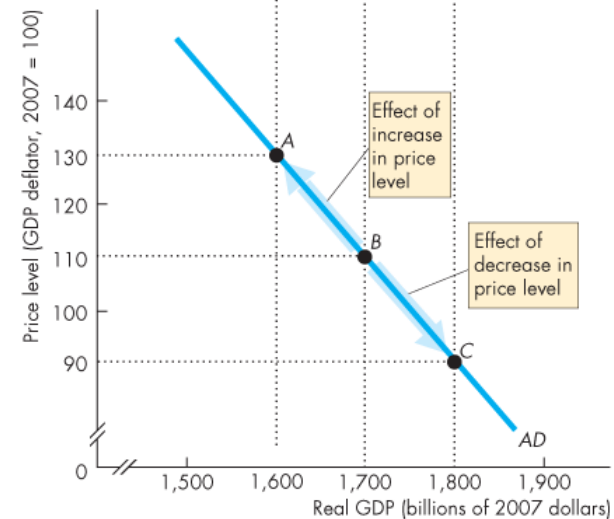


(b) Aggregate demand

The same fall in the price level that increases equilibrium expenditure ... brings a movement along the *AD* curve to from point *B* to point *C*.

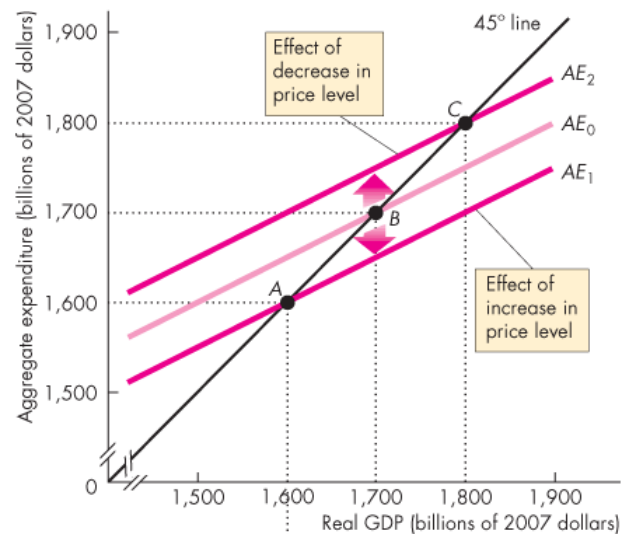


(a) Equilibrium expenditure

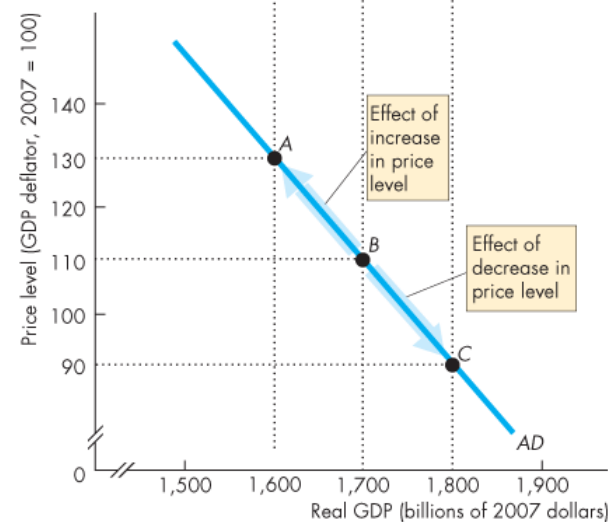


(b) Aggregate demand

Points *A*, *B*, and *C* on the *AD* curve correspond to the equilibrium expenditure points *A*, *B*, and *C* at the intersection of the *AE* curve and the 45° line.



(a) Equilibrium expenditure



(b) Aggregate demand

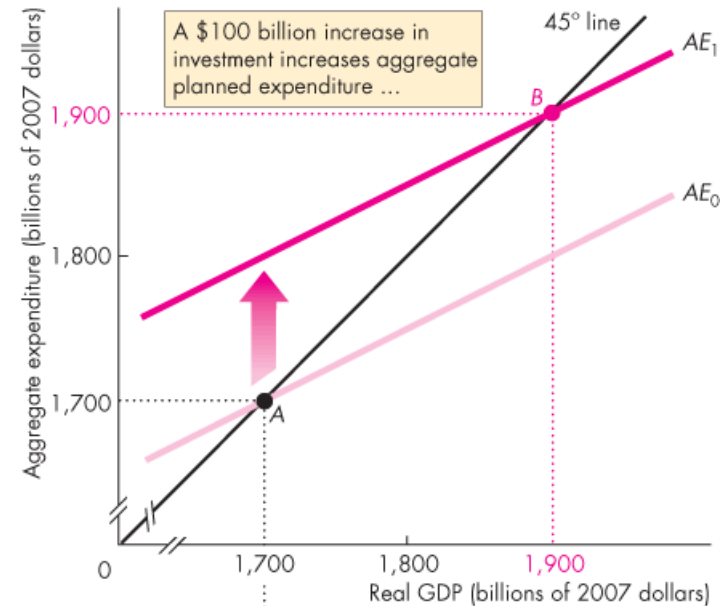
Changes in Aggregate Expenditure and Aggregate Demand

An increase in investment.

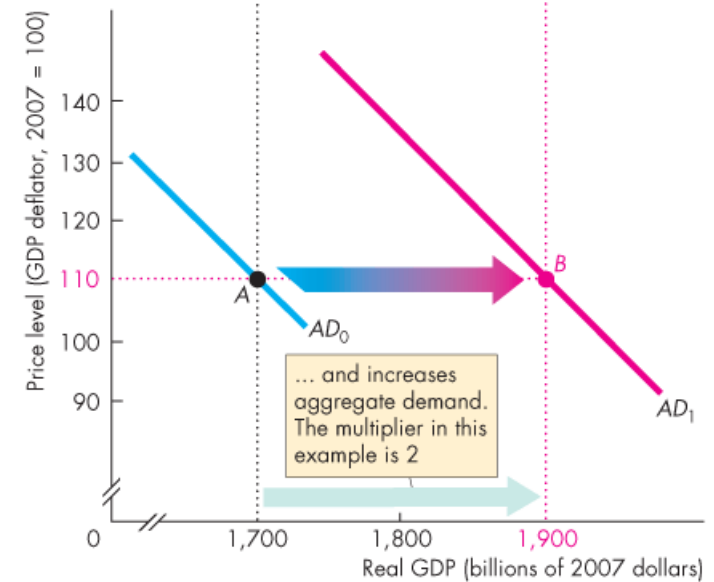
The AE curve shifts upward ...

...and the AD curve shifts rightward ...

by an amount equal to the change in investment multiplied by the multiplier.



(a) Aggregate expenditure



(b) Aggregate demand