1 Exchange Rate Essentials

An exchange rate (E) is the price of some foreign currency expressed in terms of a home (or domestic) currency.

- Because an exchange rate is the relative price of two currencies, it may be quoted in either of two ways:
  - The number of home currency units that can be exchanged for one unit of foreign currency
  - The number of foreign currency units that can be exchanged for one unit of home currency
- *To avoid confusion, we must specify which country is the home country and which is foreign.*

1 Exchange Rate Essentials

Defining the Exchange Rate

When we refer to a particular country's exchange rate, we will quote it in units of home currency per units of foreign currency.

- For example:
  - The U.S. exchange rate with Japan is quoted as U.S. dollars per yen (or \$/¥).
  - Denmark's exchange rate with the Eurozone is quoted as Danish krone per euro (or kr/€).

1 Exchange Rate Essentials

TABLE 2-1

Exchange Rate Quotations This table shows major exchange rates as they might appear in the financial media. Columns (1) to (3) show rates on December 31, 2015. For comparison, columns (4) to (6) show rates on December 31, 2014. For example, column (1) shows that at the end of 2015, one U.S. dollar was worth 1.501 Canadian dollars, 6.870 Danish krone, 0.921 euros, and so on. The euro–dollar rates appear in bold type.

		EXCHANGE RATES ON DECEMBER 31, 2015			EXCHANGE RATES ON DECEMBER 31, 2014 *ONE YEAR PREVIOUSLY*		
		(1)	(2)	(3)	(4)	(5)	(6)
Country (currency)	**Currency Symbol**	**Per $**	**Per €**	**Per £**	**Per $**	**Per €**	**Per £**
Canada (dollar)	C$	1.501	1.389	2.047	1.158	1.402	1.806
Denmark (krone)	DKr	6.870	7.463	10.13	6.154	7.446	9.595
Eurozone (euro)	€	**0.921**	—	1.357	**0.826**	—	1.289
Japan (yen)	¥	120.3	130.7	177.3	119.9	145.1	187.0
Norway (krone)	NKr	8.851	9.612	13.05	7.498	9.072	11.69
Sweden (krona)	SKr	8.431	9.158	12.43	7.828	9.473	12.21
Switzerland (franc)	SFr	1.001	1.087	1.485	0.994	1.202	1.549
United Kingdom (pound)	£	0.679	0.737	—	1.559	0.776	—
United States (dollar)	$	—	**1.086**	1.474	—	**1.210**	1.559

$E_{\$/€} = 1.086$ = U.S. exchange rate (American terms)

$E_{€/\$} = 0.921$ = Eurozone exchange rate (European terms)

$$E_{\$/€} = \frac{1}{E_{€/\$}} \qquad 1.086 = \frac{1}{0.921}$$

Appreciations and Depreciations

- If one currency buys more of another currency, we say it has experienced an **appreciation**.
    - We also might say it has *risen in value*, *appreciated,* or *strengthened* against the other currency.
- If a currency buys less of another currency, we say it has experienced a **depreciation**.
    - We also might say it has *fallen in value*, *depreciated*, or *weakened* against the other currency.

Appreciations and Depreciations

In U.S. terms, the following holds true:

- When the U.S. exchange rate $E_{\$/€}$ *rises,* more dollars are needed to buy one euro. The price of one euro goes up in dollar terms, and the U.S. dollar experiences a depreciation. It has fallen in value or weakened against the euro.

- When the U.S. exchange rate $E_{\$/€}$ *falls,* fewer dollars are needed to buy one euro. The price of one euro goes down in dollar terms, and the U.S. dollar experiences an appreciation. It has risen in value or strengthened against the euro.

Appreciations and Depreciations

To determine the size of an appreciation or depreciation, we compute the proportional change, as follows:

- In 2014, at time *t,* the dollar value of the euro was
  $E_{\$/€,t} = \$\ 1.211.$
- In 2015, at time $t + 1$, the dollar value of the euro was
  $E_{\$/€,t+1} = \$\ 1.086.$
- The change in the dollar value of the euro was
  $\Delta E_{\$/€,t} = 1.086 - 1.211 = -\$\ 0.125.$
- The percentage change was
  $\Delta E_{\$/€,t} / E_{\$/€,t} = -0.125/1.211 = -10.32\%.$
- Thus, the dollar *appreciated* against the euro by 10.32%.

Appreciations and Depreciations

Similarly, over the same year:

- In 2014, at time *t,* the euro value of the dollar was
  $E_{€/\$,t} = € 0.826.$
- In 2015, at time $t + 1$, the euro value of the dollar was
  $E_{€/\$,t+1} = € 0.921.$
- The change in the euro value of the dollar was
  $\Delta E_{€/\$,t} = 0.921 - 0.826 = + € 0.095.$
- The percentage change was
  $\Delta E_{€/\$,t} / E_{€/\$,t} = + 0.095/0.826 = + 11.50\%.$
- Thus, the euro *depreciated* against the dollar by 11.50%.

Exchange Rate Regimes: Fixed Versus Floating

There are two major types of **exchange rate regimes**—fixed and floating:

- A **fixed** (or **pegged**) **exchange rate** fluctuates in a narrow range (or not at all) against some *base currency* over a sustained period. The exchange rate can remain fixed for long periods only if the government intervenes in the foreign exchange market in one or both countries.
- A **floating** (or **flexible**) **exchange rate** fluctuates in a wider range, and the government makes no attempt to fix it against any base currency. Appreciations and depreciations may occur yearly, monthly, by the day, or even every minute.

APPLICATION

FIGURE 2-2 (2 of 2) Exchange Rate Behavior: Selected Developed Countries, 1996–2015 (cont.)

This figure shows exchange rates of three currencies against the euro, which was introduced in 1999. The pound and the yen float against the euro. The Danish krone provides an example of a fixed exchange rate. There is only a tiny variation around this rate, no more than plus or minus 2%. This type of fixed regime is known as a **band**.

How the Euro is quoted

- 8 September, €1 = $1.18

- The convention in Economics is: #?H/1F (also called *direct quote*). It makes sense: "buy low, sell high" (the F-currency)
- If Home is EA, then E(€/$) = 1/1.18€ for 1$ = 0.8475 €/$

- However, the euro is usually quoted as #?F/1H (also called *direct quote*).
- In this case, E(€/$) = 1.18$/1€ or simply 1.18$.

Consumption

- The simplest model of aggregate private consumption relates household **consumption** C to **disposable income** Y^d.

$$Consumption = C = C(Y - \overline{T})$$

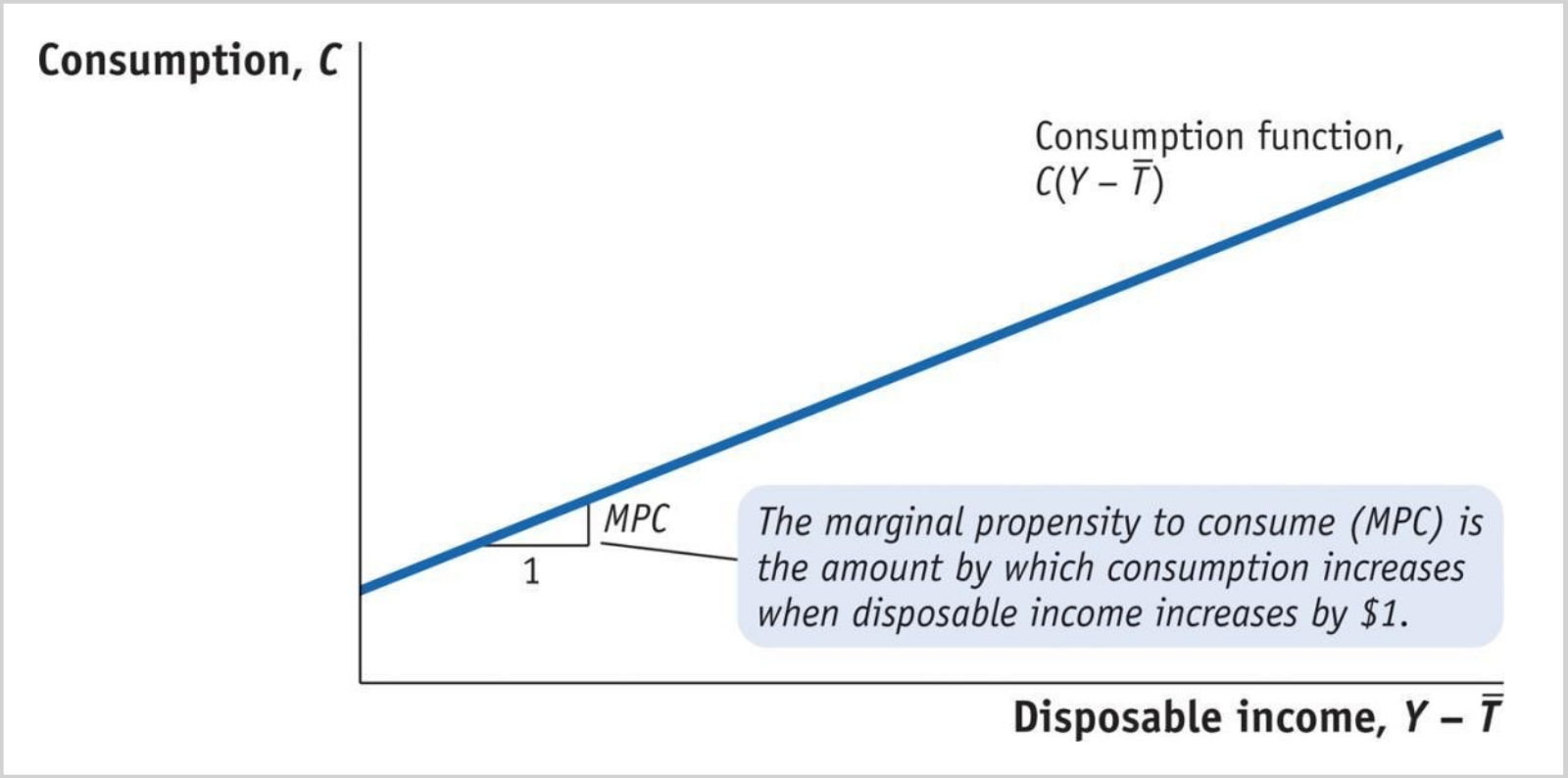
- This equation is known as the *Keynesian consumption function.*

Marginal Effects The slope of the consumption function is called the **marginal propensity to consume** (*MPC*). We can also define the *marginal propensity to save* (*MPS*) as $1 - MPC$.

1 Demand in the Open Economy

Consumption

FIGURE 7-1



The Consumption Function The consumption function relates private consumption, C, to disposable income, $Y - \bar{T}$. The slope of the function is the marginal propensity to consume, MPC.

Investment

- The firm's borrowing cost is the **expected real interest rate** r^e, which equals the nominal interest rate i minus the expected rate of inflation π^e:

$$r^e = i - \pi^e.$$

- Since expected inflation is zero, the expected real interest rate equals the nominal interest rate, $r^e = i$.

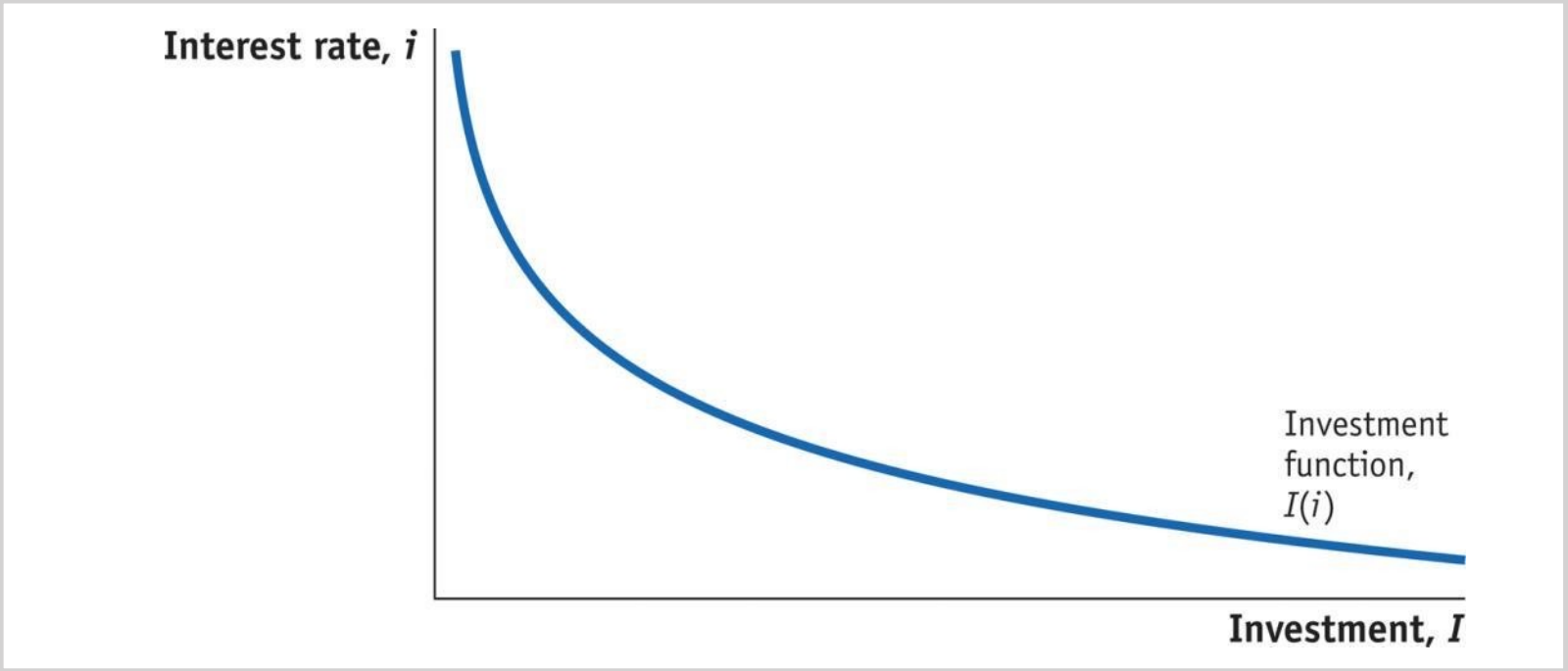
- Investment I is a decreasing function of the real interest rate. So investment $I(r)$ falls as the real interest rate rises.

- But expected inflation is zero, so the real interest rate equals the nominal interest rate. We can then write $I(i)$.

1 Demand in the Open Economy

Investment

FIGURE 7-2



The Investment Function The investment function relates the quantity of investment, I, to the level of the expected real interest rate, which equals the nominal interest rate, i, when (as assumed in this chapter) the expected rate of inflation, π^e, is zero. The investment function slopes downward: as the real cost of borrowing falls, more investment projects are profitable.

The Government

- Assume that the government collects an amount T of **taxes** from households and spends an amount G on **government consumption**.
- We will ignore government **transfer programs**, such as social security, medical care, or unemployment benefit systems.
- In the unlikely event that $G = T$ exactly, we say that the government has a *balanced budget.*
- If $T > G$, the government is said to be running a *budget surplus* (of size $T - G$).
- If $G > T$, there is a *budget deficit* (of size $G - T$ or, equivalently, a negative surplus of $T - G$).

The Trade Balance

The Role of the Real Exchange Rate

- When aggregate spending patterns change due to changes in the real exchange rate, this is **expenditure switching** from foreign purchases to domestic purchases.
- If home's exchange rate is E, and home and foreign price levels are P and P^* (both fixed in the short run), the real exchange rate q of Home is defined as $q = E P^* / P$.
  - *We expect the trade balance of the home country to be an increasing function of the home country's real exchange rate. As the home country's real exchange rate rises, it will export more and import less, and the trade balance rises.*

The Trade Balance

The Role of Income Levels

- *We expect an increase in home income to be associated with an increase in home imports and a fall in the home country's trade balance.*
- *We expect an increase in rest of the world income to be associated with an increase in home exports and a rise in the home country's trade balance.*

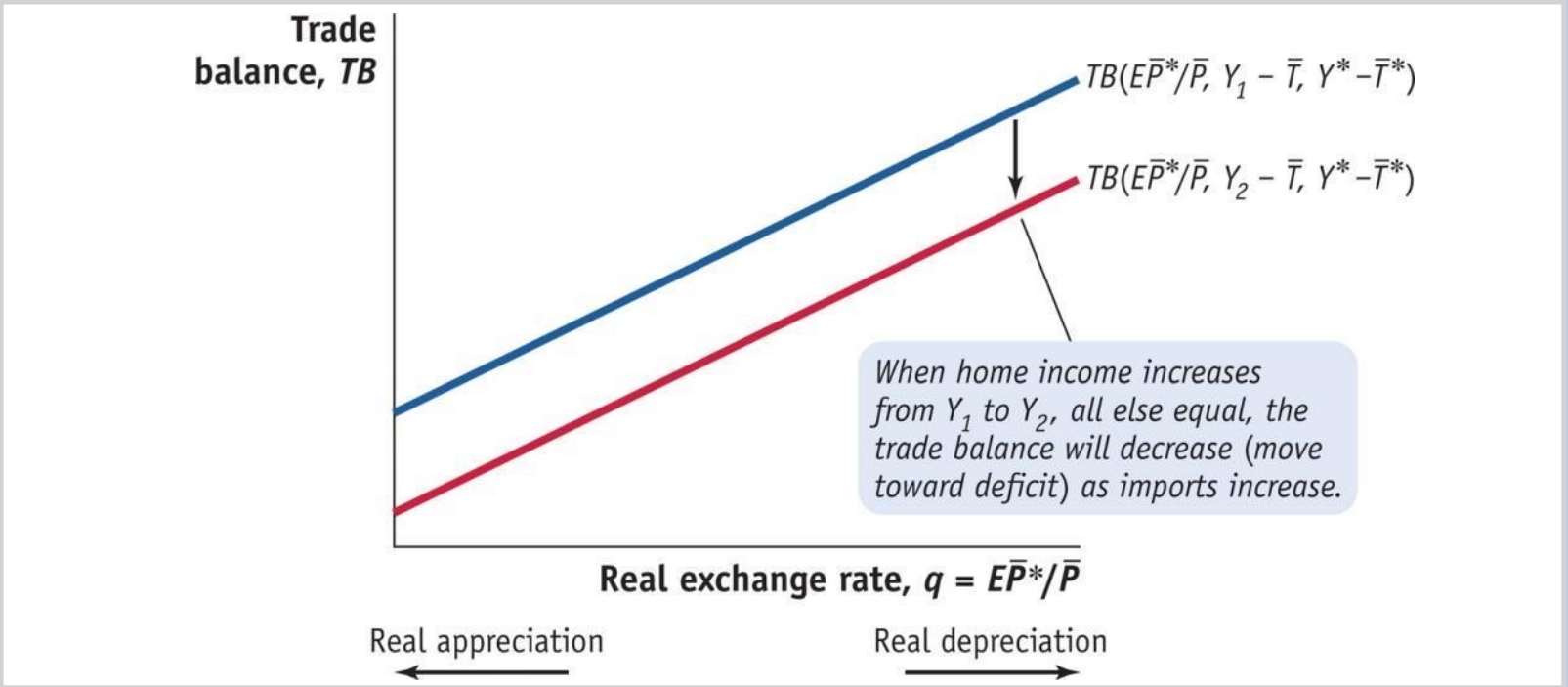
- The trade balance is, therefore, a function of three variables: the real exchange rate, home disposable income, and rest of world disposable income.

$$TB = TB(\underbrace{E\overline{P}^{*}/\overline{P}}_{\text{Increasing function}}, \underbrace{Y - \overline{T}}_{\text{Decreasing function}}, \underbrace{Y^{*} - \overline{T}^{*}}_{\text{Increasing function}})$$

1 Demand in the Open Economy

The Trade Balance

FIGURE 7-3 (1 of 2) The Trade Balance and the Real Exchange Rate

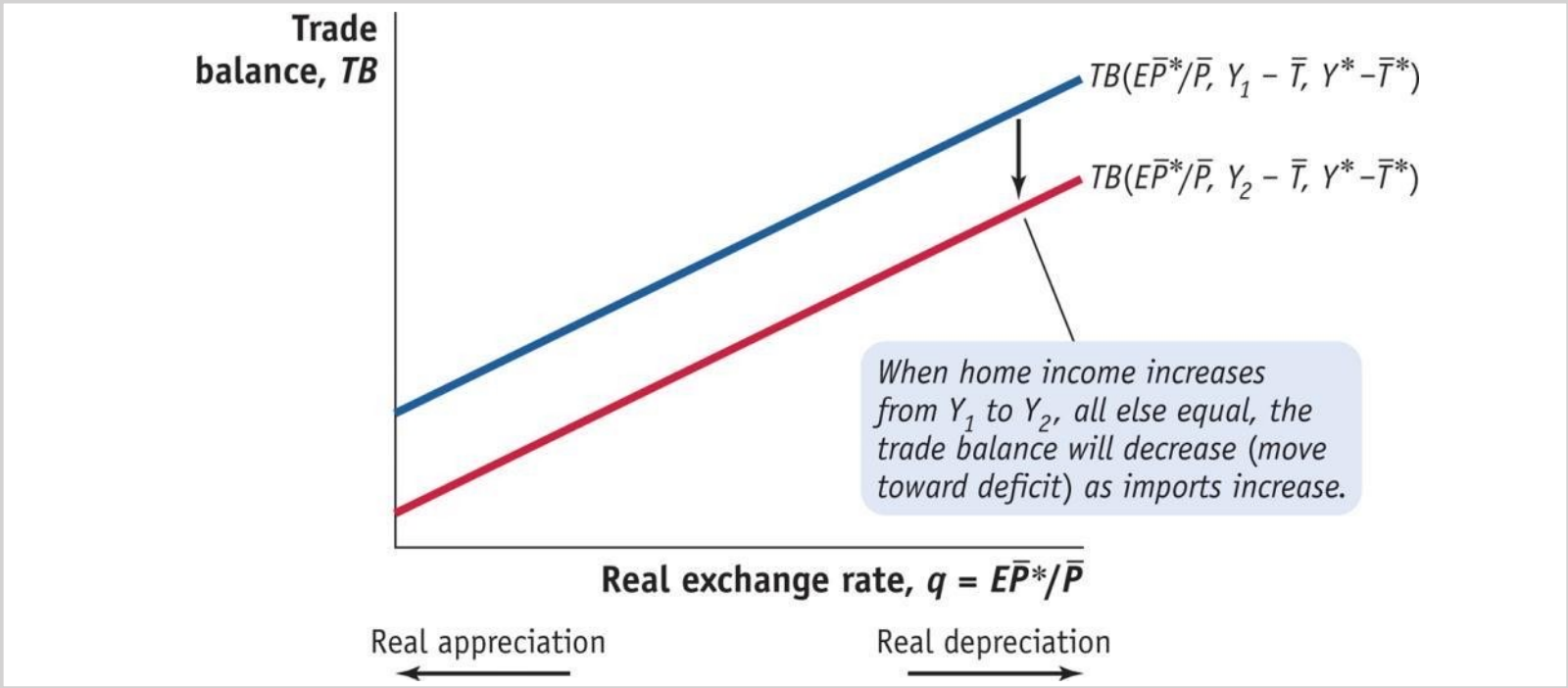


The trade balance is an increasing function of the real exchange rate, EP^*/P. When there is a real depreciation (a rise in q), foreign goods become more expensive relative to home goods, and we expect the trade balance to increase as exports rise and imports fall (a rise in TB) This is a movement *along* this line.

1 Demand in the Open Economy

The Trade Balance

FIGURE 7-3 (2 of 2) The Trade Balance and the Real Exchange Rate (continued)



The trade balance may also depend on income. If home income rises, then some of the increase in income may be spent on the consumption of imports. For example, if home income rises from Y_1 to Y_2, then the trade balance will decrease, whatever the level of the real exchange rate, and the trade balance function will shift down.

2 Goods Market Equilibrium: The Keynesian Cross

Supply and Demand

Given our assumption that the current account equals the trade balance, gross national income Y equals GDP:

$$\text{Supply} = GDP = Y$$

Aggregate demand, or just "demand," consists of all the possible sources of demand for this supply of output.

$$\text{Demand} = D = C + I + G + TB$$

Substituting, we have

$$D = C\left(Y - \overline{T}\right) + I(i) + \overline{G} + TB\left(E\overline{P}^{*}/\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)$$

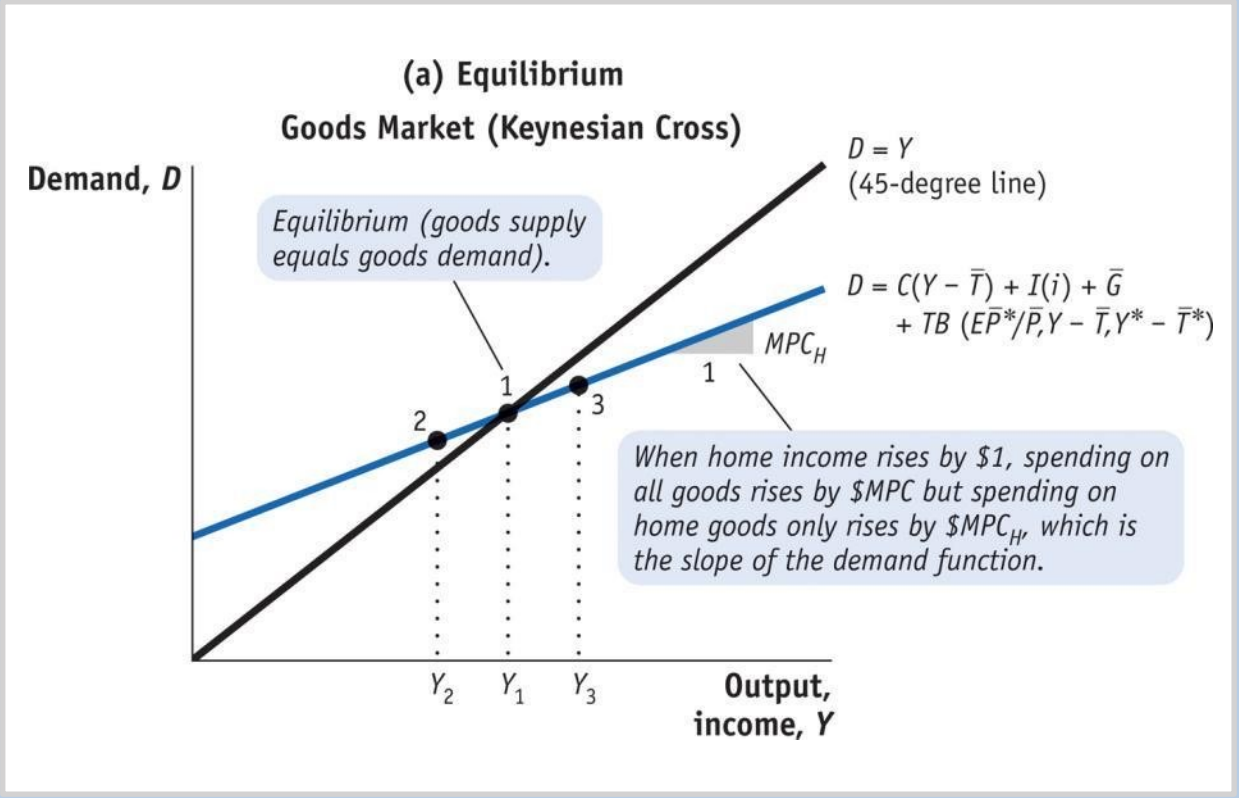
The goods market equilibrium condition is

$$Y = \underbrace{C\left(Y - \overline{T}\right) + I(i) + \overline{G} + TB\left(E\overline{P}^{*}/\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)}_{D} \qquad (7\text{-}1)$$

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (1 of 2) The Goods Market Equilibrium and the Keynesian Cross

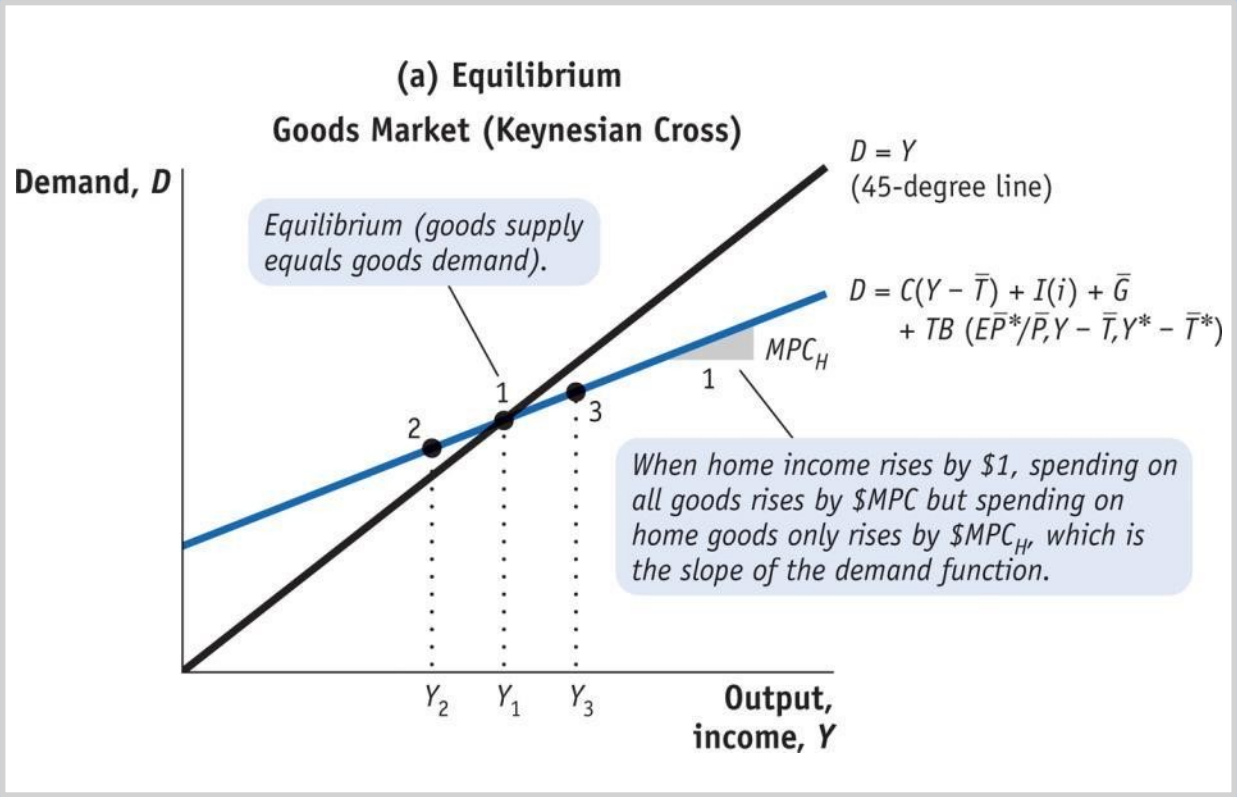


Equilibrium is where demand, D, equals real output or income, Y. In this diagram, equilibrium is at point 1, at an income or output level of Y_1. The goods market will adjust toward this equilibrium.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (2 of 2) The Goods Market Equilibrium and the Keynesian Cross (continued)



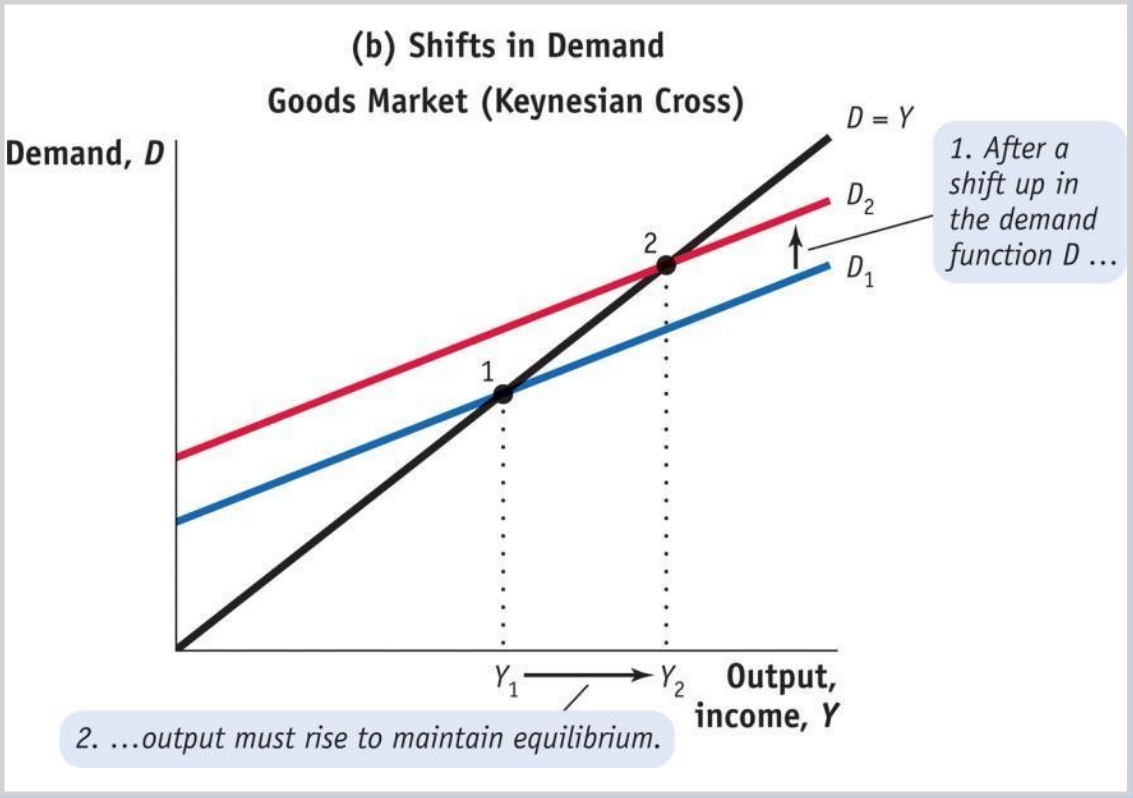
At point 2, the output level is Y_2 and demand, D, exceeds supply, Y; as inventories fall, firms expand production and output rises toward Y_1.

At point 3, the output level is Y_3 and supply Y exceeds demand; as inventories rise, firms cut production and output falls toward Y_1.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (b) Shifts in Demand



The goods market is initially in equilibrium at point 1, at which point demand and supply both equal Y_1.

An increase in demand, D, at all levels of real output, Y, shifts the demand curve up from D_1 to D_2.

Equilibrium shifts to point 2, where demand and supply are higher and both equal Y_2. Such an increase in demand could result from changes in one or more of the components of demand: C, I, G, or TB.

2 Goods Market Equilibrium: The Keynesian Cross

Summary

Rise in government spending G
Fall in taxes T
Fall in the home interest rate i
Rise in the nominal exchange rate E
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

$\Rightarrow$ Demand curve D shifts up

Increasing demand D at a given level of output Y

The opposite changes lead to a decrease in demand and shift the demand curve in.

Equilibrium in Two Markets

- A general equilibrium requires equilibrium in all markets—that is, equilibrium in the goods market, the money market, and the forex market.
- *The* **IS curve** *shows combinations of output Y and the interest rate i for which the goods and forex markets are in equilibrium.*

Forex Market Recap

Uncovered interest parity (UIP) Equation (10-3):

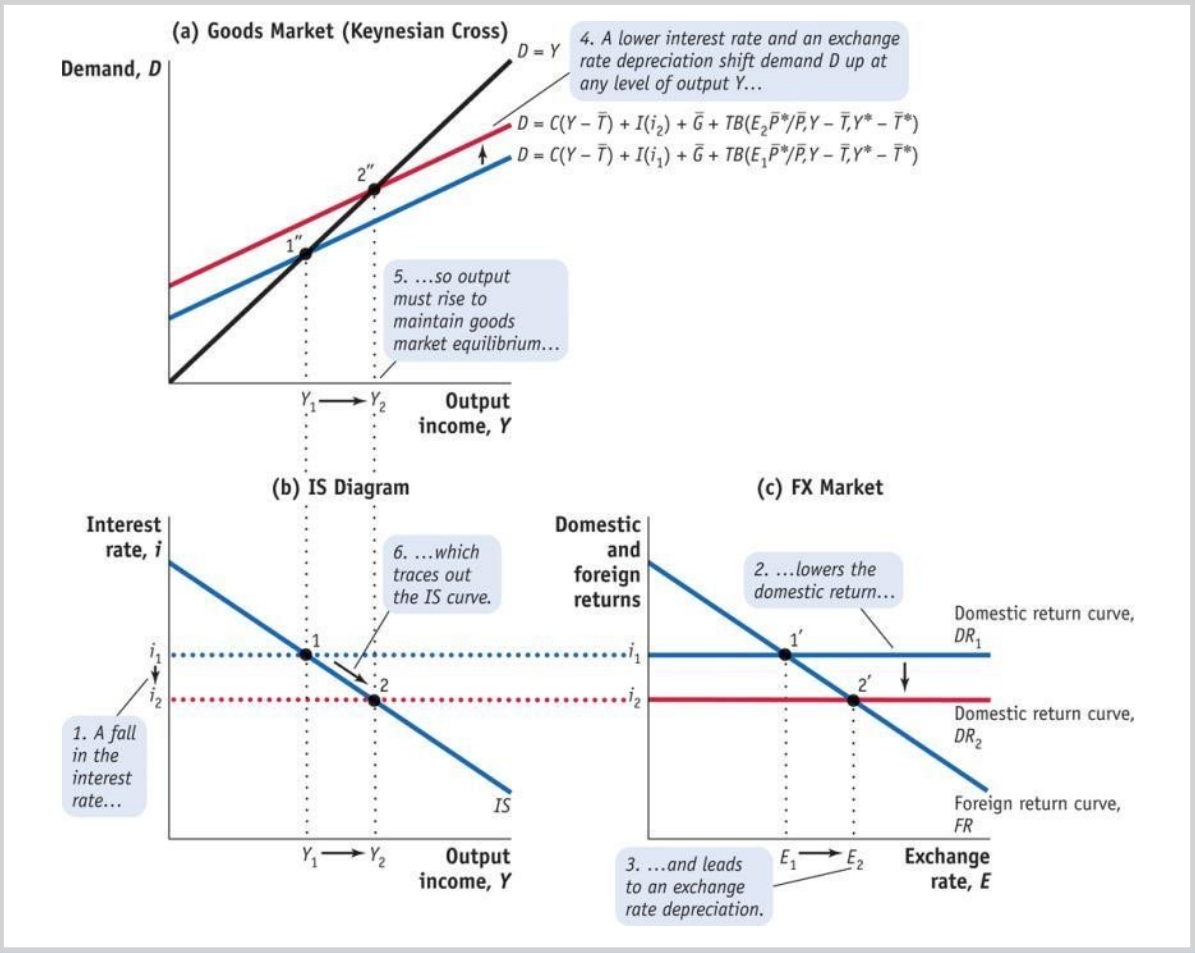
$$i = i^* + \left(\frac{E^e}{E} - 1\right)$$

Domestic interest rate = Foreign interest rate + Expected rate of depreciation of the domestic currency

Domestic return = Expected foreign return

Equilibrium in Two Markets

FIGURE 7-8 (1 of 3) Deriving the IS Curve



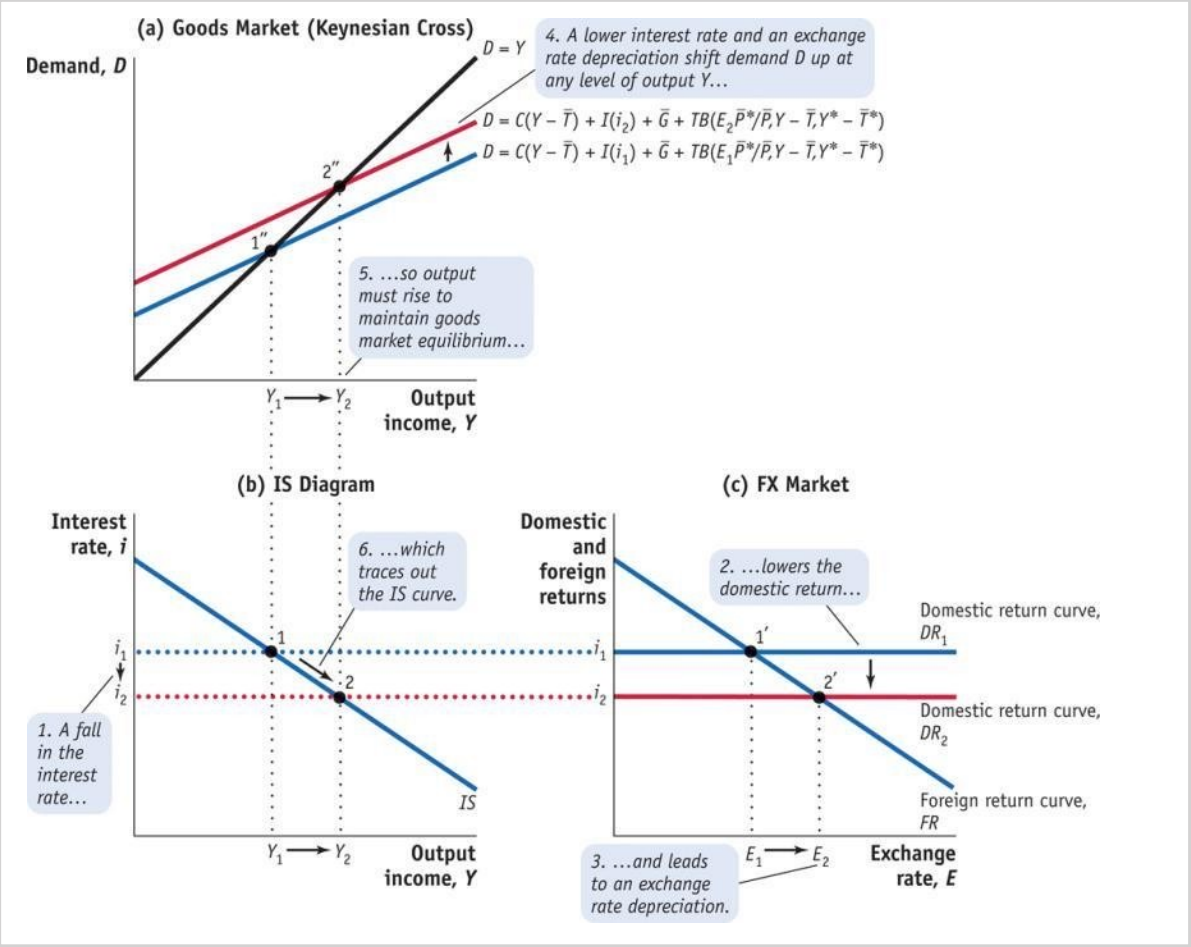
The **Keynesian cross** is in panel (a), the IS curve is in panel (b), and the forex (FX) market is in panel (c).

The economy starts in equilibrium with output, Y_1; interest rate, i_1; and exchange rate, E_1.

Consider the effect of a decrease in the interest rate from i_1 to i_2, all else equal. In panel (c), a lower interest rate causes a depreciation; equilibrium moves from 1′ to 2′.

Equilibrium in Two Markets

FIGURE 7-8 (2 of 3) Deriving the IS Curve (continued)

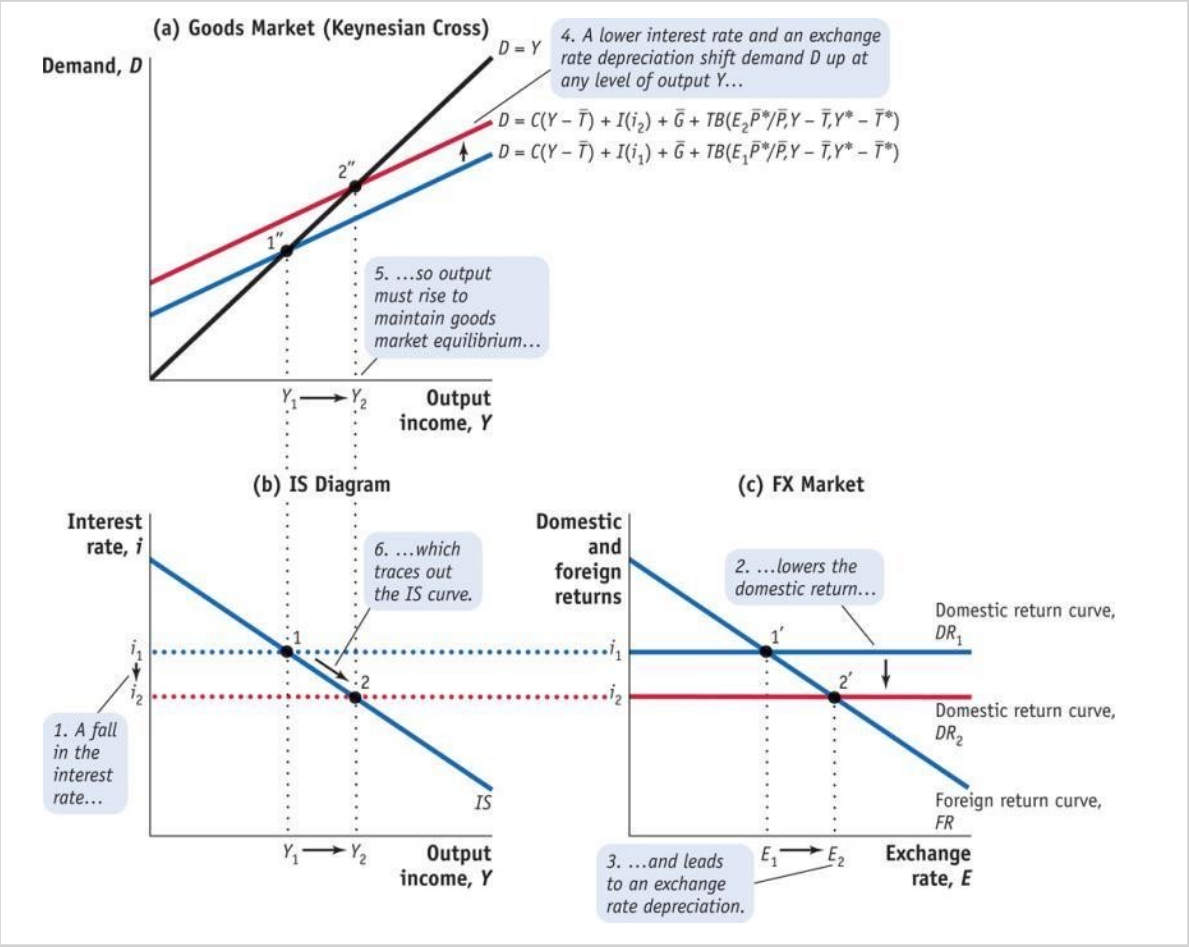


A lower interest rate boosts investment and a depreciation boosts the trade balance.

In panel (a), demand shifts up from D_1 to D_2, equilibrium from 1″ to 2″, and output from Y_1 to Y_2.

Equilibrium in Two Markets

FIGURE 7-8 (3 of 3) Deriving the IS Curve (continued)



In panel (b), we go from point 1 to point 2. The IS curve is thus traced out, a downward-sloping relationship between the interest rate and output.

When the interest rate falls from i_1 to i_2, output rises from Y_1 to Y_2.

The IS curve describes all combinations of i and Y consistent with goods and FX market equilibria in panels (a) and (c).

Deriving the IS Curve

Two important observations are in order:

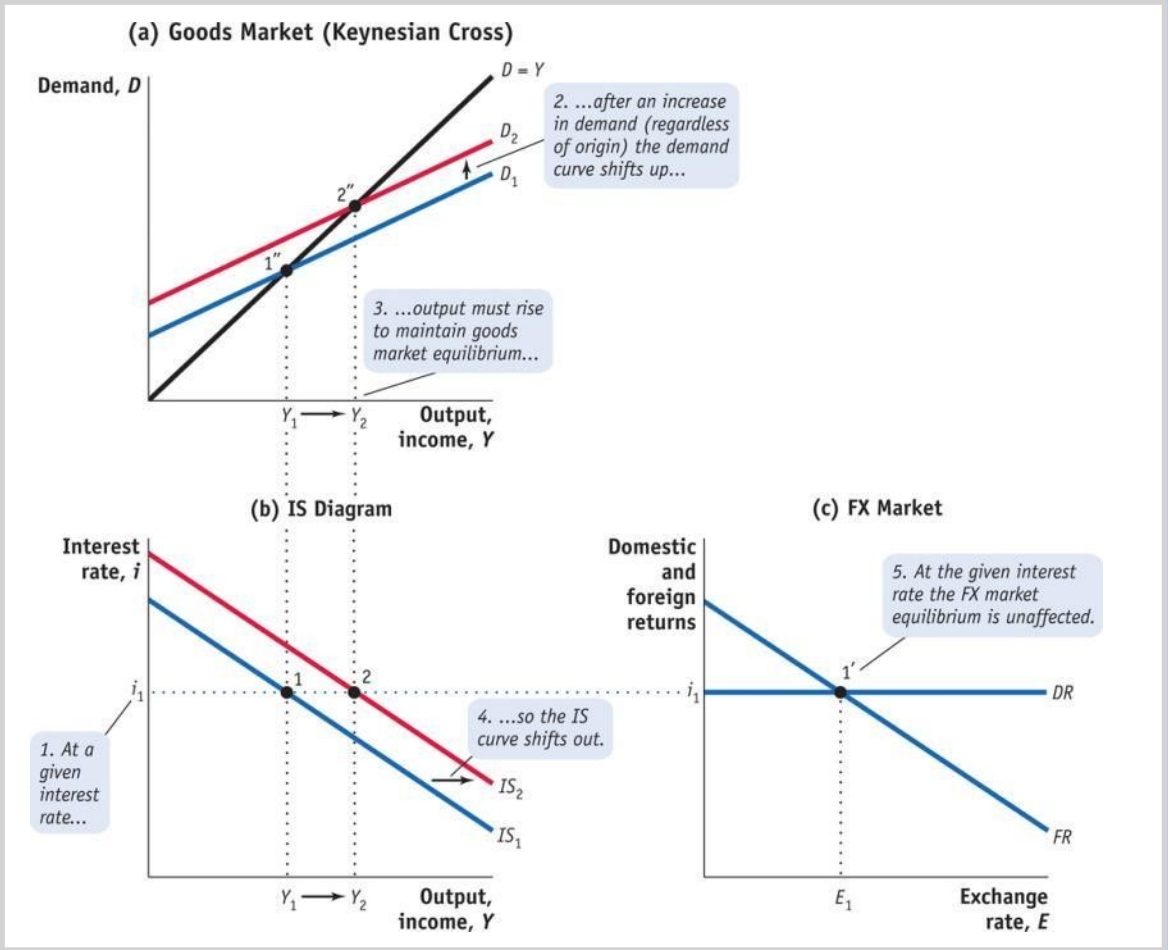
- In an open economy, lower interest rates stimulate demand through the traditional closed-economy investment channel and through the trade balance.
- The trade balance effect occurs because lower interest rates cause a nominal depreciation (a real depreciation in the short run), which stimulates external demand.

We have now derived the shape of the IS curve, which describes goods and forex market equilibrium:

- *The IS curve is downward-sloping. It illustrates the negative relationship between the interest rate i and output Y.*

Factors That Shift the IS Curve

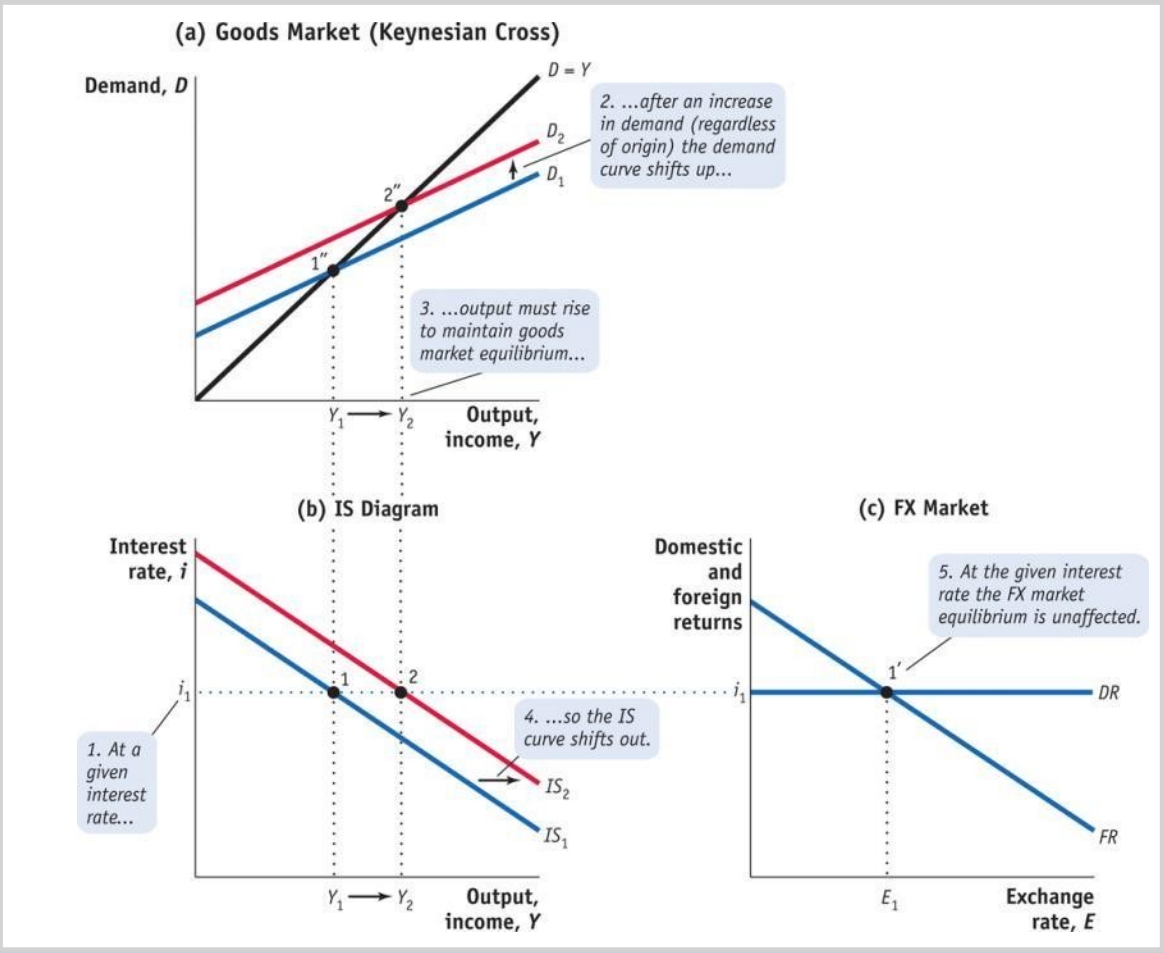
FIGURE 7-9 (1 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift



In the Keynesian cross in panel (a), when the interest rate is held constant at i_1, an exogenous increase in demand (due to other factors) causes the demand curve to shift up from D_1 to D_2 as shown, all else equal. This moves the equilibrium from 1″ to 2″, raising output from Y_1 to Y_2.

Factors That Shift the IS Curve

FIGURE 7-9 (2 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift (continued)



In the IS diagram in panel (b), output has risen, with no change in the interest rate. The IS curve has therefore shifted right from IS_1 to IS_2. The nominal interest rate and hence the exchange rate are unchanged in this example, as seen in panel (c).

Summing Up the IS Curve

$$IS = IS(G, T, i^*, E^e, P^*, P)$$

Factors That Shift the IS Curve

Rise in government spending G
Fall in taxes T
Rise in foreign interest rate i^*
Rise in future nominal exchange rate E^e
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

⇒ Demand curve D shifts up (Increasing demand D at a given level of output Y and a given home interest rate i) ⇒ IS curve shifts right (Increase in equilibrium output Y at a given home interest rate i)

These changes are for a given level of i.

The opposite changes lead to a decrease in demand and shift the demand curve down and the IS curve to the left.

4 Money Market Equilibrium: Deriving the LM Curve

In this section, we derive a set of combinations of Y and i that ensures equilibrium in the money market, a concept that can be represented graphically as the **LM curve**.

Money Market Recap

- In the short run, the price level is assumed to be sticky at a level $P^{\bar{}}$, and the money market is in equilibrium when the demand for real money balances $L(i)Y$ equals the real money supply $M/P^{\bar{}}$:

$$\frac{M}{P^{\bar{}}} = L(i)\,Y \qquad (7\text{-}2)$$

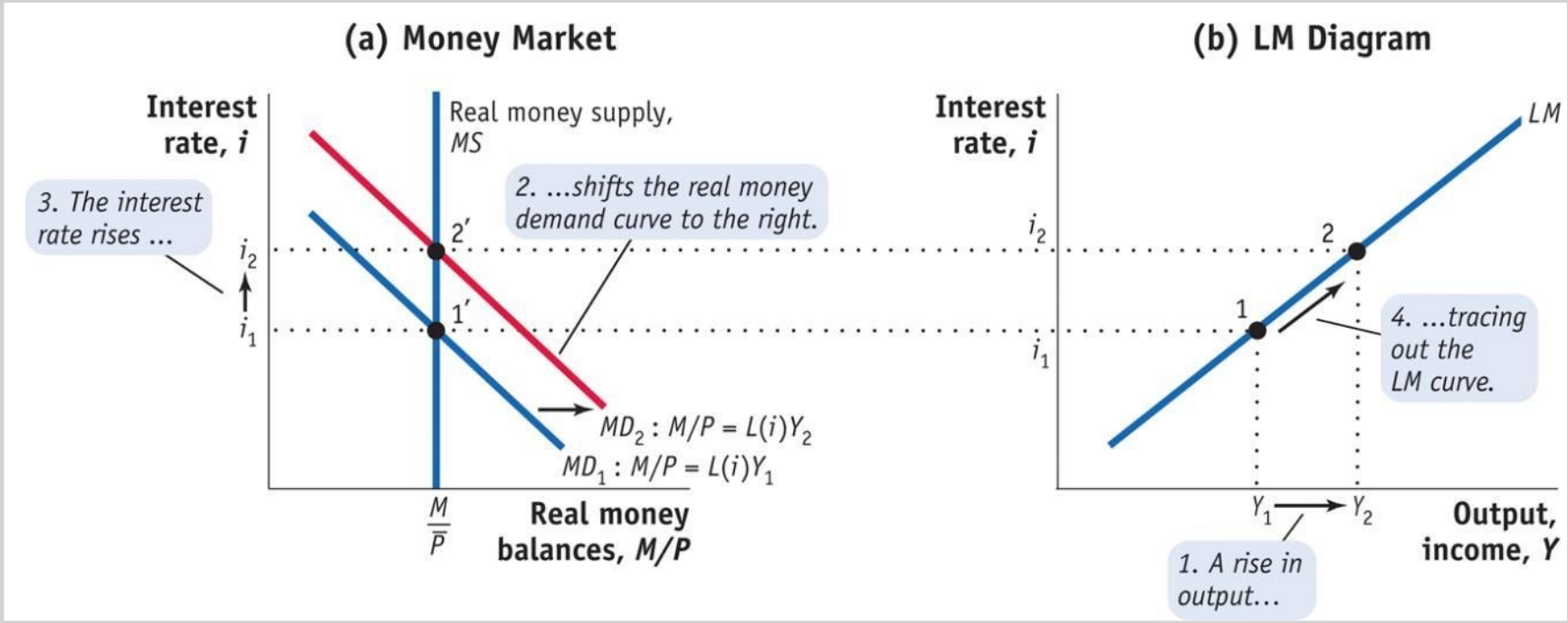
Real money supply

Real money demand

4 Money Market Equilibrium: Deriving the LM Curve

Deriving the LM Curve

FIGURE 7-10 (1 of 2) Deriving the LM Curve

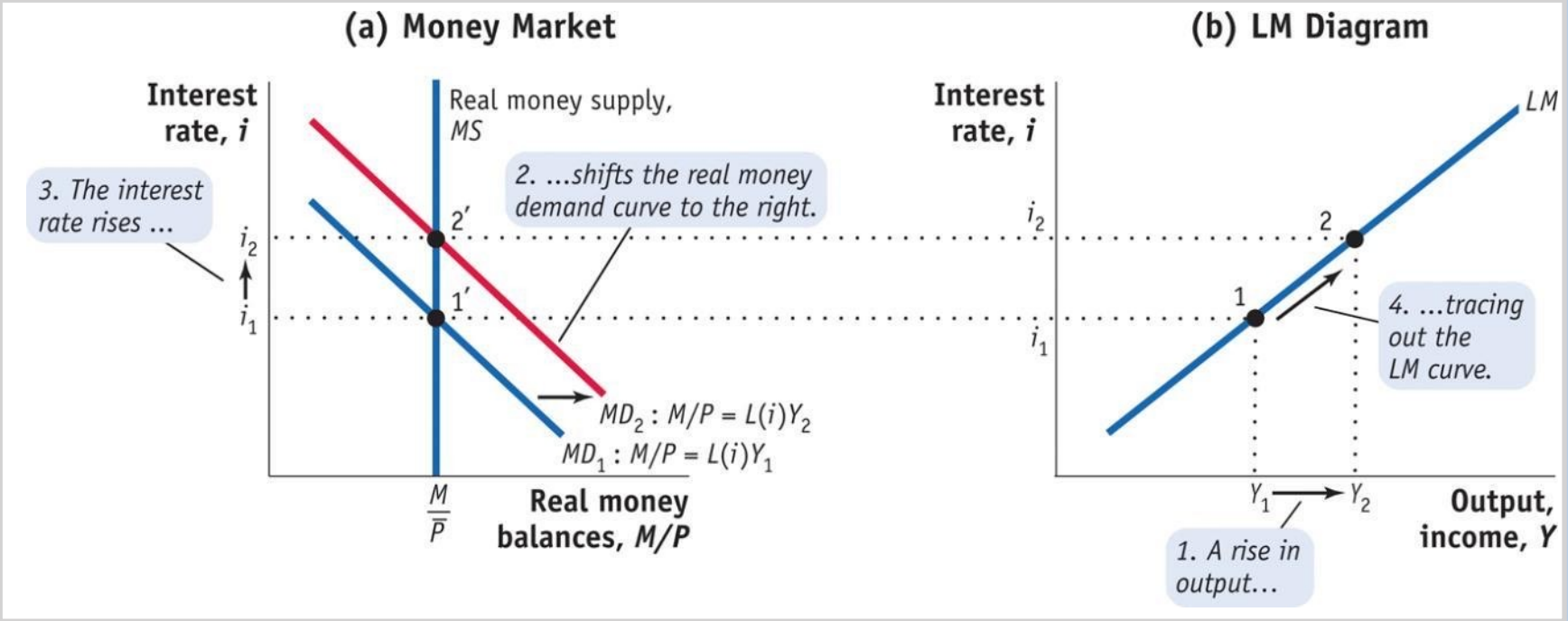


If there is an increase in real income or output from Y_1 to Y_2 in panel (b), the effect in the money market in panel (a) is to shift the demand for real money balances to the right, all else equal. If the real supply of money, *MS,* is held fixed at $M/P^{(0)}$, then the interest rate rises from i_1 to i_2 and money market equilibrium moves from point 1′ to point 2′.

4 Money Market Equilibrium: Deriving the LM Curve

Deriving the LM Curve

FIGURE 7-10 (2 of 2) Deriving the LM Curve (continued)

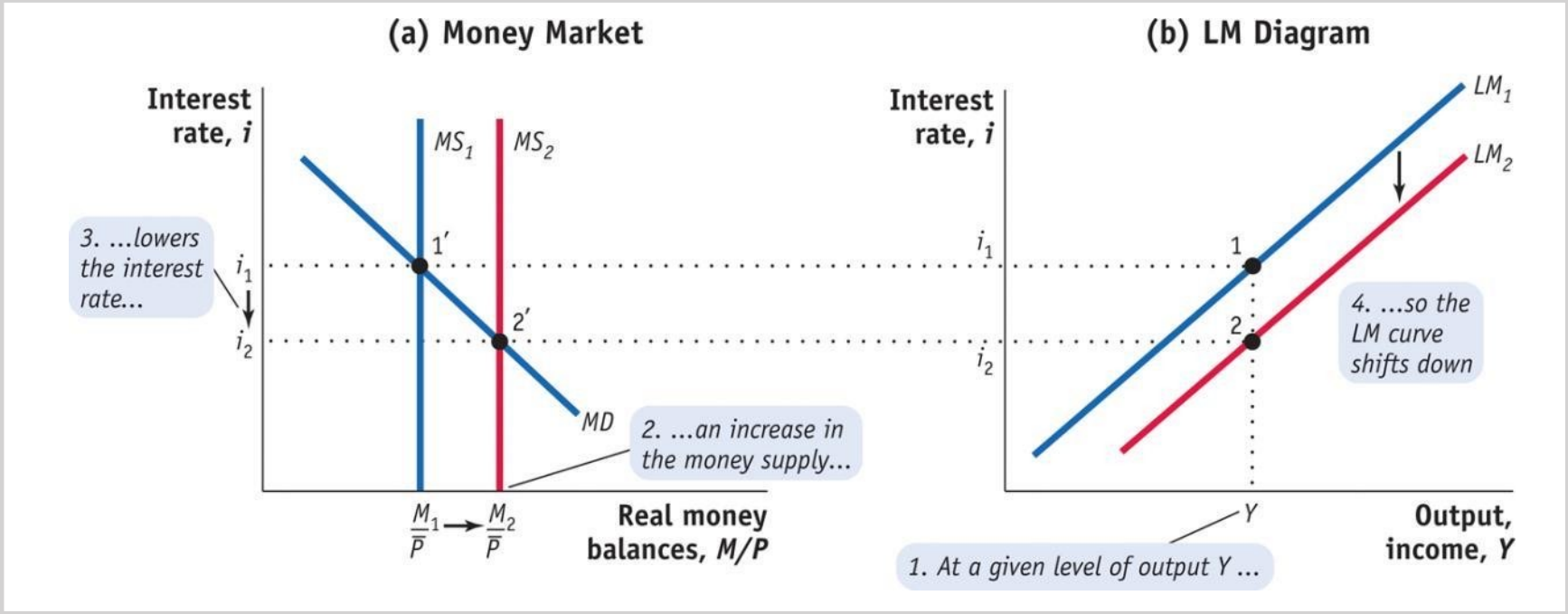


The relationship between the interest rate and income is known as the LM curve and is depicted in panel (b). The LM curve is upward-sloping: When the output level rises from Y_1 to Y_2, the interest rate rises from i_1 to i_2. The LM curve describes all combinations of i and Y that are consistent with money market equilibrium in panel (a).

4 Money Market Equilibrium: Deriving the LM Curve

Factors That Shift the LM Curve

FIGURE 7-11 (1 of 2) Change in the Money Supply Shifts the LM Curve

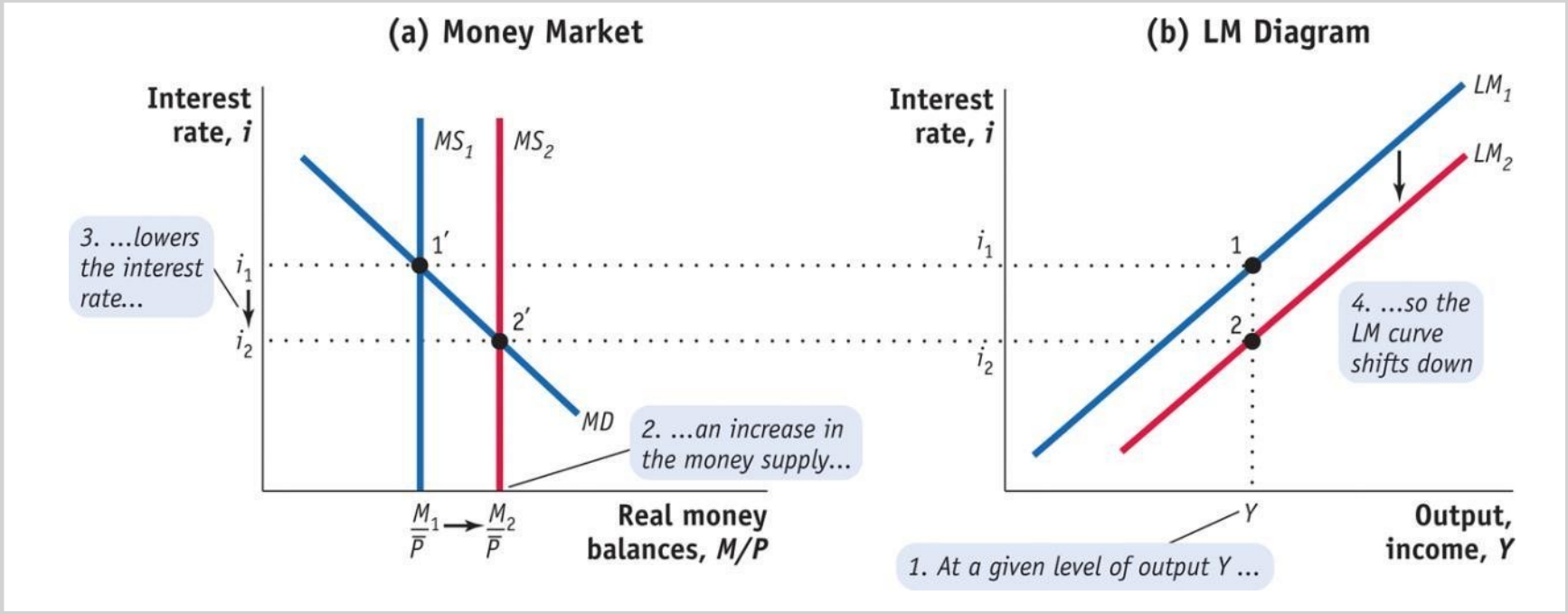


In the money market, shown in panel (a), we hold fixed the level of real income or output, Y, and hence real money demand, MD. All else equal, we show the effect of an increase in money supply from M_1 to M_2. The real money supply curve moves out from MS_1 to MS_2. This moves the equilibrium from 1′ to 2′, lowering the interest rate from i_1 to i_2.

4 Money Market Equilibrium: Deriving the LM Curve

Factors That Shift the LM Curve

FIGURE 7-11 (2 of 2) Change in the Money Supply Shifts the LM Curve (continued)



In the LM diagram, shown in panel (b), the interest rate has fallen, with no change in the level of income or output, so the economy moves from point 1 to point 2.

The LM curve has therefore shifted down from LM_1 to LM_2.

4 Money Market Equilibrium: Deriving the LM Curve

Summing Up the LM Curve

$$LM = LM\left(M\mathrm{T}\overline{P}\right)$$

Factors That Shift the LM Curve

Rise in (nominal) money supply M

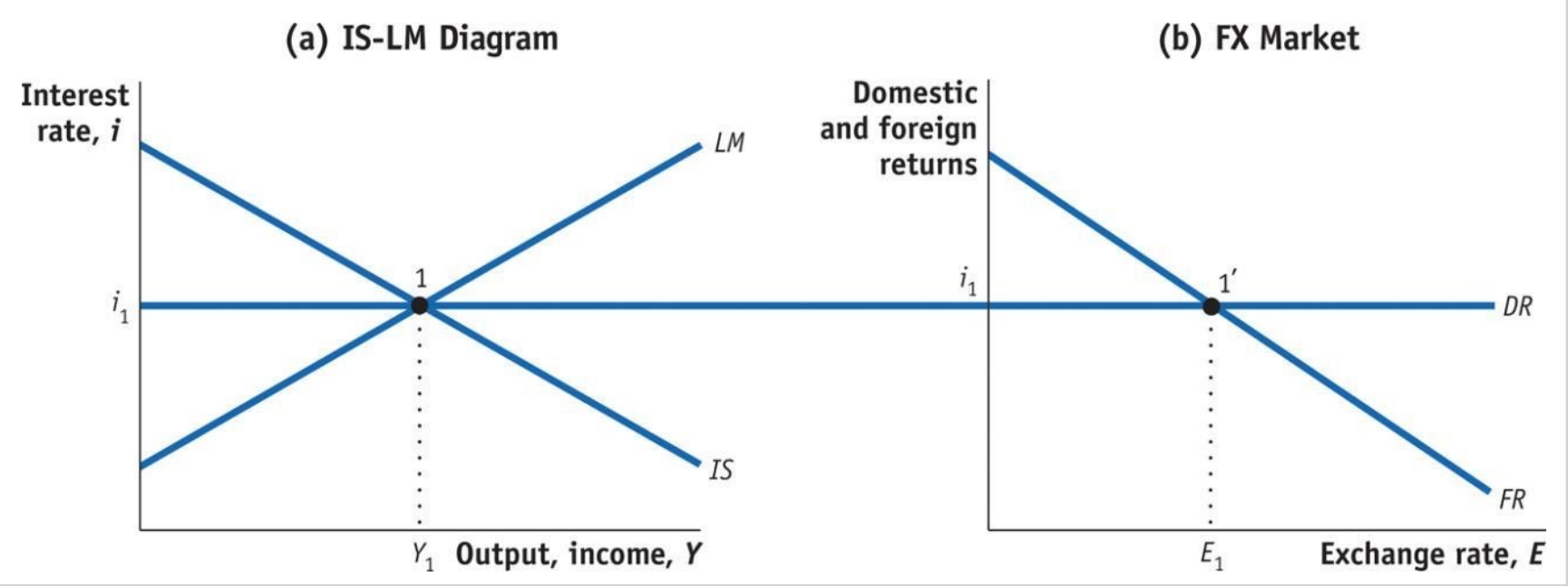
Any shift left in the money demand function L

$\Rightarrow$ LM curve shifts down or right

Decrease in equilibrium home interest rate i at given level of output Y

5 The Short-Run IS–LM–FX Model of an Open Economy

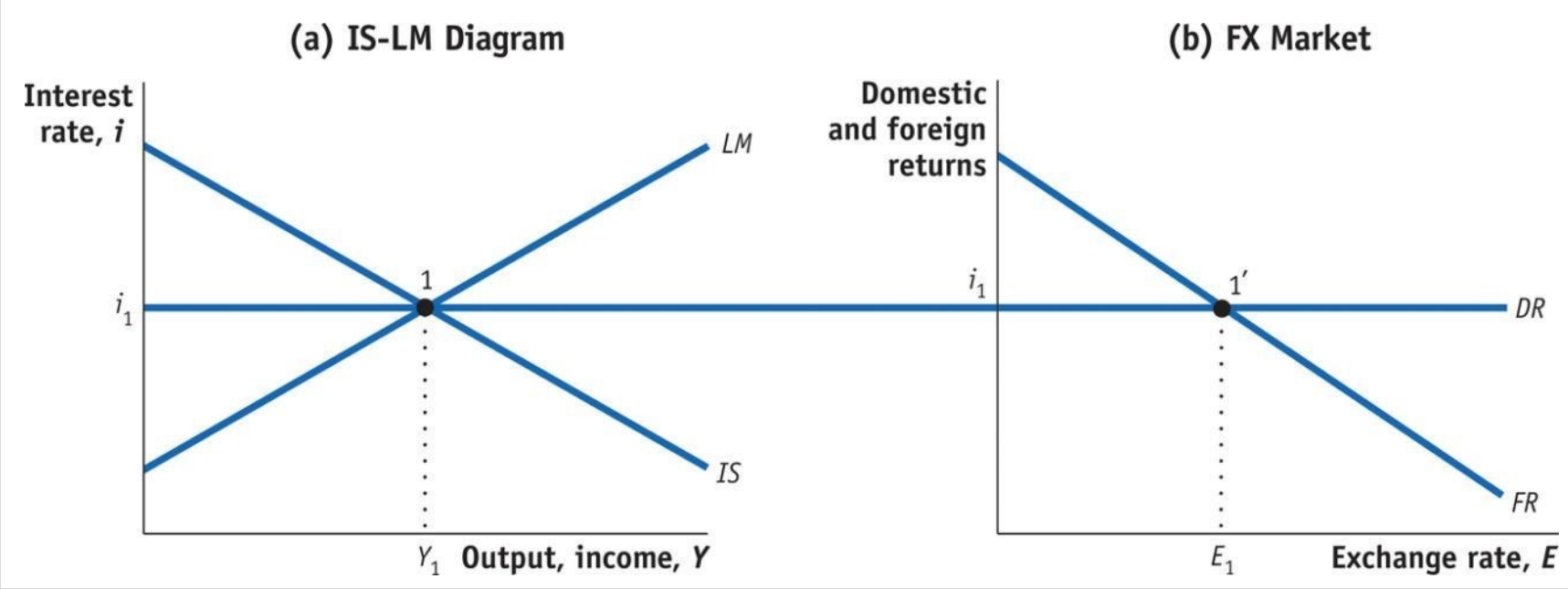
FIGURE 7-12 (1 of 2) Equilibrium in the IS–LM–FX Model



In panel (a), the IS and LM curves are both drawn. The goods and forex markets are in equilibrium when the economy is on the IS curve. The money market is in equilibrium when the economy is on the LM curve. Both markets are in equilibrium if and only if the economy is at point 1, the unique point of intersection of IS and LM.

5 The Short-Run IS–LM–FX Model of an Open Economy

FIGURE 7-12 (2 of 2) Equilibrium in the IS–LM–FX Model (continued)



In panel (b), the forex (FX) market is shown. The domestic return, *DR,* in the forex market equals the money market interest rate.

Equilibrium is at point 1′ where the foreign return *FR* equals domestic return, *i*.

CHAPTER 4

The Keynesian Short-Run Policy Model: Demand-Side Policies

Chapter Goals

- Discuss the key insight of the *AS*/*AD* model and list both its assumptions and its components.
- Describe the shape of the aggregate demand curve and what factors shift the curve.
- Explain the shape of the short-run and long-run aggregate supply curves and what factors shift the curves.
- Show the effects of shifts of the aggregate demand and aggregate supply curves on the price level and output in both the short run and long run.
- Discuss the limitations of the macro policy model.

The Keynesian *AS/AD* Model: Output

Short-run equilibrium output may differ from long-run potential output assuming a fixed price level.

- **Equilibrium output** is the level of output toward which the economy gravitates in the short run because of the cumulative cycles of declining or increasing production.
- **Potential output** is the highest amount of output an economy can sustainably produce using existing production processes and resources.

The Keynesian *AS/AD* Model: Policy

Keynesian model focuses on the use of monetary and fiscal policy.

- **Monetary policy** – a policy of influencing the economy through changes in the money supply and interest rates.
- **Fiscal policy** – the deliberate change in either government spending or taxes (or more generally the deficit) to stimulate or slow down the economy).

Key Insight of the Keynesian *AS/AD* Model

Paradox of thrift means an increase in saving may lead to a decrease in spending, output, causing a recession and lowering total saving.

Keynesians believe the economy would need government's help to prop up aggregate expenditures.

Keynesian economists advocated an activist demand management policy.

The Components of the *AS/AD* Model

Three important things about the *AS/AD* model:

1. It is a short-run model.
2. It is a pedagogical model.
3. It starts with aggregate relationships.

The *AS/AD* model does provide a simple model that suggest a role for government in keeping feedback effects from spiraling an economy downward.

The *AS/AD* Model Consists of Three Curves

1. Aggregate Demand (*AD*) Curve: a curve that shows how a change in the price level will change aggregate expenditures on all goods and services in an economy.

2. Short-Run Aggregate Supply (*SAS*) Curve: a curve that specifies how a shift in the aggregate demand curve affects the price level and real output in the short run, other things constant.

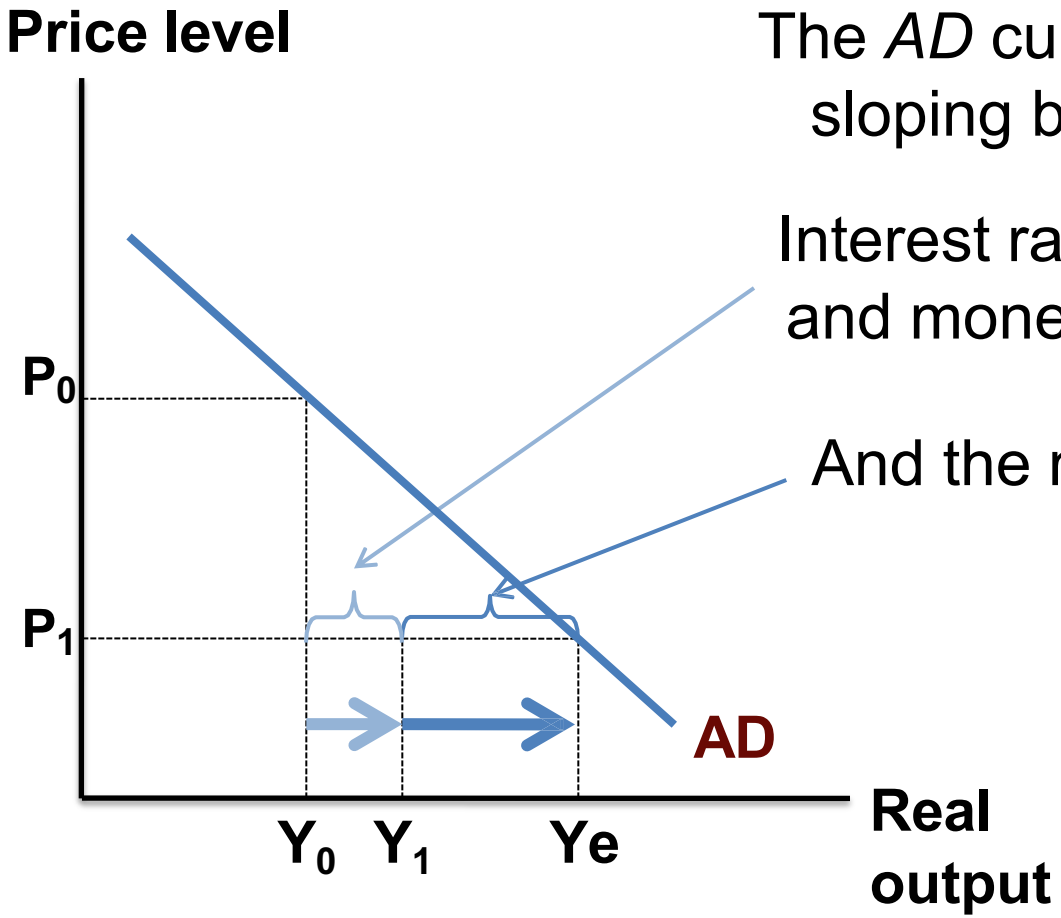
3. Long-Run Aggregate Supply (*LAS*) Curve: a curve that shows the long-run relationship between output and the price level.

The *AD* Curve Is Downward Sloping

Explanations that make the *AD* curve *downward* sloping:

- **Interest rate effect -** the effect that a lower price level has on investment expenditures through the effect that a change in the price level has on interest rates.
- **International effect -** as the price level falls (assuming the exchange rate does not change), net exports will rise.
- **Money wealth effect -** a fall in the price level will make the holders of money richer, so they buy more.
- **Multiplier effect -** the amplification of initial changes in expenditures.

The Slope of the *AD* Curve



The *AD* curve is *downward* sloping because of the:

Interest rate, international, and money wealth effects

And the multiplier effect

Dynamic Price-Level Adjustment
Feedback Effects

Dynamic effects exist that can overwhelm the standard *AD* shift factors.

Especially important when aggregate demand is declining are:

- Expectations of falling aggregate demand
- Lower asset prices (declining nominal wealth)
- Financial panics

These forces counteract the standard shift factors.

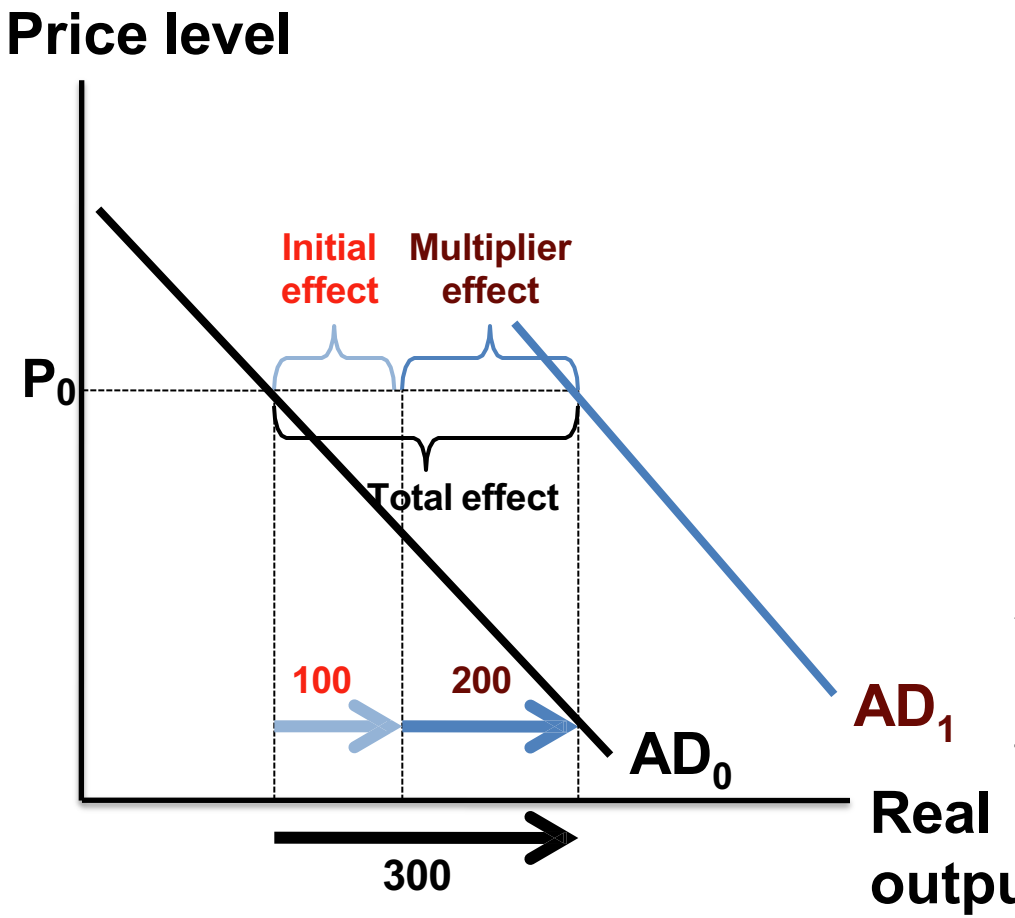
If strong enough, dynamic forces can cause aggregate demand to fall (shift to the left) when the price level falls.

Shifts in the *AD* Curve

A shift in the *AD* curve means that at every price level, total expenditures have changed. Five important shift factors are:

- Foreign income
- Exchange rate fluctuations
- Distribution of income
- Expectations
- Government policies

Shifts in the AD Curve



The AD curve shifts out by more than the initial change in expenditures:

- Exports increase by 100.
- The multiplier magnifies this shift.

AD curve shifts to the *right* by a multiple of 100, in this case by 300.

The Aggregate Supply Curves

The shape of the *SAS* curve reflects two different types of markets in our economy:

1. Auction markets: The markets represented by the supply/demand model. They are much more common in markets for resources such as oil or farm products.

2. Posted price markets: Also called **quantity-adjusting markets,** these are markets in which firms respond to changes in demand primarily by changing production instead of changing their prices. HOWEVER, firms tend to increase their markup when demand increases.

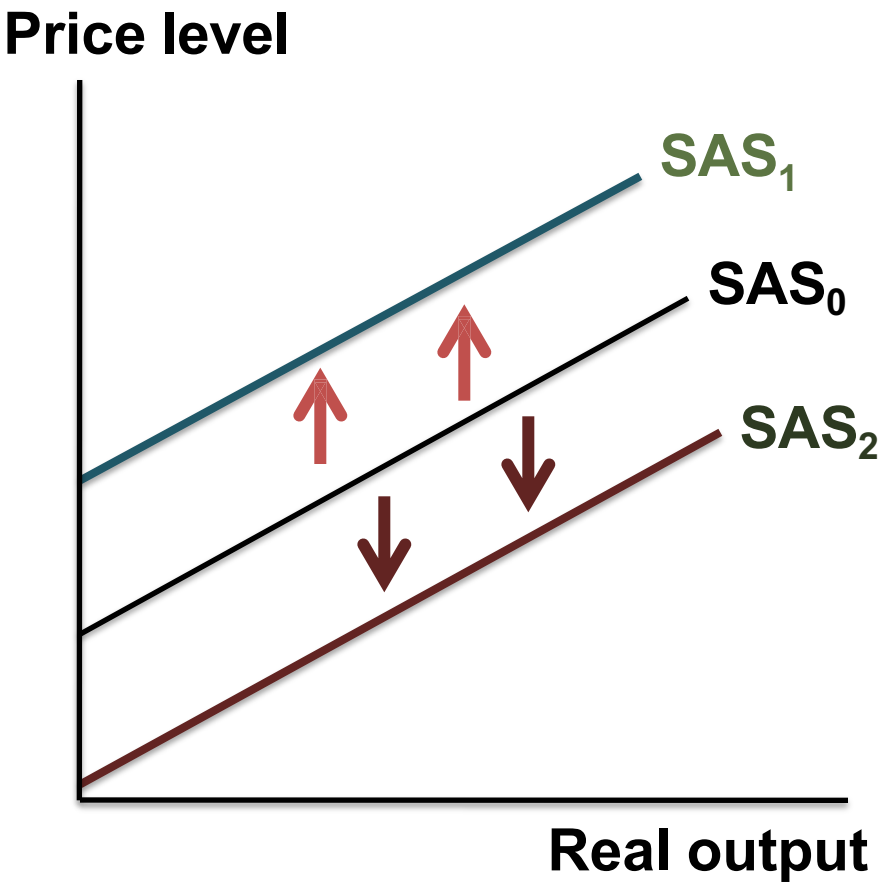
The Aggregate Supply Curves

The two reasons the *SAS* curve slopes upward are:

1. Upward-sloping supply curves in auction markets.

2. Firms' tendency to increase their markup when demand increases.

Shifts in the *SAS* Curve



Shifts in the *SAS* are caused by:

- Changes in Input prices
- Productivity
- Import prices
- Excise and sales taxes

When production costs increase, the *SAS* curve shifts up.

In general:

%Δ in price level =

%Δ in wages – %Δ in productivity

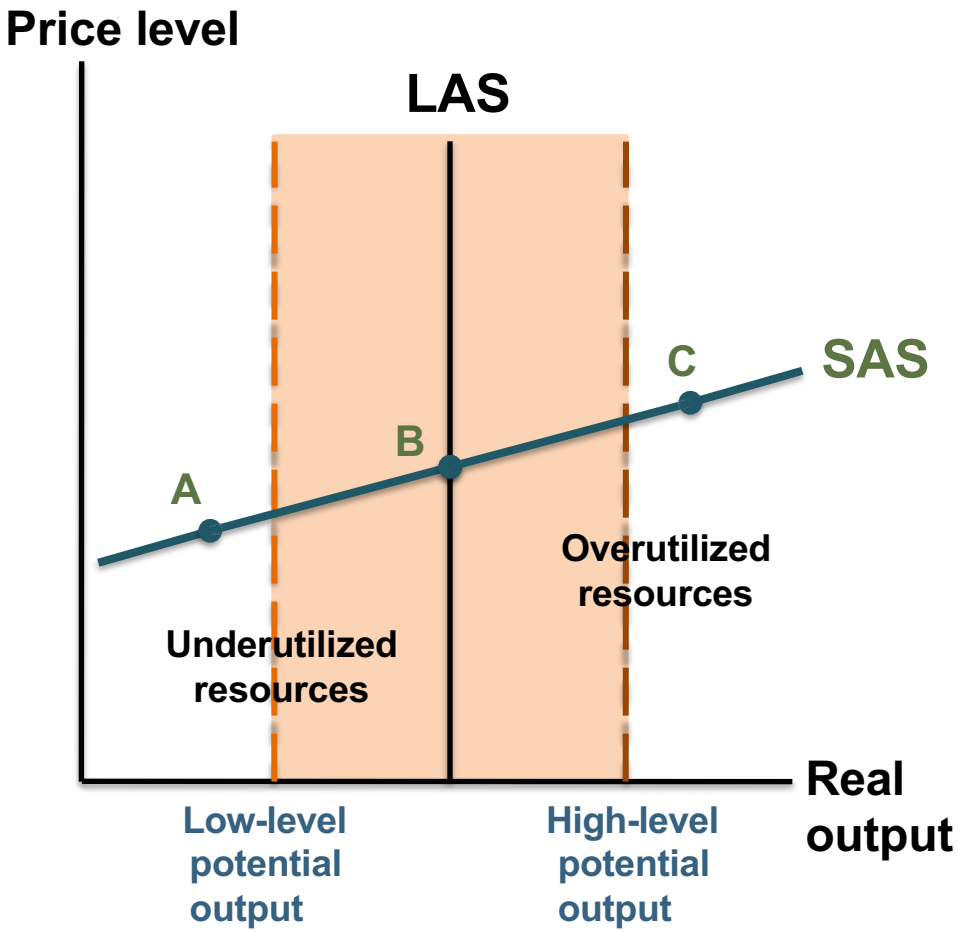
The Long-Run Aggregate Supply Curve

The long-run aggregate supply (*LAS*) curve shows the long-run relationship between output and the price level.

The position of the *LAS* curve depends on **potential output** which is the amount of goods and services an economy can produce when both capital and labor are employed at their maximum sustainable level.

The *LAS* curve is vertical because potential output is unaffected by the price level.

The *LAS* Curve

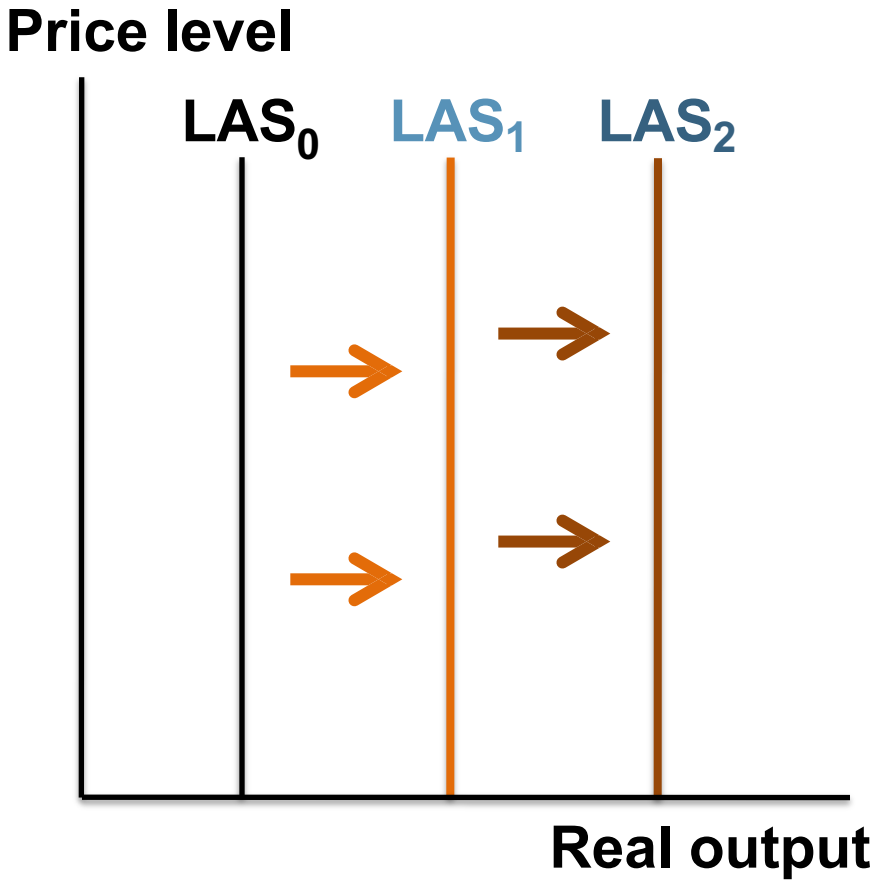


Potential output is assumed to be in the middle of a range bounded by high and low levels of potential output.

When resources are over-utilized (point C), factor prices may be bid up and the *SAS* shifts up.

When resources are under-utilized (point A), factor prices may decrease and *SAS* shifts down.

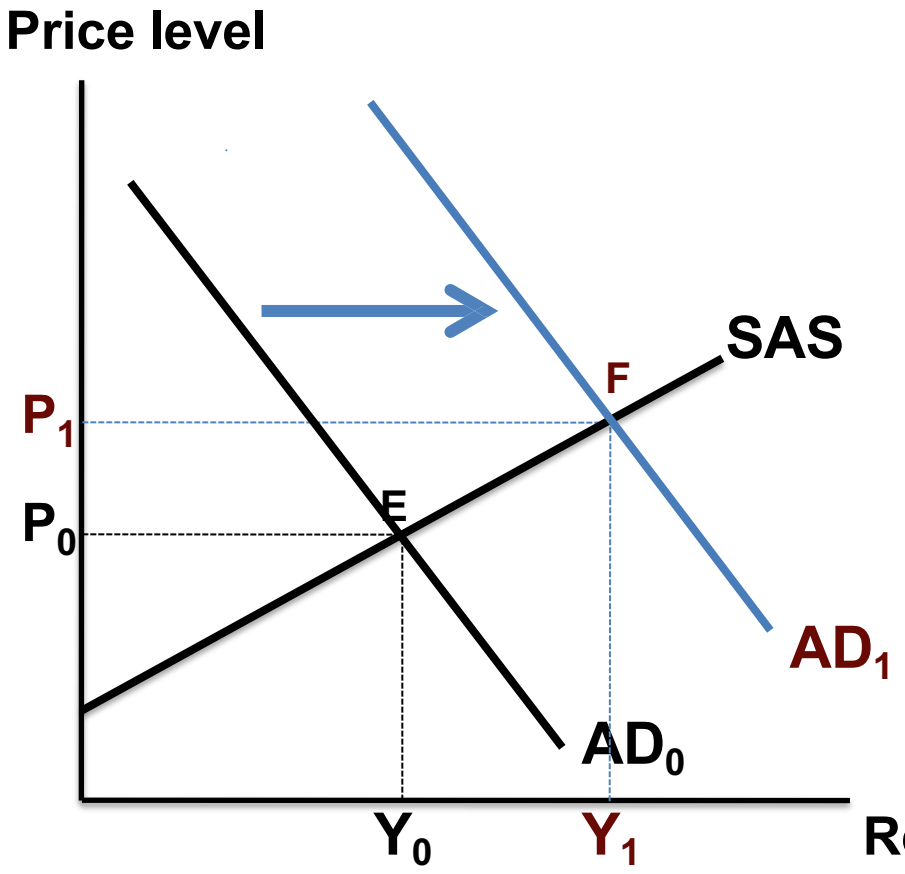
Shifts in the *LAS* Curve



Increases in the *LAS* are caused by increases in:

- Capital
- Available resources
- Growth-compatible institutions
- Technology
- Entrepreneurship

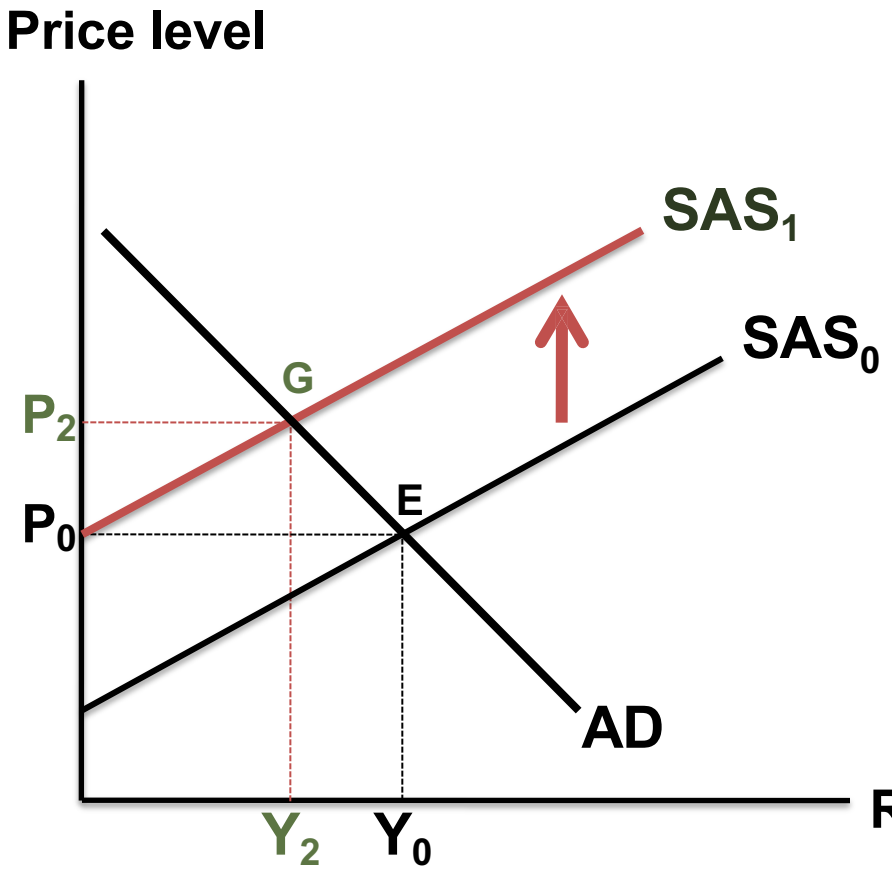
Short-Run Equilibrium in the *AD*/*AS* Model



Short-run equilibrium is where the *SAS* and *AD* curves intersect and point E is short-run equilibrium.

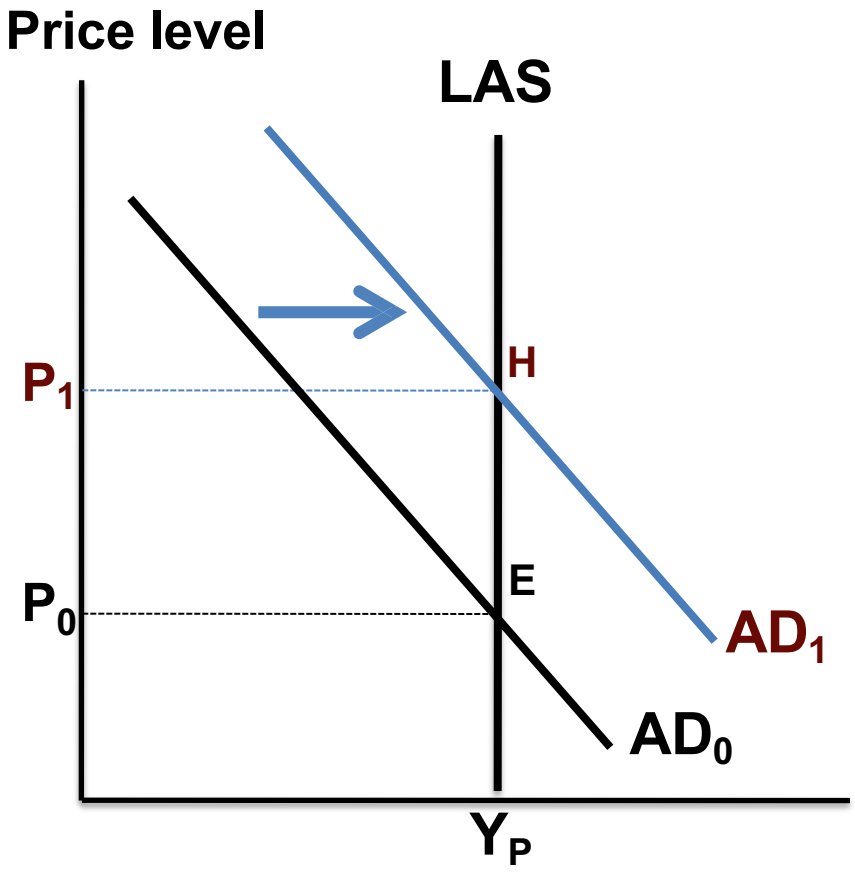
A shift in the aggregate demand curve to the right changes equilibrium from E to F, increasing output from Y_0 to Y_1 and increasing price level from P_0 to P_1.

Short-Run Equilibrium in the *AD*/*AS* Model



A shift up in the short-run aggregate supply curve changes equilibrium from E to G, decreasing output from Y_0 to Y_2 and increasing price level from P_0 to P_2.

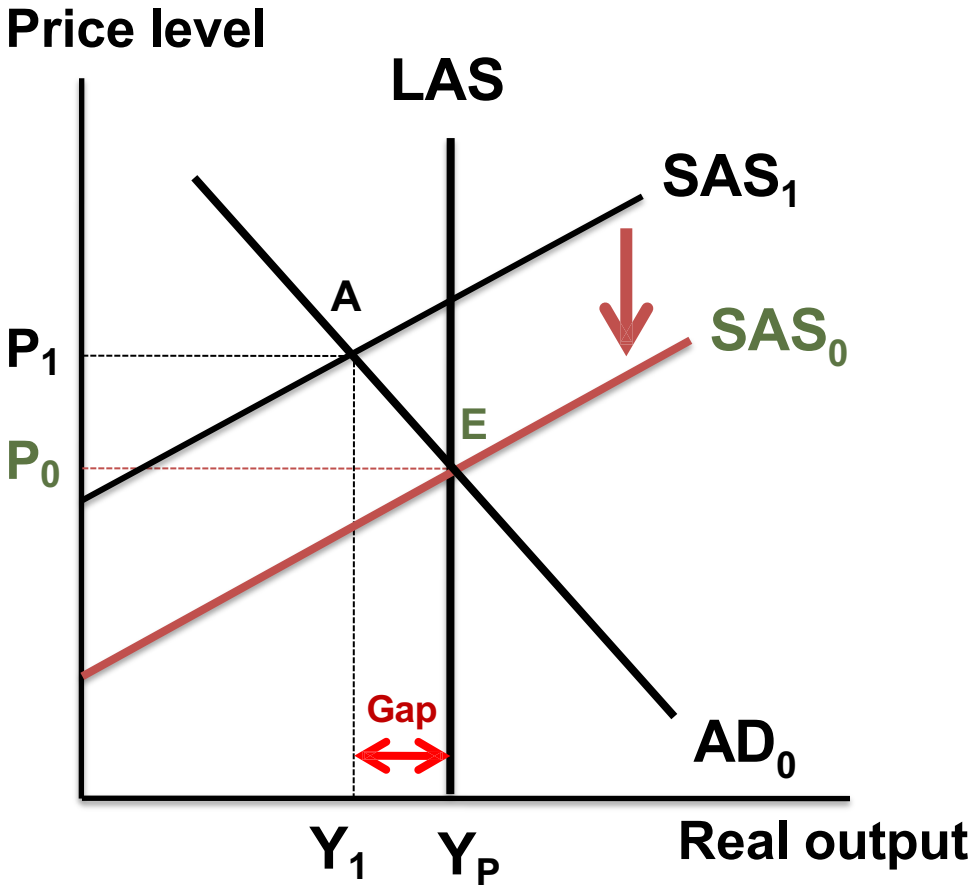
Long-Run Equilibrium in the *AD*/*AS* Model



Long-run equilibrium is where the LAS and AD curves intersect.

A shift in the aggregate demand curve changes equilibrium from E to H, increasing the price level from P_0 to P_1 but leaving output unchanged.

Application: A Recessionary Gap in the *AD*/*AS* Model

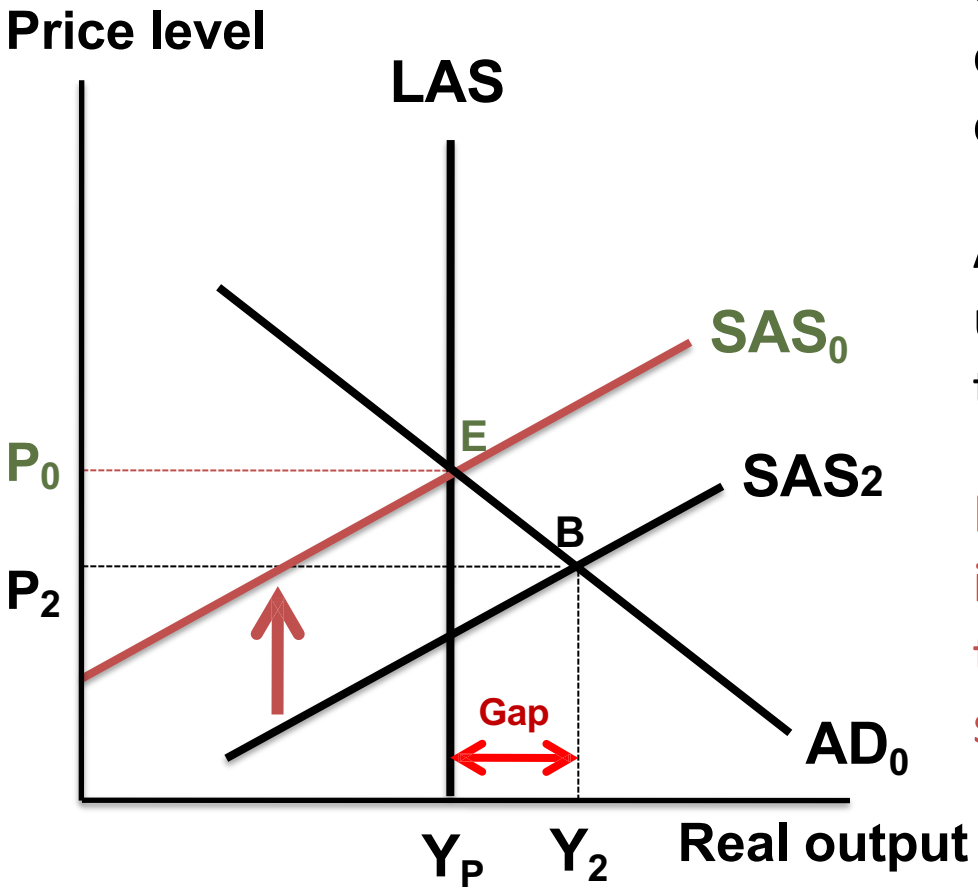


A **recessionary gap** is the amount by which equilibrium output is below potential output.

At point A, some resources are unemployed and the recessionary gap is $Y_P - Y_1$.

Eventually wages and prices decrease and *SAS* shifts down to return the economy to a long and short-run equilibrium at E.

Application: An Inflationary Gap in the *AD*/*AS* Model



An **inflationary gap** is the amount by which equilibrium output is above potential output.

At point B, resources are being used beyond their potential and the inflationary gap is $Y_2 - Y_P$.

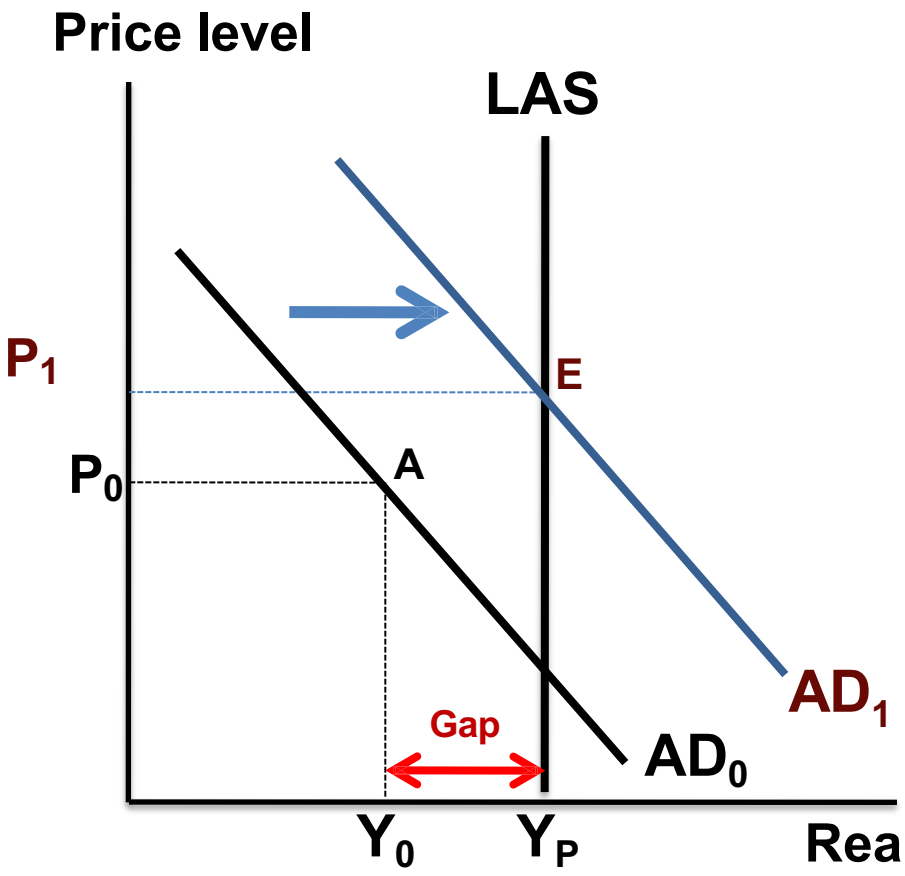
Eventually wages and prices increase and *SAS* shifts to return the economy to a long and short-run equilibrium at E.

Aggregate Demand Policy

A primary reason for government policy makers' interest in the AS/AD model is that monetary or fiscal policy shifts the AD curve.

- **Monetary policy** involves the Federal Reserve Bank changing the money supply and interest rates.
- **Fiscal policy** is the deliberate change in either government spending or taxes to stimulate or slow down the economy.

Application: Expansionary Fiscal Policy in the *AD*/*AS* Model

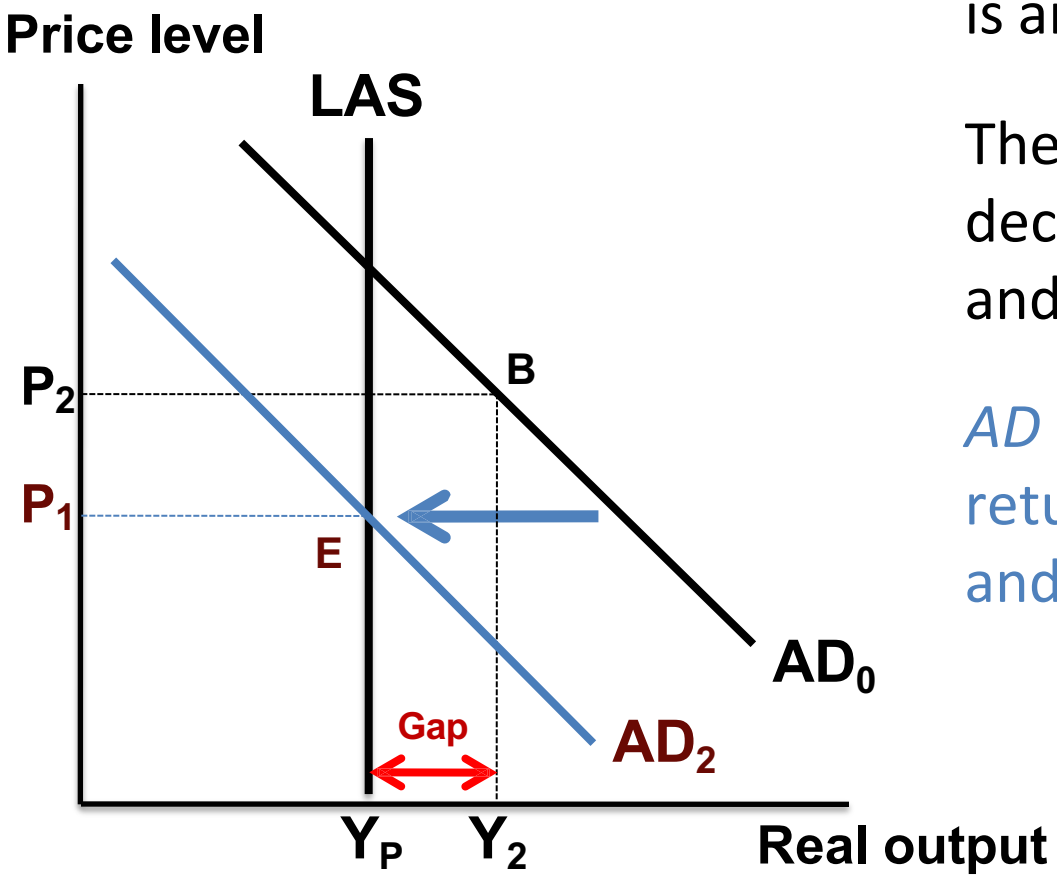


If the economy is at point A, there is a recessionary gap equal to $Y_P - Y_0$.

The appropriate fiscal policy is to increase government spending and/or decrease taxes.

AD shifts to the right and output returns to potential output Y_P and prices increase to P_1.

Application: Contractionary Fiscal Policy in the *AD*/*AS* Model



If the economy is point B, there is an inflationary gap $Y_2 - Y_P$.

The appropriate fiscal policy is to decrease government spending and/or increase taxes.

AD shifts to the left, output returns to potential output Y_P and inflation is prevented.

Limitations of the *AS*/*AD* Model

- The *AS*/*AD* model assumes away many possible feedback effects that can significantly affect the macroeconomy and lead to quite different conclusions.
- Implementing fiscal policy through changing taxes and government spending is a slow legislative process.
- There is no guarantee that government will do what economists say is necessary.

Limitations of the *AS*/*AD* Model

- Potential output (the level of output that the economy is capable of producing without generating inflation) is difficult to estimate.
- We do have ways to get a rough idea of where it is.
- There are many other possible interrelationships in the economy that the model does not take into account.
- The aggregate economy can become dynamically unstable, so a shock can set in motion changes that will not automatically be self-correcting.

Limitations of the *AS*/*AD* Model

There are two ways to think about the effectiveness of fiscal policy: in the model and in reality.

The effectiveness of fiscal policy depends on the government's ability to perceive and to react appropriately to a problem.

Countercyclical fiscal policy is fiscal policy in which the government offsets any change in aggregate expenditures that would create a business cycle.

Fine-tuning is used to describe such fiscal policy designed to keep the economy always at its target or potential level of income.

Chapter Summary (1 of 3)

The key idea of the Keynesian *AS*/*AD* model is that in the short run the economy can deviate from potential output.

The *AS*/*AD* model consists of the aggregate demand curve, and the short-run aggregate supply curve, and the long-run aggregate supply curve.

The aggregate demand curve slopes downward because of the interest rate effect, the international effect, the money wealth effect, and the multiplier effect.

The short-run aggregate supply (*SAS*) curve is upward- sloping because, while for the most part firms in the United States adjust production to meet demand instead of changing price, some firms will raise prices when demand increases.

Chapter Summary (2 of 3)

The long-run aggregate supply (*LAS*) curve is vertical at potential output.

The *LAS* curve shifts out when available resources, capital, labor, technology, and/or growth-compatible institutions increase.

Short-run equilibrium is where the *SAS* and *AD* curves intersect; Long-run equilibrium is where the *AD* and *LAS* curves intersect

Aggregate demand management policy attempts to influence the level of output in the economy

Chapter Summary (3 of 3)

Fiscal policy works by providing a deliberate countershock to offset unexpected shocks to the economy.

Macroeconomic policy is difficult to conduct because:

- Implementing fiscal policy is a slow process.
- We don't really know where potential output is.
- There are interrelationships not included in the model.
- The economy can become dynamically unstable.

We must estimate potential output by looking at past levels of potential output and by looking at where the price level begins to rise.

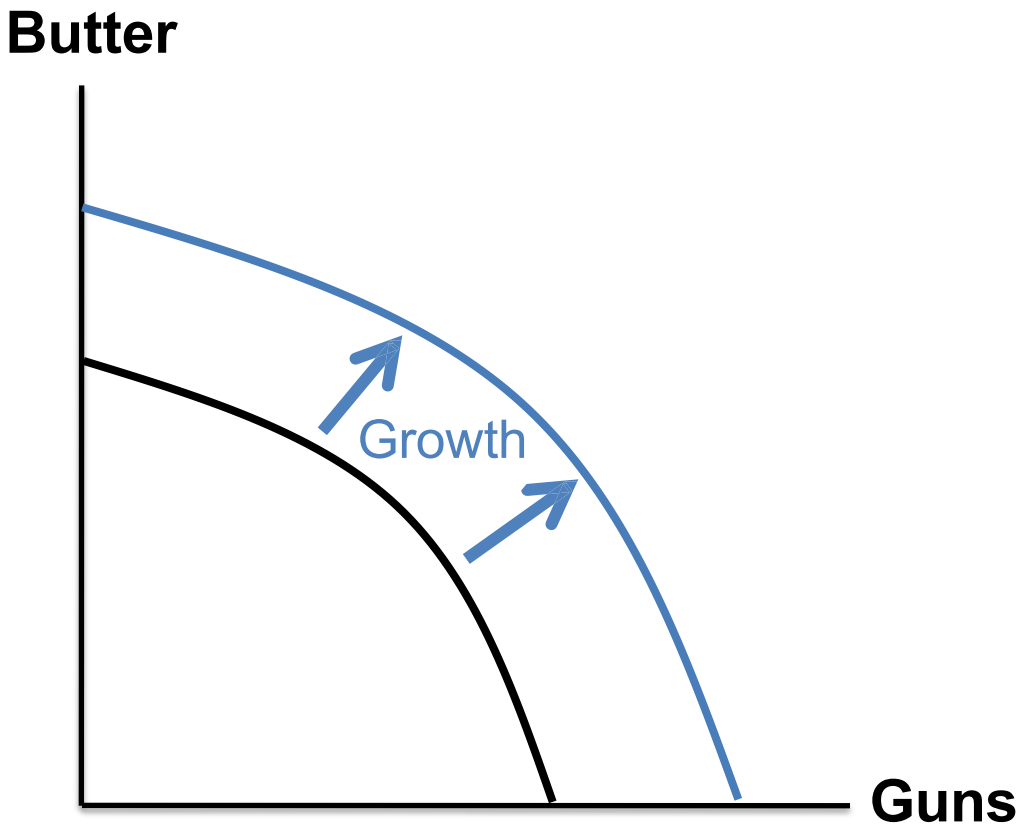
CHAPTER 5

The Classical Long-Run Policy Model: Growth and Supply-Side Policies

Chapter Goals

- Define growth, list its benefits and costs, and relate it to living standards.
- Discuss the relationship among markets, specialization, and growth.
- List five important sources of growth.
- Explain how the sources of growth can be turned into growth.

Production Possibility Curves



The analysis of growth focuses on forces that shift out the production possibility curve.

Growth and the Economy's Potential Output

Growth is an increase in potential output.

Potential output is the highest amount of output an economy can produce from existing production processes and resources.

- At potential output, an economy is operating on its production possibility curve.
- When below its potential output, an economy is operating inside its production possibility curve.
- Growth focuses on shifting out the production possibility curve.

Growth and the Economy's Potential Output

Productivity is output per unit of input.

The long-run growth focuses on supply; it assumes demand is sufficient to buy whatever is supplied.

Say's Law - supply creates its own demand.

The short-run focus is on how to get the economy operating at its potential.

The Benefits and Costs of Growth

Benefits of economic growth:

- Allows everyone in society, on average, to have more

Politically, growth (or predictions or growth) allows governments to avoid hard distributional questions.

Costs of economic growth:

- Pollution
- Resource exhaustion
- Destruction of natural habitat

Markets, Specialization, and Growth

Markets, specialization, and the division of labor increase productivity and growth.

- **Specialization** is the concentration of individuals on certain aspects of production.
- **Division of labor** is the splitting up of a task to allow for specialization of production.

Markets may seem unfair because of the effect that they have on the distribution of income.

Economic Growth, Distribution, and Markets

Even though growth isn't evenly distributed, it generally raises the incomes of the poor.

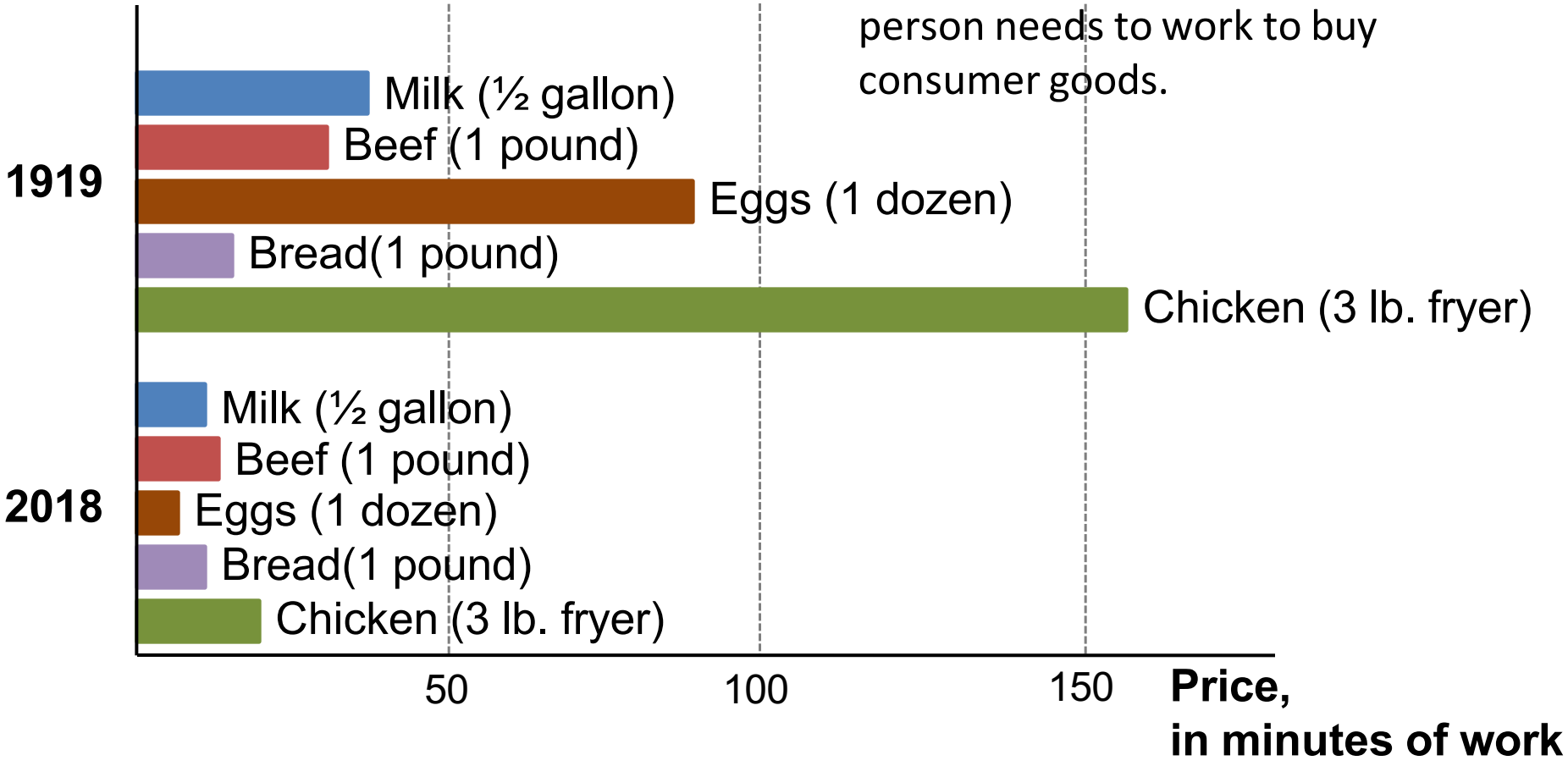
Today, the U.S. poverty level of a family of four is about $25,300.

If we go back 100 years ago in U.S. history, and adjust for inflation, that $25,300 income would put a family in the upper middle class.

Markets and growth had made that possible.

Cost of Goods in Hours of Work

Growth in the U.S. economy in the past century has reduced the number of hours the average person needs to work to buy consumer goods.



Per Capita Growth

- Per capita output is total output divided by total population.
- **Per capita growth** means the country is producing more goods and services per person.

  Per capita growth = **%** change in output **–** **%** change in population

- Some suggest that median income is a better measure because it takes into account how income is distributed.

The Sources of Growth

Economists identify five important sources of growth:

1. Growth-compatible institutions
2. Investment and accumulated capital
3. Available resources
4. Technological development
5. Entrepreneurship

Growth-Compatible Institutions

- Markets and private ownership of property foster economic growth.
- When individuals get much of the gains of growth themselves, they work harder.
- Corporations are growth-compatible institutions because of limited liability, which gives stockholders an incentive to invest their savings in large enterprises.
- Informal property rights limit borrowing by the poor, and hence limit growth.

Investment and Accumulated Capital

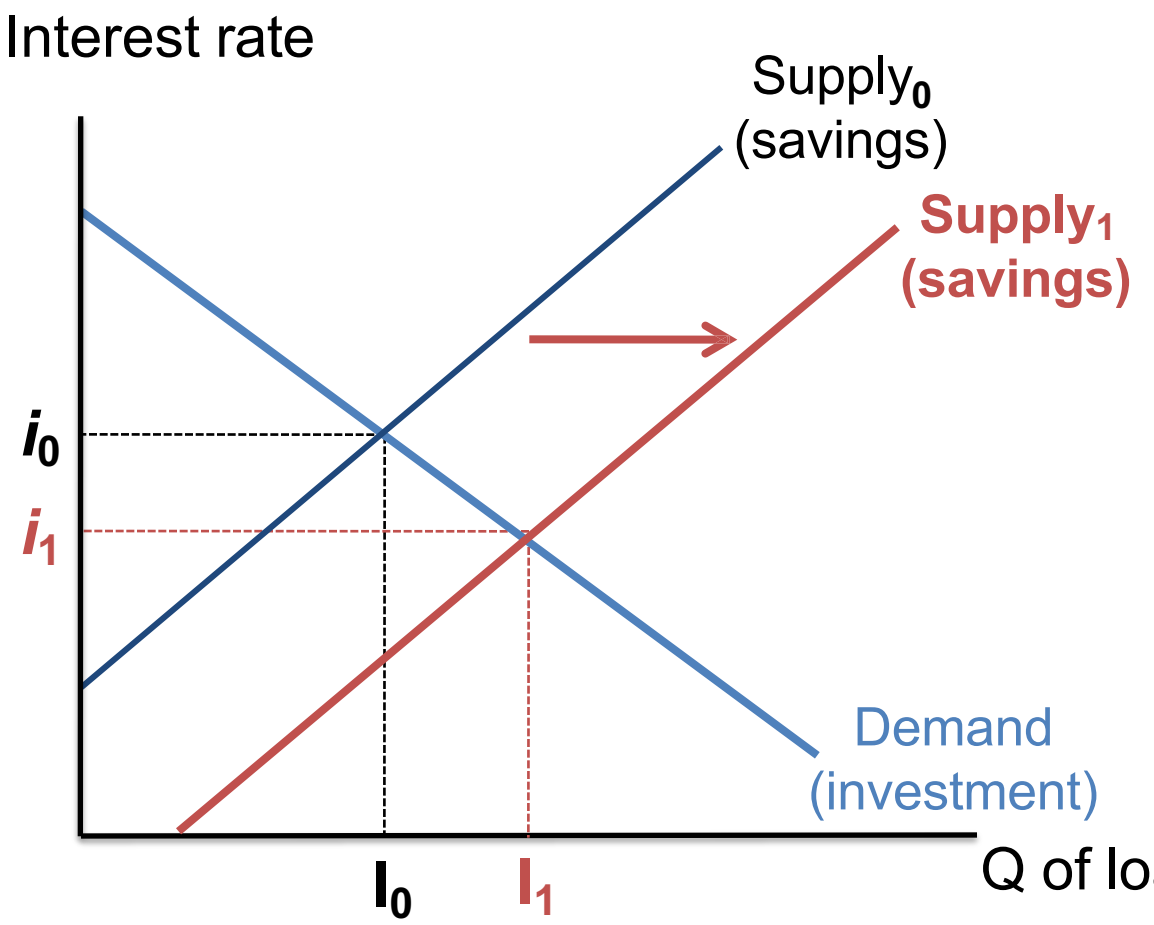
Although capital is a key element in growth, capital accumulation does not necessarily lead to growth.

Capital may become obsolete.

Capital is much more than physical machines and includes:

- **Human capital** are skills that workers gain from experience, education, and on-the-job training
- **Social capital** is the habitual way of doing things that guides people in how they approach production

The Loanable Funds Market



When the supply of loanable funds (savings) increases, the interest rate falls and the quantity of loanable funds demanded (investment) increases.

Available Resources

The growth in the U.S. in the 20th century was due in part to its large supply of natural resources.

What is a resource depends on the production processes of an economy and technology.

Greater participation in the market is another means by which to increase available resources.

Available Resources

New technology can overcome a lack of resources.

New options being explored:

- Geothermal energy
- Algae-produced fuel
- Wind power
- Plug-in cars
- Fuel cells
- Sugarcane-based ethanol
- Nuclear

Technological Development

Technology is the way we make goods and supply services.

- Changes in technology and changes in the goods and services we buy fuel growth.
- Advances in technology shift the production possibility curve *outward* by making workers more productive.
- Important developments in biotechnology, computers, and communications have helped fuel U.S. growth.

Entrepreneurship

Entrepreneurship is the ability to get things done using creativity, vision, willingness to accept risk, and a talent for translating vision into reality.

Examples of American entrepreneurs include:

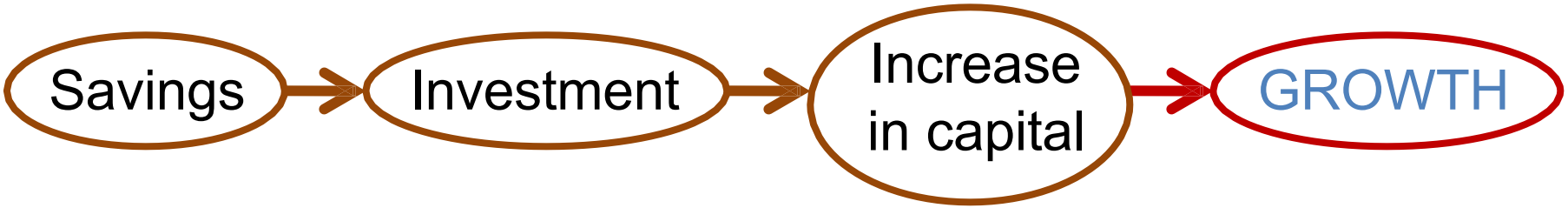
- Thomas Edison – generation and use of electricity
- Henry Ford – automobile production
- Bill Gates – computers and software
- Mark Zuckerberg – Facebook
- Jeff Bezos – Amazon

The Classical Growth Model

The Classical growth model is a theory of growth that focuses on the role of capital in the growth process.

According to the Classical growth model, the more capital an economy has, the faster it will grow.

Classical economists focused their analysis and their policy advice on how to increase investment because saving leads to growth.



The Law of Diminishing Marginal Productivity

Law of diminishing marginal productivity states that as more and more of a variable input is added to an existing fixed input, eventually the additional output produced with that additional input falls.

The predictions for the long term were incorrect because increases in technology and capital overwhelmed diminishing marginal productivity.

The focus changed to technology, not land or capital.

Without growth in technology, investment will not generate sustained growth. Eventually the per capita growth would stagnate.

Technology

Technological advance is the result of what the economy does.

- Invests in research and development
- Makes advances in pure science
- Works out new ways to organize production

The common knowledge aspect of technology creates positive externalities which is the key to growth.

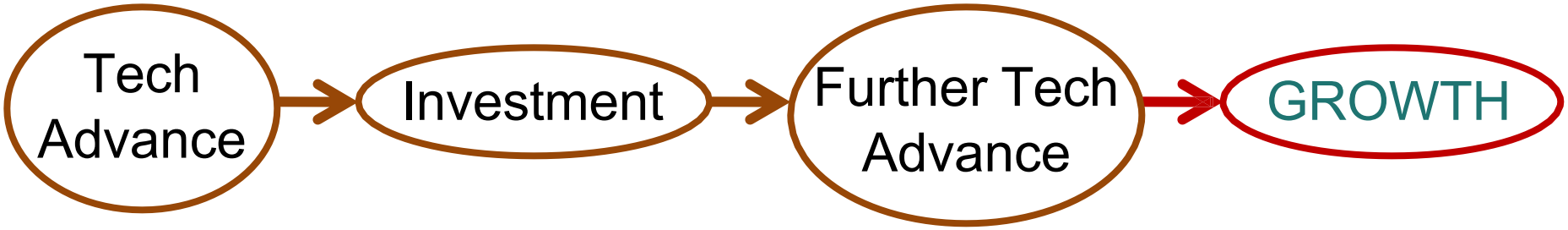
- **Positive externalities** are positive effects on others not taken into account by the decision maker.

New Growth Theory

New growth theory is a theory that emphasizes the role of technology in the growth process.

Technology is recognized as an important ingredient in growth.

Modern growth theory is named new growth theory.



Growth Policies

General policies that are good for growth include:

- Encouraging saving and investment
- Formalizing property rights and reducing bureaucracy and corruption
- Providing more of the right kind of education
- Promoting policies that encourage technological innovation
- Promoting policies that allow taking advantage of specialization

Chapter Summary (1 of 3)

Growth is an increase in the amount of goods and services an economy can produce when both labor and capital are fully employed.

Growth increases potential output and shifts the production possibility curve out, allowing an economy to produce more goods.

Markets allow specialization and division of labor, which increases productivity and leads to growth.

Per capita growth means producing more goods and services per person. It can be calculated by subtracting the percentage change in the population from the percentage change in output.

Chapter Summary (2 of 3)

Five sources of growth are (1) growth-compatible institutions (2) capital accumulation (3) available resources (4) technological development and (5) entrepreneurship.

The loanable funds market translates saving into investment that is necessary for growth and the interest rate equilibrates saving and investment.

The Classical growth model focuses on the role of capital accumulation in the growth process. The law of diminishing productivity limits growth of per capita income.

Chapter Summary (3 of 3)

New growth theory emphasizes the role of technology in the growth process.

Advances in technology have overwhelmed the effects of diminishing marginal productivity.

Policies that are good for growth are those that: (1) encourage saving and investment, (2) formalize property rights, (3) provide the right kind of education, (4) encourage technological innovation, and (5) take advantage of specialization.

CHAPTER 6

The Fiscal Policy Dilemma

Chapter Goals

- Summarize the Classical view of sound finance.
- Summarize the Keynesian view of functional finance.
- List six assumptions of the *AS/AD* model that lead to potential problems with the use of fiscal policy.
- Explain how automatic stabilizers work.

The Fiscal Policy Dilemma

The fiscal policy dilemma is what to do in periods of structural stagnation when both deficits and a balanced budget are called for.

- When an economy falls into a structural stagnation, the effectiveness of expansionary demand-side policy is limited.
- International conditions, political considerations, and institutional issues make it impossible to achieve a sustainable growth rate consistent with the type of jobs and pay acceptable by most people.

Classical Economics and Sound Finance

Economists' view of public finance and fiscal policy before 1930's supported:

- **Sound finance,** a view of fiscal policy that the government budget should always be balanced except in wartime
  - This view was based on a combination of political and economic grounds, but primarily on political grounds

Ricardian Equivalence Theorem: Deficits Don't Matter

Classical economists also believed the argument for balanced budgets were weak. David Ricardo's theory is called the Ricardian equivalence theorem.

Ricardian equivalence theorem: Deficits do not affect the level of output because people increase savings to pay future taxes to repay the deficit.

Most economists felt that, in practice, deficits could affect output and that it mattered a lot.

The Sound-Finance Precept

Given the collapse of economic expectations in the 1930s, many economists of the time favored giving up the principle of sound finance, at least temporarily, and using government spending to stimulate the economy.

If the economy is in a small recession, do nothing.

If the economy is in a depression, use deficit spending.

Keynesian Economics and Functional Finance

In 1940's, economists view of public finance and fiscal policy changed with J.M Keynes' *The General Theory* and followed with Abba Lerner's *The Economics of Control.*

Functional finance held that governments should make spending and taxing decisions on the basis of their effect on the economy, not on the basis of some moralistic principle that budgets should be balanced.

If spending was too low, government should run a deficit; if spending was too high, government should run a surplus.

Functional finance nicely fits the *AS*/*AD* model.

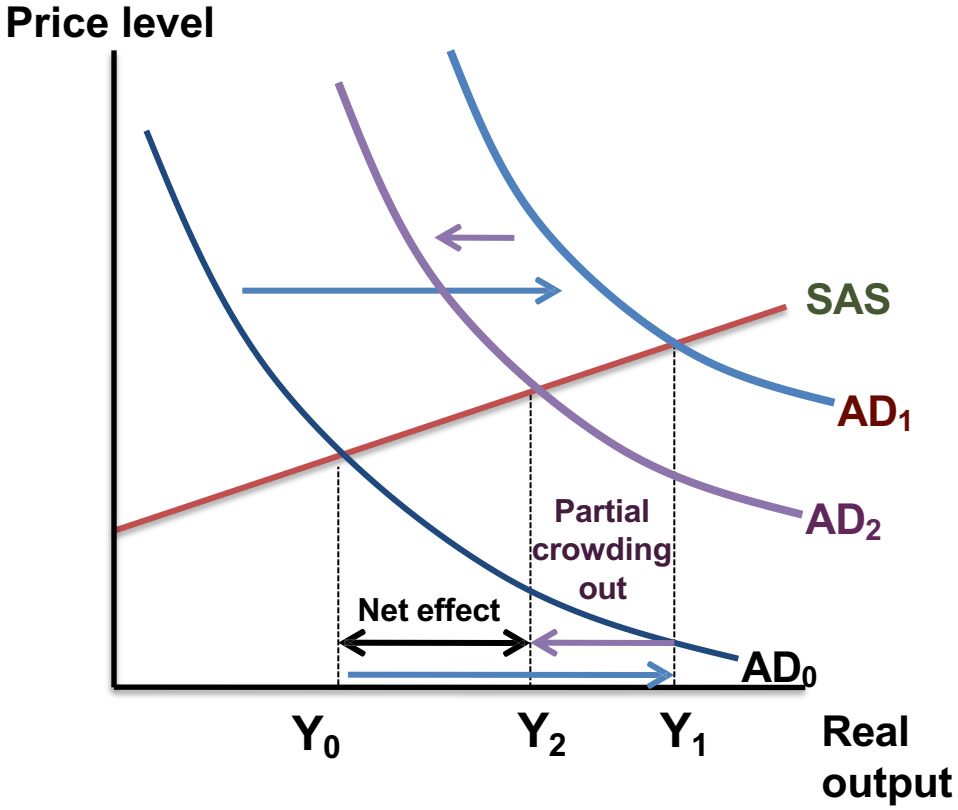
Assumptions of the *AS/AD* Model

Six assumptions of the *AS/AD* model that could lead to problems with fiscal policy are:

1. Financing the deficit doesn't have any offsetting effects.
2. Government knows what the situation is.
3. Government knows the economy's potential income level.
4. Government has flexibility in changing spending and taxes.
5. The size of the government debt doesn't matter.
6. Fiscal policy doesn't negatively affect other goals.

Crowding Out

Crowding out is the offsetting of a change in government expenditures by a change in private expenditures in the opposite direction.



The Government Knows the Situation

Data problems limit fiscal policy for fine tuning.

- Getting reliable numbers on the economy takes time.
- We may be in a recession and not know it.

The government relies on large macroeconomic models and leading indicators to predict where the economy will be like in the future, but the forecasts are imprecise.

The Government Knows the Economy's Potential Income Level

No one knows for sure the potential *full-employment* income.

Economists now see full employment to be closer to 4 percent.

Differences in estimates of potential income often lead to different policy recommendations.

In most cases, the U.S. economy is in an ambiguous state where some economists are calling for expansionary policy and others are calling for contractionary policy.

The Government has Flexibility in Changing Taxes and Spending

Putting fiscal policy into place takes time and has serious implementation problems.

Numerous political and institutional realities in the U.S. today make implementing fiscal policy difficult.

Disagreements between Congress and the President may delay implementing appropriate fiscal policy for months, even years.

The Size of the Government Debt Doesn't Matter

Although there is no inherent reason why activist functional finance policies should have caused persistent deficits, increases in government debt have occurred for three reasons:

1. Early activists favored not only fiscal policy, but also large increases in government spending.

2. Politically it's easier for government to increase spending and decrease taxes than vice versa.

3. Most economists believe that a country's debt becomes a problem somewhere around 90 to 100 percent of a country's GDP.

Fiscal Policy Doesn't Negatively Affect Other Government Goals

A society has many goals: achieving potential income is only one of those goals.

National economic goals may conflict.

For example, when the government runs expansionary fiscal policy, the trade deficit increases.

Building Fiscal Policies into Institutions

To avoid the problems of direct fiscal policy, economists have attempted to build fiscal policy into U.S. institutions.

An **automatic stabilizer** is any government program or policy that will counteract the business cycle without any new government action.

Automatic stabilizers include:

- Welfare payments
- Unemployment insurance
- The income tax system

How Automatic Stabilizers Work

When the economy is in a recession, the unemployment rate rises.

Unemployment insurance is automatically paid to the unemployed, offsetting some of the fall in income.

Income tax revenues also decrease when income falls in a recession, providing a stimulus to the economy.

Automatic stabilizers also work in reverse.

- When the economy expands, government spending for unemployment insurance decreases and taxes increase.

State Government Finance and Procyclical Fiscal Policy

State constitutional provisions mandating balanced budget act as automatic destabilizers.

- During recessions states cut spending and raise taxes.
- During expansions states increase spending and cut taxes.

Procyclical fiscal policy is changes in government spending and taxes that increase the cyclical fluctuations in the economy instead of reducing them.

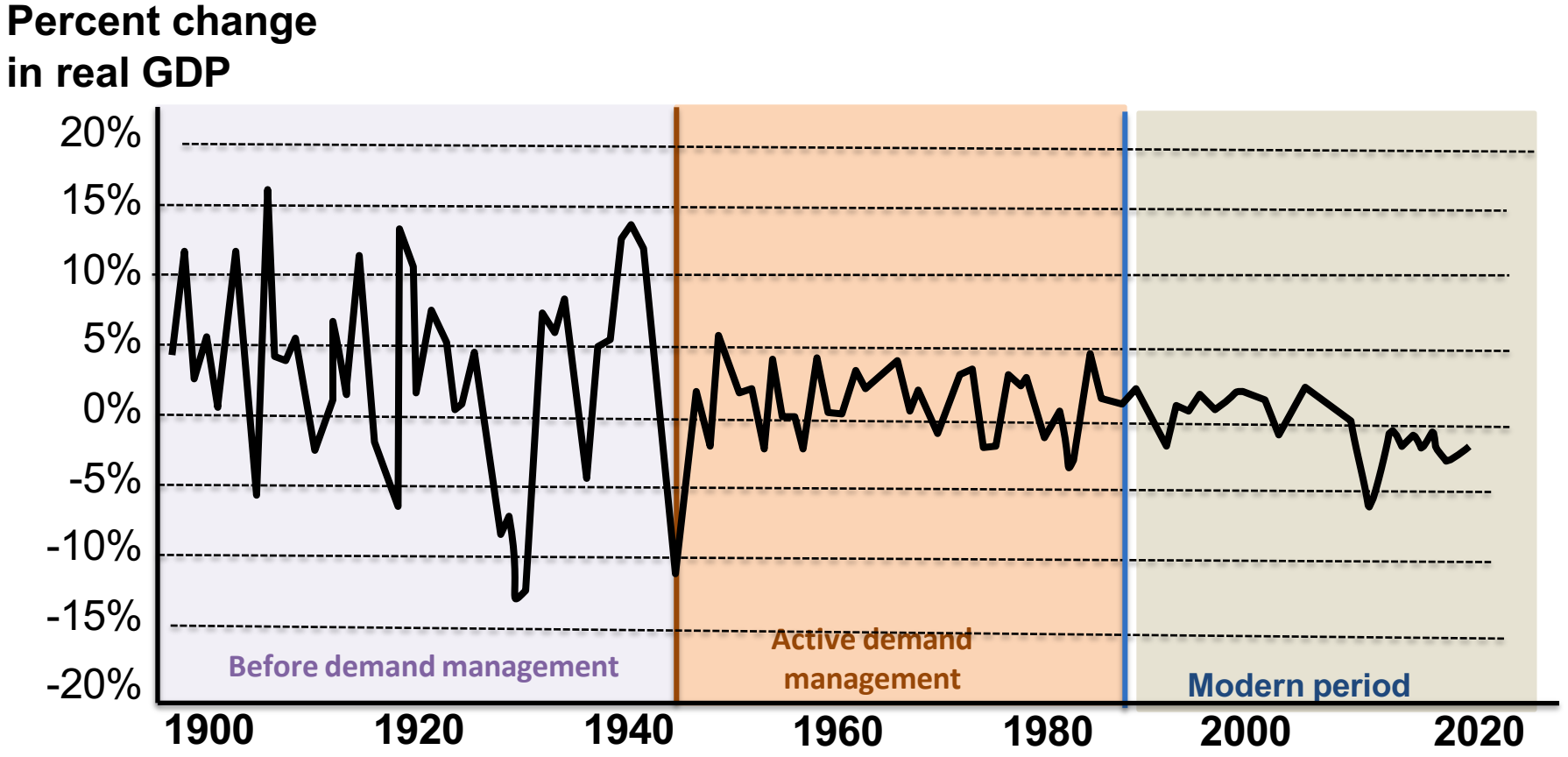
The Negative Side of Automatic Stabilizers

When the economy is first starting to climb out of a recession, automatic stabilizers will slow the process, rather than help it along, for the same reason they slow the contractionary process.

As income increases, automatic stabilizers increase government taxes and decrease government spending, and as they do, the discretionary policy's expansionary effects are decreased.

Decrease in Fluctuations in the Economy

Compared to the early 1900s, fluctuations in the economy have decreased; this suggests that policy makers have done something right.



Conclusion

The modern macro policy precept is a blend of functional and sound finance.

Modern economists' suggestion of government policy in a recession is to do nothing in terms of specific tax or spending policy, but let the automatic stabilizers in the economy do the adjustment. The two exceptions to this rule:

1. When falling into a severe recession or depression, then the government should run expansionary fiscal policy.
2. When experiencing a hyperinflation, the government should run a contractionary fiscal policy.

Chapter Summary (1 of 3)

Sound finance is a view that the government budget should always be balanced except in wartime.

The Ricardian equivalence theorem states that it doesn't matter whether government spending is financed by taxes or deficits; neither would affect the economy.

Although proponents of sound finance believed the logic of the Ricardian equivalence theorem, they believed deficit spending could affect the economy.

Still, because of political and moral issues, proponents of sound finance promoted balanced budgets.

Chapter Summary (2 of 3)

Functional finance is the theoretical proposition that governments should make spending and taxing decisions based on their effect on the economy, not moralistic principles.

Six problems that make functional finance difficult to implement are:

1. Interest rate crowding out.
2. The government not knowing what the situation is.
3. The government not knowing the economy's potential income.
4. Government's inability to respond quickly enough.
5. The size of government debt not mattering.
6. Conflicting goals.

Chapter Summary (3 of 3)

Activist fiscal policy is now built into U.S. economic institutions through automatic stabilizers.

Economists agree that if the economy is headed toward a depression or hyperinflation, follow the precepts of functional finance—expansionary fiscal policy to offset a depression and contractionary fiscal policy to offset hyperinflation. If the economy is experiencing moderate fluctuations, follow the precepts of sound finance—balance the budget.

CHAPTER 7

Inflation, Deflation, and Macro Policy

Chapter Goals

- Know the difference between goods inflation and asset inflation.
- List and discuss the costs and benefits of inflation.
- Summarize the inflation process and the quantity theory of money.
- Define the Phillips curve relationship between inflation and unemployment.

Defining and Measuring Inflation

Inflation is a continuous rise in the price level and is measured with price indexes.

There are two types of inflation:

- Goods price inflation
- Asset price inflation

Asset prices and goods prices don't always move in tandem because there are periods of asset price bubbles.

Defining and Measuring Inflation

Asset price inflation occurs when the prices of assets rise more than their "real" value.

Assets include: gold, houses, artwork, collectibles, land, stocks, bonds and many other items that people hold as a store of wealth.

There is no measure of asset price inflation since it's difficult to know when the real value of assets increase.

Does Asset Inflation Matter?

- The ratio of nominal wealth to nominal GDP can serve as a rough estimate whether asset price inflation exceeds goods price inflation.
- Asset price inflation can lead to serious misallocation of resources from conservative to risky investments.
- Asset deflation reverses many of the positive effects of asset inflation.
- The pain caused by the asset price deflation exceeds the pleasure caused by the asset price inflation.

The Distributional Costs of Inflation

Unexpected inflation redistributes income from lenders to borrowers.

- If lenders charge a nominal rate of 5% and expect inflation to be 2%, the expected real rate is 3%.
- If inflation is actually 4%, the real rate is only 1%.

People who do not expect inflation or who are tied to fixed nominal contracts will likely lose in an inflationary period.

The Distributional Costs of Asset Price Inflation

People who bet on rising asset prices are helped and those did not are hurt.

Cautious borrowers are hurt because they see the asset prices as being too high, and choose not to borrow.

Less cautious borrowers are helped because they borrow at low interest rates and receive high returns when their assets increase in value.

The Benefits of (Low) Inflation

Inflation can facilitate relative price changes.

Allowing more expansionary monetary policy.

> **Zero interest rate lower bound** – a limit on how much interest rates can fall.

Inflation as a placebo – inflation pushes up the value of assets which encourages people to invest.

The Danger of Accelerating Inflation

Asset price inflation redistributes wealth from cautious individuals to less cautious individuals.

Goods price inflation redistributes income, and reduces the amount of information prices are supposed to convey.

Inflation is a very serious problem if it increases to **hyperinflation,** when inflation hits triple digits, 100 percent or more a year.

Hyperinflation breaks down confidence in the monetary system, the economy, and the government.

The Inflation Process and The Quantity Theory of Money

Expectations play a key role in the inflationary process.

Rational expectations are the expectations that the economists' models predict.

Adaptive expectations are expectations based in some way on the past.

Extrapolative expectations are expectations that a trend will continue.

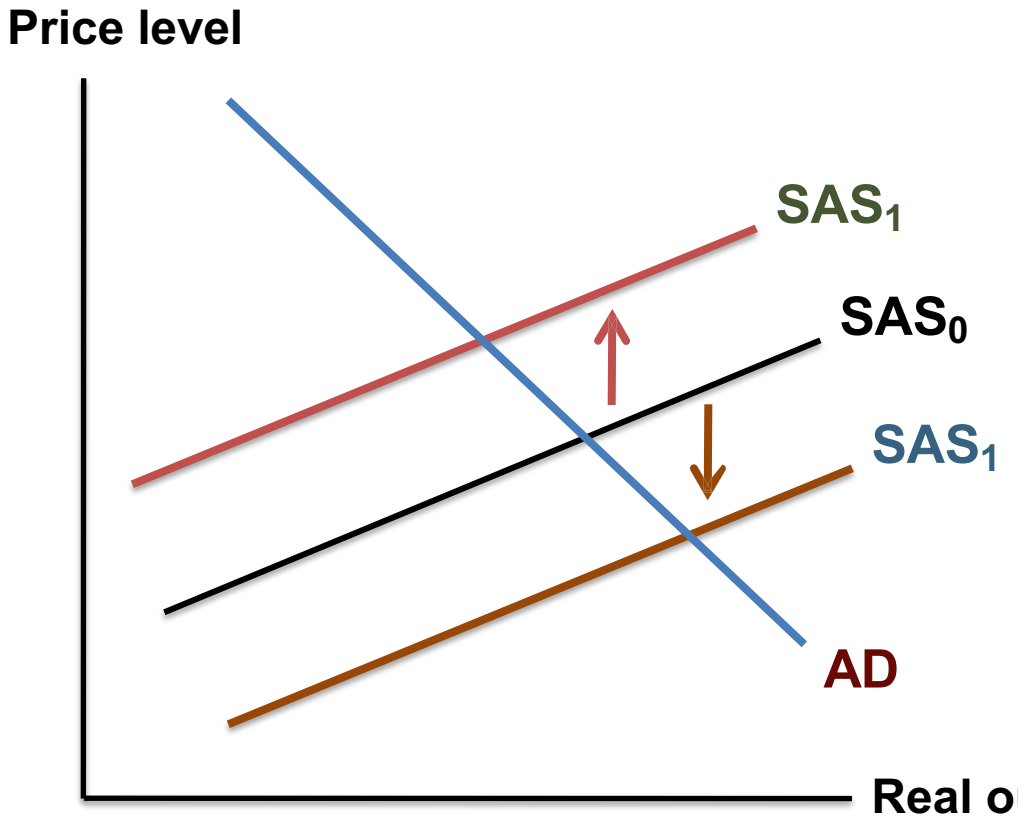
Productivity, Inflation, and Wages

Changes in productivity and changes in wages determine whether inflation may be coming.

There will be no inflationary pressures if wages and productivity increase at the same rate.

Inflation = Nominal wage increases – Productivity growth

Nominal Wages, Productivity, and Inflation



When nominal wages increase by more than the growth of productivity, the SAS curve shifts up, resulting in inflation.

When nominal wages increase by less than the growth of productivity, the *SAS curve shifts* down, resulting in deflation.

The Quantity Theory of Money and Inflation

The **quantity theory** emphasizes the connection between money and inflation.

The **equation of exchange** is: **MV = PQ**

M = Quantity of money Q = Real output

V = Velocity of money P = Price level

Velocity of money is the number of times per year, on average, a dollar gets spent on goods and services.

$$\text{Velocity} = \frac{\text{Nominal GDP}}{\text{Money Supply}}$$

Three Assumptions of Quantity Theory

1. Velocity is constant.
2. Real output (Q) is independent of money supply.
    - Q is autonomous, determined by forces outside those in the quantity theory.
3. Causation goes from money to prices.
    - The quantity theory says that the price level varies in response to changes in the quantity of money.
    - $\%\Delta M \rightarrow \%\Delta P$
    - $MV \rightarrow PQ$

The Declining Influence of the Quantity Theory

Velocity is not constant: Since 2008 velocity has decreased enormously.

Breakdown in the connection between money and inflation: In 2008, the money supply fell significantly, but goods inflation hardly fell at all.

Even though the quantity theory is no longer directly applicable, its general point remains relevant.

Inflation and the Phillips Curve Trade-Off

The **short-run Phillips curve** is a downward-sloping curve showing the relationship between inflation and unemployment when expectations of inflation are constant.

In the 1970s, there was **stagflation**, the combination of high and accelerating inflation and high unemployment.

The Long-Run and Short-Run Phillips Curves

Actual inflation depends both on supply and demand forces and on how much inflation people expect.

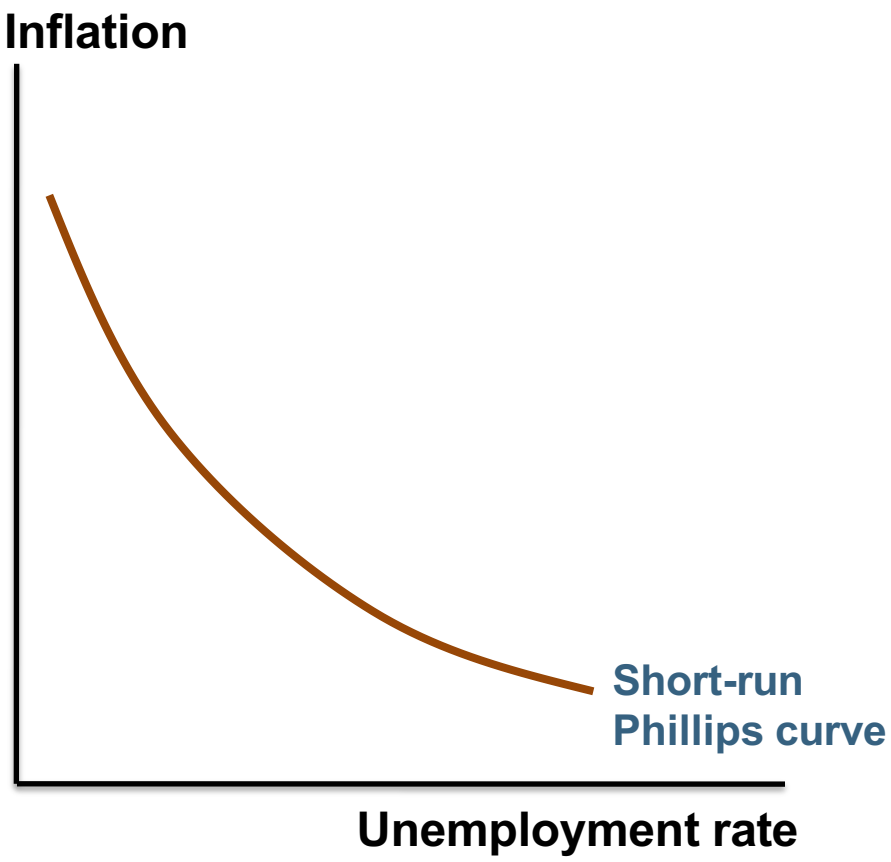
At all points on the **short-run Phillips curve**, expectations of inflation (the rise in the price level that the average person expects) are fixed.

At all points on the **long-run Phillips curve**, expectations of inflation are equal to actual inflation.

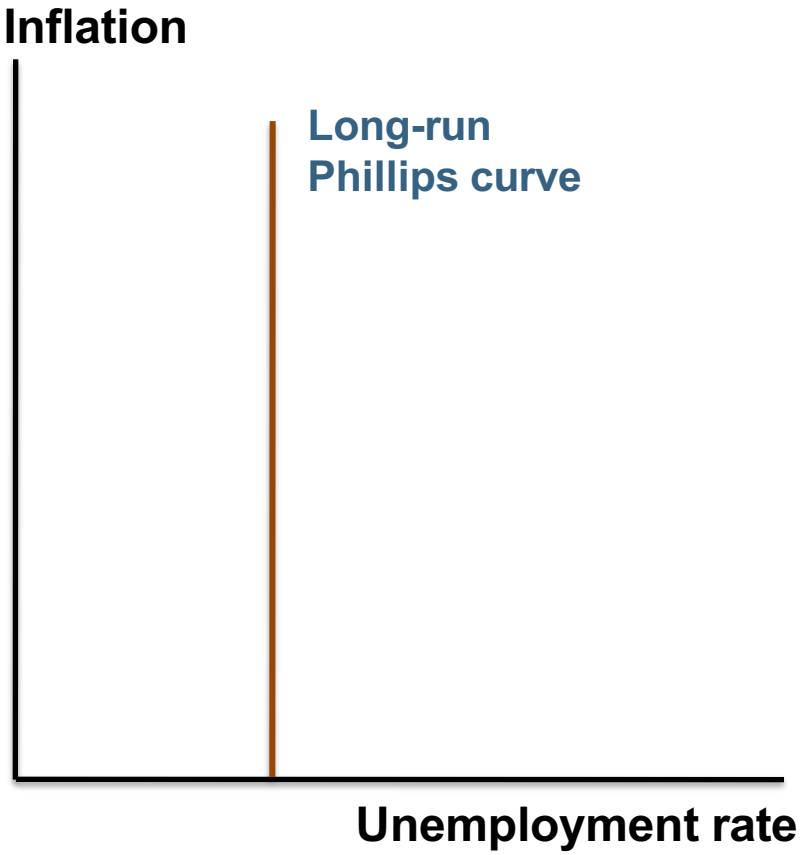
The ***long-run Phillips curve*** is a vertical curve at the unemployment rate consistent with potential output.

The Phillips Curve Trade-Off

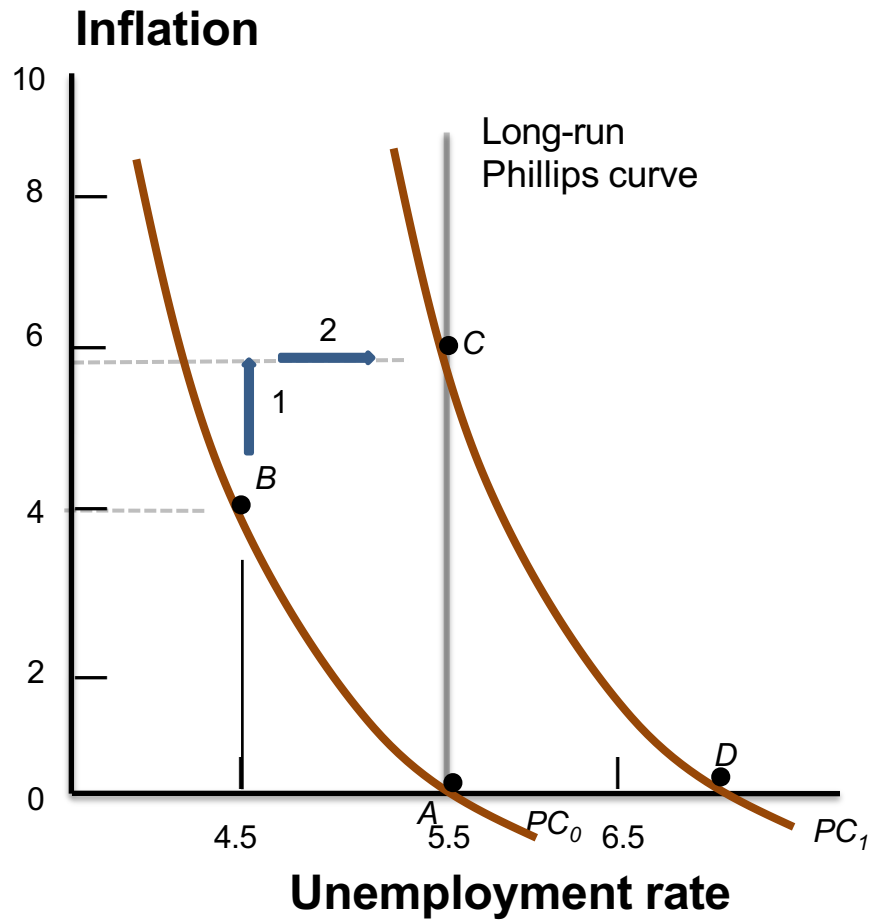
In the short-run Phillips curve, there is a trade-off between inflation and unemployment.



In the long-run Phillips curve, there is no trade-off; curve is vertical.



Moving Off the Long-Run Phillips Curve



Economy is initially at point *A* when the government runs expansionary policy to reduce unemployment below 5.5 percent.

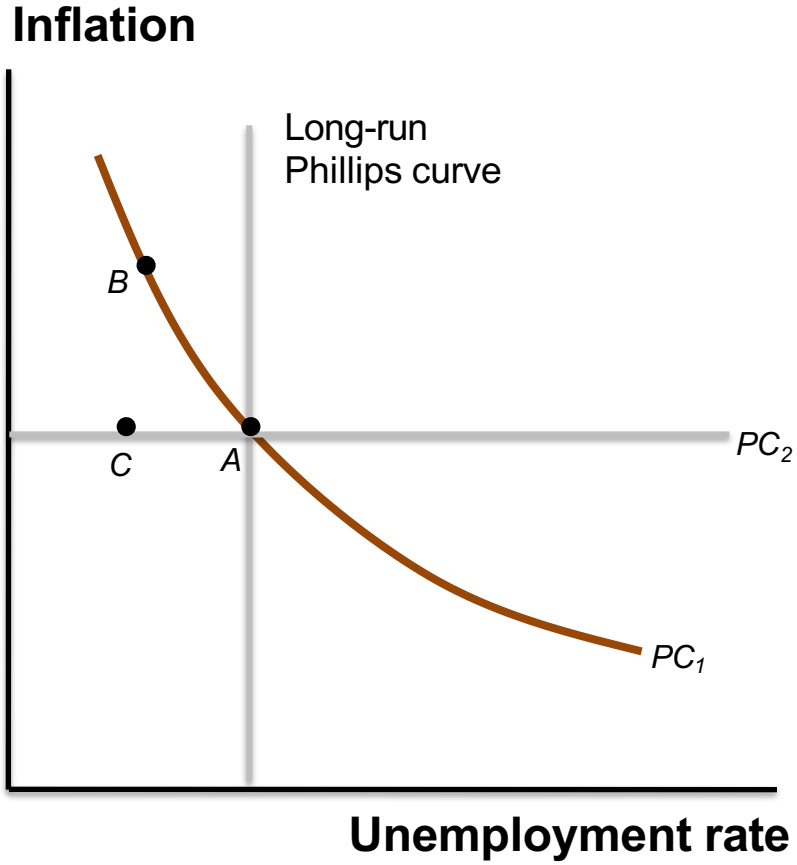
Economy moves from point *A* to point *B.*

Expectations of inflation increase, and the short-run Phillips curve begins shifting up (arrow 1).

Upward pressure will stop only when rate of unemployment moves back to target rate (arrow 2).

Economy returns to equilibrium at point C.

Global Competition and the Phillips Curve



When the world price level is below the domestic price level, inflation is held down by globalization.

A decline in the unemployment rate will not lead to inflation.

The standard short-run Phillips curve (PC_1) changes to a flat short-run Phillips curve (PC_2).

Chapter Summary (1 of 3)

At one time, inflation was measured as an increase in the money supply.

Inflation can occur for both goods and assets.

The standard goods market price indexes for judging policies are limited as they do not include the prices of assets.

The winners in inflation are people who can raise their wages or prices and still keep their jobs or sell their goods.

The losers in inflation are people who can't raise their wages or prices.

Chapter Summary (2 of 3)

Asset inflation hurts people who save with safe assets and helps those who save in risky assets.

Inflation has both costs and benefits. Conventional monetary policy emphasizes informational, institutional and distributional costs.

Inflation equals nominal wage increases minus productivity growth.

Expectations of inflation can accelerate inflation and in some cases lead to hyperinflation.

Chapter Summary (3 of 3)

According to the quantity theory of money, policy analysis about the real economy is based on the supply side of the economy.

The lack of a clear relationship between money growth and inflation undermines the quantity theory of money.

The short-run Phillips curve holds expectations constant; The long-run Phillips curve allows expectations of inflation to change; globalization can lead to a flat short-run Phillips curve.