

- A2.** Predict what happens to the international price and quantity traded of the manufactured good in Figure 1.4 with an improvement in technology in the domestic market.
- A3.** Suppose the domestic wage of manufacturing labor rises with a new labor contract. Draw a new domestic supply curve and show what happens in the international market of Figure 1.4.
- A4.** Create a diagram similar to Figure 1.4 in which demand in both nations is identical and trade arises because of differences in supply. Create another diagram in which supply is identical across nations but differences in demand lead to trade.

## **B. EXCESS SUPPLY AND EXCESS DEMAND**

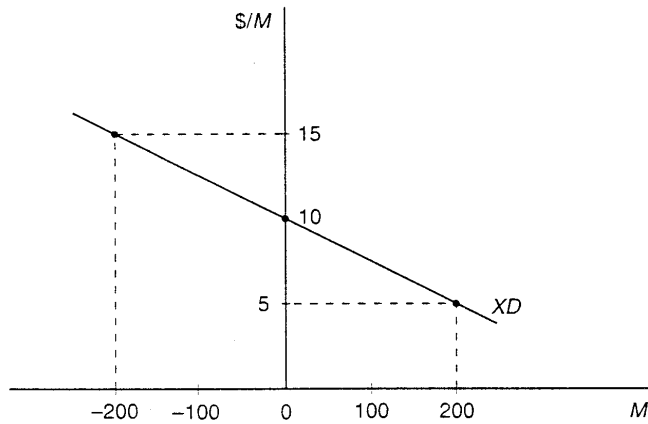
Excess supply and excess demand are tools that simplify the analysis of international markets. The difference between quantity demanded and quantity supplied at any price is *excess demand*. The difference between quantity supplied and quantity demanded at any price is *excess supply*. Using these concepts, the international market in Figure 1.4 can be reduced to a much simpler diagram with two curves.

### **Excess Demand**

The national excess demand in Figure 1.5 is derived from the home market diagram in Figure 1.4. At the domestic market clearing price of \$10, excess demand  $XD$  at home is zero. At lower prices, excess demand is positive. At \$5,  $XD$  is 200 with home firms producing 100 units and home consumers buying 300 units. The home country is willing to import 200 units at an international price of \$5.

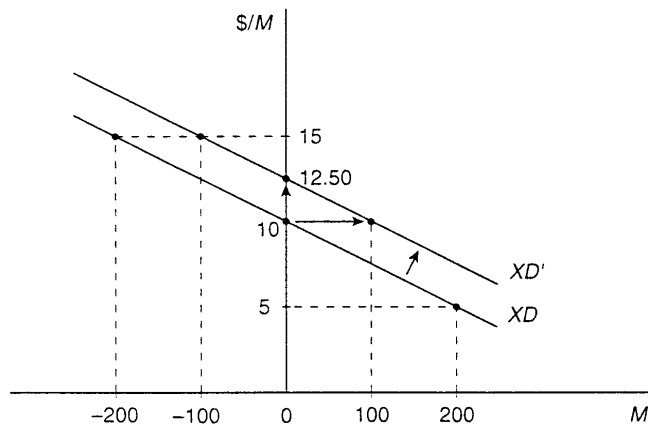
An increase in domestic demand shifts the home country's  $XD$  curve. Suppose an increase in demand drives the domestic price up to \$12.50. Excess demand increases as in Figure 1.6.  $XD$  is zero at \$12.50. This increase in  $XD$  makes the home country more willing to import the good. At \$10 the quantity imported would jump from zero to 100. Decreased supply resulting from higher costs would also cause  $XD$  to rise.

An increase in domestic supply has the opposite effect on  $XD$ . The home country becomes less willing to import the manufactured good. At any price,  $XD$  falls. This decrease can be visualized by a shift from  $XD'$  to  $XD$  in Figure 1.6. At \$5, home imports would drop from 200 to 100. The increased domestic supply and falling  $XD$  move the economy away from importing. Decreased demand or increased supply causes  $XD$  to fall.



**Figure 1.5**  
**Home Excess Demand for Manufactures**

Excess demand ( $XD$ ) is inversely related to price. When price rises,  $XD$  falls. At  $P$  (price) = \$10,  $XD = 0$ . When  $P < \$10$ , the quantity demanded is greater than quantity supplied, and  $XD > 0$ . At prices above \$10, there is negative excess demand or positive excess supply.



**Figure 1.6**  
**An Increase in Excess Demand**

Increased demand for manufactures in the home country has the effect of shifting the excess demand ( $XD$ ) for manufactures ( $M$ ) to the right. Decreased supply of manufactures in the home country has the same effect. The difference between the quantity demanded and quantity supplied rises at every price.

*Excess demand shows the quantity of a good a country wants to import at every price. International excess demand shifts when the underlying supply or demand shifts.*

**EXAMPLE 1.5** *Trade between DCs and LDCs*

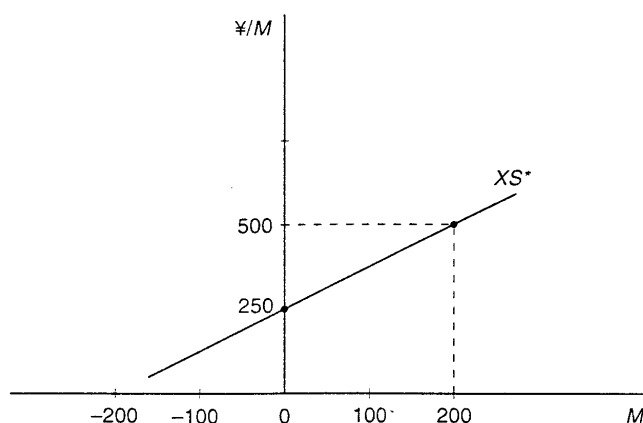
World trade in goods can be broken down between DCs and LDCs. Most goods come from industrial countries, and most of these are exported to other industrial countries. LDCs account for about a quarter of goods exports, which are shipped mostly to industrial countries. Remaining shipments go to NICs.

From DCs			From LDCs		
To:	DCs	72%	To:	DCs	65%
	LDCs	23%		LDCs	26%

**Excess Supply**

Excess supply of the foreign country can be derived from the foreign demand and supply curves in Figure 1.4. Foreign excess supply is labeled  $XS^*$  in Figure 1.7.  $XS^*$  is zero at the foreign market clearing price of 250 yen (\$2.50 by the exchange rate). At 500 yen (\$5)  $XS^*$  is 200. Changes in foreign supply and demand would shift foreign excess supply, similar to the shifts in excess demand. A good exercise at this point is to draw shifts in  $XS^*$  resulting from increases and decreases in foreign supply and demand.

*International excess supply shows the quantity of a good a country wants to export at every price. Excess supply shifts whenever the nation's underlying supply or demand shifts.*



**Figure 1.7**  
**The Foreign Excess Supply of Manufactures**

Excess supply ( $XS$ ) is positively related to price ( $P$ ). As price rises, the quantity supplied by the foreign country rises and the quantity demanded by the foreign country falls. When  $P > 250$  yen,  $XS^* > 0$ . At prices below 250 yen, there is negative excess supply or positive excess demand from the foreign country.

**EXAMPLE 1.6** *Largest US Ports*

The 10 largest ports in the US by exports of goods are listed below, along with their two largest categories of exports by value. The data is from *Foreign Trade of the United States* published by Bernan Press. Total export of goods in 1997 from the US was \$595 billion. The most frequent large categories are transportation equipment, industrial machinery and computers, and electric and electronic equipment. Seattle and Detroit ship mostly transportation equipment, and Phoenix electrical equipment. San Jose and Houston ship machinery.

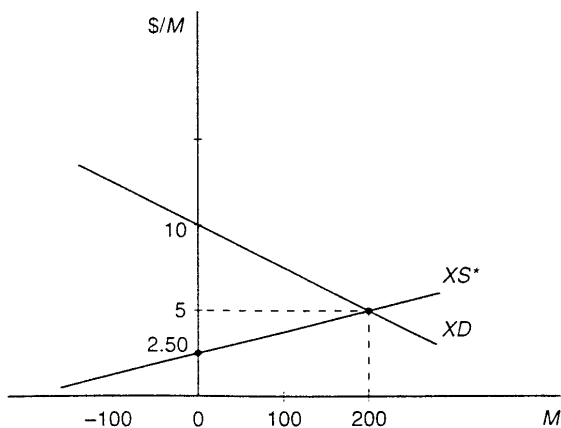
	exports	largest categories	
New York	\$29 bil	14% prim metals	10% machinery
San Jose	\$29	45% machinery	41% elec equip
Seattle	\$27	74% transp equip	7% lumber
Detroit	\$26	69% transp equip	12% machinery
Los Angeles	\$26	31% transp equip	12% machinery
Chicago	\$23	26% elec equip	16% machinery
Houston	\$19	37% machinery	5% chemicals
Miami	\$13	21% machinery	15% elec equip
Minneapolis	\$12	8% machinery	8% scientfc equip
Phoenix	\$11	55% elec equip	27% machinery

***International Markets Again***

There is a price where excess demand from one country equals excess supply from the other in a viable international market at the current exchange rate. The interaction of international excess supply and excess demand determines the quantity traded and the *international equilibrium price* of the traded good. In the international market of Figure 1.8, the international price of the manufactured good is \$5. The excess supply in the foreign country is just matched by the excess demand at home at the international price of \$5. The market for this manufactured good clears internationally.

At an international price below \$5,  $XD > XS^*$  and there is a shortage of the manufactured good on the international market. Exporters in the foreign country will notice that they cannot meet the high demand. Their inventories decline. Importers want to buy more than exporters are willing to produce. This is a clear signal for foreign producers and exporters to raise price.

If the international price is above \$5,  $XS^* > XD$ . Producers are making more than they can sell, and inventories accumulate. The best way to eliminate the surplus is to lower price.



**Figure 1.8**  
**International Excess Supply and Demand**

In this international market for manufactures, the foreign country exports 200 units of  $M$  to the home country. The international equilibrium price of \$5 equates excess demand ( $XD$ ) from the home country with excess supply ( $XS^*$ ) from the foreign country. In this example, the exchange rate is yen/\$ = 100.

The international equilibrium price balances forces of supply and demand across countries. An automatic adjustment process pushes the international market toward the international equilibrium price of \$5 with the quantity of goods traded at 200.

*International markets clear at the price where excess demand from importing countries equals excess supply from exporting countries.*

Transport costs can be crucial in determining whether a good is traded internationally. Gravel and cement are heavy relative to their value and cost too much to ship very far. At the other extreme, the ratio of weight to value is low for electronic components and drugs, goods that are heavily traded.

A national border imposes costs also. Customs procedures, including paperwork and grappling with bureaucrats, have to be cleared. Foreign exchange transactions, cross border insurance, and border delays make international commerce difficult. Charles Engel and John Rogers (1994) find that national borders add as much cost as 2500 miles between US and Canadian cities.

### EXAMPLE 1.7 *US Agricultural Trade*

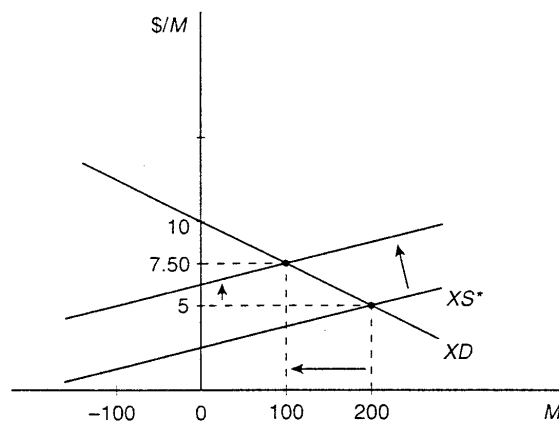
US agricultural trade is highly differentiated, both in exports and imports. The Department of Agriculture summarizes 1997 trade in agricultural products when the US exported \$57 billion and imported \$36 billion. Surpluses in agricultural trade date back to the 1960s and averaged \$20 billion per year during the 1990s.

Export revenue, \$57 billion		Import expenditure, \$36 billion	
Animal products	21%	Animal products	19%
Oil seeds	19%	Fruits and vegetables	19%
Grains	19%	Coffee	10%
Cotton	5%	Cocoa	6%
Tobacco	4%		
Other	30%	Other	46%

### Shifts in Excess Supply and Excess Demand

The exchange rate can influence international prices and the level of trade. An exchange rate of  $\$/yen = 0.01$  results in the international price of \$5 and trade level of 200 units of  $M$  in Figure 1.8. If the dollar depreciates in the foreign exchange market, its value falls and the value of the yen rises. Dollar *depreciation* means the exchange rate  $\$/yen$  rises. The same yen price for the manufactured good from Japan translates into a higher dollar price.

The foreign manufacturers do business in yen, and they are concerned with the yen price. Foreign producers supply less at every dollar price when the dollar depreciates. A dollar depreciation creates a reduction of  $XS^*$  as pictured in Figure 1.9. The international dollar price rises, and the volume of trade falls. The price of imports in the home country rises, and the quantity imported falls.



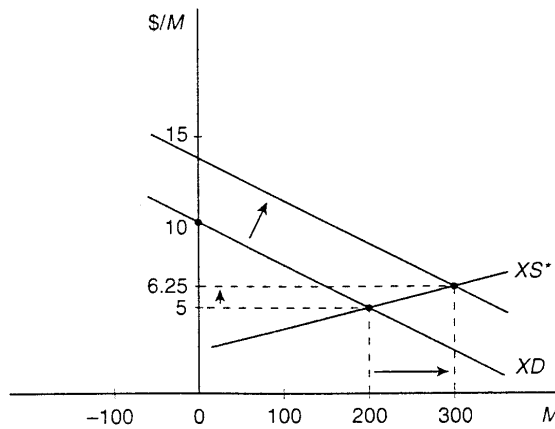
**Figure 1.9**

#### The Effect of a Depreciating Home Currency on Imports

When  $\$/yen$  rises, foreign excess supply ( $XS^*$ ) falls. Dollar prices translate into lower yen prices for foreign producers. The decline in foreign excess supply pushes up the international dollar price of manufactures and lowers the level of trade. A depreciation raises the price of imports and lowers the level of imports.  $XD$  is excess demand from the home country.

A reduction in foreign supply of the manufactured good, resulting perhaps from higher costs, will also cause  $XS^*$  to fall as in Figure 1.9. An increase in foreign demand, perhaps due to higher income, will cause a similar decline in  $XS^*$ . On the other hand, a depreciating yen, an increase in foreign supply, or a decrease in foreign demand cause an increase in  $XS^*$ , a lower international dollar price of the manufactured good, and an increase in the quantity traded.

Suppose the home country is specializing away from the manufactured good, producing more services for international trade. As the number of domestic manufacturing firms declines, domestic supply falls, resulting in an increase in excess demand. There is an increase in the international price and a higher volume of trade. In Figure 1.10 the international price rises to \$6.25 and the quantity traded rises to 300. The increase in  $XD$  could be caused by an increase in domestic demand, perhaps resulting from an increase in income or the number of consumers.



**Figure 1.10**  
**An Increase in Excess Demand**

Rising excess demand ( $XD$ ) for manufactures ( $M$ ) from the home country increases the international price of manufactures from \$5 to \$6.25 and raises the level of trade from 200 to 300.  $XS^*$  is excess supply in the foreign country.

Trading partners may be involved in a free trade agreement to lower protection against imports. Tariffs are taxes on imports, and are one form of protection. Quotas are quantitative limits on imports, and are another popular form of protection. Current examples of trade agreements are NAFTA (North American Free Trade Area) between the US, Canada, and Mexico, and the EU (European Union). Domestic producers competing with foreign exporters expect lower prices and falling profit when trade is liberalized. The anticipation of falling prices causes the most inefficient domestic producers to exit the industry.

Domestic supply falls and  $XD$  rises. A higher international price and more trade occur, as in Figure 1.10.

*Anything that affects the underlying supply or demand in a trading country shifts its excess supply or excess demand, changing the international price and quantity traded.*

During the 1990s, the US revealed a tendency to import goods and export services such as telecommunications, banking, finance, and construction. Import revenue of goods slightly outgrew export expenditure (80% versus 77%). Export revenue from services outgrew import expenditure (88% versus 54%).

### EXAMPLE 1.8 *Trade and War*

A common political belief is that democracies do not go to war with each other. Closer to the truth, countries do not go to war with their trading partners. Solomon Polachek (1997) examines the history of conflicts between 1800 and 1986. Contrary to belief, a higher degree of democracy does not decrease conflict. A higher level of trade, however, does. Countries do not want to fight with their trading partners. Free trade decreases wars because countries want to protect their trading partners.

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### **Problems for Section B**

- B1.** Show what happens in the international market for manufactures in Figure 1.8 if the dollar appreciates above  $\text{yen}/\$ = 100$ .
- B2.** Illustrate the effects of a simultaneous decrease in domestic demand and increase in domestic supply on excess demand. Predict what will happen to the international price and quantity traded.
- B3.** Suppose Japan imports wood and the domestic Japanese supply of lumber rises when a forest matures. Show the effect on the international market for lumber, assuming excess supply comes from the US.

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## **C. THE BALANCE OF TRADE**

Trade involves exchanging one thing for another. Imports are goods that we enjoy consuming without having to spend valuable resources producing. Exports are goods that we have to go to the trouble of producing but cannot enjoy consuming. Importing firms and ultimately consumers in the home country must pay firms in the foreign country for imported goods. With thousands of products traded internationally among hundreds of nations, how is a balance struck? This section begins to look into this issue by introducing the balance of trade.