

## Chapter 02

### The Basic Theory Using Demand and Supply

#### Overview

This chapter indicates why we study theories of international trade and presents the basic theory using supply and demand curves. Trade is important to individual consumers, to workers and other factor owners, to firms, and therefore to the whole economy. The box “Trade Is Important” provides useful data about the types of products traded and the increasing role of trade in national economies.

Trade is also contentious, with perpetual battles over government policies toward trade. To understand the controversy, we need to develop theories of why people trade as they do.

It is useful to organize the analysis of international trade by contrasting a world of no trade with a world of free trade, leaving analysis of intermediate cases (e.g., non-prohibitive tariffs) for Part Two. The analysis seeks to answer four key questions about international trade:

1. Why do countries trade? What determines the pattern of trade?
2. How does trade affect production and consumption in each country?
3. What are the gains (or losses) for a country as a whole from trading?
4. What are the effects of trade on different groups in a country? Are there groups that gain and other groups that lose?

Theories of international trade provide answers to these four questions.

Basic demand and supply analysis can be used to provide early answers to these four questions, as well as to introduce concepts that can be used in more elaborate theories. Using motorbikes as an example, the chapter first reviews the basic analysis of both demand (the demand curve and the role of the product’s price, other influences on quantity demanded, movements along the demand curve and shifts in the demand curve, and the price elasticity of demand as a measure of responsiveness) and supply (the supply curve, the role of marginal cost, other influences on quantity supplied, movements along the supply curve and shifts in the supply curve, and the price elasticity of supply). It pays special attention to the meaning and measurement of consumer surplus and producer surplus. This section, which focuses on review and development of basic tools, ends with the picture of market equilibrium in a national market with no trade as the intersection of the domestic demand curve and the domestic supply curve.

The remainder of the chapter examines the use of supply and demand curves to analyze international trade. If there are two national markets for a product and no trade between them, it is likely that the product's price will differ between the two markets. Someone should notice the difference and try to profit by arbitrage between the two markets. If governments permit free trade, then the export supply from the initially low-priced market (the rest of the world in the textbook example) can satisfy the import demand in the initially high-priced market (the United States in the textbook example), and the world shifts to a free-trade equilibrium. We can show this free trade equilibrium by deriving the supply-of-exports curve for the rest of the world and the demand-for-imports curve for the United States. The international market for the product clears at the intersection of the export-supply and import-demand curves, indicating the equilibrium international or world price and the quantity traded. This equilibrium world price also becomes the domestic price in each country with free trade.

The same set of three graphs (the two national markets and the international-trade market) is used to show the effects of the shift from no-trade to free-trade on different groups in each country and to show the net gains from trade for each nation. In the importing country consumers of the product gain consumer surplus and producers of the product lose producer surplus. Using the one-dollar, one-vote metric, the country as a whole gains, because the gain in consumer surplus is larger than the loss of producer surplus. In the exporting country producers of the product gain producer surplus and consumers of the product lose consumer surplus. The analysis shows that the country as a whole gains because the gain in producer surplus is larger than the loss of consumer surplus. Furthermore, the country that gains more from the shift to free trade is the country whose price changes more—the country with the less elastic trade curve (import demand or export supply).

## Tips

We believe that this chapter is an excellent way to introduce the analysis of trade. The four questions about trade focus student attention on key issues that are interesting to most of them. Students then get a quick payoff through the use of the familiar supply-demand framework. By the end of this short chapter we have preliminary answers to all four trade questions. We have also laid a solid foundation for the analysis of trade using supply and demand curves, the approach that will receive the most attention in Part Two on trade policies.

In class presentations it may be useful to show the graphs in a sequence, perhaps using a series of slides. After presenting the review of demand and supply and the national market equilibrium with no trade, the following sequence works well.

1. Two national market graphs with no trade, one with a high no-trade price (the United States), and one with a low no-trade price (the rest of the world, or ROW). Question to the class: "If you were the first person to notice this situation, could you make a profit?" This is a good way to motivate international trade driven by arbitrage.

2. The U.S. national market graph and the international market graph. Question to the class: “Let’s say that the United States is willing to open up to free trade and integrate into the world market. If it does this, the world price will also be the price within the United States. How much will the United States want to import?” It depends on what the world price is. The instructor can pick one or two hypothetical world price(s) (below the no-trade U.S. price), and measure the gap between domestic quantity demanded and domestic quantity supplied. This is the U.S. demand for imports, and these import quantity-price combinations can be used to plot the U.S. demand-for-imports curve in the international market.
3. A graph of the international market and the ROW national market. A comparable discussion to item 2 above, to derive the supply-of-exports curve.
4. Superimpose the graphs from item 2 on the graphs from item 3. Question to the class: “What will happen with free trade? When there is ongoing free trade, what is the equilibrium world price?” This set of three graphs can be used to show the free-trade equilibrium: world price, quantity traded, and quantities produced and consumed in each country.
5. A single graph showing the U.S. national market, to contrast no trade with free trade. Questions to the class: “What group is made happier by the shift from no trade to free trade? What group is a loser? Can we somehow say that the country gains from free trade?”
6. A single graph showing the ROW national market, with the same questions in item 5.

Subsequent chapters in Part I present additional theories of trade. The figure shown on the accompanying page provides a summary of the key features of these theories. It may be useful to copy and distribute this figure to your students. If it is distributed when the class begins to study the material, it can serve as a roadmap. If it is distributed when the class finishes the lectures on the material, it can serve as a summary and review.

For instructors who want to begin with the discussion of absolute and comparative advantage rather than with the supply-and-demand framework that focuses on a single product, this should be possible. After covering the introductory material (the first two pages of Chapter 2, and, possibly, the two boxes in the chapter), the course would skip to Chapter 3. The remaining material from Chapter 2 on the supply and demand analysis can be inserted right after Chapter 4’s section referring to analysis using supply and demand curves, or this material can be presented as a separate topic elsewhere in the course.

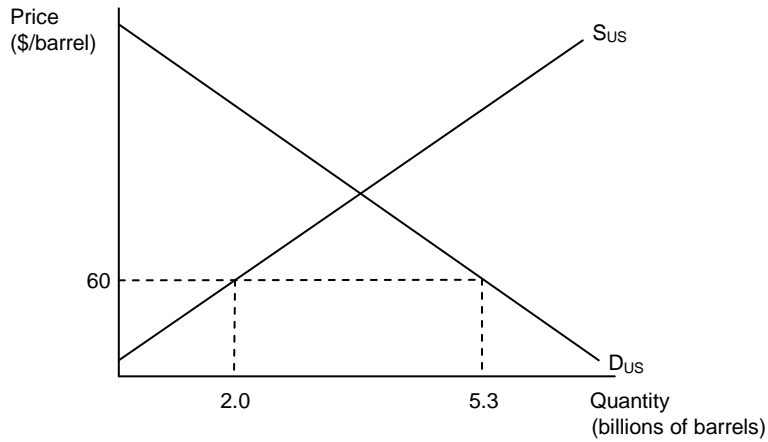
Chapter 2 has the first of six boxes about the global financial and economic crisis that began in 2007 and became dramatically worse in 2008. The box “The Trade Mini-Collapse of 2009” documents and discusses the sharp decline in global trade that began in late 2008 (and the bounce back that occurred in 2010). With the introduction of the global crisis in Chapter One and the series of six boxes, an instructor can weave discussions of the global crisis and its aftermath throughout a course.

## Suggested answers to questions and problems

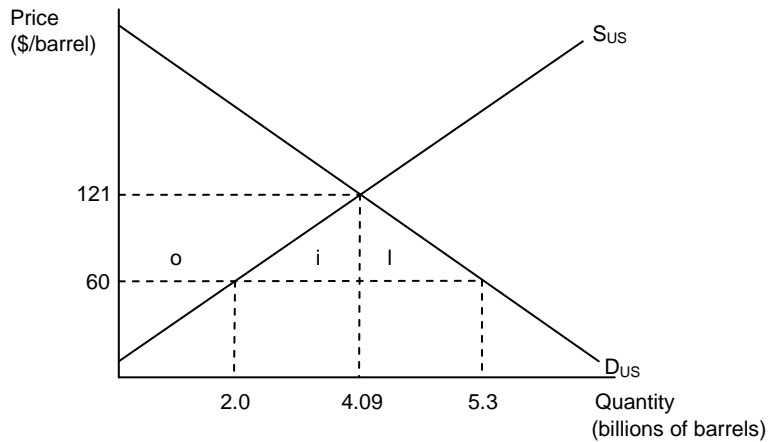
(in the textbook)

2. Producer surplus is the net gain to producers from being able to sell a product through a market. It is the difference between the lowest price at which some producer is willing to supply each unit of the product and the actual market price that is paid, summed over all units that are produced and sold. The lowest price at which someone is willing to supply the unit just covers the extra (marginal) cost of producing that unit. To measure producer surplus for a product using real world data, three major pieces of information are needed. First, the market price. Second, the quantity supplied. Third, some information about the slope (or shape) of the supply curve. How would quantity supplied change if the market price decreased? Or, what are the extra costs of producing each unit up to the actual quantity supplied? Producer surplus could then be measured as the area below the market price line and above the supply curve.
4. The country's demand for imports is the amount by which the country's domestic quantity demanded exceeds the country's domestic quantity supplied. The demand-for-imports curve is derived by finding the difference between domestic quantity demanded and domestic quantity supplied, for each possible market price for which quantity demanded exceeds quantity supplied. The demand-for-imports curve shows the quantity that the country would want to import for each possible international market price.
6. If there were no exports of scrap iron and steel, the domestic market would clear at the price at which domestic quantity demanded equals domestic quantity supplied. But the United States does export scrap iron and steel. The extra demand from foreign buyers increases the market price of scrap iron and steel. Domestic users of scrap iron and steel pay a higher price than they would if there were no exports. Thus, some support a prohibition on these exports, in order to lower the market price of the scrap that they buy.
8. a. With free trade at \$60 per barrel:  
Domestic production  $Q_S$ :  $60 = 2 + 29Q_S$ , or  $Q_S = 2.0$  billion barrels.  
Domestic consumption  $Q_D$ :  $60 = 325 - 50Q_D$ , or  $Q_D = 5.3$  billion barrels.

Chapter 2 - The Basic Theory Using Demand and Supply

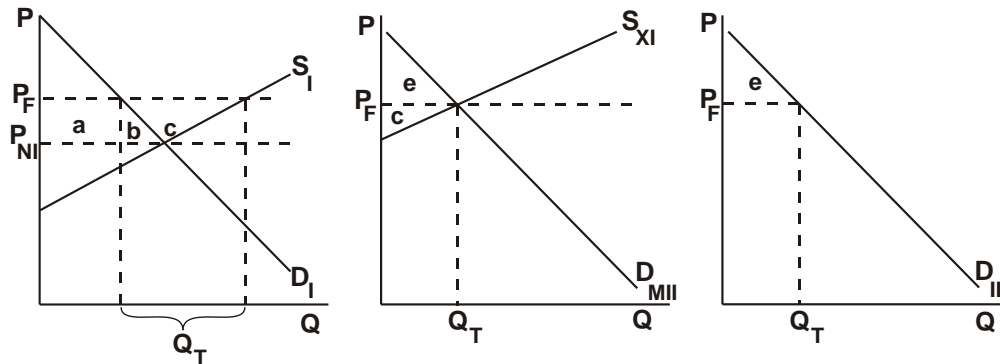


- b. With no imports, domestic quantity supplied must equal domestic quantity demanded (both equal to  $Q_N$ ) at the domestic equilibrium price  $P_N$ :  
 $325 - 50Q_N = 2 + 29Q_N$ , or  $Q_N = 4.09$  billion barrels produced and consumed.  
 Using one of the equations, we can calculate that the domestic price would be almost \$121 per barrel.



- c. Domestic producers of oil would gain, receiving an increase of producer surplus shown as area o in the graph. Domestic consumers of oil would lose, experiencing a loss of consumer surplus shown as area o + i + l in the graph.

10. The supply curve  $S_{US}$  shifts down (or to the right). The U.S. demand-for-imports curve  $D_m$  shifts to the left (or down). The equilibrium international price decreases below 1,000—it is shown by the intersection of the new U.S.  $D_m$  curve and the original  $S_x$  curve.
12. a. In the graphs below, the free trade equilibrium price is  $P_F$ , the price at which the quantity of exports supplied by Country I equals the quantity of imports demanded by Country II. (The quantity-of-imports demanded curve for country II is the same as the country's regular demand curve.) This world price is above the no-trade price in country I. The quantity traded with free trade is  $Q_T$ .



- b. In Country I producer surplus increases by area  $a + b + c$ , and consumer surplus falls by area  $a + b$ . The net national gain from free trade is area  $c$ . In country II consumer surplus increases by area  $e$  and this is also the net national gain from trade. Because there is no domestic production in Country II with or without trade, there is no change in producer surplus.

## A guide to the trade theories of Part One

<u>Name of Theory</u>	<u>What Forces Determine Trade Flows?</u>	<u>Some Key Assumptions</u>
A. The basic theory (Chapters 2-5)	Productivities Factor Supplies Product demands	Competition in all markets Constant or increasing costs Any number of production factors (types of labor, land, etc.)
B. Supply-oriented theories of trade (special cases of the basic theory, with the demand side neutral):		
1. Absolute advantage (in Chapter 3)	Absolute productivities	Competition in all markets Constant marginal costs Only one factor (labor)
2. Comparative advantage (in Chapter 3)	Relative productivities	Competition in all markets Constant marginal costs Only one factor (labor)
3. Factor proportions (Heckscher-Ohlin theory, in Chapters 4-5)	Relative factor endowments	Competition in all markets Increasing marginal costs Small number of factors Technology neutral
C. Additional theories of trade:		
1. Monopolistic competition (Krugman and others, in Chapter 6)	Product differentiation Moderate scale economies	Imperfect competition De-emphasize factor supplies
2. Global oligopoly (in Chapter 6)	Substantial internal scale economies History, luck, or government policy	Imperfect competition De-emphasize factor supplies
3. External economies (in Chapter 6)	Substantial external scale economies Large home market, history, luck, or government policy	Competition De-emphasize factor supplies
4. Technology differences, including product cycle (Vernon and others, in Chapter 7)	Technological innovation Technological "age" of the industry	Competition Importance of research and development