Chapter 3
Labor Productivity and Comparative
Advantage: The Ricardian Model

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Summary

1. ◼ Chapter Overview

The Ricardian model provides an introduction to international trade theory. This most basic model of
trade involves two countries, two goods, and one factor of production, labor. Differences in relative labor productivity across countries give rise to international trade. This Ricardian model, simple as it is, generates important insights concerning comparative advantage and the gains from trade. These insights are necessary foundations for the more complex models presented in later chapters.

The text exposition begins with the examination of the production possibility frontier and the relative prices of goods for one country. The production possibility frontier is linear because of the assumption of constant returns to scale for labor, the sole factor of production. The opportunity cost of one good in terms of the other equals the price ratio since prices equal costs, costs equal unit labor requirements times wages, and wages are equal in each industry.

After defining these concepts for a single country, a second country is introduced which has different relative unit labor requirements. General equilibrium relative supply and demand curves are developed. This analysis demonstrates that at least one country will specialize in production. The gains from trade
are then demonstrated with a graph and a numerical example. The intuition of indirect production, that is “producing” a good by producing the good for which a country enjoys a comparative advantage and then trading for the other good, is an appealing concept to emphasize when presenting the gains from trade argument. Students are able to apply the Ricardian theory of comparative advantage to analyze three misconceptions about the advantages of free trade. Each of the three “myths” represents a common argument against free trade and the flaws of each can be demonstrated in the context of examples already developed in the chapter. The first myth is that trade is driven by absolute advantage. This chapter clearly demonstrates that it is comparative advantage that matters. The second is the pauper labor argument, with poor countries having an “unfair advantage” I trade given low cost labor. The chapter highlights that the gains from trade are irrelevant to the source of comparative advantage. Finally, the myth of workers in poor countries being exploited by trade is exposed by asking whether these workers would be better off without trade. As the numerical example in this chapter demonstrates, the answer is a resounding no.

While the initial intuitions are developed in the context of a two good model, it is straightforward to extend the model to describe trade patterns when there are *N* goods. Comparative advantage in this model is driven by relative wages between countries rather than relative prices. However, the implication that countries will export goods for which they have the lowest opportunity cost remains.

The *N* good model is used to discuss the role that transport costs play in making some goods non-traded. As transport costs rise, the gains from trade decrease, and in some cases are completely eliminated. The chapter ends with a discussion of empirical evidence of the Ricardian model. The authors are careful to point out that the rather simplified model cannot explain all trade patterns, the basic prediction that countries tend to export goods for which they have a comparative advantage (high relative productivity) has been confirmed by a number of studies.

1. ◼ Answers to Textbook Problems

1. a. The production possibility curve is a straight line that intercepts the apple axis at 400(1200/3) and the banana axis at 600(1200/2).

b. The opportunity cost of apples in terms of bananas is 3/2. It takes three units of labor to harvest an apple but only two units of labor to harvest a banana. If one foregoes harvesting an apple, this frees up three units of labor. These 3 units of labor could then be used to harvest 1.5 bananas.

c. Labor mobility ensures a common wage in each sector and competition ensures the price of goods equals their cost of production. Thus, the relative price equals the relative costs, which equals the wage times the unit labor requirement for apples divided by the wage times the unit labor requirement for bananas. Since wages are equal across sectors, the price ratio equals the ratio of the unit labor requirement, which is 3 apples per 2 bananas.

2. a. The production possibility curve is linear, with the intercept on the apple axis equal to 160(800/5) and the intercept on the banana axis equal to 800(800/1).

b. The world relative supply curve is constructed by determining the supply of apples relative to the supply of bananas at each relative price. The lowest relative price at which apples are harvested is 3 apples per 2 bananas. The relative supply curve is flat at this price. The maximum number of apples supplied at the price of 3/2 is 400 supplied by Home while, at this price, Foreign harvests 800 bananas and no apples, giving a maximum relative supply at this price of 1/2. This relative

 supply holds for any price between 3/2 and 5. At the price of 5, both countries would harvest apples. The relative supply curve is again flat at 5. Thus, the relative supply curve is step shaped, flat at the price 3/2 from the relative supply of 0 to 1/2, vertical at the relative quantity 1/2 rising from 3/2 to 5, and then flat again from 1/2 to infinity.

 3. a. The relative demand curve includes the Points (1/5, 5), (1/2, 2), (1, 1), (2, 1/2).

b. The equilibrium relative price of apples is found at the intersection of the relative demand and relative supply curves. This is the Point (1/2, 2), where the relative demand curve intersects the vertical section of the relative supply curve. Thus the equilibrium relative price is 2.

c. Home produces only apples, Foreign produces only bananas, and each country trades some of its product for the product of the other country.

d. In the absence of trade, Home could gain three bananas by foregoing two apples, and Foreign could gain by one apple foregoing five bananas. Trade allows each country to trade two bananas for one apple. Home could then gain four bananas by foregoing two apples while Foreign could gain one apple by foregoing only two bananas. Each country is better off with trade.

 4. The increase in the number of workers at Home shifts out the relative supply schedule such that the corner Points are at (1, 3/2) and (1, 5), instead of (1/2, 3/2) and (1/2, 5). The intersection of the relative demand and relative supply curves is now in the lower horizontal section, at the Point (2/3, 3/2). In this case, Foreign still gains from trade but the opportunity cost of bananas in terms of apples for Home is the same whether or not there is trade, so Home neither gains nor loses from trade.

 5. This answer is identical to that in 3. The amount of “effective labor” has not changed since the doubling of the labor force is accompanied by a halving of the productivity of labor.

 6. This statement is just an example of the pauper labor argument discussed in the chapter. The point is that relative wage rates do not come out of thin air; they are determined by comparative productivity and the relative demand for goods. The box in the chapter provides data which shows the strong connection between wages and productivity. China’s low wage presumably reflects the fact that China is less productive than the United States in most industries. As the test example illustrated, a highly productive country that trades with a less productive, low-wage country will raise, not lower, its standard of living.

 7. The problem with this argument is that it does not use all the information needed for determining comparative advantage in production: this calculation involves the four unit labor requirements
(for both the industry and service sectors, not just the two for the service sector). It is not enough to compare only service’s unit labor requirements. IfHome labor is more efficient than Foreign labor in services. While this demonstrates that the United States has an absolute advantage in services, this is neither a necessary nor a sufficient condition for determining comparative advantage. For this determination, the industry ratios are also required. The competitive advantage of any industry depends on both the relative productivities of the industries and the relative wages across industries.

 8. While Japanese workers may earn the equivalent wages of U.S. workers, the purchasing power of their income is one-third less. This implies that although *w*  *w*\* (more or less), *p*  *p*\* (since 3*p*  *p*\*). Since the United States is considerably more productive in services, service prices are relatively low. This benefits and enhances U.S. purchasing power. However, many of these services cannot be transported and hence, are not traded. This implies that the Japanese may not benefit from the lower U.S. services costs, and do not face an international price which is lower than their domestic price. Likewise, the price of services in United States does not increase with the opening of trade since these services are non-traded. Consequently, U.S. purchasing power is higher than that of Japan
due to its lower prices on non-traded goods.

 9. Gains from trade still exist in the presence of non-traded goods. The gains from trade decline as the share of non-traded goods increases. In other words, the higher the portion of goods which do not enter the international marketplace, the lower the potential gains from trade. If transport costs were high enough so that no goods were traded, then, obviously, there would be no gains from trade.

10. The world relative supply curve in this case consists of a step function, with as many “steps” (horizontal portions) as there are countries with different unit labor requirement ratios. Any countries to the left of the intersection of the relative demand and relative supply curves export the good in which they have a comparative advantage relative to any country to the right of the intersection. If the intersection occurs in a horizontal portion then the country with that price ratio produces both goods.