

International Trade and Economic Growth

Topics to Be Covered

Trade and Development
Trade and Growth
Trade and Growth: Some Additional Comments
International Flows of Factors

Key Words

| | |
|--|---------------------------------|
| Economic development | Capital-saving technical change |
| Primary-export-led development strategies | Immizerizing growth |
| Linkage effects | Guest workers |
| Import-substitution development strategies | Brain drain |
| Outward-looking development strategies | Multinational corporation (MNC) |
| Neutral economic growth | Outsourcing |
| Protrade biased growth | Marginal product of labor |
| Antitrade biased growth | Diminishing returns to labor |
| Neutral technical change | Value marginal product of labor |
| Labor-saving technical change | |

An economy is said to grow when the amount of output produced in the economy (i.e., the economy's gross domestic product, or GDP) rises. Economic growth is of fundamental importance to all economies. Recall that in Chapter 2 we argued that per capita GDP provides a useful measure of a country's standard of living. Since virtually all countries experience growth in population over time, growth in GDP is required simply to maintain current standards of living. In fact, if standards of living are to rise over time, then GDP must grow faster than the population.

Economic growth is also critical for **economic development**. Economic development refers to the achievement of a quality of life for the average citizen of a country that is comparable to that enjoyed by the average citizen of a country with a modern economy, such as the United States. Economic development is characterized by such things as high levels of consumption, broad-based educational achievement, adequate housing, and access to high-quality health care. Achieving these goals can come about only after long periods of sustained high levels of economic growth.

International trade can affect the level of economic growth of an economy. With unemployed resources, an increase in export sales will lead to an overall expansion in production and an accompanying fall in the unemployment rate. International trade also allows for the purchase of capital goods from foreign countries and exposes an economy to technological advances achieved around the globe. Conversely, economic growth can affect the types of goods a country is able to trade. A technological advance in a country's import-competing sector could, for instance, lead to an overall reduction in the volume of trade of a country. Thus, international trade and economic growth are closely linked.

In this chapter we explore various relationships between trade and growth. First, we briefly consider aspects of the relationship between trade and economic development. Then, we examine how economic growth affects international trade patterns. Finally, we explore an additional link between trade and growth, international flows of factors of production. That is, each year labor and capital move from one country to another. We will discuss some of the economic consequences of these international flows of factors of production. In particular, we will consider the effects of the international migration of labor. We will also discuss international flows of physical capital, exemplified by the multinational corporation.

TRADE AND DEVELOPMENT*

Roughly 75 percent of the world's population lives in the low- or middle-income developing countries of the world.[†] The typical developing country is characterized by low per capita GDP, high levels of illiteracy, high birthrates, and inadequate housing and sanitation. Most of these countries devote a much larger share of their economy to agricultural production than do industrialized countries. These countries are plagued by shortages of physical capital. Their export sectors tend to be concentrated in only a few items, usually primary products, such as agricultural goods, petroleum, and minerals, or basic manufactures, such as textiles and shoes.

To improve their economic circumstances, many developing countries have undertaken large-scale development plans. These plans almost always involve massive government intervention into the economy. For instance, to encourage the growth of industry, governments will impose high taxes on farmers, using the proceeds to subsidize industry. These taxes also serve to encourage workers to leave agriculture for urban areas where industrial jobs are being created. Another common feature of these plans is the extensive use of trade policy. The types of strategies undertaken by these countries generally fall into one of several categories and are examined in the next few sections.

Primary-Export-Led Development Policies

Many developing countries are blessed with abundant natural resources or substantial amounts of land that are ideal for the production and export of natural-resource or land-intensive products. A **primary-export-led development strategy** involves government programs designed to exploit

Economic development

The achievement of a quality of life for the average citizen of a country that is comparable to that enjoyed by the average citizen of a country with a modern economy.

Primary-export-led development strategies

Government programs designed to exploit natural comparative advantage by increasing production of a few export goods most closely related to a country's resource base.

*This section is meant to provide only a brief introduction to the topic of trade and development. For a more complete textbook discussion, see Michael Todaro and Stephen Smith, *Economic Development*, 11th ed. (Boston, Mass.: Addison-Wesley, 2012).

[†]For a list of many of these countries as well as data on some of their basic characteristics, see Table 1.1 in Chapter 1.

natural comparative advantage by increasing production of a few export goods most closely related to the country's resource base and exporting them in return for manufactured goods produced elsewhere. The hope is that standards of living will rise due to specialization along the lines of comparative advantage (i.e., the static gains from trade).

In addition to the usual static gains from trade, there may be several benefits to the primary-export-led growth. First, in the absence of trade, it is quite possible that certain factors would be underutilized or perhaps not used at all. For instance, without international trade, a country with large amounts of fertile land might not put all of its land into cultivation. This would mean that in autarky the country would be at a production point inside its production possibility frontier (PPF). Opening the economy up to trade would encourage more intensive use of existing factors of production.*

Second, this type of development strategy can serve to entice the inflow of foreign capital. Foreign firms could locate in the country to help it to expand its export sectors. In time, as development occurs, other foreign investment might situate in related sectors, thereby helping to facilitate the development of other industries. In either event, the inflow of foreign capital would cause the PPF of the developing country to shift out.

Finally, this type of growth may have **linkage effects**. Linkage effects refer to the benefits to other industries or sectors of an economy that occur as one industry expands. For instance, the growth of a large-scale mining sector could encourage the development of a local mining-equipment industry. This type of effect is known as a backward linkage. A second type of linkage occurs when the development of an export sector leads to the provision or development of economic infrastructure, such as roads, railroads, harbors, telecommunications, electricity, and the like. The development of this infrastructure then serves to lower the costs of other industries operating in the country, further promoting development.

Primary-export-led growth strategies count on the benefits from static and dynamic gains from trade to be the primary forces to promote economic growth and development. It has been argued that Australia, Canada, and the United States achieved economic development in just this fashion. More recently, countries that have pursued a primary-export-led growth strategy with at least some success include Colombia (coffee), Mexico and Nigeria (petroleum), and Malaysia (rubber).

Despite these examples, some economists and many government leaders have been critical of primary-export-led growth strategies. Their opposition to such policies includes the following points: First, it is argued that the world markets for primary products do not grow fast enough to support development. That is, the largest markets for primary products are the industrialized countries of the world. As these countries grow, so too does their demand for primary products, but not at the same rate. Over time, one would expect that primary products would represent a declining share of industrialized countries' imports.

A second and related problem to primary-export-led development strategies is the claim that exporters of primary products face a secular deterioration in their terms of trade.† That is, it is argued that over time the price of primary-product exports relative to manufactured-goods imports will tend to fall. This fall could occur for either of two reasons. First, if demand for primary goods is sluggish in the industrialized countries, then there will be downward pressure on the growth of primary-product prices. Second, if governments in the developing countries pursue export-expansion policies, then supplies of these products will rise on world markets, again tending to deflate prices. In either event, the upshot is that a trend toward deterioration in the terms of trade suggests that developing countries may enjoy a decreasing share of the gains

* This point suggests that trade serves as a vent for surplus. Hla Myint stresses this feature of primary-export-led growth in "The 'Classical Theory' of International Trade and the Underdeveloped Countries," *Economic Journal* (1959).

† This argument has been attributed to Hans Singer, "The Distribution of Trade between Investing and Borrowing Countries," *American Economic Review* (1950); and to Raul Prebisch, primary author of United Nations, *The Economic Development of Latin America and Its Principal Problems* (1950).

Linkage effects

Benefits to other industries or sectors of an economy that occur as one industry expands.

from trade as trade continues through time. Whether this is actually the case depends not only on price but also on the quantity of exports. That is, suppose Brazil increases its exports of coffee. This will tend to lower world coffee prices. If world demand is sufficiently elastic, then Brazil's export earnings will rise. If export earnings rise relative to the price of imports, then Brazil can purchase more imports than before, and its welfare will have risen.

The issue of whether the terms of trade of primary-product exporters have been deteriorating through time has not yet been fully resolved. A study published in 1980 of the data over the 70-year period from 1900 to 1970 finds no evidence that a decline has occurred.* However, analysis of data from 1950 onward does seem to support the hypothesis of a decline in the terms of trade. A more recent study, using very modern statistical methodology and data from 1900 to 1983, again finds no evidence of any deterioration over the long run.† A very recent study that focuses on agriculture and food exports from developing countries finds evidence that there has been a deterioration in these prices relative to other goods, especially in the latter part of the last century.‡

Figure 10.1 provides some detail on the behavior of the terms of trade of oil exporting and non-oil-exporting developing countries from 1964 to 1994. As the figure shows, the terms of trade for these two groups of countries have behaved very differently over this period. Oil exporters have seen three sharp increases in their terms of trade, in 1974, 1979, and 1990. The first two coincided with the two large increases in petroleum prices engineered by the Organization of Petroleum Exporting Countries (OPEC). The third reflected the sharp rise in oil prices at the time that Iraq invaded Kuwait. In the 1980s, between the 1979 and 1990 increases, oil prices fell sharply and so too did the terms of trade of the oil exporters. This pattern has been repeated since the end of the Gulf War in 1991. The terms of trade of the non-oil exporters have shown much less fluctuation. There have been two significant downturns, coinciding with the

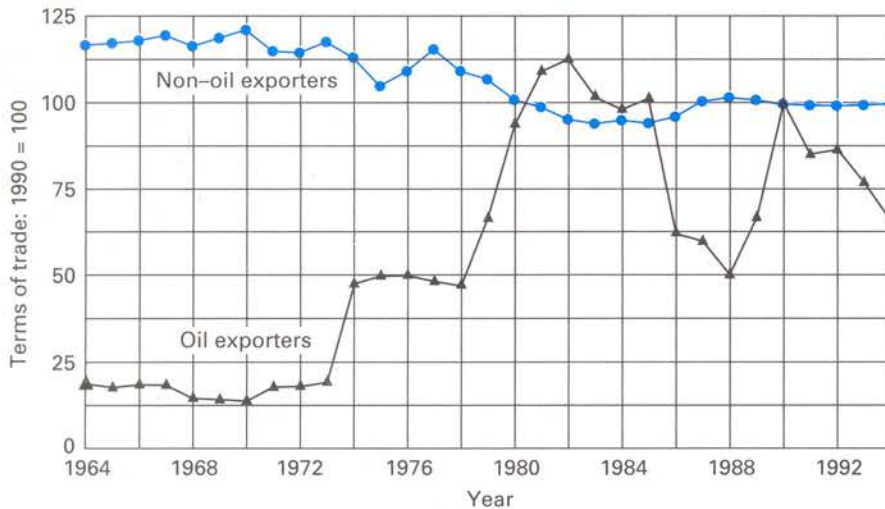


FIGURE 10.1 Terms of Trade of Developing Countries *Source: International Financial Statistics Yearbook (1995). Copyright © 1995 International Monetary Fund. Reprinted by permission.*

* See John Spraos, "The Statistical Debate on the Net Barter Terms of Trade between Primary Commodities and Manufactures," *Economic Journal* (1980).

† See John Cuddington and Carlos Urzua, "Trends and Cycles in the Net Barter Terms of Trade: A New Approach," *Economic Journal* (1989).

‡ See Raul Serrano and Vicente Pinella, "The Terms of Trade for Agriculture and Food Products, 1951–2000," *Revista de Historia Economica* (2011).

OPEC oil price increases. Otherwise, the terms of trade appear to be quite stable, with a slight downward trend over time.*

The experience described in Figure 10.1 offers some additional insights on the terms of trade debate. First, if a group of countries has significant market power over a product that is demanded in world markets, it can improve its terms of trade by restricting supply. This is the counterpart on the export side to the effect of an optimal import tariff.[†] As the figure also shows, the ability to raise one's terms of trade may not be permanent. That is, over time, consumers of the more expensive product will cut back consumption even as the higher price encourages increased production from other sources. As consumption falls and new production rises, the price of the expensive product will fall. Second, the major short-run deteriorations in the terms of trade of non-oil exporters in the past several decades were more likely caused by the policies of other developing countries (i.e., the nations involved in OPEC) than by market conditions in developed countries.

Import-Substitution Development Policies

For a variety of reasons, many developing countries have ignored primary-export-led growth strategies in favor of **import-substitution development strategies**. These policies seek to promote rapid industrialization and therefore development by erecting high barriers to foreign goods to encourage local production. Ideally, this approach to development applies the infant industry argument for protection to one or more targeted industries in the developing country. That is, the government determines those sectors best suited for local industrialization, raises barriers to trade on the products produced in these sectors so as to encourage local investment, and then lowers the barriers over time as the industrialization process takes hold. If the government has targeted the “correct” sectors, the industries in these sectors will continue to thrive even as protection comes down.

In practice, the barriers rarely do come down. Corporate managers who convinced politicians that protection should be imposed in the first place recognize the strong link between profits and protection. Any change in the market that would cause profits to fall leads these managers back to the government for additional protection. In the end, countries that follow import-substitution strategies tend to be characterized by high barriers to trade that grow over time.

Import-substitution policies have other problems. First, they tend to limit the development of industries that supply inputs to the protected industries. That is, it is often the case that the industries targeted for initial protection are producers of consumer goods. Managers in these industries would be very much opposed to any government policies that increased the costs of their inputs. Thus, they would tend to oppose protection for these other industries or demand still more protection for their products.

Second, because countries that pursue import-substitution strategies tend not to apply high tariffs to capital goods, imported capital goods are used extensively in local production. Coupled with other local policies (e.g., minimum wages that tend to raise labor costs), local managers utilize relatively capital-intensive production techniques. This means that employment in the newly industrializing sector does not grow as fast as might otherwise be the case.

Finally, because the whole development strategy depends upon the choices made by government officials, considerable resources are devoted to convincing officials of the merits of various cases. Alternatively, officials are bribed. In either event, the resources used in these activities could have been devoted to productive enterprises and hence represent additional economic waste over and above the usual deadweight costs of protection.

* A statistical analysis of these data suggests an average annual decline of 0.77 percent in the terms of trade of non-oil-exporting developing countries over the period 1964–1994.

[†] See Chapter 6 for a discussion of optimal import tariffs.

Import-substitution development strategies

Policies that seek to promote rapid industrialization by erecting high barriers to foreign goods to encourage local production.

Outward-Looking Development Policies

Instead of import-substitution policies, some developing countries have adopted **outward-looking development strategies**. These policies involve government targeting of sectors in which the country has potential comparative advantage. Thus, if a country is well endowed with low-skilled labor, the government would encourage the development of labor-intensive industries in the hope of promoting exports of these products. This type of strategy includes government policies such as keeping relatively open markets so that internal prices reflect world prices, maintaining an undervalued exchange rate so that export prices remain competitive in world markets, and imposing only minimal government interference on factor markets so that wages and rents reflect true scarcity. In addition, successful exporters often enjoy additional benefits, including special preference for the use of port facilities, communications networks, and lower loan and tax rates.

Only a few countries have followed outward-oriented development strategies for extensive periods of time, but those that have done so have been very successful. They include China since the mid-1980s, Japan in its post-World War II reconstruction, and the newly industrialized countries (NICs) of Asia: Hong Kong, South Korea, Singapore, and Taiwan. In part because of their success and because of the high economic cost of import-substitution policies, many other countries have recently begun to adopt more outward-oriented policies.

Outward-looking development strategies

Government support for manufacturing sectors in which a country has potential comparative advantage.

TRADE AND GROWTH*

Irrespective of government policies, there is always a tendency for economic growth to occur. Increases in population imply a growing labor force. Investment in new plant and equipment by firms implies a larger and larger capital stock. Over time, technological advances occur that allow for greater efficiency in production. Despite the fact that these general tendencies for growth occur around the world, actual patterns of factor growth and technical innovation differ quite substantially across various countries. (Recall the data in Table 1.1.) Moreover, the manner in which a country grows will have implications for its pattern of trade as time progresses. It is to these issues that we now turn.

Because growth can occur in a variety of ways, we shall break up our analysis into several specific cases.[†] For each of these cases, we assume that the economy in question produces two goods, S (soybeans) and T (textiles), by means of two factors of production, L (labor) and K (capital). We make the long-run assumption that these two factors are always fully employed, so that the economy's production point will always be somewhere on the nation's PPF. Growth will be depicted as a shift outward in the PPF. We assume that the production of soybeans (textiles) is relatively capital (labor) intensive, and that the economy is relatively abundant—at least initially—in labor. Hence, by Heckscher-Ohlin (HO) model arguments, the country initially has a comparative advantage in textiles and exports these goods to the rest of the world in exchange for soybeans. Finally, we assume that the country in question is small, so that it takes world prices as given, and that it follows free-trade policies.

Economic growth can be described graphically as an outward shift in a nation's PPF. How will the shift occur? As we saw from our discussion in Chapter 4 of the Rybczynski theorem, if only one factor of production grows, then the PPF will expand largely in the direction of the commodity whose production is relatively intensive in the growing factor.[‡] Suppose both factors

* The next two sections can be omitted without loss of continuity.

[†] For a taxonomic treatment of all the ways an economy can grow and the effects of this growth on international trade, see Harry Johnson, "Economic Development and International Trade," in Richard Caves and Harry Johnson, ed., *Readings in International Economics* (Homewood, Ill.: Richard D. Irwin, 1968).

[‡] Recall that the Rybczynski theorem states that at constant prices, if a country experiences an increase in the supply of one factor, it will produce more of the product whose production is intensive in that factor and less of the other product. See also Figure 4.7 for an illustration of economic growth when only one factor has increased in supply.

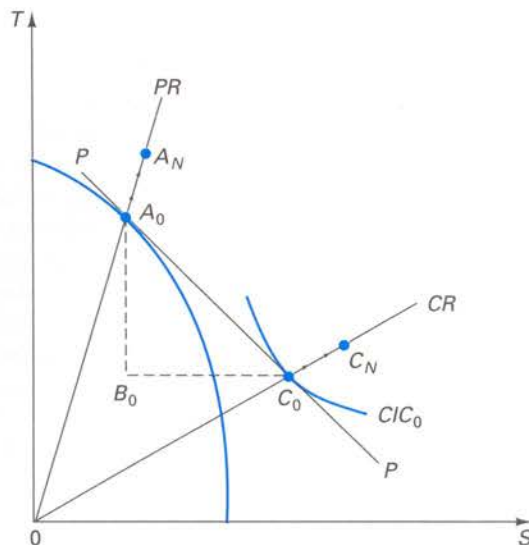


FIGURE 10.2 Patterns of Production and Consumption with Neutral Growth

grow. Then, as the PPF tends to expand more uniformly in all directions, the closer are the rates of growth of the two factors. If the two factors grow at exactly the same rates, then the overall capital/labor ratio in the economy will remain unchanged over time. In this situation, the PPF will preserve its original shape as it becomes larger.

International trade is the difference between a nation's production and its consumption. As we have seen, growth necessarily affects production. It also affects consumption. This is true because the price line that is tangent to the PPF will also be shifting out with growth, reflecting the fact that a nation with a growing endowment of productive resources is able to undertake a growing amount of consumption. Thus, since growth affects both production and consumption, it tends to affect international trade.

Consider Figure 10.2. There, we depict an economy before growth occurs.* The nation's production point is at A_0 , and its consumption point is at C_0 . The international price of S is given by the slope of the price line PP . At that price, the country exports $A_0 B_0$ units of T in exchange for $B_0 C_0$ units of S . Consider the line (denoted by PR) emanating from the origin (point 0) and passing through point A_0 . The slope of the PR line represents the initial ratio of production of the two goods in the economy. Similarly, the slope of the CR line provides the ratio in which the two goods are consumed prior to economic growth in the country. The type of growth a country experiences can be categorized according to where, in relation to the PR and CR lines, the new production and consumption points are located after growth has occurred.

Neutral economic growth is a situation where, after growth has taken place, the new production and consumption points lie farther to the right along the original PR and CR lines, respectively. In other words, after growth the economy continues to produce and consume the two goods in the same ratios as existed before growth. Such a situation would be illustrated in Figure 10.2 if the production point were to move outward, say to A_N , with a corresponding movement of the consumption point to C_N . As it turns out, in this case exports and imports will both rise by amounts proportional to the increase in production.†

Neutral economic growth

A proportionate increase in all factors and consumption so that trade expands proportionately to the growth of the economy.

* In the extended discussion that follows, we model growth as increases in the supplies of factors of production. It is equally interesting to discuss technological changes that make existing factors more productive. So long as any technological change is not industry specific, the two causes of growth are analytically identical. Later, we discuss briefly the case of industry-specific technological change.

† To convince yourself of the validity of this last statement, trace out the new trade triangle for the economy based on production occurring at A_N and consumption at C_N . Then, compare the size of this triangle with that of the old trade triangle.

What are the underlying economic circumstances necessary for economic growth to be neutral? First, it must be the case that the new PPF must look exactly like the old PPF, but bigger. Only in this case will the new production point lie on the same PR as the old production point. This statement requires some discussion. Recall that we have assumed that world prices stay constant. If output prices remain constant, so will input prices. Constant input prices, in turn, imply that after growth each industry will want to use capital and labor in the same mixes that were used prior to growth. Consequently, for output to grow by equi-proportionate amounts in the two industries, factors must grow in supply so that they can continue to be divided between the two industries in precisely the same fashion that they were before growth occurred. Thus, if the ratio of new capital to new labor equals the preexisting overall capital/labor ratio in the economy, then output of the two goods will expand proportionately.

The second condition for neutral growth is that the consumption of the two goods rises along the CR line. This will happen only if the consumption of both rises by the same proportion. What brings about the changes in consumption? Clearly, the answer is that because of economic growth, the economy is at a higher income (GDP) level.* In your Principles of Economics course, you probably learned about a measure of the relationship between changes in demand and changes in income. This measure is known as the *income elasticity of demand*. We denote the formulas for the income elasticity of demand for S and T , respectively, as

$$\eta_S = \frac{\text{percentage change in consumption of } S}{\text{percentage change in income (GDP)}}$$

and

$$\eta_T = \frac{\text{percentage change in consumption of } T}{\text{percentage change in income (GDP)}}$$

For consumption of each good to rise in the same proportion, as is required to remain on the CR line, the two income elasticities must be equal. That is, $\eta_S = \eta_T$. Moreover, since there is nothing else to purchase, the percentage changes in the consumption of both products must equal the percentage change in income. That is, it must also be the case that both elasticities equal 1.† This is the second requirement of neutral economic growth.

A numerical example of neutral economic growth is provided in Table 10.1. We assume that the economy begins with a production level of 1,000 units of T and that it consumes 600 of these. The difference of 400 is exported to the rest of the world. We assume that the world price of T in terms of S is 2, so that when this country exports 400 units of T , it receives 800 units of S in return. Adding these imports to its (assumed) production of 800 units of S allows the country to consume 1,600 units of S . The GDP for this country is calculated by adding together the level of T production (measured in units of S) and the level of S production. Hence, initial GDP equals 2,800 ($2 \times 1,000 + 800$).

Suppose that growth in the supplies of capital and labor leads to a 60 percent change in the outputs of S and T . Consumption of each good must also rise by 60 percent. If both production and consumption of a good rise by 60 percent, so too will the amount of trade in this good. This growth is illustrated by the figures in the second column of the table. Our example provides a compelling illustration of why this type of growth is called neutral. Every aspect of the economic activity in this economy has expanded by the same proportion.

* Recall that we are maintaining an assumption of fixed prices.

† Recall from your Principles of Economics course that income elasticities of demand may be positive or negative. If they are negative, goods are said to be inferior. If they are positive, goods are normal. Goods with very high (positive and greater than 1) elasticities are sometimes described as luxuries because an increase in income leads to a large increase in consumption of these products. Goods with income elasticities less than 1 are sometimes described as necessities.

TABLE 10.1 Example of Neutral Economic Growth

| | Before Growth | After Growth | Percentage Change |
|--------------------|---------------|--------------|-------------------|
| Production of T | 1,000 | 1,600 | 60 |
| Consumption of T | 600 | 960 | 60 |
| Exports of T | 400 | 640 | 60 |
| Production of S | 800 | 1,280 | 60 |
| Consumption of S | 1,600 | 2,560 | 60 |
| Imports of S | 800 | 1,280 | 60 |
| Slope of PR line | $5/4^a$ | $5/4^b$ | 0 |
| Slope of CR line | $3/8^c$ | $3/8^d$ | 0 |
| Terms of trade | 2 | 2 | 0 |
| GDP ^e | 2,800 | 4,480 | 60 |

^a Calculated as production of T /production of $S = 1,000/800$.

^b Calculated as production of T /production of $S = 1,600/1,280$.

^c Calculated as consumption of T /consumption of $S = 600/1,600$.

^d Calculated as consumption of T /consumption of $S = 960/2,560$.

^e Measured in units of S .

With the case of neutral economic growth established as a reference point, we are now in a position to consider other forms of economic growth. To cut down on the number of cases that could be illustrated, we shall assume that after growth, consumption continues to occur along the original CR line. In other words, we assume that $\eta_S = \eta_T = 1$ throughout.*

Suppose the supply of labor were to increase by a greater percentage than the supply of capital.[†] What will happen to the output of the two goods? Since T is a labor-intensive industry, and, by assumption, economic growth has made the country relatively more labor abundant, the PPF will tend to grow proportionately more along the T axis than along the S axis. Holding prices constant, the new production point will lie above the old PPF, with the new PR line rotating to the left of the original PR line. This is indicated by the regions denoted 1 and 2 in Figure 10.3. If the new production point is located in region 1, then the outputs of both T and S rise, but that of T rises in a greater proportion. If the new production point occurs in region 2, then, after growth, the output of T rises, but that of S falls. Finally, if the new production point occurs on the boundary line between these two regions (denoted by $A_0 A_E$), the output of T rises, but the output of S remains constant. Where will the production point end up? The answer is that it depends on the relative growth of labor and capital.

Recall that the T industry is assumed to be more labor intensive than the S industry. Now, we consider the case where the economy receives an infusion of new labor and capital, but at a rate that will lower the overall capital/labor ratio of the economy. The ratio of new capital to new labor will determine what happens to the outputs of S and T . If the ratio of new capital to new labor equals the original capital-to-labor ratio in industry T , then the new production point will lie on the vertical line segment above A_0 . That is, the output of T will rise after growth, while the output of S will remain constant. The intuition behind this result is relatively straightforward. The economy has received new factors of production in precisely the combination that is used to produce T . Hence, these factors can be allocated efficiently to the T industry without affecting production in the S industry.[‡]

* We leave as an exercise the effects on international trade if this were not the case.

[†] The limiting case of this type would be the Rybczynski case in which only labor increased in the economy.

[‡] Recall that, by assumption, prices are fixed. This means that new supplies of factors have no effect on factor prices. Thus, each industry will want to employ new factors in the same ratio as before growth.

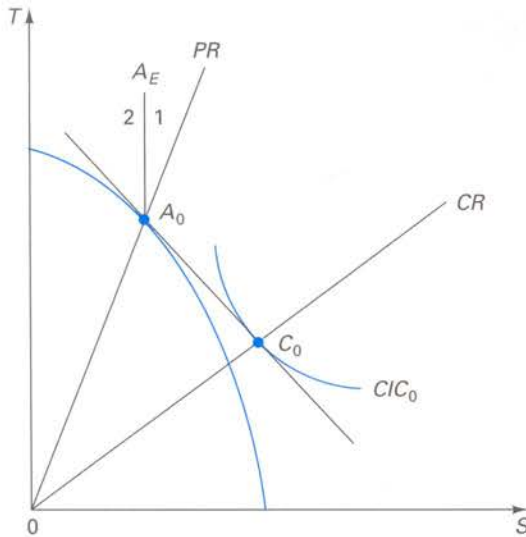


FIGURE 10.3 Location of Production Following Protrade Biased Growth

Consider now the case where the proportion of new factors is different from the ratio in which they are used in the T industry. That is, suppose that the ratio of new capital to new labor exceeds (is less than) the original capital/labor ratio in the T industry. Then, the new production point will lie in region 1 (2).^{*} Again, the logic of this is relatively straightforward. If the ratio of new capital to new labor is less than the ratio used in the T industry, then for T to be able to employ these new factors, it will need some additional capital. This capital can come only from the S industry. Hence, the output of S must fall, and, graphically, the production point moves into area 2. Conversely, if the ratio of new capital to labor exceeds that used in the T industry, the T industry could expand, but it would not want to hire factors in the proportion available to it. There would be a tendency to employ less than the fully available amounts of new capital. However, these factors would become employed if the S industry were to expand. Hence, in this case, the production point of the economy would tend to move into area 1.

No matter whether the new production point is in area 1, in area 2, or on the line between the two areas, after growth has occurred there will be a tendency for the economy to produce relatively more T and relatively less S than before growth occurred. If, as we have assumed, the economy still wants to consume S and T in the same ratios as before, then there will be a tendency for a large expansion in both exports and imports. Consider the case where the economy moves into area 2. Production of T has risen, production of S has declined, but GDP has expanded. Hence, the demand for both products has risen. Clearly, because the output of S has declined while the demand for it has risen, imports must rise (a lot!). Since, by assumption, the international price of imports has remained unchanged, the only way the economy can expand its imports of S is through an expansion in exports of T . We have now established the following result: *When an economy grows because of a relative expansion in the supply of the factor used intensively in the production of exportables, there will be a tendency for the output of exportables to rise relative to the output of importables and for international trade to rise in percentage terms by an amount greater than the percentage expansion of GDP.* This type of growth is called **protrade biased growth**.

Note carefully the implications of protrade biased growth for an economy. If the amount that a country trades is growing over time at a rate that exceeds that country's growth in GDP,

Protrade biased growth

Growth that results in an expansion of trade that exceeds the rate of growth of GDP.

^{*} In the Rybczynski case, this clearly holds because only labor increases. Therefore, the ratio of new capital to new labor is zero. This must be less than the original capital/labor ratio in the T industry; and hence, by the theorem, the output of T will rise, while the output of S will fall.

TABLE 10.2 Example of Protrade Biased Growth

| | Before Growth | After Growth | Percentage Change |
|--------------------|---------------|--------------|-------------------|
| Production of T | 800 | 1,100 | 37.5 |
| Consumption of T | 500 | 600 | 20.0 |
| Exports of T | 300 | 500 | 66.7 |
| Production of S | 200 | 100 | -50.0 |
| Consumption of S | 500 | 600 | 20.0 |
| Imports of S | 300 | 500 | 66.7 |
| Slope of PR line | 4 | 11 | 175.0 |
| Slope of CR line | 1 | 1 | 0.0 |
| Terms of trade | 1 | 1 | 0.0 |
| GDP | 1,000 | 1,200 | 20.0 |

then the relative importance of trade to that economy (as measured by, e.g., the ratio of exports to GDP) is also growing. Graphically, the PR line rotates away from the CR line so that the production point moves farther and farther away from the consumption point. As we saw in Chapter 1, since World War II, trade has tended to grow faster than GDP for most countries. This indicates a general tendency for protrade biased growth in the world.

A numerical example of protrade biased growth is provided in Table 10.2. In this example, we assume that capital and labor grow in such a fashion that the output of T rises and of S falls. That is, we illustrate a movement into area 2 of Figure 10.3. We also assume that S and T have the same nominal price, so that the relative price of S is 1. This allows a simple calculation of how much growth has actually occurred in the economy. In particular, in the example, T has risen by 300, but S has fallen by 100. Because the two goods have the same price, we can add these physical changes to find the overall change in GDP (measured in units of S). Since GDP has grown by 20 percent, given our assumption that $\eta_S = \eta_T = 1$, consumption of both S and T will rise by 20 percent. Combining the effects of changes in production and consumption of the two goods yields the effect of growth on exports and imports.

It is also possible that a country could grow so that its relative endowment of initially scarce factors increases. For instance, in our example, the capital-scarce country could experience a relative expansion in its overall ratio of capital to labor. As might be expected from our preceding discussion, if this were to occur, there would be a tendency for an expansion of S production relative to T production. In fact, *production of T could even fall* if the ratio of new capital to new labor were greater than that used originally in the S industry. If we assume that consumption rises in proportion to the overall growth in the economy, then, because the production of S , the importable, is rising faster than the overall growth of the economy, the amount this country will trade will fall. When an economy grows because of a relative expansion in the supply of the factor used intensively in the production of importables, there will be a tendency for the output of importables to rise relative to the output of exportables and for the international trade of this country to fall. This type of growth is called **antitrade biased growth**.

An implication of antitrade biased growth is that, over time, the economy produces a bundle of goods that more and more closely matches the bundle that it wants to consume. That is, the PR line rotates toward the CR line. In these circumstances, the importance of international trade to this economy tends to decline. In other words, there is a general tendency toward autarky.

Table 10.3 provides an example of a country that experiences antitrade biased growth. Here, we assume that increases in the supplies of capital and labor lead to a greater percentage growth in S than in T (i.e., 20 percent vs. 5 percent). Overall, the economy grows by 12.5 percent. Because

Antitrade biased growth

Growth that results in a reduction of trade relative to the size of the economy.

TABLE 10.3 Example of Antitrade Biased Growth

| | Before Growth | After Growth | Percentage Change |
|--------------------|---------------|--------------|-------------------|
| Production of T | 2,000.0 | 2,100.0 | 5.0 |
| Consumption of T | 1,500.0 | 1,687.5 | 12.5 |
| Exports of T | 500.0 | 412.5 | -17.5 |
| Production of S | 1,000.0 | 1,200.0 | 20.0 |
| Consumption of S | 1,250.0 | 1,406.25 | 12.5 |
| Imports of S | 250.0 | 206.25 | -17.5 |
| Slope of PR line | 2.0 | 1.75 | -12.5 |
| Slope of CR line | 1.2 | 1.2 | 0.0 |
| Terms of trade | 0.5 | 0.5 | 0.0 |
| GDP | 2,000.0 | 2,250.0 | 12.5 |

of our continuing assumption about unitary income elasticities of demand for each good, consumption of both S and T rises by 12.5 percent. Note the effects of this type of growth on international trade. Consider industry T first. There, production has grown by less than consumption. Hence, the amount of T available for export must fall. In the S industry, production has grown by more than consumption. This implies that the demand for imports has fallen. Thus, this country wants to trade less after growth than before.

Note something else about antitrade biased growth. In this situation, over time the economy tends to produce relatively less of its traditional export good and relatively more of its traditional import good. Would it ever be possible that growth could lead to a switch in trade patterns? The answer is yes. If, for instance, supplies of capital were to continue to rise much faster than labor in the country we have been considering, then eventually this country could be expected to stop exporting (importing) T (S) and begin to import (export) it.

TRADE AND GROWTH: SOME ADDITIONAL COMMENTS

The analysis we have conducted so far has made a number of quite restrictive assumptions about the sources of economic growth, the size of the country, and the trade policies that it follows. In this section, we briefly indicate how the results we have established so far change when some of the assumptions we have made are relaxed.

Technological Change

Technological (technical) change is said to occur when the same amount of output can be produced by fewer factor inputs or, equivalently, when the same amount of inputs can produce greater amounts of output. Technical change can occur in a variety of ways. **Neutral technical change** is defined as innovation that reduces by an equi-proportionate amount the quantity of factors required to produce a given level of output. **Labor-saving (capital-saving) technical change** is said to occur if the invention leads to a reduction in the use of labor (capital) at the original factor prices.

Technical change can be specific to an industry, or it can be economy wide. Thus, the combination of the location of the innovation and the way in which the innovation saves on the use of resources will have implications for the post-growth shape of the country's PPF. If neutral technical change occurs to the same degree in all industries of an economy, then that country's PPF shifts out in a manner that preserves its original shape. More likely, however, is that innovations will be industry and factor specific.

Neutral technical change

An innovation that results in an equi-proportionate reduction in the use of all factors in the production of one unit of output.

Labor-saving (capital-saving) technical change

An innovation that results in a more than proportionate reduction in the use of labor (capital) relative to other factors in the production of one unit of output.

A complete treatment of all of the possibilities for industry-specific technical change is beyond the scope of this text. However, the following general results have been established in the special case where world prices remained fixed.*

If neutral technical progress occurs in one industry, the output of that industry will rise at the expense of other industries. This will be even more the case if the innovation leads to a reduction in the per unit use of the relatively intensive factor of an industry. For instance, we would expect the output of T to rise substantially if a labor-saving innovation were introduced in the T industry. Why is this so? The effect of the innovation is to reduce the amount of labor industry T needs to produce its original level of output. At initial levels of output, this is just as if the economy were given an increase in its endowment of labor. Recall from the Rybczynski theorem that when an economy experiences an increase in the quantity of one factor, the output of the industry that uses that factor relatively intensively must rise, and the output of the other industry will fall.

If technical progress allows an industry to save on the use of the factor it uses relatively less intensively, then almost anything can happen. The output of the industry where the innovation occurred could rise, or it could fall. This is true because there are two opposing effects at work. The effect of the innovation is to lower costs to the industry where the innovation occurred. This would tend to lead to an expansion in output of that industry. Working against this is the Rybczynski effect—the output of the other industry must rise to absorb the factor that is “saved” by the innovation.

Growth, Prices, and Welfare

Suppose that the country in question is large in world markets rather than small. In that case, the way in which the country grows will have strong implications for world prices. For instance, suppose A is a large country that is relatively abundant in capital. As we have seen, if it undergoes neutral economic growth, then, over time, it will want to export more S and import more T . Because A is a large country, the increase in supply of S on world markets and the increase in demand for T will tend to lower the world price of S relative to T . In other words, in the case of neutral economic growth for a large country, the terms of trade for that country (the price of its exports relative to its imports) will tend to decline as it grows.

Biased economic growth will also have effects on a large country's terms of trade. Protrade biased growth will cause the terms of trade to deteriorate even more than neutral growth. This occurs because growth has caused a more than proportionate increase in the supply of exports to the world market and in the demand for imports from the world market. On the other hand, antitrade biased growth will lead to an improvement in the growing country's terms of trade.

Changes in a country's terms of trade have implications for the welfare level of the country. Economic growth at constant prices shifts a country's price line out, thereby expanding its consumption possibilities set and raising its standard of living. For a large country, this effect is diminished to some extent if growth leads to a deterioration in its terms of trade.

The fact that, for a large country, growth has both positive and potentially negative welfare effects means that it might be possible for growth to actually make a country worse off. In a classic paper, Jagdish Bhagwati has shown the conditions for **immizerizing growth**, or growth that makes a country worse off.[†] In Figure 10.4 we illustrate a situation of immizerizing growth. Initially, the economy is in free-trade equilibrium, producing at point X_1 and consuming at point C_1 . Its welfare level in this equilibrium is denoted by the community indifference curve, CIC_1 , and the world price in this equilibrium by the price line labeled TOT_1 . Suppose there is strong protrade biased growth in the country. This will cause the PPF to shift out along the S axis and will produce a large expansion in the desired level of exports of the country. Suppose further that

Immizerizing growth

Economic growth that results in a reduction in national economic welfare.

* See Ronald Findlay and Harry Grubert, “Factor Intensity, Technological Progress, and the Terms of Trade,” *Oxford Economic Papers* (1959), for a complete treatment of the effects of technical change on production and international trade.

† See Jagdish Bhagwati, “Immizerizing Growth: A Geometrical Note,” *Review of Economic Studies* (1958).

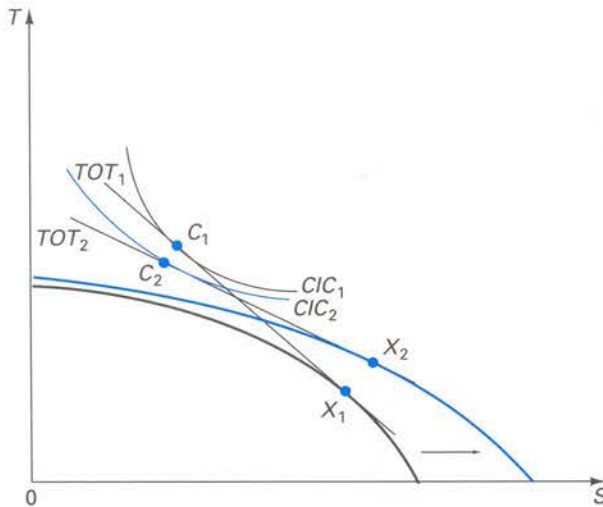


FIGURE 10.4 Immizerizing Growth

the demand for this good in the rest of the world is relatively inelastic. In this case, the world price of that product must fall substantially. This is shown by the fall in price from TOT_1 to TOT_2 . Under these circumstances, consumption moves to C_2 , and the country's welfare level falls to CIC_2 . The deterioration in the growing country's terms of trade has been so great as to lower overall welfare below its pre-growth level.

Is immizerizing growth a common phenomenon? Probably not, for two reasons. First, precise conditions on both the nature of growth and world demand must hold for immizerizing growth to occur. Second, as we learned from our discussion of the optimal tariff in Chapter 6, if a country has the ability to affect world prices with its tariff policy, it can improve its welfare. This is clearly the situation here. If, in particular, the world price of the growing country's exports is falling, the government of that country can act to prevent this by imposing an export tariff. Thus, government policy can be used to mitigate any potential negative consequences of growth. A phenomenon somewhat similar to immizerizing growth is perhaps more common. This is known as the *Dutch disease*. Global Insights 10.1 describes in more detail some of the history and implications of the Dutch disease.

Global Insights 10.1

The Dutch Disease

In the 1960s, large deposits of natural gas were discovered in the Netherlands. Natural gas soon became a leading Dutch industry in terms both of production and exports. Because of the plentiful supplies of natural gas, other Dutch industries adopted energy-intensive production techniques. In the 1970s, the world experienced two oil-price shocks. The effects of these shocks on the Netherlands were especially profound.

The higher price of oil led to higher prices of substitute forms of energy, including natural gas. As prices

rose in the natural gas sector of the economy, so did wages. This encouraged workers to leave other jobs for the expanding natural gas sector. Manufacturers in other sectors were forced to offer higher wages to keep their employees. Higher wages coupled with higher energy costs forced some manufacturers out of business. As if this were not enough, the fact that the Netherlands was relatively energy independent led foreign-exchange traders to bid up the value of the Dutch currency. This made it even more difficult for Dutch manufacturers to compete in world

(continued)

(continued)

markets, and so higher energy prices led to the demise of a significant portion of the Dutch manufacturing sector. And because of downward rigidities in wages in the Netherlands, unemployment rose.

Other countries besides the Netherlands have had similar experiences with booming resource sectors. The fact that good fortunes for one part of a country's economy can lead to very bad times for the economy as a whole has become known as the *Dutch disease*. This notion has usually been associated with the implications of a boom in the market for a particular commodity and the effects of this boom on an economy that has large endowments of the commodity in question.

Economists have become interested in the various ramifications of the Dutch disease phenomenon. In particular, they are interested in whether other sectors in the

economy must necessarily be made worse off when the resource boom occurs (in other words, whether these other sectors must necessarily catch the "disease"). They have shown that whenever a resource boom occurs, other sectors stand to be affected. This is what one would expect given constraints on the availability of resources.

However, it need not be the case, as it was in the Netherlands, that a resource boom leads to deindustrialization. Export sectors such as agriculture may absorb the burden of the boom by providing the resources to the expanding sector. In addition, sectors specializing in the provision of goods that do not enter into international trade (e.g., the government, many services) could stand to gain from a resource boom, because these industries can raise their prices without fear of international competition.*

* For more discussion of the Dutch disease, see Max Corden and Peter Neary, "Booming Sector and De-industrialization in a Small Open Economy," *Economic Journal* (1982); James Cassing and Peter Warr, "The Distributional Impact of a Resource Boom," *Journal of International Economics* (1985); and the papers in Peter Neary and Sweder van Wijnbergen eds., *Natural Resources and the Macroeconomy* (Cambridge, Mass.: MIT Press, 1986). For a recent and very accessible discussion of the Dutch disease, see Nikola Spatafora and Irina Tytell, "Commodity Terms of Trade: The History of Booms and Busts," *VoxEU*, March 24, 2010, available online at <http://www.voxeu.org/index.php?q=node/4796>

INTERNATIONAL FLOWS OF FACTORS

Labor

Up to this point, we have modeled economic growth as originating from within the growing country. Countries can also grow because they receive factor inputs from other countries. Consider the case of the United States. It is estimated that almost 75 million people migrated to the United States from foreign countries between 1820 and 2009. Table 10.4 highlights the pattern of U.S. immigration over the past 200 years. Measured in terms of the ratio of immigrants to total population, the highest proportion of immigrants in the population was found during the first decade of the twentieth century, but immigration was also very high relative to total population during the 1840s, the 1850s, and the 1880s.

This influx of new population helped to expand the labor force of the United States just at the time when other factors, such as land (through purchase, conquest, and expropriation) and capital (through domestic- and foreign-sourced investment) were also growing. Thus, immigration played a large part in the emergence of the United States as a leading world economy by the end of the nineteenth century.

The United States is not the only country to have experienced large inflows of migrants. For instance, between 1960 and 1980, Canada, Australia, and the New Zealand took in 5.7 million immigrants, roughly one-third of the permanent world immigration during this period. Moreover, because these countries have much smaller populations, the proportion of immigrants to total population is much higher there than it is in the United States.

In addition to moves that migrants view as essentially permanent, a considerable amount of temporary immigration occurs today. These temporary moves are often the result of specific policies instituted by governments in host countries. Under these programs, workers from foreign (source) countries are invited to relocate in host countries for short time spans to work in various industries. Beginning in the 1960s and extending through at least 1975, rich Western European

TABLE 10.4 U.S. Immigration, 1820–2005^a

| Year(s) | Total | | Year(s) | Total | |
|------------------------|--------|-------------------|------------------------|--------|-------------------|
| | Number | Rate ^b | | Number | Rate ^b |
| 1820–1890 | 57,090 | 3.5 | 1931–1940 | 528 | 0.4 |
| 1820–1830 ^c | 152 | 1.2 | 1941–1950 | 1,035 | 0.7 |
| 1831–1840 ^d | 599 | 3.9 | 1951–1960 | 2,515 | 1.5 |
| 1841–1850 ^e | 1,713 | 8.4 | 1961–1970 | 3,322 | 1.7 |
| 1851–1860 ^e | 2,598 | 9.3 | 1971–1980 ^g | 4,493 | 2.1 |
| 1861–1870 ^f | 2,315 | 6.4 | 1981–1990 | 7,338 | 3.0 |
| 1871–1880 | 2,812 | 6.2 | 1991–2000 | 9,095 | 3.4 |
| 1881–1890 | 5,247 | 9.2 | | | |
| 1891–1900 | 3,688 | 5.3 | 2001–2005 | 4,898 | 3.4 |
| 1901–1910 | 8,795 | 10.4 | 2006 | 1,006 | 3.4 |
| 1911–1920 | 5,736 | 5.7 | 2007 | 866 | 2.9 |
| 1921–1930 | 4,107 | 3.5 | 2008 | 863 | 2.8 |
| | | | 2009 | 855 | 2.8 |

^a In thousands, except rate. Through 1976, for years ending June 30, except as noted; beginning 1977, ending September 30. For definition of immigrants: 1820–1867, alien passengers arriving; 1868–1891 and 1895–1897, immigrants arriving; 1892–1894 and 1898 to the present, immigrants admitted. Rates based on Bureau of the Census estimates as of July 1 for resident population through 1929, and for total population thereafter (excluding Alaska and Hawaii prior to 1959). See also *Historical Statistics, Colonial Times to 1970*, series C89.

^b Annual rate per 1,000 U.S. population, 10-year rate computed by dividing sum of annual immigration totals by sum of annual U.S. population totals for same 10 years.

^c October 1, 1819, to September 30, 1830.

^d October 1, 1830, to December 31, 1840.

^e Calendar years.

^f January 1, 1861, to June 30, 1870.

^g Includes transition quarter, July 1 to September 30, 1976.

Source: Jagdish Bhagwati, “Global Interdependence and International Migration,” in James Cassing and Steven Husted, eds., *Capital, Technology, and Labor in the New Global Economy*, (Washington, D.C.: American Enterprise Institute, 1988), Table 1, reprinted by permission; and *Statistical Abstract of the United States, 2012* (Washington, D.C.: U.S. Government Printing Office 2012), Table 5.

countries invited **guest workers** (or *gastarbeiter*) from neighboring poorer countries, such as Italy, Spain, Portugal, Turkey, Greece, and Yugoslavia. All in all, about 6.3 million workers were invited to move to Western Europe, and they composed a substantial proportion of the workforces there. At one point, 18 percent of Switzerland’s labor force was made up of guest workers. The amount of workers participating in this program tended to reduce by substantial proportions the workforces in the source countries. Portugal, for example, exported more than 10 percent of its labor force. In addition to the guest worker programs in Western Europe, the OPEC countries of the Middle East have imported large numbers of workers from countries such as Egypt, Jordan, Pakistan, India, and even Korea. And, for many years, migrant workers from Mexico have crossed the border to work in the United States during agriculture harvests.

Migration occurs for many reasons and follows a variety of paths. The majority of international relocations happen because the migrant is seeking at least one of three things: better economic circumstances, refuge from political tyranny or devastation, or reunion with other family members. Much of the migrant flow, such as in the guest worker programs, is

Guest workers

Foreign workers who are invited to temporarily relocate in a country to work in a certain sector of an economy.

from poor countries to rich countries. These flows are largely motivated by the opportunities workers have to earn higher wages and to enjoy the benefits of greater job security. Poor country to poor country and rich country to rich country flows are also relatively common. Rich country to poor country flows are not.

Migrants possess different skills. Much of the rich country to rich country migration that occurs involves skilled labor.* A substantial amount of migration from poor countries to rich countries also involves skilled labor. The process whereby skilled workers leave their homeland and relocate abroad is known as **brain drain**. The notion of a brain drain became an important focus of study in the 1960s. Then, the concern was that Europe's most skilled workers, including its best scientists, doctors, and engineers, were abandoning Europe for the United States, Canada, and elsewhere. Today, that flow has diminished and in some instances may have reversed its direction. More recently, concern has grown that rich industrialized countries may be draining skilled labor from poor developing countries, where, at the margin, the contribution of skilled labor to economic development may be quite high.†

Because of relatively higher wage levels and general standards of living, poor country to rich country movements of low-skilled workers are a common phenomenon. This pattern of migration describes well the flows of workers from Southern and Eastern Europe to the United States in the early part of the twentieth century and the migration of workers from Mexico and Southeast Asia to the United States today. The outflow of unskilled workers has sometimes been described as a *brawn drain*.

Capital

Labor is not the only factor that flows across international boundaries. Capital, both in financial and in physical forms, does as well. In fact, international flows of capital have become an everyday fact of life in the international economy and, because of their enormous size, are probably much more important than labor flows in influencing rates of economic growth and the location of economic activity.

Again, we consider the case of the United States. Throughout the nineteenth century, it was a capital-importing country.‡ Other countries—most notably the United Kingdom—lent a substantial proportion of the financial capital that enabled the construction of railroads, factories, and communication systems, thereby helping to propel the U.S. economy to the status of an industrial giant. Imports of European-made capital goods (in exchange for U.S. agricultural products) also helped promote the development of the U.S. industrial base.

For much of the twentieth century, the United States was a capital exporter. That is, it lent financial capital to countries throughout the world, becoming by 1980 the world's largest net creditor. Since the 1980s, this trend has reversed. American firms, citizens, and especially the U.S. government have been borrowing in record amounts from foreigners. In the process, the United States has moved from being the world's largest net creditor to being the world's largest net debtor.**

Even though, of late, the United States has been importing more capital than it has been exporting, the United States still supplies substantial amounts of capital to the rest of the world.

* This is due in part to the fact that many host countries have immigration laws that limit the inflow of people. A feature of these laws is that it is often easier for people with special skills to immigrate.

† The issue of whether the brain drain is a problem goes beyond the scope of this text. For an excellent overview of the issues on the brain drain, see Jagdish Bhagwati, "Global Interdependence and International Migration," in James Cassing and Steven Husted, eds., *Capital, Technology, and Labor in the New Global Economy* (Washington, D.C.: AEI, 1988), and the references cited therein.

‡ In the real world, capital tends to flow both into and out of a country. That is, some agents (citizens, firms, or governments) borrow in international markets, while others lend. A capital importing (exporting) country is one where its citizens borrow (lend) more in international financial markets than they lend (borrow).

** See Chapter 11 for a more complete account of these events as well as an analysis of what this means for the United States.

Brain drain

The permanent relocation of skilled workers from one country to another.

Firms in the United States have taken the lead in a particular form of international transfer of capital known as *direct foreign investment*. This happens when a domestic (e.g., U.S.) firm acquires ownership of or control over the operations of a foreign subsidiary firm. According to U.S. definitions, a (parent) firm is said to directly invest abroad if it has a direct or indirect ownership interest of 10 percent or more in a foreign business enterprise (foreign affiliate corporation). American firms have engaged in direct foreign investment by setting up (or buying previously existing) production and marketing facilities in foreign countries, or by becoming minority owners of competing foreign corporations. Firms that own and operate capital in one or more foreign countries are known as **multinational corporations (MNCs)**.

Virtually all of America's most well-known corporations, such as Ford, General Motors, IBM, McDonald's, and Coca-Cola, are MNCs. Many lesser-known American companies are MNCs as well. In 2009, worldwide sales of U.S. MNCs totaled more than \$14 *trillion*, and worldwide employment of U.S. MNCs stood at 33.9 million people. The American (parent corporation) shares of these totals were \$9.2 trillion in sales and 23.1 million employees, respectively. Table 10.5 provides detail on an industry-by-industry breakdown of MNC activity, as measured by employment, both in the United States and in foreign locations. Clearly, the manufacturing sector accounts for the largest share of MNC employment both in the United States and overseas. Within this category, a considerable fraction of overseas employment is in the transportation equipment sector, largely employees of U.S. automakers in foreign assembly plants.

Table 10.6 provides some information on the location of foreign affiliates of U.S. MNCs, again measured by levels of employment. According to this table, almost 60 percent of foreign U.S. MNC employment is in developed countries, with the greatest share of this in Western Europe. The greatest amount of U.S. MNC employment in developing countries is found in Latin America.

Foreign MNCs exist, and most operate in the United States. U.S. companies that are affiliates of foreign MNCs sold \$2.9 trillion in goods and services in 2009 and employed about 5.3 million people. European-based corporations accounted for the greatest share of U.S. affiliate employment (65 percent). U.K.- and German-based firms were the largest employers

Multinational corporation (MNC)

A corporation that operates production or marketing facilities in more than one country.

TABLE 10.5 Employment of Nonbank U.S. MNCs in 2009 (worldwide, parent, and affiliate)

| | Number of Employees (thousands) | | | Affiliates Employment as % of Total |
|---|---------------------------------|----------|-----------|--|
| | Worldwide | Parent | Affiliate | |
| All industries | 33,922.1 | 23,120.7 | 10,801.4 | 31.8 |
| Mining | 381.2 | 179.8 | 201.4 | 52.8 |
| Utilities | 189.6 | 157.9 | 31.7 | 16.7 |
| Manufacturing | 11,485.6 | 6,898.7 | 4,586.9 | 39.9 |
| Wholesale trade | 1,922.0 | 1,134.1 | 787.9 | 41.0 |
| Information | 2,143.5 | 1,748.6 | 394.9 | 18.4 |
| Finance (except banks and insurance) | 3,156.2 | 2,512.6 | 643.6 | 20.4 |
| Professional services | 2,026.7 | 1,222.3 | 804.4 | 39.7 |
| Other | 12,614.4 | 9,266.7 | 3,347.7 | 26.5 |

Source: Kevin E. Barefoot and Raymond J. Mataloni, Jr., "U.S. Multinational Companies in 2009," *Survey of Current Business* (U.S. Department of Commerce, November 2011).

TABLE 10.6 Employment of U.S. MNC Foreign Affiliates, by Area, 2009

| | Number of Employees (thousands) |
|--|---------------------------------|
| All Countries | 10,801.4 |
| Developed Countries | 6,165.4 |
| Canada | 1,077.5 |
| Europe | 4,173.9 |
| <i>Of which:</i> | |
| France | 539.3 |
| Germany | 628.2 |
| United Kingdom | 1,194.6 |
| Japan | 322.7 |
| Australia, New Zealand, and South Africa | 390.4 |
| Developing Countries | 4,636.0 |
| Latin America | 2,106.8 |
| <i>Of which:</i> | |
| Mexico | 965.0 |
| Africa | 107.8 |
| Middle East | 100.0 |
| Asia and Pacific | 2,522.0 |
| <i>Of which:</i> | |
| China | 943.8 |
| India | 490.7 |
| Korea | 119.9 |

Source: Kevin E. Barefoot and Raymond J. Mataloni, Jr., "U.S. Multinational Companies: Operations in 2009," *Survey of Current Business* (U.S. Department of Commerce, November 2011).

of workers in the United States, with 17 percent and 11 percent, respectively. Canadian firms accounted for 9 percent.*

Why some firms choose to become MNCs is an interesting and unresolved question in economics. Clearly, firms that operate in foreign countries are at a disadvantage relative to their locally based foreign competitors. That is, they face additional costs, including the costs of coordinating activities over long distances, that their competitors do not incur. Economic theory suggests, then, that there must be special advantages to being multinational, or else these firms would cease such operations. What sort of special advantages might there be? First, MNCs might have access to special technology. Control over this technology would enable the MNC to compete successfully with local firms. A second possibility is that there may be increasing returns to scale that accrue to a firm that operates plants in many locations.†

* For more information on the activities of foreign MNCs in the United States, see Thomas Anderson, "U.S. Affiliates of Foreign Companies: Operations in 2009," *Survey of Current Business* (U.S. Department of Commerce, August 2011).

† For a more complete discussion on the economics of MNCs, see John Dunning, "The Determinants of International Production," *Oxford Economic Papers* (1973); and James Markusen, *Multinational Firms and the Theory of International Trade* (Cambridge, Mass.: MIT Press, 2002).

As we noted in our discussion of NAFTA, some have argued that trade liberalization between rich and poor countries will induce firms in high-wage countries to relocate their manufacturing operations to low-wage countries. In the process, employment would fall in high-wage countries and production would be replaced by imports from low-wage countries. This practice is known as **outsourcing**. The numbers in Tables 10.5 and 10.6 suggest that, to date, U.S. MNCs have not made widespread use of this practice. Global Insights 10.2 provides more detail on outsourcing.

Outsourcing

Shift of production by a firm to a foreign location.

Economic Analysis

In this section, we end our discussion of international flows of factors by developing and analyzing a simple model that allows one to understand some of the economic implications of these flows. The model we develop is sufficiently general to allow us to apply it to international flows either of labor or of capital. For concreteness, however, we shall discuss labor migration. We leave as an exercise the application of this model to the study of international capital mobility.

Global Insights 10.2

U.S. Outsourcing

The movement of production to affiliate firms outside of the country is known as outsourcing or off-shoring. Although a long-standing practice of many MNCs, outsourcing has recently become very controversial. As a candidate for the presidency, Barack Obama was a frequent critic of outsourcing. He pledged on a number of occasions to “stop giving tax breaks to companies that ship jobs overseas” although he was never very precise about which tax breaks he would try to eliminate, and since he has been president he has not been able to achieve that goal. Over time, he has softened that position, calling instead for tax breaks to companies that move jobs back to the United States. Others, including Lou Dobbs of Fox News, have been much more strident in their criticisms of the practice.*

Outsourcing can take any of several forms. MNCs can expand horizontally by setting up affiliate operations overseas that produce the same product and sell it in the foreign market rather than producing the product in the home market and exporting it to the overseas market. An example of this type of activity is the opening and operation of branches of U.S. banks in foreign markets. At the other extreme, an MNC might expand vertically by setting up an affiliate to produce a good or service that is then imported back to the home market, either for use as an input in production or for direct sale as a final good. One example would be a U.S. company that sets up a call center in India to provide customer or technical support for its products; another would be a company that buys parts from an affiliate manufacturer

in Mexico. While either type of MNC expansion might lead to domestic job loss, it is not obvious that this outcome is inevitable. Outsourcing may allow firms to expand their sales, thereby increasing overall employment in all locations. At worst, it might produce cost savings sufficient to allow a firm to survive.

What makes outsourcing controversial is the implicit threat that this practice poses to employment and employment opportunities in the domestic job market. Politicians and pundits see job losses—most notably in the manufacturing sector—and conclude that this trend reflects firms relocating jobs overseas. In fact, manufacturing jobs are disappearing around the world. A recent study by Alliance Capital management shows that over the period 1995–2002, manufacturing employment fell by 11 percent in the United States, 15 percent in China, and 20 percent in Brazil.† These reductions occurred even as worldwide manufacturing rose by 30 percent. Apparently, rather than being due to outsourcing, manufacturing job losses are explained by enormous increases in productivity.

One area where jobs may be threatened is in the provision of services, but here the evidence is not very clear, because data on the outsourcing of U.S. firms are incomplete. At one extreme, some industrial publications have made estimates of possible gross job changes in specific sectors of the economy: For instance, in 2004, Forrester Research predicted that a total of 3.4 million U.S. IT jobs would be moved offshore by the end of 2015.‡ As the data in Tables 10.5 and

* See, for instance, Lou Dobbs, *Exporting America: Why Corporate Greed Is Shipping American Jobs Overseas* (New York: Warner Business Books, 2004).

† For more detail, go to http://axaonline.com/rs/axa/public_articles/10202003Manufacturing_Payrolls_Declining.html

‡ While this number may seem very large, it should be compared to the projected 160 million jobs expected to exist in 2015, as forecast by the Bureau of Labor Statistics.

(continued)

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10.6 demonstrate, the Department of Commerce (DOC) provides employment data for U.S. MNCs at home and abroad, but these data do not identify how many jobs shifted from American workers to foreign workers. In addition, these data do not count the number of Americans who are employed in the United States by foreign MNCs.

Each year since 1994, the DOC has surveyed a group of American MNCs regarding their corporate operations here and abroad, and a limited number of studies that use these data are now beginning to appear. One report, by Maria Borga, focuses on the behavior of firms that have vertically integrated their production by allowing foreign affiliates to produce inputs for their final products. She reports that over the 1994–2002 period, the share of imported inputs used by domestic firms rose from 6.9 percent to 7.8 percent, concluding that “the vast majority of U.S. parent purchases are from domestic suppliers.” Borga then compares the behavior of domestic MNC firms that experienced growing domestic employment over the period (about two-thirds of the firms) with those firms that reduced their domestic workforce. She reports that firms with domestic job losses increased their reliance on imported inputs from

both their foreign affiliates and other foreign firms. Firms with domestic employment gains used slightly lower levels of imported inputs over this period, and this share remained virtually constant. In short, Borga finds no significant link between changes in the reliance on foreign inputs and domestic employment. Instead, she points out that changes in domestic employment levels by firms moved closely with employment levels in foreign affiliates; these changes were due primarily to changes in product demand and labor productivity. Finally, she suggests that overseas operations exist to provide access to those markets rather than to take advantage of low-cost inputs.**

Borga's findings mirror those in studies conducted by other economists.†† The basic conclusions of these studies are in general agreement. First, the extent of outsourcing is currently relatively limited and its impact is relatively minor on the overall U.S. labor market. Second, as technology develops and trade barriers fall, outsourcing will increase, which could exacerbate political tensions. Finally, in the aggregate economy, outsourcing appears to be consistent with increased U.S. employment as MNCs expand employment both at home and abroad.

** See Maria Borga, *Trends in Employment at U.S. Multinational Companies: Evidence from Firm-Level Data* (U.S. Bureau of Economic Analysis, Department of Commerce, September 2005).

†† For more on outsourcing, see N. Gregory Mankiw and Phillip Swagel, “The Politics and Economics of Offshore Outsourcing,” *American Enterprise Institute Working Paper #122* (December 2005); Martin Baily and Robert Lawrence, “What Happened to the Great U.S. Job Machine? The Role of Trade and Electronic Offshoring,” *Brookings Papers on Economic Activity* (2004); and eds., Susan Collins and Lael Brainard, *Brookings Trade Forum 2005: Offshoring White-Collar Work* (Washington, D.C.: Brookings Institute, 2005).

Marginal product of labor

The additional amount of output (in physical terms) that is produced because one more worker is added to the production process.

Diminishing returns to labor

The fact that as workers are added to the production process, holding all other factors fixed, the marginal product of labor declines.

Value marginal product of labor

The monetary value of the marginal product of labor.

We begin by assuming that there is one country, America, that produces one good, Y (or GDP), by means of fixed amounts of capital and labor. The first thing we want to establish is the level of labor demand in America under this situation. We define the **marginal product of labor** (MP_L) in America as the additional amount (in physical units) of output that can be produced with the addition of one more worker to the production process. What are the properties of the MP_L ? Recall that we have assumed that there is a fixed stock of capital in America. If the capital stock is fixed, it seems plausible that, as more and more workers are added to the production process, the MP_L will exhibit **diminishing returns to labor**. That is, the increase in output due to an increase in labor will become smaller and smaller. This will occur because a fixed amount of machines is being shared by a larger and larger workforce.

Suppose that Y sells for P dollars per unit in the output market and that the market is competitive. Then, we define the **value marginal product of labor** (VMP_L) as the amount of money producers receive from selling the amount that was produced because the last worker was hired. In other words,

$$VMP_L = P \times MP_L \quad (10.1)$$

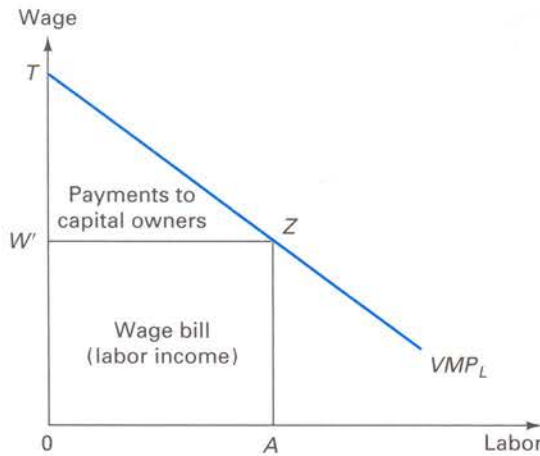


FIGURE 10.5 Distribution of Income Between Labor and Capital

where VMP_L represents the marginal revenue to producers from hiring the last worker.

Let's now consider the profit-maximizing decision by producers in determining their labor input. Suppose the going wage rate for workers is W ; W can be thought of as the marginal cost of the last worker. The profit-maximizing rule, then, is simple. Producers should hire workers until the marginal cost of the last worker equals the marginal revenue that accrues because that worker was hired. That is, firms should equate marginal revenue with marginal cost.

Given information on the value of P and values of MP_L for different levels of employment, it is possible to develop a graph of the VMP_L . Such a graph appears in Figure 10.5. This curve slopes downward, reflecting the diminishing marginal product of labor. The VMP_L curve can be thought of as the demand-for-labor curve. We denote the fixed supply of workers in the economy by distance $0A$ in the diagram. The interaction of demand and supply in the labor market determines the wage rate, W' . Note, then, that the rectangular area defined by $0W'ZA$ is the total value of labor earnings in the economy. This is determined by the fact that there are $0A$ workers, each earning $0W'$. The remaining area under the VMP_L curve, the triangle $W'TZ$, represents payments to the other factor of production, capital. How do we know this? Recall that at any point the height of the VMP_L curve represents the marginal revenue earned by producers because that worker was hired. The worker was paid $0W'$. The remainder is the amount left over that is available to pay owners of the capital stock also used in the production process. The combined areas represent total labor income and total income paid to capital owners, in other words, the value of GDP.

We are now in a position to consider migration. Let's assume that America allows an inflow of foreign workers and that these workers are as skilled as their American counterparts. The obvious effect of this policy is to increase the supply of labor. We denote this increase by the distance AB in Figure 10.6. There are several economic implications to the immigration of foreign workers.

First, as the diagram shows, there is a wage effect. Because of the expansion in the supply of labor (and the assumption that everything else, including the capital stock, has been held constant), wages are driven down to W'' . There is also an output effect. The expansion in the labor force means that more goods can be produced. The value of expanded production is shown in the diagram as the area of the trapezoid $AZZ''B$. Of this amount, the triangle $ZZ''Z''$ represents payments to capital, while the rectangle $ABZ''Z''$ represents the wages paid to foreign workers.

Finally, there is an income-redistribution effect. Domestic labor experiences a drop in the wage rate from $0W'$ to $0W''$, and total domestic labor earnings fall from $0W'ZA$ to $0W''Z'A$. The difference between the areas of these two rectangles represents the value of lost earnings

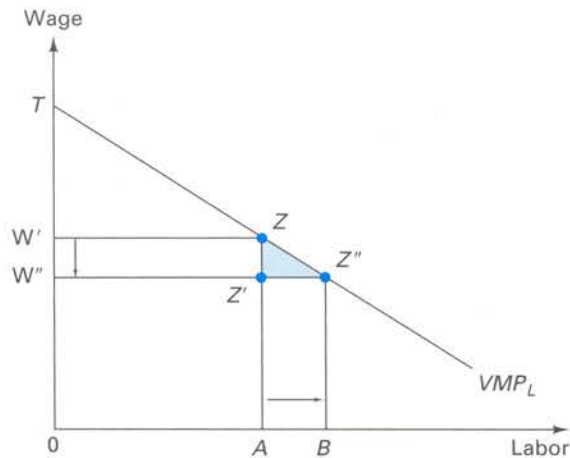


FIGURE 10.6 The Economic Effects of Labor Immigration

to domestic labor. This amount is not lost to the economy, however. Rather, it reverts back to capital owners (assumed to be domestic residents). Capital owners benefit from the immigration of foreign labor because the resulting expansion in output leads to a more intensive use of capital and therefore to a rise in rental rates.

Thus, it is clear that even though foreign labor immigration leads to greater domestic output, not all in society benefit from this inflow. Domestic labor loses. Domestic capital owners gain. Exactly the opposite occurs in the source country. This can be seen from the diagram by considering an outflow of workers equivalent to the distance AB . In this case, labor has become somewhat more scarce. Wages rise and total output falls. Capitalists in the labor-exporting country are made worse off because of this emigration of labor from their country.

We can draw several conclusions from this analysis. First, if we were to generalize the results of this model to many goods and factors of production, the following result obtains: *International factor flows tend to lower the incomes of those factors in the host country that most directly substitute for this factor and tend to raise the incomes of other factors.* This could mean that some types of labor in the host country could benefit from foreign migration. For instance, an influx of foreign unskilled labor into the United States may result in higher incomes for (domestic) skilled workers. Second, because factor flows have effects on the distributions of income in host and source countries, these countries often impose policies to limit factor flows. Such policies include restrictions on immigration and limits on capital outflows. The former are more common in rich countries, while the latter are more common in poor countries.

Summary

1. International trade and economic growth are related to each other in many ways. Expanded exports tend to raise the level of GDP. The way in which a country grows affects the way it trades.
2. Economic development refers to the attainment of a high standard of living for the average citizen of an economy. Economic growth is essential for economic development.
3. Because of the relationship between trade and growth, some developing countries pursue outward-looking or primary-export-led development strategies that encourage the production of exports. Some of these countries have been the most successful in achieving economic development over the past several decades.
4. Other developing countries have pursued import-substitution policies to encourage development.

These policies involve high tariffs or quotas on many items in an attempt to protect local industry. In practice, these policies have not been very successful.

5. When a country is at full employment, growth occurs because of an expansion in factors of production or because of technological innovations.
6. The way in which a country grows affects its pattern of international trade. A country can experience neutral growth, in which exports and imports grow at the same rate as GDP; protrade biased growth, in which trade grows faster than GDP; or antitrade

biased growth, in which international trade may even fall.

7. A country can also grow because it acquires factors from other countries. For instance, the growth of the United States in the last century was due in large part to the considerable immigration of foreign workers to the United States as well as to an inflow of foreign capital.
8. Factor inflows from foreign countries tend, as a whole, to raise welfare in the host country and to lower welfare in the source country.

Exercises

1. Compare and contrast the types of trade policy actions taken by governments that pursue import-substitution policies versus those that pursue outward-looking strategies.
2. Many Latin American countries have followed import-substitution policies. Many of these same countries have also experienced long periods of high inflation. Explain some of the possible linkages between import-substitution policies and high inflation.
3. Give an example of economic growth sustained by the acquisition of foreign factors of production.
4. Describe how import-substitution policies can encourage the escalation of tariffs by stages of processing.
5. Explain carefully how international trade can affect the rate of growth of an economy.
6. Suppose that in country A the income elasticity of demand for good S is less than 1, and the income elasticity of demand for T is greater than 1. Suppose also that A exports good S and imports good T , and the S is relatively capital intensive in

its production and that A is relatively capital abundant. What would happen to A 's trade pattern if, alternatively,

- a. A were to experience an equi-proportionate drop in K and L ?
 - b. A were to experience a relative increase in K versus L ?
 - c. A were to experience a relative increase in L versus K ?
7. Compare the costs of an MNC operating in a foreign country with the costs of domestic firms operating in that country. Explain how an MNC can compete under these circumstances.
 8. Suppose that A is a small open economy that takes world prices as given. What would be the effect on wages and rents in A if it were to experience an outflow of foreign capital? Use a diagram to explain your answer. Which groups would favor this capital outflow? Which would oppose it? Explain.
 9. What is immiserizing growth? Do you think it is likely to occur in the real world? Explain.

References

Bhagwati, Jagdish. "Global Interdependence and International Migration," in James Cassing and Steven Husted, eds., *Capital, Technology, and Labor in the New Global Economy* (Washington, D.C.: American Enterprise Institute, 1988).

Todaro, Michael P., and Stephen C. Smith. *Economic Development*, 10th ed. (Boston, Mass.: Addison-Wesley Publishing Co., 2009).

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