CASE STUDY 6-2 Job Loss Rates in U.S. Industries and Globalization

Table 6.1 shows that, from 2003 to 2005, the percentage of jobs lost in U.S. manufacturing was three times higher than in U.S. service industries, but in all sectors (except professional and business services) job losses were much higher in the nontradable than in the tradable sectors (and thus not caused by increased imports, outsourcing, or offshoring). As discussed in Case Study 3-4, most *direct* job losses in the United States resulted from technological changes that raised labor productivity rather than from international trade itself, and it affected mostly low-skilled industrial workers. As debated by *Samuelson* (2004), *Bhagwati* (2007), *Blinder* (2008), *Coe* (2008), *Summers* (2008), and *Harrison and McMillan* (2011), the fear now is that the revolution in telecommunications and transportation is making possible the export of an increasing number of high-skill and high-paying jobs, not only in manufacturing but also in a growing range of services that until recently were regarded as secure. In fact, *Barefoot and Mataloni* (2011) found that from 1999 to 2009 U.S. multinational corporations cut their workforce in the United States by nearly 900,000 while at the same time expanding it by 2.9 million workers abroad.

TABLE 6.1. U.S. Job Loss Rates by Industry (Percent)

Industry	Overall	Tradable	Nontradable
Manufacturing	12	12	17
Information	4	4	15
Financial Services	4	3	12
Professional & Business Services	4	6	3

Source: A. Bradword and L. G. Kletzer "Fear of Offshoring: The Scope and Potential Impact of Imports and Exports of Services," *Policy Brief*, Petersen Institute, January 2008.

CASE STUDY 5-7 Capital and Labor Requirements in U.S. Trade

Table 5.6 gives the capital and labor requirements per million dollars of U.S. exports and import substitutes, as well as the capital/worker-year for imports relative to exports. For example, dividing the capital/worker-year of $18,180 for U.S. import substitutes by the capital/worker-year of $14,010 for exports using 1947 data (see the third row of the table), Leontief obtained the capital/worker-year for imports relative to exports of 1.30. Since the United States is a relatively capital-abundant nation and U.S. import substitutes are more capital intensive than U.S. exports, we have a paradox. Using 1951 trade data, the K/L ratio for imports/exports fell to 1.06, and, excluding natural resource industries, the ratio fell to 0.88 (thus eliminating the paradox). Using 1958 input requirements and 1962 trade data, Baldwin obtained the K/L ratio for imports/exports of 1.27. When natural resource industries were excluded, the ratio fell to 1.04, and when human capital was included, it fell to 0.92 (once again, eliminating the paradox).

TABLE 5.6. Capital and Labor Requirements per Million Dollars of U.S. Exports and Import Substitutes

	Exports	Import Substitutes	$\frac{\text{Imports}}{\text{Exports}}$
Leontief (1947 input requirements, 1947 trade):			
Capital	$2, 550, 780	$3, 091, 339	
Labor (worker-years)	182	170	
Capital/worker-year	$14, 010	$18, 180	1.30
Leontief (1947 input requirements, 1951 trade):			
Capital	$2, 256, 800	$2, 303, 400	
Labor (worker-years)	174	168	
Capital/worker-year	$12, 977	$13, 726	1.06
Capital/worker-year, excluding natural resources			0.88
Baldwin (1958 input requirements, 1962 trade):			
Capital	$1, 876, 000	$2, 132, 000	
Labor (worker-years)	131	119	
Capital/worker-year	$14, 200	$18, 000	1.27
Capital/worker-year, excluding natural resources			1.04
Capital/worker-year, excluding natural resources and including human capital			0.92

Sources: Leontief (1951, 1956) and Baldwin (1971). See the Selected Bibliography at the end of the chapter.

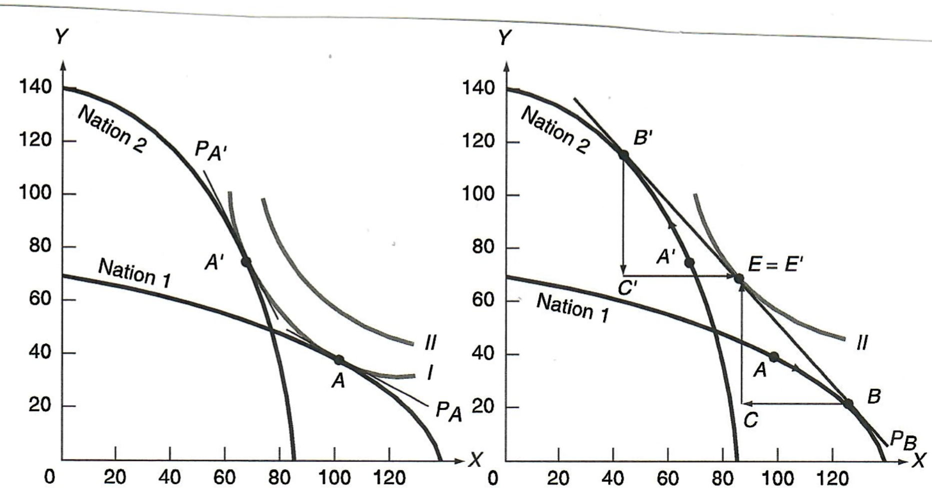

FIGURE 5.4. The Heckscher—Ohlin Model.
Indifference curve *I* is common to both nations because of the assumption of equal tastes. Indifference curve *I* is tangent to the production frontier of Nation 1 at point *A* and tangent to the production frontier of Nation 2 at *A′*. This defines the no-trade equilibrium-relative commodity price of P_A in Nation 1 and $P_{A'}$ in Nation 2 (see the left panel). Since $P_A < P_{A'}$, Nation 1 has a comparative advantage in commodity X and Nation 2 in commodity Y. With trade (see the right panel) Nation 1 produces at point *B* and by exchanging X for Y reaches point *E* in consumption (see trade triangle *BCE*). Nation 2 produces at *B′* and by exchanging Y for X reaches point *E′* (which coincides with *E*). Both nations gain from trade because they consume on higher indifference curve *II*.

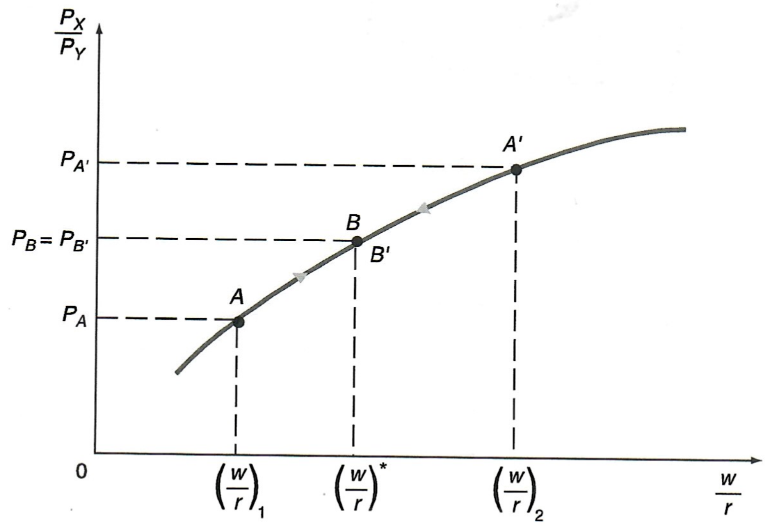

FIGURE 5.5. Relative Factor–Price Equalization.
The horizontal axis measures w/r and the vertical axis P_X/P_Y. Before trade, Nation 1 is at point *A*, with $w/r = (w/r)_1$ and $P_X/P_Y = P_A$ while Nation 2 is at point *A′*, with $w/r = (w/r)_2$ and $P_X/P_Y = P_{A'}$. Since w/r is lower in Nation 1 than in Nation 2, P_A is lower than $P_{A'}$ so that Nation 1 has a comparative advantage in commodity X. As Nation 1 specializes in the production of commodity X with trade and increases the demand for labor relative to capital, w/r rises. As Nation 2 specializes in the production of commodity Y and increases its relative demand for capital, r/w rises (i.e., w/r falls). This will continue until point $B = B'$, at which $P_B = P_{B'}$ and $w/r = (w/r)^*$ in both nations.

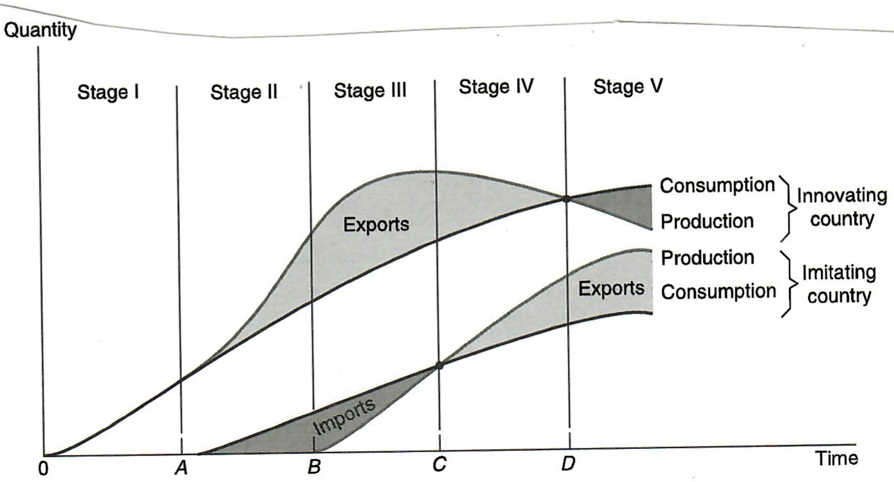

FIGURE 6.4. The Product Cycle Model.
In stage I (time *OA*), the product is produced and consumed only in the innovating country. In stage II *(AB)*, production is perfected in the innovating country and increases rapidly to accommodate rising demand at home and abroad. In stage III *(BC)*, the product becomes standardized and the imitating country starts producing the product for domestic consumption. In stage IV *(CD)*, the imitating country starts underselling the innovating country in third markets, and in stage V (past point *D*) in the latter's market as well.

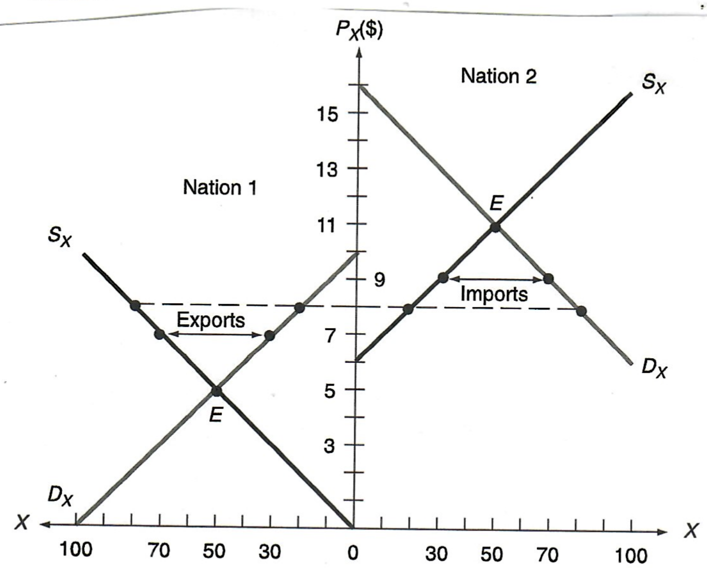

FIGURE 6.5. Partial Equilibrium Analysis of Transport Costs.
The common vertical axis measures the dollar price of commodity X in the two nations. A movement to the left from the common origin measures increasing quantities of commodity X for Nation 1. In the absence of trade, Nation 1 will produce and consume 50X at P_X = \$5. Nation 2 will produce and consume 50X at P_X = \$11. With transport costs of \$2 per unit, P_X = \$7 in Nation 1 and P_X = \$9 in Nation 2. At P_X = \$7, Nation 1 will produce 70X, consume 30X, and export 40X. At P_X = \$9, Nation 2 will produce 30X, import 40X, and consume 70X.

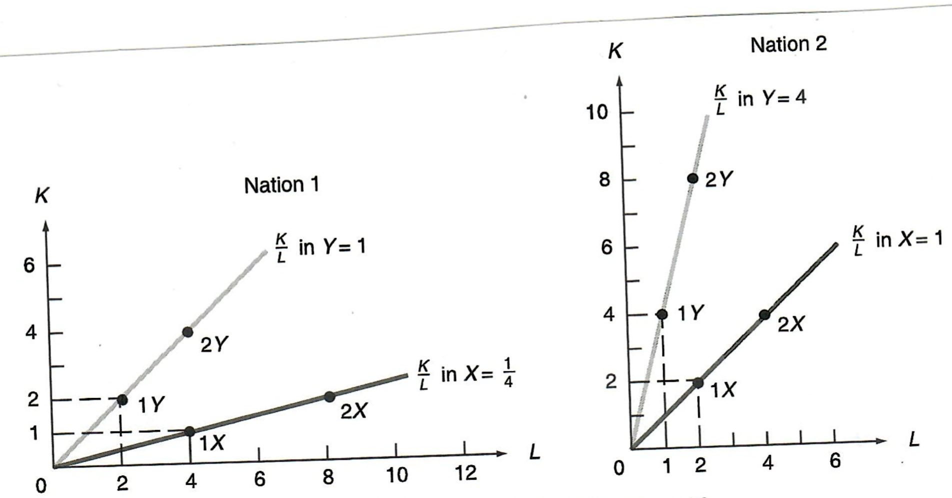

FIGURE 5.1. Factor Intensities for Commodities X and Y in Nations 1 and 2.
In Nation 1, the capital–labor ratio (K/L) equals 1 for commodity Y and $K/L = 1/4$ for commodity X. These are given by the slope of the ray from the origin for each commodity in Nation 1. Thus, commodity Y is the K-intensive commodity in Nation 1. In Nation 2, $K/L = 4$ for Y and $K/L = 1$ for X. Thus, commodity Y is the K-intensive commodity, and commodity X is the L-intensive commodity in both nations. Nation 2 uses a higher K/L than Nation 1 in the production of both commodities because the relative price of capital (r/w) is lower in Nation 2. If r/w declined, producers would substitute K for L in the production of both commodities to minimize their costs of production. As a result, K/L would rise for both commodities.

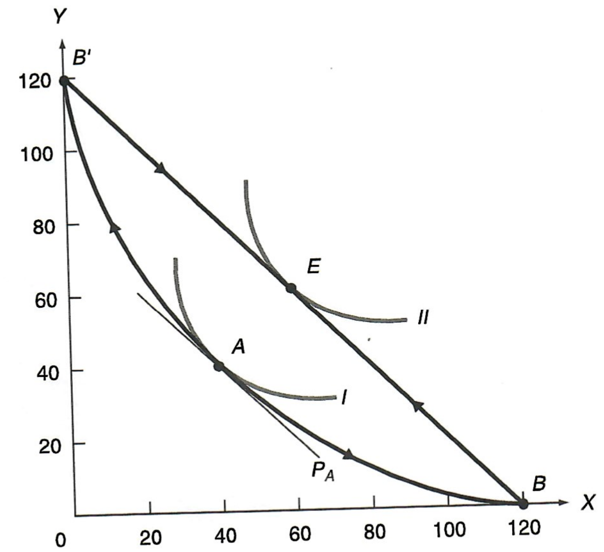

FIGURE 6.1. Trade Based on Economies of Scale.
With identical and convex to the origin (because of economies of scale) production frontiers and indifference maps, the no-trade equilibrium-relative commodity price in the two nations is identical and given by P_A. With trade, Nation 1 could specialize completely in the production of commodity X and produce at point B. Nation 2 would then specialize completely in the production of commodity Y and produce at point B'. By then exchanging 60X for 60Y with each other, each nation would end up consuming at point E on indifference curve II, thus gaining 20X and 20Y.

■ **TABLE 6.2.** U.S. Imports and Exports of Automotive Products (billions of dollars)

Year	Canada	Mexico	Europe	Japan	World
Imports					
1965	.11	–	.07	.01	.19
1973	4.92	–	3.14	2.41	10.55
1980	7.87	.22	6.73	11.85	26.94
1985	20.77	2.93	11.84	24.55	58.57
1990	27.71	4.39	13.27	30.12	79.32
1995	41.63	12.11	15.65	34.94	108.02
2000	58.75	28.30	29.11	44.49	170.20
2005	64.42	29.86	43.06	49.37	205.45
2010	47.96	43.73	33.63	42.92	189.76
Exports					
1965	.62	–	.07	–	.87
1973	4.12	–	.48	.09	6.03
1980	9.54	1.35	1.46	.19	16.74
1985	16.32	2.72	1.15	.21	21.07
1990	19.48	3.57	3.65	1.52	32.55
1995	28.94	5.14	5.45	4.07	52.51
2000	38.23	13.28	6.55	2.73	67.20
2005	45.77	13.55	10.41	1.45	85.99
2010	43.05	17.14	9.73	1.24	99.51

Source: WTO, *International Trade Statistics* (Geneva, various issues).

■ CASE STUDY 6-4 Variety Gains with International Trade

Until now, the welfare gains from trade have been measured by the reduction in the price of imported goods and their greater consumption. But another very important gain from trade arises from the large increase in the variety of goods available for consumers to purchase as a result of international trade. *Broda and Weinstein* estimate that American consumers would have been willing to pay an extra $280 billion, or about 3 percent of GDP, to have access to the variety of goods that were available in 2001, rather than what they could have bought in 1972. The number of varieties of goods available to American consumers increased from 74,667 (7,731 more goods from an average of 9.7 countries) in 1972 to 259,215 (16,390 goods from an average of 15.8 countries) in 2001. The authors estimate that the conventional import price index, therefore, overestimates the price of imports by about 1.2 percent per year by not taking into account the higher value that variety brings.

The gains from trade resulting from making available to consumers a much larger variety of each type of good are much greater for developing countries that only recently opened up more widely to international trade. China is the country that received the largest gain—a whopping 326.1 percent of GDP—from the much greater variety of goods available in 1997 (after China opened up its economy to international trade) compared to those available to Chinese consumers in 1972 (when China was, for the most part, a closed economy). The former Soviet Union follows with a gain of 213.7 percent of GDP. There is then South Korea with a gain of 185.3 percent of GDP and Taiwan with 126.9 percent gain. In fact, all the other 19 countries that the authors study had gains in the double digits (as compared with a gain of 3 percent of GDP for the United States), because the U.S. economy has always been one of the most open during the past three decades covered by the study (and therefore the one that gained the least as a percentage of GDP). From their study of U.S. automobile imports, *Blonigen and Soderbery (2010)* believe, however, that U.S. net gain from variety is likely to be much greater.

Sources: C. Broda and D. Weinstein, "Are We Underestimating the Gains from Globalization for the United States?" *Current Issue in Economics and Finance*, Federal Reserve Bank of New York, April 2005, pp. 1–7; C. Broda and D. Weinstein, "Variety Growth and World Welfare," *American Economic Review*, May 2005, pp. 139–144; and B. A. Blonigen and A. Soderbery, "Measuring the Benefits of Foreign Products Variety with an Accurate Variety Set," *Journal of International Economics*, November 2010, pp. 168–180.

CASE STUDY 5-1 Relative Resource Endowments of Various Countries

Table 5.1 gives the share of the world's resource endowments of (1) land, (2) physical capital, (3) research and development (R&D) scientists, (4) highly skilled labor, (5) medium-skilled labor, and (6) unskilled labor, as well as the share of world GDP, for most of the leading developed and developing countries in 2006 (more recent data were not available for all resource endowments). Arable land is the general resource to produce agricultural products; physical capital refers to machinery, factories, and other nonhuman means of production; R&D scientists refers to the most highly skilled labor with more than tertiary (college) education and used to produce the most highly technological products; highly skilled labor is labor that has completed tertiary or college education; unskilled labor is labor that has no education beyond primary education. A nation is broadly defined as having a relative abundance of those factors for which its share of the world availability of that factor exceeds the nation's share of world output (GDP in terms of purchasing power).

The table shows that the U.S. share of the world availability of R&D scientists and highly skilled labor exceeds its share of world GDP; it is about the same as its share of world output for the availability of physical capital, and smaller than its share of world GDP for arable land and

TABLE 5.1. Factor Endowments of Various Countries as a Percentage of the World Total in 2006

Country	(1) Arable Land	(2) Physical Capital	(3) R&D Scientists	(4) Highly Skilled Labor	(5) Medium-Skilled Labor	(6) Unskilled Labor	(7) GDP
United States	12.2%	22.0%	24.1%	22.2%	7.5%	0.4%	21.9%
Japan	0.3	14.1	12.3	10.3	4.2	0.2	7.0
Germany	0.8	6.8	4.9	4.4	3.3	0.5	4.5
United Kingdom	0.4	2.8	3.2	3.4	2.2	0.1	3.4
France	1.3	4.4	3.5	3.1	1.9	0.1	3.3
Italy	0.5	3.5	1.4	1.5	2.3	0.3	2.8
Canada	3.2	3.0	2.2	3.1	0.9	0.1	2.0
China	10.1	11.1	21.1	5.9	25.6	24.9	10.2
India	11.2	4.9	1.6	5.9	9.2	21.7	4.5
Russia	8.5	2.3	8.1	2.8	6.6	0.1	3.0
Brazil	4.2	2.9	1.5	2.6	3.2	2.9	2.7
Korea	0.1	3.3	3.5	2.6	1.7	1.3	1.7
Mexico	1.8	2.0	0.8	3.2	1.5	0.2	2.1
Rest of the World	45.4	16.7	11.7	29.0	28.4	47.2	30.7
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Author's calculations on data from: World Bank, OECD, and United Nations Data Bank.

(continued)