Chapter 9

The Effects of International Trade on U.S. Skills and Employment

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services also increased rapidly, although not so rapidly as merchandise trade.

In the United States, trade has risen greatly in the past two decades as a component of the economy. Between 1970 and 1984, the dollar value of imports of merchandise rose 16 percent per year, from $39.9 billion to $327.8 billion, or from 4 percent to nearly 9 percent of gross national product (GNP).[3] In the same period, merchandise exports increased 12 percent annually, from $42,5 billion to $220.3 billion, or from 4.3 percent of GNP to 6 percent.[4] The expansion of U.S. trade has many positive effects on the economy. Increasing trade means, for consumers and producers alike, that a wider variety of products is available. In addition, the products and services which are traded embody knowledge of production processes and technology, and trade helps to transfer this knowledge. Such transfers enable people in poor or developing countries to improve their standard of living, as they learn how to produce sophisticated products.'

Another result of the rising importance of trade is that more and more U.S. workers are affected. This has both positive and negative impacts: more people owe their jobs to additional demand created by exports and more people are threatened with job loss or have lost jobs as a result of import competition, The difference in the rates of growth between imports and exports means that the number of workers affected by import competition has grown faster than the number of workers who owe their jobs to exports. The United States has changed from being a net exporter throughout much of the 20th century to being a net importer on a very large scale. The largest contributor by far to the deficit is merchandise trade: in 1984, the merchandise trade deficit was $107 billion. Throughout the 1970s and 1980s, the United States has run services trade surpluses. Although the surplus fell by more than half from 1980 to 1984, the services surplus was still $17.0 billion in 1984.[8] However much of the services trade surplus is in investment income, unconnected with U.S. jobs. Leaving this out, the United States will probably experience a serious services trade deficit in 1985. This is the first year that services trade, exclusive of investment income, will experience a deficit,

The rapid deterioration of the U.S. international trade balances in the 1980s, both in services and merchandise, is largely a result of the rise in the value of the dollar against foreign currencies.[7] However, it is also a fact that many U.S. manufacturing industries have lost competitive ability relative to foreign producers. Many of these industries began to have competitive problems in the late 1970s, when the dollar was undervalued, and some had begun to decline earlier. It will be very difficult for industries with basic competitive problems to recover when the dollar falls. The number of industries with basic competitive problems has risen, and now includes portions of high-technology sectors. Such industries will have more difficulty creating new production jobs; it will be difficult for many to avoid displacement and employment loss. Even industries which probably are internationally competitive, but for the overvalued dollar, will have trouble rebounding from the prolonged setback of the 1980s. Although the value of the dollar has dropped since spring of 1985, it still has a long way to fall before affected industries will be able to reestablish market position. Even then, regaining customers who have built relationships with foreign suppliers may take time.

Decreasing costs of communication and transportation have been significant factors in the expansion of international trade, as well

[2]Merchandise trade includes petroleum and petroleum products, manufactured goods, and agricultural products.

[3]U. S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business,* various issues.

[4]Ibid.

[5]Richard M. Cyert, "The Plight of Manufacturing: What Can Be Done?" *Issues in Science and Technology,* Summer 1985, p. 89.

[6]Much of this surplus is investment income, unconnected with U.S. jobs. Leaving out the investment income, the United States will probably run *a* substantial services trade deficit in 1985.

[7]The spectacular rise of the dollar, in turn, has been linked to high U.S. budget deficits and interest rates. These relationships are complex, and are not addressed in this study. For a discussion of the deficit issue, see Norman S. Fieleke, "The Budget Deficit: Are the International Consequences Unfavorable?" New *England Economic Review*, May / June 1984.

in the difficulties many U.S. firms face in international competition. Easier communication means that information on economic and political trends, fashions and tastes, production techniques, and the like can be quickly and cheaply shared internationally, giving foreign producers up-to-date information to plan production and exports. For example, swift style changes in high-fashion apparel require either production very close to the market, or communication links which allow producers in other nations to collapse the time between the emergence of a fashion trend and delivery of finished apparel to the market.

Falling transportation costs mean that countries with even modest cost advantages in production are better able to compete on the basis of that cost advantage in foreign markets. Reduction of either transportation or communication costs accentuates the importance of other cost factors in determining where products are made. In industries and production processes which rely heavily on unskilled or semiskilled labor, labor costs can be a particularly important influence on the competitive position. Labor costs reflect both the compensation paid to workers (wage rates plus fringe benefits and payroll taxes) and labor productivity (labor content per unit of output). Thus, industries and countries with relatively high wage rates may still be internationally competitive if worker productivity is great enough to support the high wages. Worker productivity, in turn, is affected by many factors, including good management, up-to-date equipment, the education and skills of the work force, labor-management relations, and effective work organization.

Industrialized countries with relatively high wage rates, such as the United States and West Germany, often respond to competition from low-wage countries by automating production to raise worker productivity. While higher productivity is essential to improving competitiveness, it can also cost jobs, as smaller numbers of workers are needed to produce equivalent output. If demand is rising more slowly than productivity, jobs are lost. Moreover, in industries or production processes where labor costs are a large portion of production costs, automation sometimes cannot offset the advantage of producers in low-wage areas. Production with automated equipment may be more expensive than more labor-intensive production in low-wage countries, or automation may fail to raise productivity enough to make products competitive. Labor costs have been a significant factor, for example, in loss of competitiveness of the U.S. apparel industry, commodity semiconductors, motor vehicle parts, footwear, computer components, consumer electronics, shipbuilding, and textiles. In these cases, imports become more attractive, often displacing domestic production. In many of these industries, however, wages of American workers are high only by comparison with wages in the Third World; workers in the apparel and footwear industries, for example, made less than $6 per hour, only two thirds the average hourly wage for all American production workers in September 1985.

Because the labor cost advantage is often large in industries which rely heavily on unskilled and semiskilled production workers—a type of labor which is abundant in many developing and Third World nations—the effect of increasing global competition falls more heavily on production workers than on skilled technical and professional workers. Among the workers displaced between 1979 and 1984, the group most affected in relation to their numbers was machine operators, assemblers, and inspectors in manufacturing (see ch. 3),

The expansion of international trade makes it harder for industrialized nations like the United States to affect employment using strictly domestic policies. For example, a tax cut designed to stimulate employment by increasing consumption has a smaller employment effect if much of the additional consumption is produced overseas. More and more, the number and kinds of jobs available in the U.S. economy depend on international trade and competition. This is particularly true in manfactur-

ing industries, which can produce goods in one location for consumption in another.[a]

For at least the next few years (holding cyclical factors constant), manufacturing employment is likely to remain level or decline. Even in the long run, if trade continues to gain importance in the U.S. economy, competitive pressures from a growing number of countries and industrial sectors is likely to exert downward pressure on manufacturing employment. Some of the downward pressure will be offset by rapidly rising demand; for example, growth in demand for semiconductors is projected to be 19 percent per year through 1990, and semiconductor employment is expected to increase. In other sectors such as steel, apparel, and automobiles, no such rapid expansion of demand is anticipated to counter the effects of foreign competition. Of course, if demand growth exceeds expectations, total manufacturing employment may increase.

In the whole economy, the number of workers whose jobs are affected by trade will increase if global trade continues to grow. The dollar cannot remain overvalued forever; as it falls, U.S. exports should be stimulated, and more people will be employed in producing products for export. While the growth of imports may be slowed by a falling dollar, growth will probably continue nonetheless, and more workers' jobs will be affected by imports. Those whose jobs are most vulnerable are likely to be those less skilled, particularly in manufacturing.

[a] International competition in services industries can also affect employment; however, many services, such as hotel and lodging services, restaurants, and banking and insurance, require that services be produced and consumed in the same location. Competition in services industries, and their effects on the U.S. economy and employment, is the subject of an OTA assessment, *International Competition in the Service Industries*, to be completed in 1985.

THE EFFECT OF TRADE ON EMPLOYMENT

Export markets increase the effective demand for products, which adds to employment. Export-generated employment includes workers in industries which produce goods and services for export, upstream employment in industries making inputs to goods and services which are exported, and downstream jobs needed to move products to ports. For example, exports of U.S. aircraft create more jobs not only in aerospace industries but in the steel, aluminum, plastics, electrical and electronic machinery, and machine tools industries as well. People involved in transporting the aircraft to their destinations are also counted in export-generated employment.

The relationship between imports and jobs is a little more complex. In some situations, increasing imports cost American workers their jobs; in other cases, imports and U.S. employment can grow together, for someone must sell and service the imported products. Imports are likely to cost jobs in industries where import penetration is increasing faster than product demand, and where import penetration is a major motivating force behind automation. Where workers are displaced in industries facing greater pressure from imports, it is overly simple to ascribe displacement either to foreign competition or to changing technology. In most cases, both forces are operating. Rising imports, and the technological changes which are made in response, are responsible for employment declines in sectors such as motor vehicles, consumer electronics, steel, textiles, and footwear.

Imports and exports also affect the demand for different types of skills, Many studies have concluded that the comparative advantage of the United States lies in skill-intensive products—e.g., aircraft, computers, and complex electronic circuits—which embody labor with a higher skill content than the products the United States imports.[9] As a result, the dis-

[9] Seev Hirsch, "The Leontief Paradox in a Multi-Country Setting," *Weltwirtschaftliches Archiv*, vol. 113, No. 3,1977, pp. 417-418.

placement resulting from international trade is heavily concentrated in low-skill occupations and in industries which rely heavily on unskilled labor. The jobs generated by exports, on the other hand, are difficult for these low-skilled displaced workers to qualify for.

Examination of the characteristics of displaced workers substantiates this point. Nearly half of the displaced workers are from manufacturing, with overrepresentation in the least skilled occupations (see ch. 3). Another source of support is in data on the labor content of U.S. trade. A 1983 study by the International Trade Commission calculated the labor content (roughly equivalent to the number of jobs) associated with U.S. imports and exports, by industrial sector (table 9-1). The ratio of production workers (usually representing the highest proportions of unskilled and semiskilled workers) to total industry employment is an indicator of skill intensity. In the manufacturing industries where employment is significantly affected by trade, there is a highly significant direct correlation between skill intensity and positive balances of trade-related employment.[10] That is, industries whose skill intensity was highest–measured roughly by low ratios of production workers to total industry employment—had more jobs associated with exports than were embodied in imports.

From these data, it is clear that there is a high degree of association between the net labor content of trade and skills in the labor force, roughly measured. In general, the heavier the reliance on less skilled labor (production labor), the greater the likelihood that the net effect of trade on employment is negative. Industries where the availability of a particular natural resource is more important than a skilled labor force in determining a comparative advantage and industries that trade in noncompetitive specialty items do not follow this pattern.

[10]OTA performed a Spearman Rank Correlation test on the data in table 9-I, ranking all manufacturing industries (containing more than 100,000 work-years of trade-related employment) in terms of two factors: net trade-related employment and ratio of production workers to total employment. The correlation was significant at the 0.01 percent level.

The following sections discuss the effect of exports and imports on the number of jobs in the United States, and on the skill mix of the American work force.

Exports and the Numbers of U.S. Jobs

The growth of U.S. exports has stimulated employment in this country. In 1980, when merchandise exports were $224.2 billion, over 6 million Americans owed their jobs to exports, according to an estimate made by the International Trade Administration (ITA) of the U.S. Department of Commerce.[11] In 1982, merchandise exports had fallen to $211.2 billion, and ITA estimated that the number of workers whose jobs depended on exports fell to 5 million. In 1983, the number of export-generated jobs dropped further to 4.6 million. Merchandise exports increased by $20 billion in 1984, but the number of export-generated jobs decreased slightly to 4.5 million, largely because of increasing labor productivity.

Change in the labor content of exports was one cause of the decline in export-generated employment throughout the years from 1980 to 1984, according to ITA. As productivity increased, fewer workers were required to produce equivalent amounts of output. Between 1980 and 1982, the labor content per billion dollars of U.S. exports decreased from 30,300 jobs to 25,200.[12] In 1984, the number of jobs per $1 billion worth of exports was estimated at less than 25,000.[13]

Export-related employment tends to fluctuate fairly widely, reflecting the synergistic nature of trade itself. During periods of economic expansion, U.S. demand for imports usually increases. This stimulates export industries in other countries, raising their output and employment. These countries are then able to import more products themselves—often from the

[11]U.S. Department of Commerce, *Domestic Employment Generated by U.S. Exports,* International Trade Administration, Office of Trade and Investment Analysis (Washington, DC, May 1983), Executive Summary.

[12]Ibid.

[13]U.S. Department of Commerce, "Preliminary Export-Related Jobs Estimate for 1984," Office of Trade and Investment Analysis, International Trade Administration, June 1984, mimeo.

Table 9-1 .—Labor Content of Trade and Ratios of Production to Total Employment, by Manufacturing Sector, 1982[a]

Industry	Domestic labor content (thousands of work-years) Imports (1)	Exports (2)	Balance (2- 1)	Population employment ratio[a]
Office, computing, and accounting machines	200	416	216	0.40
Aircraft and parts	87	269	182	0.51
Chemicals and selected chemical products	75	233	159	0.54
Construction and mining machinery	19	175	156	0.63
Scientific and controlling instruments	73	168	95	0.57
Electric industrial equipment and apparatus	45	117	72	0.68
Plastics and synthetic materials	12	79	67	0.65
Lumber and wood products, except containers	124	183	59	0.88[b]
Drugs, cleaning, and toilet preparations	29	75	46	0.55
General machinery and equipment	61	94	33	0.63
Miscellaneous electrical machinery and equipment	54	78	24	0.70[b]
Special industry machinery and equipment	48	69	21	0.61
Metalworking machinery and equipment	62	82	20	0.70b
Other transportation equipment	60	60	0	0.60
Optical, ophthalmic, and photographic equipment	63	62	–1	0.53[b]
Household appliances	55	59	–6	0.77
Rubber and miscellaneous plastic products	89	72	–17	0.77
Paper and allied products, except containers	103	85	–18	0.74
Electronic components and accessories	204	180	–24	0.57[b]
Other fabricated metal products	88	59	–29	0.74
Broad and narrow fabrics, yarn and thread mills	81	50	–31	0.87
Primary nonferrous metals manufacturing	182	108	–74	0.73
Miscellaneous fabricated textile products	171	24	– 147	0.81
Primary iron and steel manufacture	228	58	– 170	0.75
Radio, TV, and communication equipment	326	150	– 176	0.50[b]
Footwear and other leather products	228	22	– 206	0.84
Petroleum refining and related industries	306	42	– 264	0.60[b]
Miscellaneous manufacturing	474	150	– 324	0.72
Motor vehicles and equipment	694	245	–449	0.73
Apparel	536	56	– 480	0.85
All manufacturing industries				0.68

[a]Ratio of employment of production workers t. total industry employment These industries al I account for more than 100,000 workyears of trade-related employment
[b]These industries d. not fit th. general pattern of having lower ratios of Production workers than the all-manufacturing average when there is a net labor content surplus in trade, or having higher ratios of production workers when the *labor* content of trade IS *negative See* text for explanations

SOURCE U S International Trade Commission, *U S Trade-Related Employment;* and U S. Department of Labor, Bureau of Labor Statistics, *Supplement to Employment and Earnings*

United States. According to one analyst, economic growth of more than 1,5 to 2 percent in countries belonging to the Organization for Economic Cooperation and Development (OECD) means that non-oil imports of the OECD increase about three times as fast.[14] This continuing process stimulates worldwide incomes, employment, and standards of living. During downturns, the process reverses. According to the same analyst, when OECD economic growth falls below 1.5 percent annually, trade declines even faster. Falling demand for imports, in turn, hurts the economies of exporting countries, which then reduce their own demand for imports, and so on,

Between 1977 and 1980, a time of economic growth, 1.5 million jobs were generated in all sectors of the economy by the stimulus of rising exports of manufactured goods. In the manufacturing sector, export-related employment accounted for 80 percent of the increase in manufacturing jobs.[15] Between 1980 and 1983, ITA estimated that 1.5 million total jobs were lost thoughout the economy, largely due to falling export volume (exaggerated to some degree by rising productivity).

[14]William R. Cl i.., ''I ntroduction and Summary, *Trade Policy in the 1980s*, William R. Cline (cd.] (Cambridge, MA: MIT Press and Institute for International Economics, 1983], p. 5.

[15]U.s. Department of Commerce, *Domestic Employment Generated by U.S. Exports,* op. cit., p. 3.

Exports and the Demand for Skills

Exports create jobs in many sectors. Merchandise exports (which include manufactured and nonmanufactured goods[16]) accounted for about 4.9 million jobs in 1982. The stimulus for generating about 80 percent of these jobs in all sectors, according to the Department of Commerce, was the export of manufactured goods. These exports accounted for 2.3 million jobs in manufacturing industries, 0.2 million jobs in nonmanufactured goods, and 1.5 million jobs in service sectors—a total of 4 million jobs.[17]

What is the nature of jobs that are generated by exports? International trade theory, which assigns great importance to differences in factor endowments—i.e., the amounts of labor, capital, and resources—of different countries, concludes that nations which are rich in capital export capital-intensive products, and nations more heavily endowed with labor export labor-intensive goods. An early investigation into the capital intensity of U.S. exports and imports revealed, however, that by at least one measure, U.S. exports were more labor-intensive than U.S. imports.[18] This finding, known as the Leontief Paradox, stimulated a great deal of research in the ensuing three decades which tried to explain the original finding. Several explanations have been put forward; for example, some U.S. imports may be capital-intensive when produced in the United States, but more labor-intensive in the countries where they are produced. One explanation, which has been substantiated by several investigators, is that the U.S. advantage in trade lies in skill-intensive goods—i.e., products which require relatively high amounts of human capital and skill to produce.[19] In general, U.S. exports probably generate a large number of jobs for highly skilled workers; these jobs are relatively secure from competition from low-wage nations, where human capital is more scarce.

This conclusion is supported by findings of the 1983 ITA study on the kinds of labor embodied in U.S. exports and imports. As shown in table 9-I, there is a highly significant correlation between high skill content (measured by lower-than-average ratios of production employment to total industry employment) and positive balances of trade-related employment. In addition, industries in which exports account for large numbers of jobs also tend to have lower-than-average ratios of production to total employment. According to the study, the export sectors in manufacturing which embodied the largest labor content in 1982 were, in descending order of the number of work-years:

1. office, computing, and accounting machines;
2. aircraft and parts;
3. motor vehicles and equipment;
4. chemicals and selected chemical products;
5. lumber and wood products;
6. electronic components;
7. construction and mining machinery;
8. scientific and controlling instruments;
9. radio, TV, and communication equipment:
   —tied with miscellaneous manufacturing;
10. electric industrial equipment and apparatus; and
11. primary nonferrous metals.[20]

Of these 12 industries, 8[21] had ratios of production workers to total employment which were below the average for all manufacturing (figure 9-1).

[16] Nonmanufactured goods sectors include agriculture and fisheries, forestry, coal, and other minerals.

[17] U.S. Department of Commerce, *Domestic Employment Generated by U.S. Exports,* op. cit., p. 5.

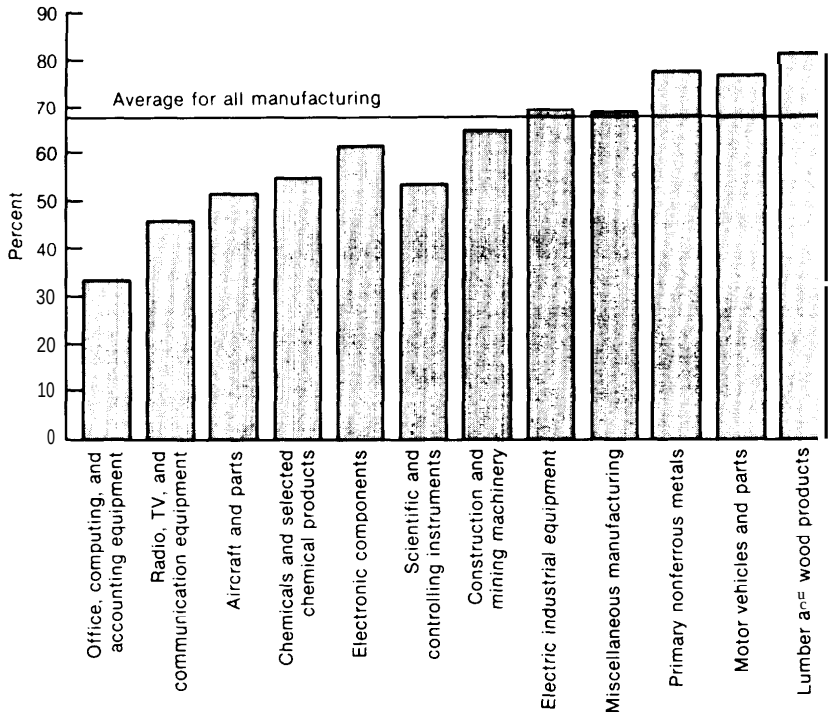
[18] Wassily Leontief, "Domestic Production and Foreign Trade, the American Capital Position Re-Examined," *Economia Internazionale*, vol. 7, Geneva, 1954.

[19] See Hirsch, "The Leontief Paradox in a Multi-Country Setting," *Weltwirtshcaftliches Archiv*, vol. 113, No. 3, 1977.

[20] U. S. International Trade Commission, *U.S. Trade-Related Employment,* USITC Publication 1445 (Washington, DC: USITC), pp. 37-4o. Exports of these 12 manufacturing industries all embodied more than 100,000 work-years of domestic labor in 1982. Many of the same industries also showed substantial losses of job opportunities due to imports.

[21] The eight are: 1) office, computing, and accounting equipment; 2) aircraft and parts; 3) chemicals and selected chemical products; 4) electronic components; 5) construction and mining machinery; 6) scientific and controlling instruments; 7) radio, TV, and communication equipment; and 8) electric industrial equipment and apparatus.

Figure 9-1 .—Ratio of Production Employment to Total Employment in Export Industries[a]



[a]Exports of these 12 industries all embodied more than 100,000 domestic work-years in 1982.

SOURCE: US. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics Survey of Manufacturing Industries, 1980

Of the four which had higher concentrations of production workers, two—primary nonferrous metals and lumber and wood products—are industries whose advantage, relative to foreign producers, rests primarily on natural resource endowments rather than capital or skill. Motor vehicles and equipment, which contributed 245,000 work-years to exports, also had the largest deficit in trade-related employment of 480,000 work-years. The reason for the industry's large contribution to export-related employment is not the skill intensity of production. Nearly three-quarters of U.S. motor vehicle exports go to Canada; the U.S. and Canadian auto industries and markets are highly integrated. Canada's domestic automobile industry consists of the major U.S. manufacturers; the Canadian motor vehicle market is an extension of the American market, and Canadians buy American cars for the same reasons Americans do.

Miscellaneous manufacturing contributed 150,000 work-years to exports, but also had a net deficit in trade-related employment of 324,000 work-years, reflecting the $4.8 billion trade deficit in miscellaneous manufactures. The industry includes a variety of sectors—e.g., jewelry and silverware, costume jewelry, games, toys, sporting goods, pens, pencils, artists' supplies, buttons and fasteners, artificial flowers and Christmas trees—many of which are specialty items. In many of these sectors, the ability to export probably is less related to the skills needed for production than to the special characteristics of the product.

Another indicator of the relative skill intensity of U.S. exports is in the ratios of managers and officers, professional, and technical workers in export industries (table 9-2). Data on the occupational makeup of industries also lends credence to the idea that industries supporting

Table 9-2.—Occupational Employment in Export Industries

Industry	SIC codes	Percentage of work force (1980)						
		High pay	Occupational groups					Low pay
		Managers & officers	Professional workers	Technical workers	Production, maintenance, construction, repair, & material handling & powerplant workers	Sales workers	Clerical workers	Service workers
Average for all manufacturing		6.6	6.9	2.9	68.1	2.2	11.5	1.8
Office, computing, and accounting equipment	357	11.0	21.3	4.4.	32.7[a]	1.2[a]	18.3	1.0[a]
Radio, TV, and communication equipment	365, 366	8.0	20.1	9.0	45.0[a]	0.6[a]	15.9	1.4[a]
Aircraft and parts	372	7.8	20.1	5.9	50.9[a]	0.4[a]	13.4	1.6[a]
Chemicals and selected chemical products	281, 286, 287, 289	9.9	12.9	5.4	54.2[a]	2.8	12.8	2.0
Electronic components	367	6.6	11.5	7.4	61.0[a]	1.0[a]	11.1[a]	1.3[a]
Scientific and controlling instruments	381, 382, 384, 387	8.1	10.2	0.5	53.3[a]	2.0[a]	14.2	1.8
Construction and mining machinery	353	6.7	7.6	4.1	64.5[a]	2.2	13.5	1.5[a]
Electric industrial equipment	361,362	5.2[a]	7.9	4.5	69.8	0.9[a]	10.3[a]	1.3[a]
Miscellaneous manufacturing	39	7.7	3.5[a]	1.5[a]	68.8	2.8	14.1	1.7[a]
Primary nonferrous metals	333, 334, 335, 336	4.8[a]	4.4[a]	2.0[a]	77.1	1.1[a]	8.7[a]	1.8
Motor vehicles and parts	371	4.0[a]	6.7[a]	2.1[a]	76.8	0.6[a]	6.8[a]	3.0
Lumber and wood products	241, 242, 243, 249	6.2[a]	1.5[a]	0.8[a]	81.6	1.5[a]	6.4[a]	2.1
Printing and publishing	27	10.1	9.9	1.0[a]	48.8[a]	7.4	2[illegible].1	1.7[a]

[a]Lower than average for all manufacturing.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics Survey of Manufacturing Industries, 1980; and *Occupational Employment in Manufacturing Industries*, Bulletin 2133 (Washington, DC: U.S. Government Printing Office, September 1982).

large numbers of export-related jobs are more likely to employ highly skilled people. In printing and publishing, for example, the United States had a net trade surplus of over $300 million in 1984. Managers and officers constituted over 10 percent of employment in this sector, and professionals 9.9 percent, compared to 6.6 and 6.9 percent, respectively, in all manufacturing. In transportation equipment, which includes both motor vehicles and equipment and aircraft and parts, professional workers accounted for over 13 percent of industry employment, nearly double the average for all manufacturing, In the chemical industry and in instruments and related products, all three of the most skilled types of employment—managers and officers, professional workers, and technical workers— formed higher percentages of industry employment than in all manufacturing.[22]

Imports and the Number of U.S. Jobs

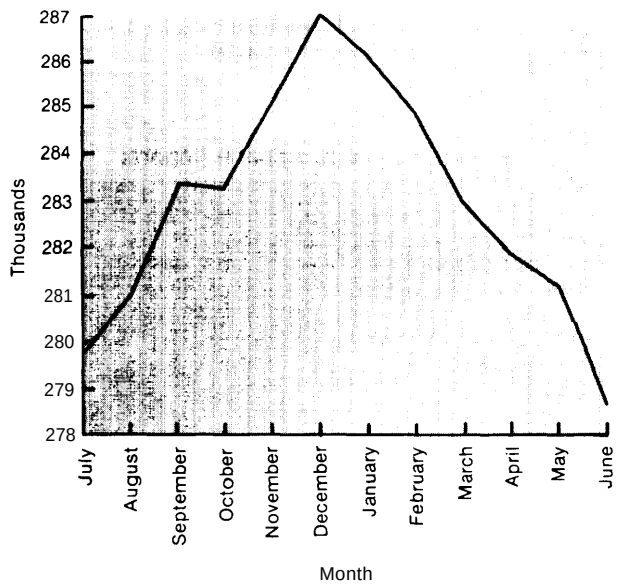
Increasing import penetration in a number of industries has been a major factor behind employment declines, However, increasing imports do not always cost American workers their jobs.

Imports do not cost job opportunities if the products which are imported cannot be produced domestically, or can be produced only in very limited quantities. These products are called noncompetitive imports, and include minerals and other natural-resource products and those based on proprietary or patented technologies.[23] For instance, imports of diamonds, cobalt, mahogany, and teak do not cost U.S. jobs, as these things are not produced in the United States. Petroleum can be produced domestically in limited quantities, so petroleum imports also do not mean lost jobs for Americans; in fact, if petroleum imports were cut off, the effect would be a substantial loss of employment in many sectors. This is a significant example: petroleum imports were nearly 18 percent of all U.S. imports of merchandise in 1984.

Imports do not cost jobs in industries where demand for the product is growing fast enough to accommodate both rising imports and stable or increasing levels of domestic production, For example, while imports of semiconductors have risen from less than $1.8 billion in 1969 to $7.8 billion in 1984, demand has grown even more rapidly, and so has employment. Over the same period, total semiconductor industry employment went from about 75,000 to 273,000. The long-term outlook for semiconductor employment is upward, despite the cyclical slump of late 1984 and 1985. Between December 1984 and June 1985, total semiconductor employment has dropped by 8,300 jobs (figure 9-2).

However, where imports are rising more rapidly than demand, American workers can lose their jobs. If this happens gradually, much of the employment loss can be handled through attrition, as employees retire or leave to take other jobs. This is not always the case.

Figure 9-2.—Semiconductor Employment July 1984-June 1985



SOURCE: U.S Department of Labor, Bureau of Labor Statistics, "Employment & Earnings," various issues.

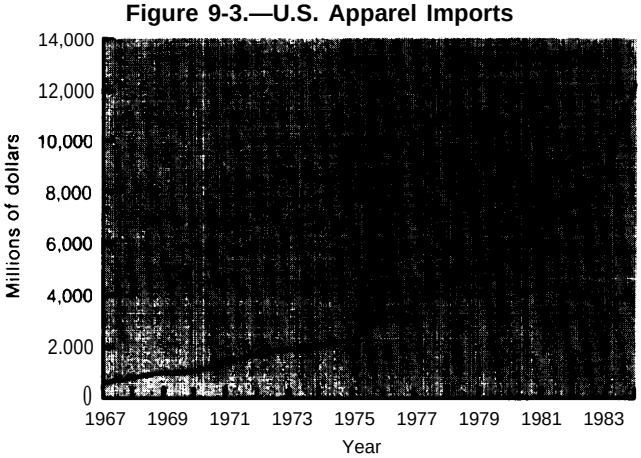
[22] U. s. Department of Labor, *Occupational Employment in Manufacturing Industries,* Bureau of Labor Statistics Bulletin 2133 (Washington, DC: U.S. Government Printing Office, September 1982), p. 4.

[23] H. Peter Gray, "Non-Competitive Imports and Gains From Trade, " mimeo.

Employment in the apparel industry, for example, dropped from over 1.44 million in 1973 to 1.175 million in early 1985, while imports have captured an increasing share of the U.S. market. By 1983, one of every four garments sold in the United States was manufactured in another country; in 1958, the percentage of imports was near zero. Despite highly structured, institutionalized protection provided by the Multifiber Arrangement, the dollar value of imports has risen from less than $300 million in 1958 to about $12 billion in 1984 (figure 9-3), or, in deflated terms, by a factor of 11.[24] Although the percentage drop in apparel employment is moderate compared, for example, with losses of steel employment in the 1980s, the decline has not been steady. Apparel employment dropped by about 195,000 from 1973 to 1975, recovered to 1.33 million, and then again fell rapidly from 1978 to 1982 (figure 9-4). From 1982 to 1984, it recovered from 1.16 million to 1.196 million. These clumps of employment loss in the apparel industry were due largely to increased foreign competition, which caused many U.S. firms to close. The closures—3,200 over the last decade—were not matched by new entries.[25] There has been a net employment loss in apparel in the 1980s; between March 1980 and February 1985, 116,000 jobs were lost.[26]

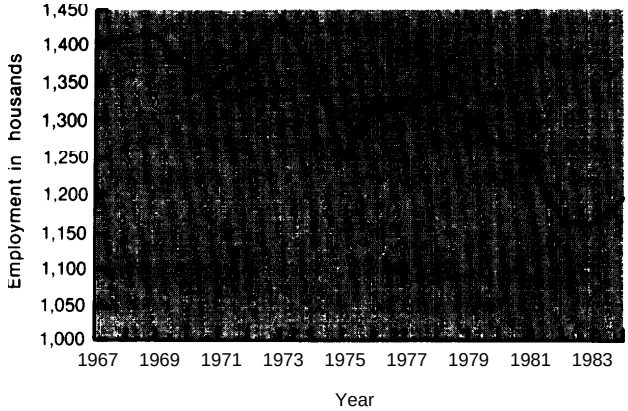
[24]Source for employment figures: U.S. Department of Labor, ***Employment and Earnings,*** various issues. Source for import data: Carol Parsons, "The Employment Effects of International Trade in the Apparel Industry," contractor report for the Office of Technology Assessment, April 1985, p. 8. The MFA did permit increasing imports of apparel and textiles; however, imports have risen faster than MFA targets.

Figure 9-3.—U.S. Apparel Imports



SOURCE: U.S. Department of Commerce Market Expansion Division, OTEXA, ITA

Figure 9-4.–U.S. Apparel Employment (SIC 23)



SOURCE U S. Department of Labor Bureau of Labor Statistics, Employment and Earnings.

Imports have also been an important factor in employment losses in consumer electronics, notably in the television industry. Imports of black-and-white televisions rose from one-fourth to over two-thirds of U.S. sales between 1967 and 1982,[27] while employment in television manufacture declined rapidly.[28] Several other factors—including productivity growth and relocation of manufacturing operations to low-wage countries—were responsible for employment losses in this industry, but rising imports, as part of a cluster of events, were the primary cause of job losses.[29]

The exact number of jobs lost to imports cannot be ascertained. It is too simple to assume that the number of jobs needed to make all imported products could be captured by U.S. workers if imports were cut off, for two rea-

[25]Parsons, op. cit., p. 8.

Reemployment figures are seasonally adjusted.

[27]John A. Alic and Martha Caldwell Harris, "Employment Lessons From the U.S. Electronics industry, " manuscript; and us. Congress, Office of Technology Assessment, ***International Competitiveness in Electronics,*** OTA-ISC-200 (Washington, DC: U.S. Government Printing Office, November 1983), p. 112.

[26]BLS statistics on employment, used throughout this report, go back only to 1972 for radio and TV receiving sets (SIC 3651). Between 1972 and 1984, employment in SIC 3651 dropped from 114,500 to 71,800. Source: U.S. Department of Labor, Bureau of Labor Statistics, ***Historical Employment and Earnings*** and various supplements.

[29]Alic and Harris, op. cit.

sons, First, many U.S. production processes are more capital-intensive (and therefore, less labor-intensive) than comparable production overseas, meaning that fewer American workers would be required to produce equivalent outputs. This appears to be the case, for example, in the manufacture of some semiconductors and computer products. Second, one of the most important reasons imports succeed is their price; they are often cheaper than equivalent U.S.-made goods, If imports were eliminated, U.S. consumers would have to pay higher average prices for products, and would reduce consumption. Thus, if U.S. production were substituted for imports, the quantity consumed—and therefore, produced—would be lower than if imports were permitted. The number of jobs thus "recaptured" would be correspondingly lower.

Although it is difficult to identify precisely how many job opportunities disappear or how many workers are displaced by imports, there is no question that increasing imports do eliminate American jobs.

Imports and the Demand for Skills

In marked contrast to the **case** of exports, manufacturing industries which face the greatest pressure from imports have higher concentrations of relatively low-skilled workers. The reason is straightforward: low-wage countries have a comparative advantage in producing goods which require high concentrations of low-skilled labor.

One study examined the demographic and occupational characteristics of workers in 20 manufacturing industries in which trade-related job opportunities had been most adversely affected, and compared them with 20 manufacturing industries with the most favorable effects on job opportunities from trade between 1964 and 1975. The study found that workers in favorably affected industries were more skilled than workers in adversely affected industries. Moreover, workers in adversely affected industries were found to be less skilled than in manufacturing as a whole.[30] Not surprisingly, the workers in industries most adversely affected were also poorer; this reflected the decline in parts of several low-wage industries, including apparel, textiles, footwear, and leather products (table 9-3). It also reflects the fact that workers with few skills—those most vulnerable to displacement due to imports—are paid less.

These findings are consistent with more current information, A study by the International Trade Commission computed the U.S. labor content embodied in exports and the U.S. labor content required to produce imports in the United States (table 9-1).

In 11industries, the amount of U.S. labor required to substitute domestic production for imports **was** greater than 100,000 work-years, al Eight of these industries had ratios of production workers to total employment which were above the average for all manufacturing (68 percent in 1982). Many of the sectors—including lumber and wood products, paper and allied products, apparel, textile mill products, leather and leather products (which includes footwear), and primary metal products (which includes primary iron and steel) —also have proportionally fewer managers and officers, professional workers, and technical workers than all manufacturing.

Three industries do not fit the general pattern: radio, TV, and communication equipment; petroleum refining and related industries; and electronic components and accessories. In petroleum refining, the skill or labor content is less important in determining patterns of comparative advantage than resources. The United States depends on other countries for a great deal of its petroleum; as other countries (e.g., Saudi Arabia) develop their own refining industries, refined petroleum products are imported. Petroleum refining has a low concentration of production workers, and high concentrations of managers and officers, professional and

[30] C. Michael Aho and James A. Orr, "Trade-Sensitive Employment: Who Are the Affected Workers?" *Monthly Labor Review*, February 1981, p. 33.

[31] The sectors, shown in table 9-1, include 1) motor vehicles and equipment; 2) apparel; 3) miscellaneous manufacturing; 4) radio, TV, and communication equipment; 5) petroleum refining and related industries; 6) footwear and other leather products; 7) primary iron and steel manufacturing; 8) electronic components and accessories; 9) office, computing, and accounting machines; 10) lumber and wood products; and 11) paper and allied products.

Table 9-3.—Characteristics of Workers and Industries Whose Employment was Most Affected by Trade Between 1964 and 1975

Item	Average of the 20 favorably affected industries	Overall manufacturing average	Average of the 20 adversely affected industries
Demographic characteristics:			
Family income below poverty level	5.8 0/0	7.0 %	*9.8* 0/0
Annual earnings under $10,000	72.1	77.4	81.7
High school education (4 years)	39.1	36.6	34.0
College education (4 years)	6.9	5.1	3.1
Occupational measures:			
Skill measured as a percentage of the average wage in manufacturing (1937)	104.0	100.0	97.8
Skilled workers as a percentage of the labor force	55.8	50.0	38.8
White-collar workers as a percentage of the labor force	36.3	30.3	21.1
Industrial characteristics:			
Technical intensity (scientists and engineers as a percentage of the labor force)	6,87	3.20	2.29
Technical intensity (research and development as a percentage of sales)	5.90	2.36	1.39

SOURCE: C Michael Aho and James A Orr, "TradeSensitive Employment Who Are the Affected Workers?" *Monthly Labor Review*, *1981*, p 32.

technical workers in comparison to the average for manufacturing, However, the Saudis and other oil-exporting nations have imported much of this kind of talent from the United States in order to develop their own petroleum-related industries.

In radio, TV, and communication equipment, the anomalous result probably has a great deal to do with the industry classification. This industry shows a net employment deficit in trade (i.e., it would take more American labor to replace imports than is embodied in exports] but has a low concentration of production workers (only 50 percent). Two industries make up this sector, and the ratios and trade balances (and therefore, the labor content of trade) differ significantly. In radio and TV receiving sets, total employment was 91,300 in 1982 and the ratio of production workers to total employment is higher than in all manufacturing.[32] This industry ran a trade deficit in 1982 of over $4, s billion, which would probably mean a net deficit of trade-related employment as well. The other industry, communication equipment, employed over 569,000 workers, of which less than 47 percent were production workers, significantly below the all-manufacturing average. The industry ran a small trade surplus of $108 million; the trade-related employment balance for this industry was probably either roughly in balance or slightly positive. As a result, when these industries are pulled apart, both behave as expected, in terms of skill content and the effect of trade on employment.

One industry—office, computing, and accounting machines—had a much lower ratio of production workers than most other industries in which the amount of labor required to produce imports domestically was over 100,000 work-years. However, this industry had a net trade-related labor surplus of 216,000 work-years, reflecting the sector's trade surplus. Apparently all imports in this sector, in 1982, were office machines: typewriters, duplicating machines, weighing machines and scales, and calculators, These products are generally simpler and require fewer skills of the entire work force than electronic computing equipment, which showed a significant trade surplus. In electronic computing equipment, the ratio of production to total employment was 38 percent; in office machines, 51 percent. It is clear

[32] In 1982, th, ratio of production workers to total industry employment was just over 68 percent, slightly below the all-manufacturing average. However, 1982 was the depth of a recession; in 1981 and 1983, the ratio of production workers to total employment was significantl, higher (7 I and 70 percent, respectively).

that this sector, like others, fits the pattern of exporting products which are more skill-intensive than imports.

On balance, therefore, as trade increases, the demand for skilled workers in the United States is expected to increase, while the demand for less skilled workers will decrease. Displacement will hit hardest at the unskilled workers in manufacturing.

RESPONSES TO INTERNATIONAL COMPETITION

Loss of export markets and increasing imports are among the symptoms of declining competitive ability of U.S. firms. Losses of competitive ability occur for many reasons, including failure to modernize plant and equipment, poor management leading to inefficient production, competition from low-wage countries, U.S. trade restrictions, foreign government policies which favor domestic firms or limit imports, and overvaluation of the dollar. Some losses of competitiveness may be for reasons entirely outside the control of individual industries—e.g., increasing comparative advantage in other sectors of the U.S. economy and rising competitiveness overseas, No matter what the cause of slipping competitiveness, however, efforts of firms to respond commonly cost some jobs, or at least slow the rate of employment growth.

Firms can respond to stiffer competition—domestic or international—in a variety of ways, many of which are aimed at reducing costs, Many firms automate—particularly when they face competition based largely on low foreign wage rates, To improve competitiveness, the firm usually has to raise productivity, and the method often chosen is to improve process technology. Changing product technologies—improving product function and specifications, improving quality and reliability—is also an important part of a strategy to improve productivity and regain competitiveness; many firms upgrade both process and product technologies, Yet despite their importance, the employment effects of product improvement and innovation are hard to assess; it is difficult to predict whether improved product technologies will increase markets enough to stimulate employment. Improved process technologies, on the other hand, have a predictable, negative effect on job opportunities. If firms succeed in raising productivity, fewer American workers are needed to make the same output as before. If the displaced workers can be reemployed elsewhere, the effect of the productivity increase is positive for the economy; moreover, process innovation can enable producers to sell at lower prices, increasing demand. In some cases, increased consumption is enough to maintain or increase employment, even with productivity improvement. In other cases, it is not.

Another strategy to regain competitiveness is to reorganize production on a global scale, relocating production of labor-intensive operations in low-wage nations while maintaining operations that are capital-intensive (including both human and physical capital) in the United States, Still another strategy is protection from imports. Many industries have lobbied for protection, and some have gotten it. If firms make no response to competition, or make unsuccessful responses, they may eventually go out of business. Successful responses often involve job losses too, through increased productivity or location of some jobs offshore to lower costs. However, in the long run, successful responses preserve more jobs than unsuccessful ones, and may provide the basis for generating new jobs in the future.

The responses described above, and their employment effects, are normal occurrences in any dynamic, relatively open economy like that of the United States. However, with trade becoming increasingly important to the economy and international competition becoming intense, the decisions that firms make to improve

their competitive ability have increasingly profound effects on employment. The employment effects of the various responses do differ, and so, as a result, do the interests of policy makers concerned about the employment effects of international trade.

Improved Technology as a Response to International Competition

Improving process technology has several aims: to raise worker productivity to maintain high wages in industries faced with low-wage competition; to improve product performance and reliability; and to lower production costs. While automation has not always succeeded in achieving all those ends, a number of industries have chosen the high technology option, often in combination with other strategies, and some have come up winners. In other cases, automation efforts have raised productivity, but not enough to offset the advantage of producers in low-wage countries. Often, improved technology cannot alone support the wages of American workers, some of which are high only in comparison with developing and Third World wages, but quite low by U.S. standards.

The following sections explore the effects of improved technology on employment in four industries: textiles, televisions, automobiles, and apparel. These case studies help to illustrate how changing technology can reduce employment as well as preserve some jobs, and the limitations of technological change alone in maintaining competitiveness.

Automation in the Textile Industry

Investment in new capital equipment is a strategy the textile industry has used to respond to increasing pressure from imports. The textile industry is labor-intensive, and employs a high proportion of unskilled workers relative to all manufacturing. Most of its production technologies are standardized, and require relatively low capital investments. Thus the industry is a logical choice for industrializing countries with abundant low-skilled labor and limited capital.[33] The effect of competition from producers in low-wage countries is apparent: between 1972 and 1984, textile imports rose from $1.3 billion to nearly $3.8 billion, or 192 percent, while U.S. industry shipments increased more slowly, from $28.1 billion to $57.8 billion, or 106 percent.[34] The increase in textile imports has occurred despite import limits negotiated in a series of agreements with foreign producers. These began in in 1957 with a 5-year agreement limiting Japanese exports of cotton textile products to the United States, and culminated in the Multifiber Arrangement first negotiated in 1974.[35] Even with this protection, the textile industry has had to adopt a number of strategies to improve its competitive position. Both technological innovation and shifts of production to higher value-added products have been important strategies.[36]

The textile industry is rapidly moving towards greater capital intensiveness, particularly in sectors like manmade fibers, cotton weaving mills, and manmade fiber weaving mills; capital expenditures in these sectors increased at compound rates of over 10 percent per year between 1972 and 1982.[37] The investments have paid off in productivity growth. In the textile industry as a whole, labor productivity rose at 5.2 percent per year between 1974 and 1982, a greater rate of increase than in any other industry (manufacturing and nonmanufacturing) except electrical and electronic manufactur-

[33] Stanley Nehmer and Mark W. Love, "Textiles and Apparel: A Negotiated Approach to International Competition, " U.S. Competitiveness in *the World* Economy, Bruce R. Scott and George C. Lodge (eds.) (Boston, MA: Harvard Business School Press, *1985),* p. *238.*

[34] U.S. Department of Commerce, International Trade Administration, 1985 ***U.S. Industrial Outlook, Prospects for Over 35o Manufacturing and Service Industries*** (Washington, DC), pp. 44-1 to 44-9.

[35] Discussion of protection in the textile industry can be found in Nehmer and Love, op. cit., pp. 239-244; and Vinod K. Aggarwal, with Stephan Haggard, "The Politics of Protection in the U.S. Textile and Apparel Industries, " ***American Industry in International Competition,*** John Zysman and Laura Tyson (eds.) (Ithaca and London: Cornell University Press, 1983), pp. 249-312.

[36] Aggarwal and Haggard, op. cit., P. 252.

[37] *1985 Industrial Outlook,* op. cit., pp. 44-8 to 44-12.

ing.[38] U.S. production of manmade fiber and yarn, in particular, is internationally competitive, and its share of textile output has risen.

While rising capital intensity has helped parts of the textile industry to remain competitive, it has had the predictable effect on the labor force in an industry where the dollar value of output, adjusted for inflation, has been nearly flat for a decade. In manmade fibers, total employment dropped by 30,600, or 32 percent, between 1972 and 1984; the number of production workers has fallen from 72,800 to 47,900, or 34 percent. Employment in the textile industry as a whole dropped by over 200,000 during the same period, and production employment fell from nearly 88 percent of the work force to 86.6 percent—not a dramatic drop by any means, but indicative of future trends. The long-term employment trend in the textile industry is downward.[39] The technological changes which help the competitive position of the textile industry—aimed at reducing the number of steps involved in manufacturing and reducing the amount of labor needed—are making inroads into production jobs. If the textile industry continues to respond as it has to competitive pressures, fewer workers will be needed, and more of them will be skilled.[40]

Technological Developments in Television Manufacture

Like the textile industry, the television industry has faced intensifying foreign competition and rising imports. By the mid-1960s, Japanese competition in U.S. monochrome (black-and-white) television markets was well-established. Using technologies licensed from U.S. firms, the Japanese developed lightweight, small monochrome television sets for export, and export they did. Between 1961 and 1966, the Japanese share of the U.S. monochrome TV market moved from practically nothing to 11 percent.[41] By 1982, import penetration of black-and-white televisions in the U.S. market had grown to 67.9 percent, and American monochrome TV producers could compete only in very narrow market segments.[42]

In the 1960s and 1970s, American consumers were shifting rapidly from monochrome to color television sets, and so were Japanese manufacturers. Color television imports, particularly from Japan, expanded rapidly in the late 1960s and early 1970s. By 1976, imports had captured nearly 36 percent of the U.S. market by volume (19 percent by value). The trend toward increasing import penetration reversed between 1976 and 1982, when imports of color televisions went from 36 percent of U.S. sales to only 19 percent, in numbers of units, and from 19 to nearly 13 percent by value. The difference between import penetration in 1976 and in 1982 is a direct result of U.S. trade policy. In response to a series of complaints by U.S. manufacturers, beginning in 1968, an import quota (termed an Orderly Marketing Arrangement, or OMA) was negotiated with Japan, and later extended to South Korea and Taiwan. After the OMA was adopted, imports dropped by more than half. The OMA with Japan was lifted in June, 1980, and the OMA with Korea and Taiwan expired in 1982, Since then, imports have climbed, although import penetration has not yet reached 1976 levels.

One major factor in the success of Japanese TVs in the American market was advanced technology. The Japanese, in order to penetrate the American market, relied on technical development to help overcome the lingering reputation of Japanese-made goods for poor qual-

[38] Edward Rappaport, "The Textile and Apparel industries: Economic Status and institutional Environment," Congressional Research Service report, mimeo, Mar. 13, 1985, p. CRS-7.

[39] Figures on textile industry employment are taken from the *1985 U.S. Industrial Outlook,* op. cit, pp. 44-1 to 44-12, rather than the Bureau of Labor Statistics, which does not report separate figures for employment in both sectors of manmade fiber production, SIC 2823 and 2824. These manmade fiber sectors are in SIC 28, Chemicals and Allied Products, rather than in SIC 23, Textiles, but are usually included as pert of the textile industry.

[40] Lukas Michel, G.A. Berkstresser 111, and N.A. Williámson, *Technology for the Textiles and Apparel Manufacture* in *the U. S.,* contractor report submitted to the Office of Technology Assessment, School of Textiles, North Carolina State University, August *1984,* p. 241.

[41] James E. Millstein, "Decline in an Expanding Industry: Japanese Competition in Color Television, " *American Industry in International Competition,* op. cit., p. *113.*

[42] U.S. congress. Office of Technology Assessment, *International Competitiveness in Electronics,* op. cit., p. 112.

ity. With government assistance, the Japanese developed solid-state television designs, and new technologies for stereo sound in televisions.[43] Japanese manufacturers also concentrated on automating their production processes to achieve economies of scale.[44]

The pressures created by imports, and the lower production costs of Japanese television sets, forced American manufacturers to respond. This response took several forms: as noted above, the industry sought and received protection; some manufacturers moved production offshore, and many responded by automating production, reducing parts counts, and shifting to solid-state designs to lower production costs and improve quality and reliability.[45] As in the textile industry, labor productivity rose. Apparent productivity increased from 150 color television sets per worker in 1971 to 560 in 1981. Between 1968 and 1981, employment in U.S. television manufacture dropped by more than half, due to the combined effects of increased productivity, offshore manufacture, and imports.[46]

The experience of the television industry exemplifies the trade-offs involved in strategic responses to international competition. In 1974, Quasar's TV operation was bought by Matsushita, a Japanese company. Matsushita made significant changes in Quasar: it automated production processes, reorganized work on the shop floor to emphasize quality control and employee participation, and moved some manufacturing operations to Mexico. While these actions cut into American job opportunities in Quasar, they did save the company, whose survival was by no means assured. As a result, several thousand U.S. jobs were saved.[47]

Automation in Motor Vehicles

The textile and television industries are examples of industries in which many firms have made strategic responses to competition during the last decade or two. The U.S. motor vehicle industry is currently trying to adapt to the same kinds of pressures. If the motor vehicle industry is successful in regaining competitiveness in some product lines, it will probably face a long period of gradually declining employment; if unsuccessful, and imports rise as rapidly as they did in the late 1970s, many more jobs will be lost.

Between 1972 and 1984, motor vehicle imports rose from less than 20 percent of domestic sales to nearly 29 percent (estimated).[48] Nearly four-fifths of all imported passenger cars came from Japan, and 98 percent of the imported trucks. Put another way, Japanese cars accounted for over 20 percent of all cars sold in the United States in 1983, while all imports amounted to 26 percent. Imported trucks accounted for 14.8 percent of all U.S. truck sales.[49] In 1986, import penetration in automobiles is expected to hit nearly 35 percent.[50]

As in the television industry, Japanese automakers based their advantage on carefully selecting a market niche—originally, subcompact automobiles—and developing superior products, by automating production, by developing effective marketing and distribution channels, and by expanding into other market segments. For several years, Japanese automakers have been able to produce equivalent cars more efficiently and with less labor than American manufacturers. This difference is referred to as the Manufacturing Cost Difference (MCD), and it is estimated to have grown from $1,500 to $2,000 per car in 1979-80 to $2,000 to $2,600 in 1985.[51] Part of the difference—about $500—is probably due to the strength of the dollar against the Japanese yen, but most is due to

[43] Ibid., p. 181.
[44] Millstein, op. Cit., p. 120.
[45] U.S. Congress, Office of Technology Assessment, *International Competitiveness in Electronics,* op. cit., pp. 184-5.
[46] Alic and Harris, op. Cit., p. 12.
[47] This paragraph depends heavily on Alic and Harris, op. cit., p. 12.
[48] Figures cited in Robert Scott, "Motor Vehicles, " contract report to the Office of Technology Assessment, Apr. 29, 1985, p. 13.
[49] U. s. Department of Commerce, *The U.S. Automobile Industry, 1983,* Report to the Congress from the Secretary of Commerce, December 1984. Pp. 7, 13.
[50] Personal communication with John Hartmann, Automotive Industry Analyst, International Trade Administration, Sept. 19, 1985.
[51] Scott, op.cit., pp. 2-3; and John Hartmann, Automotive Industry Analyst, International Trade Administration, personal communication, Sept. 20, 1985.

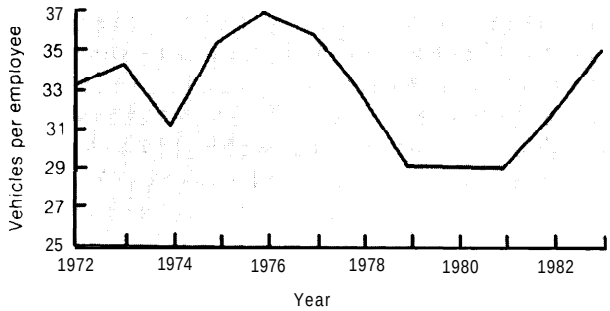
differences in unit labor costs, which includes differences in productivity as well as wages and salaries for white- and blue-collar workers.

The U.S. motor vehicle industry has chosen several strategies to respond to the competitive pressure: increased offshore manufacture of vehicles, parts and subassemblies; efforts to reorganize shopfloor operations and increase employee involvement; asking for (and getting) trade protection; establishing joint ventures with foreign producers; reducing labor costs; putting greater pressure on suppliers to cut costs; redesigning products; and automating domestic manfuacturing.

Capital investment in the auto industry is unprecedently high. Between 1978 and 1985, the U.S. automakers invested $84 billion worldwide in plant, equipment, and special tools (excluding design); from 1970 to 1977, investment was $32 billion. Most of this investment—it is not possible to tell exactly how much—has been in the United States.[52] In the next 5 years, the industry is planning to invest an additional $100 billion in plant, equipment, special tools, and design worldwide.[53] A major thrust of this investment is automation: such things as increased use of computer control in vehicle design and development, production, and testing, increasing the use of robots, and other forms of assembly automation. General Motors, for example, recently acquired Electronic Data Systems (EDS), shifted its own data processing people to EDS, and put EDS to work streamlining and improving GM's data-processing systems.[54] These changes have not yet shown significant results in worker productivity (figure 9-5). The number of vehicles produced per employee in U.S. auto assembly peaked in 1977, at nearly 37 units per worker, and fell to only 29 units per worker by 1979; in 1984, the figure was 35.2 units.[55] Part of the reason for the decline in apparent productivity in the late 1970s was the increase in the complexity of the average vehicle, as well as loss of much of the bottom end of the market–compacts and subcompacts —where vehicles are simpler. Much of the improvement in productivity between 1980 and 1984 was due to increasing capacity utilization rather than technological improvement. Technological advance probably was a factor in raising productivity in automotive parts and stampings, however, as parts manufacturers shifted to numerically controlled and computer numerically controlled machine tools.[56] The investments the auto industry has made are expected to raise productivity in the future by around 5 percent per year, while domestic production and sales probably will expand more modestly. Employment in automobiles peaked in 1979, at over 1 million workers. By 1982, due to the combined effects of recession and foreign competition, auto employment had fallen below 700,000, Employment has recovered to 865,000 by October 1985 (seasonally adjusted), but will likely remain substantially below its peak in the late 1970s, and probably will continue a long-term, gradual decline.

The employment decline will affect different workers differently. Increased use of automated equipment has already increased the proportion of skilled workers relative to production workers in automobile assembly from 1:5 in 1978 to 1:4 in 1984, a trend which is likely to continue.[57]

Figure 9-5.—Apparent Labor Productivity in U.S. Motor Vehicle Assembly: 1972-84 (SIC 3711)



SOURCE: Robert Scott, "Motor Vehicles, " contractor report prepared for the Office of Technology Assessment, April 1985, p 16.

[52]Hartmann, op. cit.; and Kerry Lanham, International Trade Administration, personal communication, Sept. 19, 1985.
[53]Ibid.
[54]Michael Brody, "Can GM Manage It All?" *Fortune*, July 8, 1985, pp. 22-25.
[55]Scott, op. cit., p. 16.
[56]Ibid., p. 17.
[57]Ibid., p. 40,

Automation in the Apparel Industry

The apparel industry is one of the most labor-intensive in all manufacturing. Moreover, nearly 85 percent of its work force consists of production workers. Of the total labor force in apparel (SIC 23), over 40 percent are sewing machine operators—a job which can be learned quickly. Partly because of low skill requirements, and partly because of intense competition in the industry, apparel workers' wages are very low: in 1984, production workers in apparel made just $5.55 per hour, compared to $9.18 in all manufacturing. The work force in the apparel industry is over 80 percent female, nearly 20 percent minority, and relatively uneducated. In 1975, one-third of all people in the apparel industry had not completed the ninth grade[58]

Capital requirements in the apparel industry are also low relative to other manufacturing. In 1979, the capital stock per hour worked in the apparel industry was $2.98, compared to an average of $16.28 in other manufacturing industries. [59]

This is the kind of industry most vulnerable to foreign competition. Low capital requirements and heavy reliance on low-skill workers gives poorer countries a distinct cost advantage over American producers. Apparel wages, by U.S. standards, are not at all generous, and have declined by 16 percent between 1968 and 1982 in real terms. However, unskilled workers making over $5 per hour in the United States still look expensive compared to workers in Southeast Asia, Latin America, and other developing and Third World countries (table 9-4). Productivity differences only partially reduce the gap between the U.S. and low-wage producers; the American Apparel Manufacturers Association estimates that U.S. productivity is generally 35 to 100 percent greater than that of workers in less developed countries, while wage differentials are often much greater. [60]

Table 9-4.-Apparel Industry Wage Rates in Selected Countries, 1982

Country	Hourly wage	Wage + fringe	Index
United States	5.20	6.50	100
Hong Kong	1.80	2.05	32
Taiwan	1.50	1.75	27
Korea	1.00	1.25	19
Singapore	0.90	1.35	21
Philippines	0.40	0.50	8
China	0.20	0.30	5
Jamaica	0.75	0.95	15
Costa Rica	0.60	0.80	12
Haiti	0.30	0.40	6
Mexico	NA	1.68	26
Portugal	1.20	150	23
Egypt	0.40	0.55	8

NA—Not available or applicable?

SOURCE: Carol Parsons, "The Employment Effects of International Trade m the Apparel Industry, " contractor report prepared for the Office of Tech. nology Assessment.

Apparel makers have responded to the increase in foreign competition by keeping up the pressure for protection, moving production to low-wage nations, shifting to product lines in which the foreign advantage is least,[61] and, to some extent, automating. However, compared with the other industries considered above—textiles, motor vehicles, and televisions—automation in apparel manufacture is not likely to make as much difference in the competitive position of U.S. manufacturers. It would require a very substantial labor-saving technical breakthrough to offset the large labor cost advantages of foreign producers. While research aimed at such a breakthrough is underway in the United States, the Japanese have invested much more, leaving the likelihood that the United States will capture the advantages of new automation open to doubt. Also, if automated equipment is to confer a great advantage on the United States —enough to offset the advantages low-wage countries now hold—it would have to greatly raise labor productivity and either require skilled people to operate it,

[58] Figures cited in Parsons, op. cit., p. 6.

[59] U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States: 1984* (Washington, DC: U.S. Government Printing Office, December 1983), pp. 542-543. Figures are in 1972 dollars.

[60] Parsons, op. cit., p. 26.

[61] For example, many types of outerwear, such as women's dresses, are very sensitive to fashion changes, and the advantage in these markets often goes to the producer who can get a new line of clothing to retail outlets most quickly. In this case, foreign producers may beat something of a disadvantage; while verbal communication between fashion centers like New York and production locations like Southeast Asia is very rapid, it may take somewhat longer to transfer information on the type and weight of fabric, color, and design details which is more difficult to do verbally.

or require a large capital investment which poorer countries could not afford.

So far, technology has done little to offset the differences in labor costs (wage rates weighted by productivity) between the United States and low-wage countries. In the 1960s, new technologies for synthetic fibers, developed in the United States, lowered material prices and gave the U.S. apparel industry a short period of competitive advantage. Synthetic fiber production, however, was adopted fairly rapidly in low-wage countries, and perversely, the lower prices of manmade fibers accentuated international differences in labor costs, further eroding the competitive position of the American apparel industry.[62] Automation in stages of apparel production other than sewing—pattern grading or cutting; fabric cutting, and fabric marking—have helped to raise productivity, but all these activities apply to production processes which account for less than 5 percent of total labor costs.

While some promising technologies are on the horizon, apparel making will remain relatively labor-intensive for the foreseeable future. New technologies include computer-aided design of garments and patterns; improved programmable cutting equipment; computer-controlled handling of work in process; computer networks between suppliers, manufacturers, and retailers; automated sewing; and automated packaging. Some technological changes have been made; in the late 1960s, the automatic sewing machine (or numerically controlled sewing machine) increased sewing speeds and improved the uniformity of sewing—and thereby improved the quality of the product. These machines made it possible to reduce significant amounts of labor in some operations—e.g., automatic inside sewing of shirt collars reduces labor by 64 percent—but these machines could handle only certain relatively simple sewing operations. Moreover, they are dedicated equipment, which cannot be adapted for new tasks. For these reasons, automatic sewing machines are used for a minor share of sewing in the U.S. apparel industry, and the industry has remained very labor-intensive. To date, none of the technological improvements made in the apparel industry have reduced labor intensity enough to overcome the advantage of the low-wage producers.

Although a major new effort is underway in the United States to produce a new machine which will automatically load, fold, and sew limp fabric, the effort is not very well-funded compared with a Japanese effort with the same objective. The project is taking place at Draper Laboratories in Massachusetts, supported by the Textile and Clothing Technology Corp. (TC^2). Corporation members include many textile and clothing firms,[63] the Amalgamated Clothing and Textile Workers Union, and the Department of Commerce. With about $2 million funding from TC^2 since 1981, Draper has produced a machine which has shown some promise in a field test.

Whether this machine, or future developments like it, will be successful in boosting the competitiveness of much of the U.S. apparel industry is uncertain. A major question about the eventual impact of TC^2 arises because of its relatively low level of funding ($2 million dollars over 3 years). In comparison, Levi Strauss invested $5.5 million in research and development in 1983 to produce innovations which automated the sewing of belt loops and the bottoms of blue jeans legs. This strategy was not effective for Levi Strauss, not because of any failure of technology, but because the demand for blue jeans faded.[64] The Draper project is also underfunded compared with an effort mounted by the Technology Research Association of Automated Sewing of the Japanese Ministry of International Trade & Industry (MITI). This project—a Japanese version of TC^2—was begun in 1983; its mission, similar to that of Draper's, is to automate apparel manufacture, particularly for small production quantities. The MITI effort is planned to last until 1989 and has a commitment of $40 to $60 million behind it.

[62] Parsons, op. cit., pp. 9-10.

[63] These firms include Hart Schaffner and Marx, Genesco, Burlington Menswear, Du Pent, J.P. Stevens, and Surgikos Division of Johnson & Johnson.

[64] Parsons, op. cit., P. 54.

Past innovations in the apparel industry have shown no particular attachment to the United States. In many industries, automation improves the competitive position of American producers, either because it increases the need for skilled operators, maintenance people, technicians and professionals in manufacturing processes, or because the capital investment required for efficient production is prohibitively high for poorer nations. So far, innovations in the apparel industry have done neither. Numerically controlled sewing machines are now used offshore, and the spread of this and other technologies has helped to reduce the difference between U.S. and Third World productivity in apparel.[65]

Whatever the success of the effort to automate apparel manufacture, the long-term outlook for apparel employment is for further gradual decline at best. With increasing import pressure, and only slowly growing demand, the prospects for anything but employment decline in the long term are dim.

Reorganizing Production on a Global Scale: Manufacturing Offshore

Another major strategy adopted by firms facing stiffer international competition is to reduce costs by seeking low-cost areas for production. For many companies, this has meant reorganizing production on a regional or global scale, locating production facilities in areas which offer the best chances of sustaining production cost advantages. Locating manufacturing facilities abroad to penetrate foreign markets is nothing new; according to one source, Samuel Colt located Colt's Repeating Arms Manufactory in London in 1852.[66] By 1914, U.S. companies had $478 million worth of investment in foreign manufacturing, mostly in Europe and Canada.[67] What distinguishes past overseas investment in manufacturing from today's is the motive: in the past, investments were usually made in order to penetrate foreign markets where exporting would have been difficult, or in order to take advantage of certain natural resources (e.g., tropical hardwoods) which were unavailable in the United States. While these motives are still important reasons for overseas investment, a major reason, increasingly, is to supply the U.S. market more cheaply. Manufacturing in foreign locations for export either to the home country—in this case, the United States—or to third-country markets is a relatively new feature in the landscape of U.S. foreign investment, emerging as a major strategy as late as the 1960s.[68] Moreover, in some sectors, contracting with foreign firms to supply all or part of products designed for the home market is becoming a more common strategy for survival and competitiveness.

One form of offshore assembly, termed outward processing, works as follows. U.S. producers make part of a product, and then ship it, in unfinished form, to a foreign plant for additional work. The product is then re-imported into the United States for sale or further processing, with tariffs levied only on the foreign value-added. This kind of import is often termed an 806/807 import, after items 806.30 and 807.00 in the Tariff Schedule of the United States (TSUS) which permits the activity.[69] Between 1966 and 1983, 806/807 imports increased in total value 20 percent per year, from $953 million to over $21 billion (figure 9-6). The foreign value-added increased slightly less rapidly, at 19 percent per year. In 1966, the vast majority—94 percent—of these imports were from developed countries like West Germany and Canada. Since then, the newly industrializing countries have increased their shares of BOG/807 imports rapidly. From 1977 to 1983, the share of 806/807 imports coming from developed countries accounted for 55 to 57 percent

[65] Ibid, pp. 50-51.

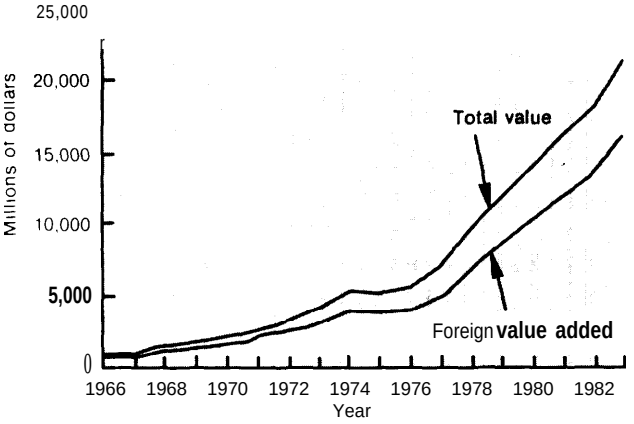
[66] Tadakatsu Inoue, "A Comparison of the Emergence of Multinational Manufacturing by U. S., European, and Japanese Firms," in Akio Okochi and Tadakatsu Inoue (eds.), *Overseas Business Activities,* Proceedings of the Fuji Conference (Japan: University of Tokyo Press, 1984), p. 15.

[67] Tadakatsu Inoue, op. cit., p. 3.

[68] Joseph Grunwald and Kenneth Flamm, *The Global Factory: Foreign Assembly in international Trade* (Washington, DC: The Brookings Institution, 1985), p. 3.

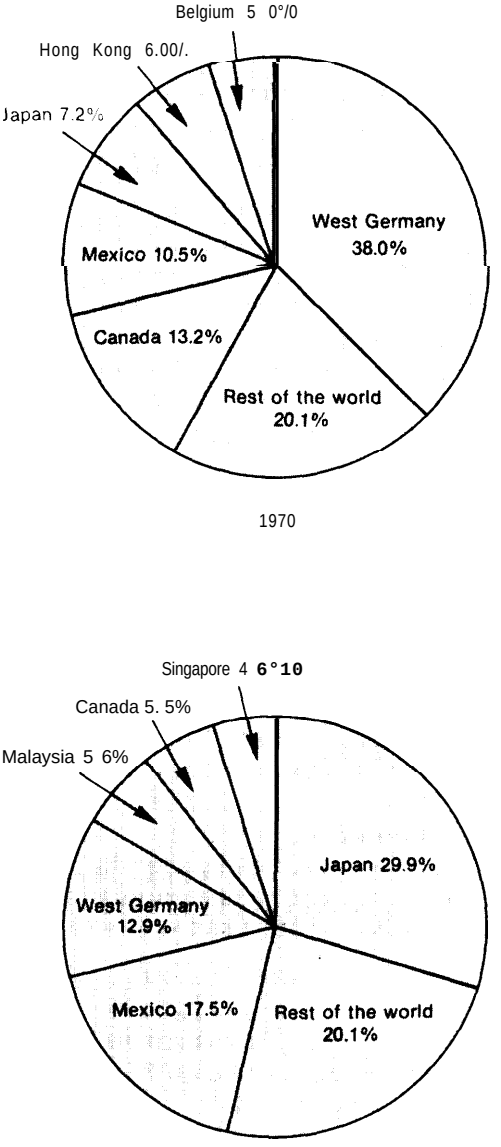
[69] Item 806.30 includes only metal items which have been manufactured or processed in the United States, exported for foreign processing, and returned. Item 807.00 includes everything else.

Figure 9-6.—U.S. Imports Under Items 806/807



SOURCE: U.S International Trade Commission, *Imports Under Items 806.30 and 807.00 of the Tariff Schedules of the United States, 1980-83,* April 198S, p. 100

Figure 9-7.- Principal Sources of Imports Under Item 807, 1970 and 1983



SOURCE: US. International Trade Commission, *Imports Under Items 808.30 and 807.00 of the Tariff Schedules of the UnitedStates, 1980-83,* April 1985, p. 23,

of the total. Figure 9-7 also illustrates the increasing importance of production in newly industrializing countries such as Malaysia, Singapore, and Mexico in 807 imports. Japan has rapidly taken a greater share of 807 imports into the United States, replacing West Germany as the largest source.[70] Motor vehicles predominate among the products imported under TSUS 807, accounting for 62 percent of total 807 imports. Other products making up a significant share include semiconductors and parts, televisions and parts, office machines, and apparel.

The prime reason for foreign assembly of products meant for home or third country markets is to save on labor costs, especially in production processes that do not require high proportions of skilled labor. In some offshore locations, lower productivity accompanies the lower labor costs, which partly offsets the effect of lower wages; but often the wage differentials are great enough to make up for lower productivity. Moreover, for some operations in some locations, productivity may be greater than in the United States.

Changing the location of production within the United States to find lower labor Costs is not a new strategy; leaving the country to reduce labor costs is a newer development. In the United States, for example, textile producers migrated to the South from the industrial Northeast to find lower wages and non-union labor. Even in service industries, where "production" is often physically inseparable from consumption, automation has made it possible

[70]Figures cited in this paragraph are from U.S. International] trade Commission, *Imports Under Items 806.30 and 807.00 of the Tariff Schedules of the United States, 1980-83,* USITC Publication 1688, April 1985, pp. 15-29.

to shift certain operations to lower wage areas to save on labor costs. For example, a California insurance company, in the process of automating claims processing, shifted this job from a unionized city office to more rural, nonunionized areas of California, where costs, especially wages, were lower. Modern telecommunications made the shift possible.

U.S. producers are by no means the only ones engaged in international reorganization of production. As the Japanese economy prospered, productivity and wage rates rose, making Japan a high-cost producer relative to much of the rest of Asia in many labor-intensive processes. In response, the Japanese, too, have transferred some manufacturing operations to lower wage countries: in 1978, three of Japan's largest firms had assembly operations in Mexico. Interest in Mexican assembly operations in a variety of industries on the part of many industrialized nations, including many European nations, is growing.[71]

In some cases, American companies—for example, automakers and semiconductor manufacturers —have invested in offshore facilities and obtained majority or minority interests. In others, American producers contract with foreign manufacturers for low-cost products which are then marketed under the label of the U.S. company. Automakers and apparel manufacturers have both used this strategy.

There is no question that offshore assembly and manufacturing of products for home or export markets cost American jobs, although there is not a one-for-one correspondence between the number of jobs in offshore operations and the number of jobs lost in the United States. Since it is the operations which involve the greatest reliance on low-skill labor which are most likely to go offshore, the workers most vulnerable in strategic decisions to move production offshore are–like workers affected both by changing process technology and increased imports-less skilled production workers in manufacturing.

[71] Grunwald and Flamm, Op. Cit., P. 150.

Like other strategic responses to increased international competition, however, the decision to move some operations offshore or contract with lower cost foreign producers can save more U.S. jobs than going out of business altogether, but only if offshore production is effective at improving competitiveness.[72] In the earlier example of Matsushita's acquisition of Quasar, one of the several interconnected strategies was to move some operations to Mexico. This move was probably instrumental in Quasar's survival, and the preservation of many jobs in Quasar's U.S. operations. Offshore production is an important part of a long-term competitive strategy for American producers in a widening variety of industries. To the extent that any strategy is successful in improving competitiveness, there will be more jobs for Americans than if firms and industries wither.

Offshore Production in Semiconductors

The semiconductor industry is a quintessentially high-technology industry, on which many hopes for future growth and innovation rest. Overall, the industry employed over 280,000 Americans in May 1985. It has been one of the fastest growing manufacturing industries in the United States. While it experienced a cyclical slump in late 1984 and 1985, its long-term growth prospects are solid; demand for semiconductor devices is expected to grow at 19 percent per year through 1990.[73]

While its prospects are good, the semiconductor industry has been hurt by the high value of the dollar and the current downturn in the

[72] Not all countries are good sites for offshore production facilities; many operations cannot be moved offshore to save money. In general, only operations which rely mostly on unskilled labor are good candidates, and even then, productivity is so much lower in some countries that even very low wages cannot make up for it,

73 The 19 percent figure includes expected annual growth of 20 percent per year for the worldwide merchant semiconductor market and 15 percent per year in captive semiconductor production. Merchant production includes semiconductors that are made and sold as inputs to other firms which produce equipment—e.g., computers, office equipment, and appliances—which incorporate semiconductors. Captive production refers to semiconductors which are made for in-house use. Source: Carol Parsons and Jay Stowsky, "The Effects of International Trade on Employment in the Semiconductor Industry," contract report for the Office of Technology Assessment, May 17, 1985, p. 3.

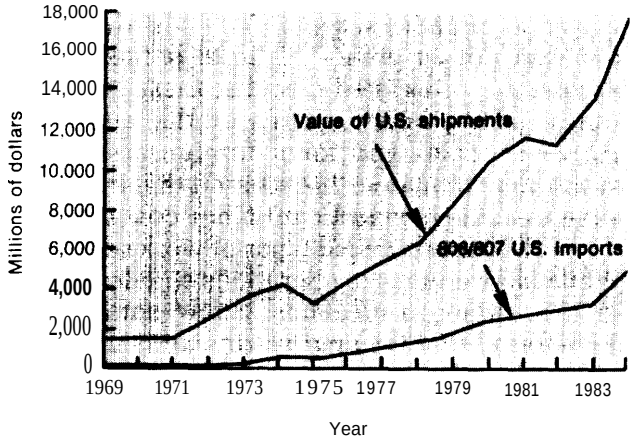
market for semiconductors. The current weakness is probably temporary, however, as growth in telecommunications and computer markets boost demand for semiconductors. The trade balance in semiconductors, historically a surplus, became a deficit in 1982, largely because of offshore production.[74]

Besides providing rapidly growing employment at home, the semiconductor industry also pioneered the movement of assembly overseas. Because of its youth, compared to older industries like motor vehicles, textiles, and apparel, many of the semiconductor industry's products mature fairly quickly, and competition from foreign producers is well-established. However, it was intense domestic competition that initially caused U.S. producers to move labor-intensive operations offshore. The move began in 1964 with the establishment of a plant in Hong Kong by Fairchild. By the end of the 1960s, over 50 foreign semiconductor manufacturing plants had been established, mostly in low-wage Asian nations like Hong Kong, Taiwan, Singapore, and Korea.

Since then, imports of semiconductors—including 806/807 imports from foreign affiliates—have expanded even more rapidly than U.S. production (figure 9-8). Between 1969 and 1984, U.S. shipments of semiconductors grew 17.5 percent annually, while imports rose by over 30 percent per year. The portion of imports under TSUS 806/807 went up by 27.7 percent annually .75 By 1984, including 807 imports, the value of the foreign content of 807 imports totaled 28 percent of U.S. shipments. All semiconductor imports, including 807 imports, totaled 44 percent of U.S. shipments. About 50 percent of all merchant semiconductors in the U.S. market come from 806/807 imports, mostly from Southeast Asian countries (table 9-5). Low wages in these countries give producers a cost advantage.

Information on production-worker wages in other countries is sparse, but some comparisons are possible. By one estimate, total manufacturing costs can be reduced 50 percent by sending assembly offshore to Far Eastern and Latin American plants; in 1973, assembly of one kind of integrated circuit cost less than half as much if assembled in Singapore than if assembled in the United States.[76] Another estimate from the mid-1970s was similar: total manufacturing costs of simple integrated circuits or discrete devices, with offshore assembly, were about $0.15 per device at that time,

Figure 9-8.—806/807 U.S. Imports and U.S. Total Shipments of Semiconductors



SOURCE: Kenneth Flamm, *The Global Factory* (Washington, DC: The Brookings Institute, 1985), p. 74; and 1982 Census of Manufacturers, preliminary statistics for SIC 3674.

Table 9+.—imports of Semiconductors Under TSUS 807.00, 1983

Country	Value of imports ($000)	Value of U.S. components ($ million)
Japan	11,011	6.3
Malaysia	1,063,689	649.3
Singapore	371,917	208.2
Philippines	633,173	426.4
Republic of Korea	487,504	38.6
Taiwan	138,958	56.9
Total, Asia	2,706,252	1,665.7
Mexico	160,741	48.9
West Germany	5,259	3.4
Canada	126,842	83.5

SOURCE: U.S. International Trade Commission, Imports Under *Items* 0630 and *807. 00 of the Tariff Schedules of the UnitedStates, 1980-83,* USITC Publication 1988, April 1985, pp. 127-156.

[74]U.S. Department of Commerce, 1985 *U.S. Industrial Outlook*, op. cit., pp. 32-3 to 32-10.

[75]Figures are cited in Parsons and Stowsky, op. cit., p. 15a. Figures for 1984 production and imports are estimates.

[76]William Finan, ***The international Transfer of Semiconductor Technology Through U.S. Based Firms,*** National Science Foundation, 1975, p. 23. Cited in Parsons and Stowsky, op. cit., p. 11.

while, with domestic assembly, costs were $0.35 to $0.60, depending on the ratio of U.S. wages to offshore wages. " The cost differential was not as great—15 to 28 percent—for large-scale integrated circuits; these are currently taking larger shares of the market.[78] However, costs still favor foreign assembly, and some companies have found that it is possible to achieve significant labor cost savings by sending more skilled types of work offshore. While labor-intensive operations still dominate in U.S. offshore affiliates, a few companies have found that the engineering and technical support needed to do increasingly complex circuit testing can be obtained offshore at much lower prices than in the United States. There has been some speculation that more complex testing, which requires skilled people to write software, maintain testing equipment, and execute tests, could bring testing operations back to the United States, but so far, experience has shown that this kind of work can be done adequately in countries like Singapore and Malaysia.[79]

The main advantage of offshore manufacturing, however, is still in labor-intensive operations. This shows up in employment figures; worldwide, U.S. firms employ only about three-quarters as many people as they employ in the United States, but 80 percent of offshore employment consists of production workers. In the United States, production workers are only about 40 percent of semiconductor industry employment.[80]

Offshore Production in Apparel

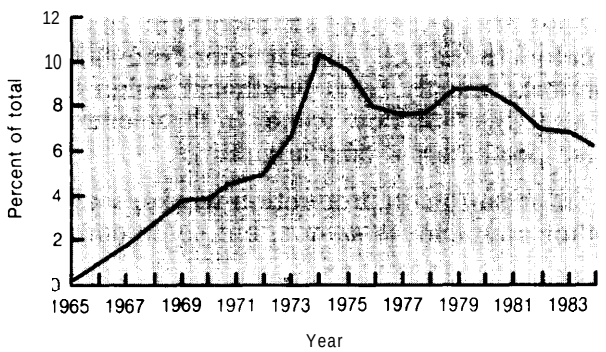
In 1983, 807 imports of apparel and footwear totaled $745 million, or 4.6 percent of all 807 imports. Although the apparel industry's share of 807 imports is modest, offshore production is an important part of the strategy of apparel producers. imports of items under TSUS 807 have increased much faster than apparel imports as a whole, between 1965 and 1974. Since 1974, the share of 807 imports has fallen (figure 9-9).

TSUS 807 allows apparel firms to send fabric overseas for operations like sewing, hemming, or stitching which do not change the form of the basic product.[81] While the bulk of U.S. apparel imports come from Southeast Asia, most 807 imports come from Latin America, with Mexico as the largest supplier. Of all 807 imports of apparel and footwear, 31 percent came from Mexico, and 19 percent from the Dominican Republic. Other major suppliers included Haiti, Costa Rica, the Philippines, Colombia, Honduras, Barbados, and Jamaica. One reason for the predominance of Latin American countries among the sources of 807 imports is that, unlike Far Eastern producers, Latin American countries are relatively high-cost producers of textiles. However, their low wage rates make them attractive apparel producers using U.S.-made fabrics. Asian producers, with their lower textile costs, are more likely to produce both textiles and apparel domestically and export to the United States.[82]

Like semiconductor manufacturers, apparel producers began sending production offshore in the 1960s. In 1965, the value of 807 apparel

[77] The lower domesti assembly cost is associated with a ratio of U.S. wages to foreign wages of 5:1; the higher estimate with a ratio of 10:1.
[78] U.S. Congress, Office of Technology Assessment, *International Competitiveness in Electronics,* op. cit., p. *514*.
[79] William Finan, *Quick,* Finan Associates, personal communication, Sept. 23, 1985.
[80] Alic and Harris, op. cit., p. 14.
[81] Parsons, 0p. cit., p. 43.
[82] Grunwald and Flamm, op. cit., p. 18.

Figure 9-9.—Percent of U.S. Imports of Apparel Under Item 807



SOURCE International Ladies Garment Workers Union, Research Department, February 1985

imports totaled $1.7 million; afterwards, these imports rose nearly 38 percent per year, much more rapidly than 807 semiconductor imports. The most labor-intensive operation—sewing—is most commonly sent offshore to take advantage of foreign labor costs, which are commonly 5 to 10 percent of U.S. labor costs in many Latin American countries.

Offshore production of apparel is expected to continue to grow as U.S. producers become more experienced at managing offshore facilities. In the past, some firms have had mixed experiences with offshore production. For example, Casualwear, a producer of women's clothing, found that a small joint venture made in Haiti in the 1960s was not paying off. Low productivity and high labor turnover offset the advantage of extremely low Haitian wages of $1 per day, and the cost of clothes produced in Haiti and shipped to the United States cost 90 percent of what they would have cost if made in America. Casualwear tried again, moving to a facility which straddled the U. S.-Mexican border, and had 20 to 30 percent of its output sewn in Mexico. This venture was more successful, and production costs came down.

Other apparel firms—particularly bigger ones—have also learned how to manage offshore production. Several of the largest apparel firms, including Manhattan Industries, Philips-van Heusen, Warnaco, and Kellwood—import 30 percent of their products, some from 807 plants and some from foreign-owned facilities under contract. Liz Claiborne, the largest producer of women's apparel in the world, does not manufacture any of the clothes it sells. production is contracted out to over 70 domestic and foreign producers, while the company specializes in design and marketing, Nearly 70 percent of the company's products are made abroad, mainly in Hong Kong, Korea, and Taiwan.[83]

While offshore production has been a rewarding strategy for some U.S. apparel producers, the strategy could prove less successful in the long run than in some other industries. For example, the front-end operations in semiconductors—research and development of new products, design, and pilot production—are heavily skill-intensive, requiring large proportions of highly educated and talented people (such as electrical engineers). The costs of educating these people are high; it is difficult for poor countries. Front-end operations in apparel production also involve design, but the emphasis is less on education than on artistic ability, talent, and creativity. While these skills are not commonplace, the United States has no monopoly on them, as the recent international success of Japanese fashion designers illustrates. It may be easier for foreign manufacturers of apparel to find talented designers for their own industries than to find the engineering and scientific talent needed to erode the U.S. advantage in complex electronic circuitry. Moreover, it is fairly easy for anyone—including foreign manufacturers—to copy the designs of clothing on the racks in retail outlets, and produce similar clothing quickly.[84]

Offshore manufacturing, subcontracting abroad, and expanding imports all mean fewer jobs in the apparel industry. Unlike the demand for semiconductors, demand for apparel is growing very slowly. In such a market, greater use of foreign labor will continue to reduce U.S. apparel employment; the only real question is how rapidly. Without protection, apparel employment probably would have declined more rapidly than it has.

whatever the rate of job loss, the most affected workers are the less skilled, predominantly sewing machine operators. Over 40 percent of the approximately 2 million workers in the apparel industry—i.e,, nearly 500,000 people in 1984—operate sewing machines.

Offshore Manufacture in Telecommunication Equipment

Telecommunications is a high-technology sector which, like the computer and semiconductor industries, has transformed both economic and social life in the United States. In 1983, telecommunication equipment and serv-

[83]The information in the preceding two paragraphs is taken from Parsons, op. cit., pp. 44-45.

[84]Parsons, op. cit., p. 46.

ices was a $116 billion market (3 to 4 percent of GNP). It is expected to reach $300 to $4100 billion by the early 1990s.[85] The world market for telecommunication equipment alone (not including services) was about $50 billion in 1984, with the United States accounting for over one-third of world production.

Telecommunication equipment consists of three kinds of products: 1) terminal equipment in the customer's office or house (referred to as Customer Premises Equipment, or CPE), which includes telephones and facsimile machines; 2) transmission equipment, such as coaxial cable or communication satellites, which carry signals between terminals and switching centers; and 3) switching equipment, which routes signals or calls between terminals. Most switching facilities are located in telephone company facilities, but some—Private Branch Exchanges, or PBXs—are located in customer facilities. For example, large offices sometimes have central switchboards to route incoming and outgoing calls. The United States produces nearly 39 percent of the world's switching equipment, 37 percent of its transmission equipment, and 19 percent of its terminal equipment.[86]

Advanced telecommunication equipment resembles other high-technology sectors like semiconductors and computers in several ways. The United States was and continues to be a major source of new innovations and applications, and much of the advanced research and development is done here. Telecommunication equipment changes fairly rapidly, and product life cycles are short compared with some other manufactured products. Nonetheless, foreign competition is rapidly becoming an important consideration.

Between 1980 and 1983, U.S. trade in telecommunication equipment went from a surplus of over $400 million to a deficit of nearly $650 million. The strong dollar was a major factor in the deterioration of the trade balance, but low-cost foreign competition in many less sophisticated products, such as telephone handsets, was well-established before the rise of the dollar. Another major factor in the rapid rise of imports was the relative openness of the U.S. market;[87] a series of legal decisions opened the U.S. market for customer premises equipment. Foreign penetration of the market began after 1968, when the Federal Communication Commission's Carterphone decision allowed the hookup of non-AT&T equipment to the network of the Bell System. This opened the market to foreign producers, although the monopoly that AT&T/Western Electric equipment then held took some time to dissolve. By the time AT&T was broken up in January 1984 by court decision, a result of a Justice Department Antitrust suit, the competition in CPE had already taken hold. Western Electric, AT&T's equipment manufacturer, lost market share in almost all types of telecommunication equipment in the 1970s and 1980s.

As both domestic and foreign competition have intensified American telecommunication equipment manufacturers have used a variety of strategies to cope with it. Some producers, in some product lines, have chosen to compete on a basis other than price, offering sophisticated products with a variety of features (including service) not duplicated by other manufacturers. Many producers have automated equipment manufacture. Some, particularly producers of equipment which embody standard electronic components, have moved production of these components to low-wage areas, or have imported both standardized components and raw materials from offshore producers.

Comdial, a manufacturer of high-quality telephone handsets, has done these things. Comdial used its expertise in semiconductors to enter the market for specialized telephones. In 1982-84, Comdial automated its manufacturing processes to reduce costs, increasing its engi-

[85] Jay Stowsky, "The Employment Effects of International Trade in the Telecommunications Equipment Industry," contract report for the Office of Technology Assessment, Apr. 19, 1985, pp. 6-7.

[86] Ibid., p. 6.

[87] U.S. duties on telecommunications equipment vary from zero to 9 percent, substantially lower than tariff barriers of most of the rest of the world. Canada and the United Kingdom, which have liberalized their markets, are exceptions to the general pattern of tight protection. Source: Stowsky, op. cit., p. 62.

neering staff fivefold and reducing its dependence on production labor.[88] Parts of its manufacturing process, however, are still labor-intensive. In 1983, Comdial moved its manufacturing operation from Charlottesville, Virginia, to Shenandoah, 40 miles away. Even this short move allowed the company to reduce its labor bill while keeping close communication with Charlottesville headquarters. For several reasons, Comdial chose not to move production to the Far East. According to a company representative, quality of Far Eastern handsets is improving and production costs are lower, but the advantage is not yet great enough to justify paying the tariff on Asian imports. Moreover, customer requirements for quick servicing and upgrading of equipment also weigh against Far Eastern producers, for it would take too long to send equipment back to Asia for repairs and upgrades. However, Comdial does buy raw materials and standardized electronic components—e.g., integrated circuits, capacitors, and resistors—from offshore producers, because the prices are lower than the cost of Comdial's manufacturing these components itself.[89]

Another illustration of the kinds of decisions producers of telecommunication equipment face in locating manufacturing facilities is in PBX manufacture. PBXs are normally tailored to fit customer specifications, and most customers for U.S. firms are in the United States. Although price competition is important, competitive success in the PBX market depends more on product flexibility, reliability, and features. Software, written to fit the specifications of individual customers, has become a significant part of the PBX. As a result, when customized features are added, producers almost always locate final assembly close to the customer. Even foreign manufacturers have set up final assembly plants in the United States to serve their American customers. However, like high-quality handsets, PBXs incorporate standardized parts that can be obtained from foreign producers at lower costs. One manufacturer, Rolm, buys many of these commodity products[90] from outside vendors. Another PBX manufacturer, Mitel of Canada, makes its custom integrated circuits in Vermont, assembles printed circuit boards in Puerto Rico, and does final assembly for the U.S. market in Florida.

The growth in markets for high-quality, flexible telecommunication equipment and the pressures for locating production close to the customer should mean continued employment growth in the United States. However, as products become more standardized and price competition intensifies, the pressures to lower manufacturing costs will increase. The pressure will be felt most by low-skilled production workers. Between 1977 and late 1985, with intensifying competition in telecommunication equipment, the proportion of production workers in the telephone and telegraph apparatus equipment industry dropped from 68 to less than 62 percent; the absolute number of production jobs fell by over 16,000. In 1983, the telecommunication industry experienced its first trade deficit. The largest portion of the deficit was in CPE, where most imports are low-end, standardized handsets in which labor costs are a significant factor in the ability to compete internationally. Even though the telecommunication industry will continue to employ larger numbers of people, most of them are, and probably will continue to be, well educated and highly skilled. In some standardized equipment, the effects of low-wage foreign competition can already be seen. AT&T recently announced that it planned to lay off 24,000 employees from its computer and telecommunication equipment work force in order to cut costs.[91] Over 1,800 of the layoffs came from a plant in Shreveport, Louisiana, where AT&T manufactured telephone handsets. One of AT&T's decisions was to move production of residential handsets (telephones) to Singapore, which will almost certainly displace many workers. Although AT&T has announced that it will try to find new jobs in AT&T for

[88] Since November 1983, Comdial has laid off about 700 production workers, partly because of automation and partly because of soft markets.

[89] Stowsky, op. cit., pp. 51-53.

[90] Integrated circuits, printed circuit boards, metal parts and castings, and commodity peripheral equipment.

[91] Michael Schrage, "AT&T Announces Largest Layoff in Its History," *Washington Post*, Aug. 22, 1985.

its laid-off workers, it is unlikely that all of the 24,000 people AT&T is laying off, or even all of the 1,877 workers laid off from the Shreveport plant, can be placed. The layoffs have hit managers and professionals as well as production workers, but apparently nearly 69 percent of the workers AT&T laid off were production workers, while the average for the overall industry is less than 62 percent. The telecommunications industry as a whole should continue to create many new jobs, mostly for skilled, professional people; opportunities for low-skilled or semiskilled production workers will be much more limited.

POLICY RESPONSES TO EMPLOYMENT DECLINE: THE PROTECTION DEBATE

The combination of high unemployment rates and record trade deficits has brought trade protection debates into new prominence. Many companies and workers hurt by foreign competition have brought allegations of unfair trade practices and petitioned for protection. In some cases, protection has been given, but generally there has been more pressure for protection than action in the 1970s and 1980s.[92] Part of the reason is that action is slow: in most cases, it takes years to settle questions regarding the fairness of foreign competition. Even after the Federal Government makes decisions, according to the terms of U.S. trade treaties, on the fairness of foreign competition and the degree of injury to U.S. producers, debate and pressure often continue.

Protection is almost always viewed by policymakers as a last resort to the problems of employment decline and displacement in industries pressed by rising imports. Often, the motives are simply to prevent massive job losses; in industries like apparel, without protection, a great many American workers would have been displaced rapidly. In other cases, protection may be advocated to give industries facing stiff international competition time to make the necessary adjustments, including gradual reduction of the work force so as to minimize displacement. Recent protection for the motor vehicle and steel industries are examples of this strategy.[93] Finally, some have advocated "infant industry" protection, to give new industries time to develop products, make production processes efficient, and develop markets without the additional strains imposed by foreign competition. This approach has been tried in other countries, but not in the United States. Preservation of jobs and minimizing displacement are often the arguments made most strongly by those seeking protection. Ironically, some of the most persuasive arguments *against* protection also are employment-related. The next section discusses the advantages of protection, in terms of employment; the section following discusses costs of protection.

The Effect of Protection on Employment: Positive Aspects

The strong commitment of the United States to free trade is supported by mainstream economic theory, which states that everybody is better off under free trade conditions. Theory states that, if each country produces and exports those products which it has an advantage in producing, and imports products where its disadvantages are greatest, consumers in all countries have access to a wider variety of cheaper products. As a country's advantage shifts—when some industries lose their advan-

[92] William R. Cline (cd.), *Trade Policy in the 1980s* (Washington, DC: Institute for International Economics, 1983), p. 8.

[93] In their petition for restraints on imports of steel in January 1984, the United Steelworkers of America and Bethlehem Steel cited the need for "breathing space" to allow the industry time to modernize. The subsequent Presidential decision in September 1984 provided some protection, and directed the International Trade Commission to monitor the efforts of the industry to modernize. According to one analysis, the steel industry has met the requirements, stepping up its investments in new plant and equipment. Sources: American Iron and Steel Institute, "Steel Industry Continues Long History of Production Process Innovation, " excerpts from testimony of David J. Cantor, Congressional Research Service, Aug. 29, 1985; and U.S. Department of Commerce, 1985 U.S. *Industrial Outlook*, op. cit., p. 19-20.

tage and others grow stronger—labor and capital leave some industries and enter others. For example, as the U.S. apparel and television industries lose their advantage, labor and capital are shifted out of these industries and into others where the United States is more competitive. This process of adjustment is a normal part of a dynamic economy, and economic theory usually assumes that there is ample time for the process to work.[94] When this is true, it is easy to see the advantages of free trade.

However, theory also assumes that capital and labor are fully used—in the case of labor, this means that there is no structural unemployment—and that they can readily shift from one sector to another, Both assumptions have faults. unemployment has been rising in all industrialized countries; in the United States, the unemployment rate is at a historic high for a period of prosperity (see ch. 4). There are not enough new jobs to go around, and some people displaced from declining industries are unable to find new ones readily. Moreover, much of the skill and knowledge that people use in their jobs are not suitable for new jobs; the same is true of capital equipment. The capital equipment used in the apparel industry, for example, is not very adaptable to more competitive industries like computers and aircraft, and neither are many of the workers. When there is plenty of time for adjustment, capital equipment can be depreciated, and employment can be reduced through attrition. When there is not, as is often the case, the transfers are more painful; people are displaced, and industry-specific skills and capital have no value.[95] The more abrupt the transition, the greater the likelihood that workers will face prolonged periods of involuntary unemployment and other costs of displacement, such as taking a new job at much reduced pay.

Protection can help to reduce the costs of adjustment by prolonging the period of transition, making it possible to reduce the work force through attrition rather than layoffs, An example is the apparel industry, which has had some form of negotiated protection—though not in all products, or from all countries—for nearly three decades. Since 1974, the Multifiber Arrangement (MFA) has provided the basis for managed growth of apparel and textile trade. The MFA allows signatories (originally, there were 50) to negotiate bilateral agreements establishing export quotas in cotton, wool, and manmade fibers.[96] The United States has such agreements with 28 countries, as well as agreements with 8 countries which did not sign the MFA.[97] These agreements were not intended to stifle imports, but to permit them to rise steadily, without great disruption of domestic industries. However, the rate of growth in U.S. demand for apparel has been lower than the rate of import growth under MFA, with resulting disruptions in the U.S. apparel industry. Yet without the MFA protection, employment losses and displacement would likely have been, as one analysis puts it, "massive."[98] The MFA is due to expire in mid-1986, but legislation establishing new protection in textiles and apparel is moving through Congress as this report is being written. If MFA is not replaced with some kind of protection (which it probably will be) job losses could reach 570,000 by 1990.[99] protection certainly does not guarantee employment stability, and apparel employment is expected to decline with or without it. However, slow erosion of employment is more humane, from the standpoint of workers, than rapid job loss.

Another industry in which job losses were slowed by protection is the motor vehicle industry. In the late 1970s, Japanese automobiles were making rapid inroads into the U.S. market; from 1978 to 1981, the Japanese share of U.S. car sales accelerated from 12.7 to 21.4 percent, while the U.S. share fell from 82 to 73.1 percent. Employment dropped by over 216,000, with a loss of almost 202,000 jobs between 1979

[94] H. Peter Gray, *Free Trade or Protection? A Pragmatic Analysis* (London: The Macmillan Press Ltd., 1985, in press), p. 3.
[95] Ibid., p. 4.
[96] Jeffrey S. Arpan, Jose de la Terre, and Brian Toyne, *The U.S. Apparel Industry: international Challenge, Domestic Response*, Research Monograph No. 88 (Atlanta: Georgia State University, 1982), p. 116.
[97] U.S. Department of Commerce, 1985 *U.S. Industrial Outlook*, op. cit., p. 45-2.
[98] Nehmer and Love, op. cit., p. 232.
[99] Estimate cited in Parsons, Op. cit., p. 40.

and 1980 alone. In 1980, the Ford Motor Co. and the United Auto workers petitioned for import relief, which was subsequently denied by the International Trade Commission. However, pressure for protection was growing; in 1981, support was increasing for congressional proposals to restrict Japanese exports of motor vehicles. On May 1, 1981, the Japanese Ministry of Industry and Trade (MITI) announced a voluntary restraint agreement (VRA) on exports of motor vehicles to America, limiting Japanese exports to 1.76 million cars, passenger vans, and utility vehicles. In late 1983, the agreement was extended until March 31, 1985, at a level of 1.94 million units.[100]

There is wide disagreement on the number of automobile industry jobs protected by the VRA. A number of assumptions must be made in order to estimate the employment impacts, including assumptions on how many Japanese automobiles would have entered the U.S. market without protection, how many additional American cars were made because of the limitations on imports, and how many American workers were employed to make the additional American cars. Estimates range from 26,200 to 133,000 jobs saved in the auto industry; assumptions on the rate of Japanese import penetration probably accounts for most of the difference.[101]

The higher estimate represents an upper bound of the number of jobs protected in the automobile industry alone, assuming that Japanese automobiles would have captured about 39 percent of the U.S. market without the VRA,[102] and that this would have meant a reduction of about 1.7 million domestically made automobiles. The lower estimates are based on conservative assumptions about the eventual share of Japanese automobiles. For example, the U.S. International Trade Commission estimate that the VRA averted losses of 44,100 jobs in automobiles assumed that the growth trends of 1967 to 1980 would have continued during the time the VRA was in effect. This estimate took little account of the rapid acceleration in the Japanese share in the late l970s.

An estimate from the International Trade Administration projected Japanese market penetration on the basis of two different assumptions. Under very conservative assumptions, the Japanese share was projected to grow at 0.6 percent per year without the VRA, or at the same rate that it grew during the first 2 years of the VRA—meaning, in effect, that the VRA had no impact on the Japanese share. A more realistic estimate was that the share would have increased by 3 percentage points per year, comparable to the growth between April 1979 and March 1981. The second estimate yielded an employment gain (or avoidance of loss) of nearly 62,000 jobs in the automobile industry in the last 2 years of the VRA.[103] ITA also estimated that an additional 43,000 jobs were protected in supplier industries, such as steel, rubber, and glass, bringing its estimate of protected employment to 105,000. Neither ITA nor any other analysis has attempted to measure tertiary impacts—i.e., outside jobs generated in stores, housing construction, and other economic activity by employment in the automobile or supplier industries. If tertiary impacts are counted, jobs protected by the VRA might number well over 105,000.

In addition to preserving some jobs in American industries, or stretching out employment losses, protection–or the possibility of protection—may also encourage some foreign companies to locate manufacturing facilities in the United States. There is little question that protection helped stimulate recent Japanese in-

[100] These limits were exceeded every year of the VRA. Between 1981 and 1984, the original period of the VRA, imports ranged from 1.78 million to 1.84 million units. During the last year of the VRA, from Apr. 1, 1984, to Mar. 31, 1985, 2.31 million automobiles were imported from Japan.

[101] Scott, op. cit., pp. 27-33, The lower number was made by Robert Crandall of the Brookings Institution, and covers only the first 2 years of the agreement.

[102] The 39 percent share is based on an estimate that the Japanese could have captured almost all the subcompact market segment, half the compact segment, and about 3.5 percent of other market segments.

[103] According to ITA, the VRA did not seriously limit Japanese car sales in the United States until the second quarter of 1983, largely due to depressed markets during the recessions of 1980 and 1982. Source: U.S. Department of Commerce, International Trade Administration, "Analysis of the Japanese Auto Export Restraint," Executive Summary, mimeo, pp. 5-9.

vestments in television, automobile, and truck production in the United States. Locating manufacturing facilities here has two advantages for the Japanese: it helps to soften pressures for protection, and it allows Japanese producers to gain larger shares of the U.S. market than they could with exports alone.

The employment gains from foreign producers locating in the United States should not be overstated. In 1983, Japanese automakers in the United States employed fewer than **30,000** American workers, or 4 percent of industry employment.[104] As the number of Japanese assembly plants in America and U.S.-based joint ventures with Japanese automakers increase, the proportion should grow. By 1990, Japanese automakers are expected to have the capacity to make nearly 1 million autos per year in the United States.[105] However, foreign firms locating production facilities in the United States do not create as many indirect jobs as do American firms. Japanese automakers and television manufacturers buy more of their parts from overseas than do American manufacturers. For example, the New United Motor Manufacturing, Inc. (NUMMI) joint venture between General Motors and Toyota, producing Chevrolet Novas in Fremont, California, will buy 70 percent of its parts—including major subassemblies such as engines and transmissions—from Japan, and only 30 percent from the United States.[106] Typically, the proportion of domestically produced parts is much higher for American firms.[107]

The Effect of Protection on Employment: Costs

Although protection can be effective in preserving jobs for a time and allowing orderly employment declines, the costs can be high. Protection raises the price of the protected product to consumers, either by adding a tariff to the price consumers pay or by limiting the number of items imported. When import prices go up, domestic manufacturers also increase their prices. Estimates of the increased cost to consumers, together with estimates of the numbers of jobs preserved, are the basis for the often-quoted figures on "cost per job saved." The figures are usually quite high; for example, the International Trade Commission (ITC) estimates that, from 1981 to 1984, the VRA increased the prices of domestic and imported automobiles by $15.7 billion (about **$800** per car), and saved 44,100 jobs in the auto industry. The numbers of jobs saved in supplier industries was not estimated because, according to ITC, "it is believed that estimates of these additional employment effects would not be particularly useful."[108] Dividing the ITC estimates of costs and jobs saved gives *a* figure of nearly $357,000 per job over 3 years. Another estimate, by Robert W. Crandall of the Brookings Institution, concludes that the VRA cost American consumers about $160,000 per job in 1983.[109] The International Trade Administration estimated that the VRA cost consumers about $10.1 billion between April 1983 and March 1985. Costs per job saved over these 2 years were, therefore, about $164,000 to $96,000 per job, depending on whether indirect job gains are counted.[110]

These estimates cannot be taken at face value. First, only one—that of ITA—counts the number of jobs preserved in supplier industries, and none of the estimates includes tertiary effects. In that sense, all the estimates overstate the costs per job saved. In some of the estimates (especially that of ITC) the assumptions on growth of the Japanese share of

[104] Total employment in motor vehicles and equipment was 753,700 in 1983, of which 723,000 were employed by Ford, General Motors, Chrysler, AMC, and Volkswagen. Sources: U.S. Department of Commerce, *The U.S. Automobile Industry*, op. cit., p. 19; and U.S. Department of Labor, Bureau of Labor Statistics, ***Supplement to Employment and Earnings,*** June 1985.

[106] Warren Brown, "Chrysler, Mitsubishi Set Joint U.S. Venture," *The Washington Post*, Oct. 7, 1985, p. A14.

[108] Daniel J. Schroeter, "Joint Venture Unwrapped, Nova Debuts at Detroit's St. Regis, " *Automotive Business,* June 17, 1985, p. 1.

[107] John Hartmann, Automotive Industry Analyst, U.S. Department of Commerce, International Trade Administration, personal communication, Oct. 8, 1985.

[108] U.S. International Trade Commission, "A Review of Recent Developments in the U.S. Automobile Industry Including an Assessment of the Japanese Voluntary Restraint Agreements, " USITC Publication 1648, February 1985, p. 41. No explanation is given for the uselessness of estimates of related employment.

[109] Robert W. Crandall, "Import Quotas and the Automobile Industry: The Costs of Protectionism, " ***The Brookings Review, vol. 2, No. 4,*** Summer 1984, p. 16. Crandall estimated that the VRA had saved 26,200 jobs, and cost consumers $4.3 billion, not including "additional losses in consumer welfare. "

[110] ITA estimated that both the consumer cost of the VRA and the jobs protected were modest until early 1983.

the U.S. auto market are so conservative as to be unrealistic. Moreover, none of the estimates includes any analysis of possible long-term effects of protection on competitiveness. If the long-term effect of the VRA turns out to be improved productivity, product design, and product performance in the U.S. auto industry, the costs of protection may turn out to be temporary, and may be paid back in the years to come. Over the short run, however, it is clear that the VRA cost tens of thousands of dollars per year per job saved.

Protection can give industries the time they need to improve their competitiveness. Temporary protection, for example, gave the automobile industry a "breathing space" to improve productivity and product design and performance; eventually, these changes may help to preserve more jobs than if the pressure from imports in the late 1970s had continued into the early 1980s. The story is similar in textiles. The industry has invested heavily in new plant and equipment under the Multifiber Arrangement, raising productivity and competitiveness particularly in manmade fibers. However, protection does blunt the competition, and may thereby remove some of the incentive for beleaguered industries to take the steps needed to compete.

Another of the employment effects of protection that is often overlooked is the shift of competition from protected to unprotected products or industries. For example, some argue that protection of U.S. natural fiber markets resulted in foreigners shifting more rapidly to production of manmade fibers. The VRA in automobiles caused Japanese producers to fill their quotas with more expensive, profitable cars which competed in the luxury-car market previously dominated by American and European cars. Bilateral agreements limiting exports of one country can also encourage the formation of industries in countries without quota agreements. Early quota arrangements in textiles and apparel applied only to Japan, leaving the door open to other countries wishing to export cotton to the United States; Hong Kong was the first to do so. In the end, the result was pressure for more protectionist arrangements with other countries; the single country agreement did not effectively limit imports.[111]

Employment can be adversely affected in industries other than those protected, as foreign countries retaliate. For example, threats of protection against natural fibers from China have evoked threats of countermeasures to limit Chinese purchases of American agricultural products. Since agricultural products figure heavily in U.S. exports, retaliatory protection affects agriculture disproportionately.

Increasing pressure for protection, as more industries and countries respond to existing arrangements, threatens more than just a few workers or industries. If one country limits its market to foreign producers, exporting countries usually seek new markets, putting unprotected markets at greater risk. The wider protection spreads, the greater the likelihood that economies which depend on trade will slump, with serious repercussions for overall industrial performance and employment.

Even if long-term effects are included, and all primary, secondary, and tertiary jobs preserved by protection are counted, protection is expensive. It costs consumers money, and may lead to more pressure for protection. The alternatives, when industrial decline and job loss occur as a result of international competition, are for the economy to create enough new jobs to provide for displaced workers as well as other job seekers, and for government programs to provide adjustment assistance to displaced workers having trouble finding jobs comparable to those they have lost.

The first alternative—creating enough new jobs—has proven an unattainable goal for most of the last four decades throughout the industrialized world. Government policies to stimulate job creation cover a broad spectrum. They include macroeconomic policies aimed at stimulating growth of the whole economy, trade policies which protect domestic markets or attempt to open foreign markets to domes-

[111] Aggarwal and Haggard, op. cit., p. 265.

tically produced goods, subsidies to industries or workers to keep existing workers employed, and jobs programs for people with particular disadvantages in the labor market. Some countries employ policies that are termed job creation policies that are really more policies designed to reduce the number of people counted as unemployed, While most industrial countries have tried policies such as these to stimulate employment, no country can legitimately claim to have succeeded, Unemployment rates have been rising throughout the world; one symptom of the depth of the current problem is that the United States, with its historically high unemployment rates of 7 to 7.5 percent in prosperous 1984 and 1985, is viewed by many European analysts as a place where answers to high unemployment problems are to be found. This comes at a time when U.S. policymakers have begun, again, to grapple with the problem of high unemployment rates.

Adjustment assistance is often viewed as equitable compensation to workers who bear a disproportionate share of the burden of policies to promote free trade. The United States has two adjustment assistance programs: Trade Adjustment Assistance, for workers who have lost jobs due to trade; and Title III of the Job Training Partnership Act, for all displaced workers. These programs, the services they provide, and their performance, are the subject of chapters 5 and 6.