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# 5 International Competition in the Products of U.S. Basic Industries

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## *1. Barry Eichengreen*

Capitalism, as Joseph Schumpeter defined it, is a process of creative destruction. In a market economy, one should expect new products, processes, and even producers to supplant their predecessors in the normal course of events. Yet Schumpeter's metaphor provides little comfort to employees and shareholders of basic industries in the United States, all of which are suffering the effects of foreign competition. The American steel industry is the most dramatic case in point: between 1979 and 1985, the number of wage employees there declined from 342,000 to 151,000, while the percentage rate of return on stockholders' equity fell from 5.8 to −18.5 (American Iron and Steel Institute 1986). Recent trends in the automobile, textile, and apparel industries, while somewhat less alarming, similarly convey an impression of U.S. basic industries in steady and perhaps irreversible decline.

In this paper, I first document the dramatic fall in the shares of U.S. basic industries in domestic employment and global production. I then consider explanations for these industries' relative—and, in some instances, absolute—decline. Those explanations fall into two categories: domestic and international. Domestic explanations focus on the decisions of three sets of actors: management, labor, and government. Management is blamed for ill-advised decisions (O'Boyle 1983), labor for high wage costs (Kreinin 1984), government for harmful tax, trade, and macroeconomic policies (Bluestone and Harrison 1982). International explanations focus on the tendency of the product cycle to continually shift the production of established products and standardized processes to newly industrializing countries (due to what Alexander Gerschenkron called, in now unfashionable parlance, the advantages of "economic backwardness").[1] Late industrializers, it is argued, while lacking the infrastructure to be in the forefront of innovation, have the advantage of low labor and material costs when it comes to the production of established goods using standardized technologies.

The problem that plagues this search for culprits should be familiar to fans of the board game Clue. As in Clue, the problem is one of too many suspects, and some method is required to eliminate candidates. One of the findings of section 5.1 is a striking contrast in the recent fortunes of the American steel industry on the one hand and the automotive and textile industries on the other—steel continuing to spiral downward, automobiles and textiles showing signs of greater stability. For an explanation of recent difficulties in the basic industries to be convincing, it must be capable of accounting for this contrast. Much of the analysis that follows is organized around the contrasting experiences of these industries.

After documenting recent trends in the U.S. basic industries, I decompose those trends into components associated with the rise of competing supplies, the growth of demand, and changes in competitiveness. First, I consider the rise of competing supplies, contrasting product cycle explanations that view shifts in the location of basic industries as a natural consequence of the international diffusion of standardized technologies with explanations that emphasize the influence of public policy. Evidence on the diffusion of established technologies, while confirming the importance of the product cycle, suggests also that continued innovation in the United States can preserve important segments of the U.S. basic industries. Next, I examine global trends in demand for the products of basic industries. Because there is a strong correlation between the intensity of demand-side pressures and the severity of the problems faced by the basic industries, I conclude that demand-side factors have played an important role in recent trends. Finally, I analyze factors influencing the competitiveness of basic industries in the United States and abroad, ranging from labor costs, work conditions, management strategies, and investment decisions to the macro, trade, and tax policies of governments.

A central message of this paper is that monocasual explanations for the recent difficulties of U.S. basic industries conceal more than they reveal. Those difficulties reflect both the efficient interplay of market forces (driven largely by economic development abroad) and inefficiencies resulting from labor, management, and government decisions that have proven ill advised in light of subsequent events. Insofar as product-cycle-based shifts in the international pattern of comparative advantage have contributed to recent difficulties, some decline in the

U.S. basic industries is both inevitable—barring measures to isolate the U.S. market from international competition—and justifiable on efficiency grounds. Insofar as labor, management, and government decisions share responsibility, the recent difficulties of U.S. basic industries may be at least partially reversible.

To the extent that these factors vary in importance across industries—indeed across segments of the same industry—it is misleading to offer an undifferentiated assessment of the prospects of the basic industries in the United States. Much depends on the facility with which different segments of those industries adopt new technologies emanating from the high-tech sector. The steel industry, for example, is increasingly bifurcated into a declining segment dominated by large-scale integrated works and a more profitable, technologically progressive segment dominated by minimills. Similarly, the application of new technologies holds out more promise for the survival and prosperity of some segments of the U.S. automobile and textile industries than for others. In consequence, it is increasingly difficult to analyze the basic industries as a monolithic bloc and even to distinguish them clearly from the high-tech sector.

## 5.1 Recent Trends in U.S. Basic Industries

It is not immediately clear which industries should be defined as basic. Basic industries are typically thought to be those that traditionally loomed large in U.S. industrial production and have fallen recently on hard times: iron and steel, textiles and apparel, and motor vehicles. These industries are lumped together more for their long-standing importance to the U.S. economy, their recent difficulties, and their regional concentration than for their innate economic characteristics. Technically, basic industries are those situated far upstream in the input-output table. Their products serve as inputs into production in a variety of other sectors. They are distinguished by the age of the industry and of the enterprise. Their technology is relatively standardized. Production is often capital-intensive, and there exist barriers to entry. Textiles, apparel, motor vehicles, and steel satisfy these criteria to differing extents. While the steel industry is relatively far upstream, aged, and capital-intensive, the speed with which its technology evolves resembles the high-tech industries. The textile and apparel industries, while relatively old and heavily dependent on standardized technologies, are not situated so far upstream (in the sense that they rely as much on consumer as producer goods markets), are labor- rather than capital-intensive, and until recently have exhibited few entry barriers. Despite the difficulties posed by the terminology, in this paper I adopt the popular definition of basic industries and focus on steel, motor vehicles, textiles, and apparel.

Figures 5.1–5.3 show trends and fluctuations in output, employment, and import penetration in these industries since the 1973 peak.[2] In figure 5.1, the cyclical volatility of steel and motor vehicle output contrasts with the relative stability of textile and apparel production. While textile and apparel production showed no trend through 1979, output in the two industries fell by 10 percent and 20 percent, respectively, between 1979 and 1985. In contrast, both steel and auto production fell sharply during the 1973–75 and 1979–81 recessions. While vehicle production tended to make up lost ground following each cyclical downturn, steel output appears to have ratcheted down to permanently lower levels. That ratchet effect was twice as severe in the 1979–82 recession as in 1973–75. Whereas automobile production had fully recovered by 1977, steel production remained 17 percent below 1973 levels. Similarly, whereas vehicle production had recovered to within 5 percent of 1979 levels by 1985, steel production remained 35 percent below these levels.

Trends in employment, in figure 5.2, mirror the trends in output in figure 5.1.[3] Textile and apparel employment declined gradually over the period (as it has since World War II), reflecting the loss of more than two hundred thousand jobs between 1973 and 1985 (amounting to nearly 10 percent of industry employment at the beginning of the period). Employment in steel moved in a similar manner until 1979, after which it declined sharply; by 1985, employment in the steel industry was barely 40 percent of 1973 levels. Employment in the motor vehicle and equipment industries, in contrast, has been dominated not by a sharp downward trend but by pronounced cyclical fluctuations, although, as foreign-based companies establish and increase production in the United States, the share of the four U.S.-based companies in U.S. vehicle employment continues to decline.

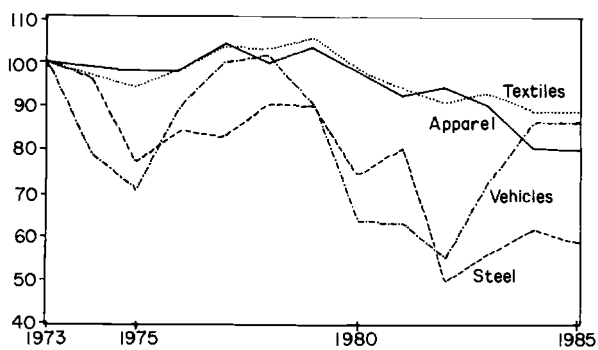


**Fig. 5.1** Trends in U.S. basic industry output (1973 = 100).

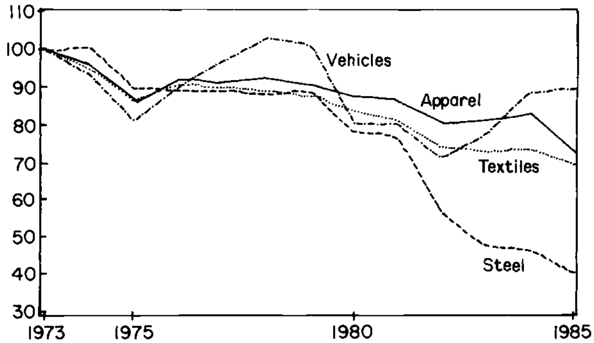


**Fig. 5.2** Trends in U.S. basic industry employment (1973 = 100).

Together, changes in output and employment provide a perspective on industry adjustment. Comparing figures 5.1 and 5.2, one finds that only in motor vehicles did the percentage change in output significantly exceed the percentage change in employment between 1973 and 1985. In steel, employment has fallen considerably more than output, especially over the second half of the period when low-productivity plants were closed and a number of products with high labor requirements were abandoned. In textiles and apparel, employment has fallen slightly more than output, especially over the first half of the period. In both of these industries, the decline in labor-output ratios reflects substitution of capital for labor designed to increase productivity. In contrast, the maintenance of relatively high levels of employment in motor vehicles, especially between 1973 and 1979, reflects anticipations of producers that industry demand would soon recover.[4]

Figure 5.3 displays import penetration ratios (shares of domestic sales or apparent consumption accounted for by imports).[5] The reason for concern over imports is obvious. In all three industries, the share of the domestic market captured by imports has risen dramatically since the early 1970s—from approximately 15 percent to fully 25 percent in automobiles and steel and to nearly 35 percent in textiles. The timing of the import surge varies among industries, however, and there is no direct correspondence between movements in the import penetration ratio and trends in output and employment. In textiles and steel, the surge in import penetration began in 1980–81. In the case of textiles it proceeded steadily, while in the case of steel it was interrupted in 1983 and again in 1985, coincident with the implementation of two sets of voluntary export restraints. These two interruptions to the rise in steel imports fully account for the lower import penetration ratio in steel than in textiles in 1985. The case of automobiles is very different. The surge in import penetration began earlier, in 1978–79, but deceler-

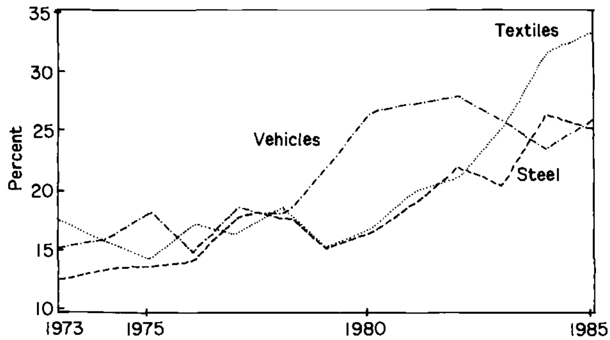


**Fig. 5.3** U.S. basic industry import penetration ratios, 1973–85.

ated, leveled off, and ultimately declined in the early 1980s, again coinciding with the adoption of voluntary export restraints. Reinforcing the impression conveyed by their output and employment experiences, the import penetration performance of the automobile industry looks very different from that of textiles and steel.

Tables 5.1–5.7 provide an international perspective on trends in basic industry production. Three features stand out from tables 5.1–5.3 concerned with metals production. First, there has been a dramatic shift in the locus of production from developed to developing countries. The same pattern is evident in iron and steel, nonferrous metals and metal products alike, as if common market forces underlie recent trends. Second, trends in production in centrally planned economies (dominated in the 1980s by China and Romania) have tended to mirror trends in the developing world and hence to accentuate the international shift in the locus of production. Third, U.S. output has been sustained most successfully in the more technologically advanced stages of production.

As illustrated by the contrast between the 8.5 percent annual rate of growth of iron and steel production in developing countries and the 2.5 percent annual rate of decline in developed nations, the United States is not alone among developed countries in suffering a decline in iron and steel output (table 5.1). Even Japanese output fell between 1974 and 1983, a trend that has accelerated recently as Japanese finished steel production fell by 6.3 percent between the first half of 1985 and the first half of 1986, Japanese exports fell by 15.5 percent, and Japanese imports (notably from South Korea, Brazil, South Africa, and Taiwan) rose by 51.4 percent. But the rate of decline of the U.S. share of world output is exceptional: the U.S. share of total world raw steel production fell from 17 percent in 1976 to 11 percent in 1985 (calculated from American Iron and Steel Institute 1986).

**Table 5.1** **Changes in Global Iron and Steel Production, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed Countries | 0.69 | −16.79 | 7.22 | −2.01 | 5.10 | 5.02 | −7.24 | −0.81 | −16.40 | −0.09 | −1.10 | −2.80 | −2.53 |
| U.S. | −2.50 | −20.00 | 8.65 | −0.88 | 8.93 | 0.00 | −18.03 | 8.00 | −37.96 | 14.93 | −1.98 | −5.98 | −3.89 |
| Canada | 5.71 | −10.00 | −1.11 | 1.12 | 10.00 | 9.09 | −7.41 | 0.00 | −22.00 | 5.13 | 0.93 | −1.62 | −0.95 |
| Japan | −2.31 | −13.98 | 10.00 | −2.27 | 3.49 | 10.11 | 2.04 | −6.00 | −3.19 | −2.20 | 0.14 | −0.23 | −0.43 |
| EEC | 3.12 | −17.83 | 6.98 | −3.26 | 2.69 | 5.82 | −5.33 | −3.39 | −9.75 | −3.49 | −1.40 | −2.33 | −2.44 |
| Non-EEC | 11.60 | −8.26 | −0.44 | −1.98 | 4.92 | 8.59 | −0.04 | −2.26 | 0.11 | 3.64 | 1.52 | 1.36 | 1.59 |
| Developing Countries | −6.63 | 31.93 | 15.12 | 7.74 | 7.63 | 16.11 | 6.63 | 7.13 | −2.41 | 3.27 | 10.71 | 9.25 | 8.65 |
| Centrally planned economies | 6.73 | 6.35 | 3.83 | 5.67 | 5.55 | 0.62 | 0.57 | −9.24 | −2.50 | 4.17 | 2.56 | 2.00 | 2.21 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously. In "developed countries," 1983 excludes Australia. In "developing countries," (1) 1974 excludes Mexico and Hong Kong; (2) 1975 excludes Hong Kong; (3) 1978 excludes the Philippines; (4) 1982 excludes Colombia, Dominican Republic, Philippines, and Sri Lanka; and (5) 1983 excludes Colombia, El Salvador, Peru, Dominican Republic, Philippines, Sri Lanka, Ethiopia, Ivory Coast, and Kenya.

**Table 5.2** **Changes in Global Nonferrous Metals Production, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | 3.90 | −19.74 | 15.83 | 2.82 | 4.26 | 2.64 | −2.40 | −2.44 | −8.68 | 2.47 | 0.61 | −0.42 | −0.13 |
| U.S. | −10.87 | −19.00 | 27.16 | 0.97 | 5.77 | 2.73 | −11.50 | 2.00 | −18.63 | 10.84 | 0.76 | −1.99 | −1.05 |
| Canada | 12.50 | −15.00 | −3.53 | 15.85 | 0.00 | −7.37 | 13.64 | 1.00 | −16.83 | 15.48 | 2.14 | 0.03 | 1.57 |
| Japan | 9.30 | −29.00 | 19.72 | 4.71 | 7.87 | 4.17 | 0.00 | −4.00 | −3.12 | 3.23 | 1.60 | 1.07 | 1.29 |
| EEC | 8.80 | −17.76 | 12.29 | 2.37 | 1.75 | 1.89 | 1.61 | −5.61 | −3.09 | 0.81 | 0.67 | 0.25 | 0.30 |
| Non-EEC | 20.25 | −14.30 | 5.81 | 2.39 | 1.05 | 5.26 | 1.26 | −4.23 | 0.68 | 6.47 | 2.19 | 2.02 | 2.46 |
| Developing countries | 14.61 | −0.87 | 25.50 | 30.39 | 22.78 | 45.28 | 44.61 | 27.72 | 18.10 | −24.69 | 26.25 | 25.35 | 20.32 |
| Centrally planned economies | 12.34 | 9.89 | 5.88 | 4.97 | 5.12 | 0.20 | −0.28 | −5.31 | 1.75 | 4.04 | 4.10 | 3.84 | 3.85 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously. In "developed countries," 1983 excludes Australia. In "developing countries," (1) 1974 and 1975 exclude Hong Kong; (2) 1976 and 1978 exclude the Philippines; (3) 1982 excludes Bolivia, the Philippines, and Tunisia; (4) 1983 excludes all listed countries except Chile, India, Korea Republic, Singapore, and Mexico.

Trends in nonferrous metals (tin, copper, etc.), in table 5.2, display a similar pattern, with production by developing countries rising dramatically and that by developed nations stagnating. Of the country groups considered, only in the United States did production fall absolutely, however. Even that decline, at a rate of one percent per annum, is small compared to the experience of iron and steel.

Table 5.3 shows that the United States maintained its position relatively well in the more advanced stages of metal production and fabrication. Despite a decline in developed country output and a rise in developing country production not unlike those apparent in table 5.1, U.S. output remained steady over the 1974–83 period, in contrast to the less impressive performance of the Canadian and European industries. U.S. performance in metal fabrication in large part reflects the bouyant state of domestic demand, since it occurred despite a steady deterioration in the trade balance in steel-containing goods.

Trends in textiles, apparel, and footwear, in tables 5.4–5.6, are more heterogeneous. As in metals, production tended to shift from developed to developing and centrally planned economies over the course of the decade. In comparison to metals, however, these shifts were small, and in both textile and clothing the growth of output by centrally planned economies exceeded that by developing nations. Compared to steel there has also been more variation in output trends within the developed world. In textiles, for example, North American output rose slightly, while production elsewhere in the OECD fell. In clothing, in contrast, U.S. and Japanese output contracted, while production elsewhere in the OECD increased. Footwear production fell sharply in the United States and the EEC, while remaining stable in Japan and rising elsewhere in the OECD. The heterogeneity of response suggests that variations in trade and industrial policies (in nonmarket economies, planning) played an even larger role in textile trade and production than in iron and steel.

The experience of the global motor vehicle industry (table 5.7) contrasts with that of both textiles and steel. Production by developed countries grew respectably over the period, increasing most rapidly in Japan, of course, but expanding also in non-EEC Europe (notably Scandinavia), the United States and Canada. Only in the EEC did vehicle production actually decline. The astounding rates of growth of output in developing countries reflect the low levels from which production started in the early 1970s and the takeoff of automobile industries in Brazil, Mexico, South Korea, and Taiwan.

## 5.2 Growth of Competing Supplies

As the preceding analysis makes clear, a leading influence over the state of the U.S. basic industries has been the growth of competing

**Table 5.3** **Changes in Global Production of Metal Products, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | −0.55 | −10.76 | 11.60 | 5.75 | 5.95 | 5.74 | −1.80 | 0.01 | −20.57 | −6.14 | 1.93 | −0.51 | −1.08 |
| U.S. | −0.47 | −11.38 | 12.20 | 6.52 | 8.16 | 4.72 | −9.91 | 2.00 | −15.69 | 4.65 | 1.42 | −0.48 | 0.04 |
| Canada | 8.41 | −9.28 | 6.82 | −2.13 | 3.26 | 7.37 | −1.96 | 0.00 | −17.00 | −3.61 | 1.56 | −0.50 | −0.81 |
| Japan | −7.97 | −18.89 | 17.81 | 6.98 | 8.70 | 2.00 | −1.96 | −4.00 | −3.13 | −5.05 | 0.33 | 0.64 | 0.07 |
| EEC | 2.31 | −7.03 | 11.05 | 5.56 | 3.62 | 9.37 | 6.54 | 0.10 | −38.00 | −18.83 | 3.94 | −0.72 | −2.53 |
| Non-EEC | 7.49 | −5.79 | 1.90 | 4.81 | −0.26 | 1.80 | 5.35 | −1.19 | −2.99 | 1.27 | 1.76 | 1.24 | 1.24 |
| Developing countries | 0.40 | 11.44 | 29.96 | 13.13 | 32.49 | 22.43 | 26.68 | 25.84 | 15.07 | −73.75 | 20.21 | 11.49 | 10.34 |
| Centrally planned economies | 9.34 | 9.50 | 7.27 | 7.75 | 4.16 | 4.13 | 2.56 | −1.49 | 2.25 | 2.97 | 5.40 | 5.05 | 4.84 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously. In "developed countries, EEC and non-EEC," 1982 excludes Italy, Luxembourg, and Cyprus. In "developing countries," (1) 1974 excludes Hong Kong and Indonesia; (2) 1975 excludes Hong Kong and Malaysia; (3) 1977 excludes Malaysia; (4) 1980 excludes Bangladesh and Malaysia; (5) 1981 excludes Madagascar; (6) 1982 excludes Mexico, Dominican Republic, Sri Lanka, Bolivia, Fiji, Papua New Guinea, and Madagascar; and (7) 1983 excludes Mexico, Peru, Dominican Republic, Philippines, Sri Lanka, Malta, Papua New Guinea, Turkey, Ethiopia, Kenya, and Madagascar.

**Table 5.4** **Changes in Global Textile Production, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | −4.85 | −7.14 | 9.89 | −2.00 | −1.02 | 5.15 | 1.96 | −3.00 | −4.12 | 1.08 | −0.13 | −0.57 | −0.41 |
| U.S. | −7.62 | −9.66 | 12.63 | −1.64 | 1.83 | 6.05 | −3.16 | −2.07 | −9.42 | 13.27 | −0.46 | −1.45 | 0.02 |
| Canada | −2.00 | −3.06 | 2.11 | 3.09 | 5.00 | 8.57 | −3.51 | 3.64 | 19.30 | 9.78 | 1.73 | −0.61 | 0.43 |
| Japan | −10.00 | −6.67 | 9.52 | −2.17 | 2.22 | 1.09 | −1.08 | −2.17 | −1.11 | 0.00 | −1.16 | −1.15 | −1.04 |
| EEC | −2.83 | −7.77 | 10.52 | −4.76 | −2.00 | 5.10 | −2.91 | −4.00 | −3.13 | −3.23 | −1.08 | −0.47 | −0.74 |
| Non-EEC | 0.81 | −9.13 | 3.84 | −3.53 | −2.40 | 8.68 | 1.33 | −6.68 | −1.09 | 1.14 | −0.89 | −0.91[a] | −0.70[a] |
| Developing countries | 2.38 | 1.16 | 6.90 | 0.00 | 3.23 | 2.08 | 2.04 | 0.00 | −2.00 | 4.08 | 2.22 | 1.75 | 1.99 |
| Centrally planned economies | 5.26 | 6.25 | 4.71 | 4.49 | 4.30 | 1.03 | 2.04 | 1.00 | −0.99 | 2.00 | 3.64 | 3.12 | 3.01 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously.

[a] Excluding Cyprus.

**Table 5.5** **Changes in Global Apparel Production, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | −1.98 | −2.02 | 7.22 | 0.00 | −0.96 | 1.94 | −4.76 | −3.00 | −3.09 | 0.00 | −0.45 | −0.74 | −0.67 |
| U.S. | −2.83 | −5.21 | 14.11 | 4.59 | 0.11 | −0.21 | −4.84 | −4.84 | −10.98 | 7.60 | 0.11 | −1.12 | −0.25 |
| Canada | 0.34 | 1.74 | 7.19 | −6.64 | 0.75 | 13.27 | −7.40 | 1.20 | −15.01 | 13.15 | 1.31 | −0.51 | 0.86 |
| Japan | −4.12 | −5.65 | 6.44 | −0.07 | 1.24 | 1.66 | −3.82 | 1.49 | −0.88 | −1.52 | −0.35 | −0.14 | −0.52 |
| EEC | −0.93 | 2.80 | 3.85 | −2.78 | −1.90 | 2.91 | −5.66 | −3.00 | 0.00 | −3.09 | −0.59 | −0.86 | 0.77 |
| Non-EEC | 0.60 | 12.68 | 4.55 | −1.71 | 5.25 | −1.29 | −14.21 | 9.16 | 0.66 | −0.02 | 1.88 | 1.74[a] | 1.57[a] |
| Developing countries | 7.89 | 2.44 | 8.33 | −1.10 | 4.44 | 3.19 | 3.09 | 7.00 | 0.00 | 3.74 | 4.41 | 3.92 | 3.90 |
| Centrally planned economies | 7.14 | 6.67 | 6.25 | 3.53 | 4.55 | 3.26 | 5.26 | 2.00 | 0.98 | 1.94 | 4.83 | 4.40 | 4.16 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics,* various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously.

[a] Excluding Cyprus.

**Table 5.6** **Changes in Global Production of Footwear, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | −4.20 | −3.98 | 0.74 | −2.81 | −0.63 | 1.50 | −2.24 | −2.80 | −3.77 | −4.58 | −1.80 | −2.02 | −2.28 |
| U.S. | −9.00 | −2.65 | −2.73 | −8.41 | 1.02 | −2.02 | 3.09 | −6.00 | −11.70 | 1.20 | −3.34 | −4.27 | −3.72 |
| Canada | 2.39 | −1.03 | 6.52 | −8.16 | 11.11 | 8.00 | −7.41 | 7.00 | −15.89 | 11.11 | 2.30 | 0.28 | 1.36 |
| Japan | −1.03 | 0.00 | 0.00 | 1.02 | 3.03 | 3.92 | −5.66 | 2.00 | −1.96 | −4.00 | 0.41 | 0.15 | −0.27 |
| EEC | −1.48 | −5.62 | 2.18 | −0.55 | −2.76 | 1.80 | −5.46 | −2.65 | 1.00 | −4.38 | −1.82 | −1.50 | −1.79 |
| Non-EEC | −1.31 | −4.19 | 7.10 | 2.45 | −2.48 | 9.11 | 9.59 | 1.33 | −3.12 | −4.76 | 2.70 | 2.05 | 1.37 |
| Developing countries | 11.82 | −0.19 | 36.19 | 12.50 | 21.68 | 16.24 | 23.13 | 53.32 | 1.17 | −88.00 | 21.84 | 19.54 | 8.79 |
| Centrally planned economies | 7.80 | 6.95 | 3.53 | 4.12 | 5.17 | 3.49 | 2.62 | −0.88 | 1.97 | −0.33 | 4.01 | 3.79 | 3.37 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously. In "developed countries," 1983 excludes Australia. In "developing countries," (1) 1974 excludes Hong Kong and Madagascar; (2) 1975 excludes Hong Kong and Malaysia; (3) 1980 excludes Bangladesh and Malaysia; (4) 1981 excludes Madagascar; (5) 1982 excludes Dominican Republic, Fiji, India, and Madagascar; and (6) 1983 excludes all listed countries except Chile, Ecuador, Panama, and Korea Republic.

**Table 5.7 Changes in Global Production of Motor Vehicles, 1974–83 (percentage per annum)**

| | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1974–81 | 1974–82 | 1974–83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developed countries | −3.87 | −0.11 | 20.04 | 11.75 | 8.58 | 3.56 | −9.81 | 3.49 | −3.60 | 1.49 | 4.20 | 3.37 | 3.18 |
| U.S. | −13.49 | −2.27 | 26.74 | 13.76 | 8.06 | 0.00 | −25.37 | 3.00 | −10.68 | 25.00 | 1.30 | −0.03 | 2.48 |
| Canada | 0.54 | −12.20 | 18.52 | 7.81 | 0.00 | 0.00 | −27.54 | 1.00 | −3.96 | 26.80 | −1.48 | −1.76 | 1.10 |
| Japan | 18.35 | 10.85 | 17.85 | 16.35 | 12.90 | 12.62 | 16.19 | 11.35 | 1.73 | 5.11 | 14.56 | 13.13 | 12.33 |
| EEC | −5.18 | −7.61 | 13.12 | 5.41 | 2.05 | 1.28[a] | −3.80 | −13.93[b] | −1.33 | 42.25[c] | −1.08 | −1.11[b] | −5.22[c] |
| Non-EEC | 16.12 | 10.97 | 11.90 | 13.97 | 9.47 | 16.87 | 1.69 | −6.61[d] | 12.80 | −60.77[e] | 10.90 | 11.11 | 3.92[e] |
| Developing countries | 66.18 | 74.77 | 104.86 | 122.14 | 105.58 | 18.02 | 57.32 | 22.26 | −46.52 | n.a. | 71.39 | 58.29 | n.a. |
| Centrally planned economies | 12.7 | 16.72 | 13.93 | 19.56 | 9.06 | 23.00 | −0.03 | −17.17 | −0.77 | 103.83 | 9.72 | 8.56 | 18.08 |

*Source:* Constructed from United Nations, *Yearbook of Industrial Statistics*, various issues.

*Notes:* Year-to-year changes may be affected by the absence of data for some countries in some years and should therefore be treated cautiously. In "developed countries," (1) 1979 excludes Denmark; (2) 1980 excludes South Africa; (3) 1981 excludes Netherlands and Portugal; (4) 1982 excludes New Zealand; (5) 1983 excludes Denmark, Italy, Netherlands, United Kingdom, Austria, Portugal, Sweden, South Africa, New Zealand, and Australia. In "developing countries," (1) 1974 excludes Hong Kong and Indonesia; (2) 1975 excludes Hong Kong and Malaysia; (3) 1978 excludes Kuwait; (4) 1980 excludes Peru, Bangladesh, and Malaysia; (5) 1981 excludes Ecuador, El Salvador, Peru, and Kuwait; and (6) 1982 excludes Ecuador, El Salvador, Peru, Bangladesh, Fiji, India, Kuwait, and Tunisia. The abbreviation n.a. means not available.

[a] Excluding Denmark.

[b] Excluding Netherlands

[c] Excluding Denmark, Italy, Netherlands, United Kingdom.

[d] Excluding Portugal from 1981.

[e] Excluding Austria, Portugal, and Sweden.

supplies. Does this growth of foreign competition reflect inexorable shifts in the pattern of international comparative advantage, or should foreign government policies designed to promote the expansion of these industries be held responsible for recent trends?

### 5.2.1 The Product Cycle

According to models of the international product cycle, a pioneering producer of steel, automobiles, and textiles like the United States should expect its share of global output to erode as production processes are standardized and diffuse to newly industrializing countries. While an economy with a comparative advantage in the development of new products and processes will be the initial home of new industries, as products and processes are standardized and technological know-how spreads, the location of production will shift to other countries. The pioneering producer will retain a productivity advantage only if its rate of development of new processes exceeds their rate of international diffusion.

The first industry in which product cycle forces can be observed is cotton textiles. In the nineteenth century, the mechanism by which industrialization initially spread from Britain to the Continent, North America, and then other parts of the world was the diffusion of English-based spinning and weaving technologies. As early importers of British technologies, U.S. textile producers had begun to fear by the end of the nineteenth century that they were being placed at a competitive disadvantage by the continuing spread of textile technology to lower-wage parts of the world. Although innovation by the American industry helped stem this tide, other producers quickly began to emulate American example. Japanese firms, for example, after having turned for advice to English machinery manufacturers in the 1870s and 1880s and adopting the mule spinning technology favored in Britain, quickly shifted to the ring spinning technology developed in the United States. The Japanese industry expanded rapidly: by the interwar period, textile goods accounted for fully half of Japanese exports. But as the technology continued to diffuse, Japan's share of world textile exports fell. By the late 1950s Japan had begun to import textiles, and by 1978 imports reached 18 percent of domestic sales. In 1979, Japan's textile trade balance was in deficit for the first time in modern history.

The second phase in the textile industry product cycle, which took place between the late 1930s and early 1960s, was dominated by American technologies for the production of synthetics and blended fibers. Like their predecessors, these methods were labor-intensive and readily emulated. Hence the location of production continued to shift toward the NICs, for whom the textile industry is an important source of total manufacturing production and employment (see tables 5.4 and 5.5).

The diffusion of knowledge has been accelerated by the aggressive international sales activities of textile machinery companies, including those based in the United States. Today more than one hundred countries ship textile and apparel products to the United States.

The product cycle in the steel industry has been even more dramatic, since it has been compressed into such a short time span. In Japan, for example, where the steel industry was relatively small and inefficient prior to World War II, the transfer of advanced technologies was concentrated in the twenty-five years immediately following the war. In the 1960s, Japanese producers greatly expanded productive capacity, surpassing U.S. producers in their rate of adoption of new technologies such as the basic oxygen furnace and in construction of large greenfield plants offering economies of scale. A significant aspect of these programs was the Japanese industry's continued dependence on foreign technology. As late as 1961, over 60 percent of the Japanese industry's sales were dependent on technology imported from abroad, mainly from the United States. Over the course of that decade, foreign technologies were adapted and the pace of Japanese innovation accelerated. By 1967 the share of sales dependent on foreign technology had fallen to 8 percent, and by the 1970s Japan had begun to export technology to the United States (Oshima 1973, 313).

Production by third world countries, which remain heavily dependent on foreign technologies, increased dramatically (by nearly 150 percent) between 1970 and 1980.[6] While developing-country steel industries are only occasionally multinational, technology transfer still takes place through direct foreign involvement. China, for example, has relied successively on Soviet, Japanese, and, to a lesser extent, West German expertise, in 1978 signing an agreement with Nippon Steel for the construction of a greenfield, fully integrated plant at Shanghai and for the addition of a wide hot-strip mill to existing works at Wuhan. As part of this agreement, the Japanese offered to train Chinese technicians to operate the new works. In South Korea, advanced technology has been transferred whole with the assistance of foreign advisers. In Brazil, an exception to the rule that steel industries tend to be indigenous, two of the three largest private steel companies have significant European and Japanese participation. Brazil's new Tuberao plant is a joint venture with the Japanese and Italians. As a rule, however, government ownership predominates, and direct foreign financial involvement is rare.

As in steel, technology transfer in automobile production has been expedited by direct foreign involvement (often on the part of U.S. firms). But in contrast to steel, the multinational form dominates. This has been true even of Japan, GM and Ford having operated plants there from the mid-1920s to the end of the 1930s. The alternative—obtaining designs and tooling from abroad—is rendered difficult by foreign exchange shortages like those that hindered Japanese efforts in the 1950s and plague developing countries today. Compared to the other basic industries, product cycle forces operate slowly in the automobile industry since motor vehicles are exceedingly complex to produce and market. Major mechanical components such as engines and transmissions tend to be produced using automated, capital-intensive methods; because of high capital and low labor requirements, LDCs have no obvious comparative advantage. "Finish parts" such as exterior body stamping and moldings must fit precisely and be adapted to market demands. Again, there may be disadvantages associated with the use of relatively inexperienced labor and advantages from proximity to the consumer. LDCs' most obvious comparative advantage therefore lies in the production of minor mechanical components such as starters, springs, and wiring harnesses.

While for the immediate future foreign sourcing of minor mechanicals is likely to remain the principal form of LDC auto production affecting U.S. automakers, import competition from developing countries promises to have an increasingly powerful impact on the economy end of the U.S. market. The Hyundai, imported from Korea, in 1986 enjoyed the highest first-year sales ever recorded by an import and undoubtedly figured in GM's decision to halt production of its subcompact, the Chevrolet Chevette. This plus the introduction of the Yugo (manufactured in Yugoslavia) led to plans to import a similar economy car, the Proton Saga, from Malaysia. Meanwhile, established companies have developed plans to produce cars in LDCs for sale in the United States (Volkswagen in Brazil, Pontiac and Ford in Korea, Mercury in Mexico, Dodge in Thailand). For the time being, LDC competition is heavily concentrated at the bottom of the product line. The critical issue from the standpoint of U.S. companies is whether—or, more precisely, when and to what extent—these countries will begin to penetrate other segments of the American market.

### 5.2.2 Government Policy

Even while product cycle influences were shifting the locus of basic industry production from the United States to other parts of the world, foreign government policies could have been operating simultaneously to speed the process. The recent debate over the extent and effectiveness of foreign industrial targeting and export subsidization focuses on the latter set of influences. Following Krugman (1984), it is useful to distinguish three categories of policy: financial support (such as tax relief and privileged access to capital markets), control of product market access (through tariffs, quantitative restrictions, and administrative guidance), and government control of industry conduct (through the encouragement of mergers, joint ventures, and collusive pricing policies).

The efficacy of these policies might be judged according to several criteria. Did they raise foreign output, employment, and exports? Did they reduce foreign production costs? Did the returns on these policies exceed the costs from a national point of view? Finally, and this is the criterion relevant here, did foreign policies accentuate the shift in basic industry production from the United States and contribute to U.S. industry's competitive difficulties?

The extent to which governments have promoted the growth of their basic industries is notoriously difficult to quantify. How, for example, is one to measure the impact of moral suasion designed to encourage banks to lend money to enterprises in a particular sector? Despite these difficulties, some general conclusions about the impact of policy on the basic industries can be offered. It is clear, for example, that policy played an important role in the growth of the Japanese steel and automobile industries in the 1950s; in the 1970s and 1980s, in comparison, its influence has been much diminished. In the 1950s, the Japanese steel market was protected by stringent import restrictions which increased the profitability of domestic production and permitted the industry to produce at minimum efficient scale. Low-interest loans and tax concessions provided added incentive to invest. Although these policies remained in place into the 1970s, by the mid-1960s Japanese competitiveness had improved to a point where import restrictions were redundant. By the mid-1970s, policy shifted toward restraining the industry's growth to avoid exacerbating trade conflicts with other industrial countries.

As in steel, the growth of Japan's automobile industry was stimulated in the 1950s by prohibitive barriers to imports and by statutes requiring that companies be Japanese owned. Half the cost of a new automobile factory could be written off in the first year of operation. In the 1980s, in contrast, few such tax concessions have been available. Over the entire period 1966–81, Nissan paid an average effective corporate tax rate of 35 percent.[7]

Although various tax and financial incentives have been provided the Japanese textile industry, the government's basic strategy has been one of not interfering with the decline of employment. The share of textile manufacturing in Japanese employment fell from 23 percent in 1955 to 13.2 percent in 1979, with 18 percent of Japanese textile jobs lost in the 1970s alone. The late 1970s saw more than a thousand Japanese textile firm bankruptcies per annum. The implications of these developments for Japanese output are evident in tables 5.4 and 5.5. Some steps were taken to slow the industry's contraction, notably provision of concessional financing for development of new merchandise, modernization of equipment, and investment in R&D. But despite these examples to the contrary, Japanese textile-industry policy has generally emphasized adjustment rather than job retention.

Policy in Europe, in contrast, has focused more directly on stemming the decline of basic industry employment. In the early 1970s, government initiatives tended to be indirect, taking the form of measures to encourage private lending for rationalization and modernization, for example. Funds for the French steel industry were raised through government efforts to promote the formation of an industrywide syndicate to market bonds to the small investor. Banks were encouraged by the state to aid in the industry's modernization. As the financial condition of Europe's basic industries worsened, however, governments became increasingly involved directly in the provision of financial assistance. In 1978 the French government implemented a restructuring program that guaranteed the industry's debts.[8] In several other European countries, transfers from general revenues have been needed to permit publicly owned companies to service debt and continue operations. Subsidies and grants extended to the steel industry by members of the EC have been estimated at 70 billion DM between 1980 and 1985 (Gerken, Gross, and Lachler 1986, 775). Most of these measures have been taken in concert through the offices of the EC Commission.

As with its policy toward steel, the objective of European textile policy has been to prevent the erosion of employment. Starting in the 1970s, Belgium, Italy, and the United Kingdom offered textile firms substantial subsidies and in some cases experimented with nationalization. In Norway, the textile industry was provided relief from social security payments and financial support for investment in machinery. France provided transitional assistance to small- and medium-sized firms and subsidized technological research to increase productivity. The Netherlands initially permitted the market to operate freely but, once more than half of all textile jobs in Holland disappeared between 1970 and 1976, intervened with loans and with investment and current expenditure subsidies for cotton, rayon, linen, and clothing producers. If anything, the scope of such policies has expanded in recent years. France, for example, recently announced a program providing relief from social security contributions to textile firms that maintain or increase employment and investment. The Belgian government recently proposed extending loans and interest rate subsidies to firms promising to retain at least 90 percent of their labor forces (Toyne et al. 1984, 123–29).

Have these policies contributed in important ways to the competitive difficulties of U.S. basic industries? Krugman (1984) argues no. Taking steel as an example, he points out that Japanese policies served to subsidize industry expansion in the 1950s but not subsequently. One would have to document persistent links from the learning effects of the 1950s to costs of production in the 1970s in order to establish the relevance of Japanese subsidies to current trends in competitiveness. Krugman argues further that European policies have been "more a bailout for bondholders than a subsidy for production or for the creation of new capacity" (p. 117).

It is true that the direct effects of Japanese policies are small; one study estimates that between 1951 and 1975, loans by public institutions, export promotion schemes, and other assistance measures reduced the cost of a net ton of Japanese steel by no more than $0.45 US (out of an estimated Japanese cost of production in 1975 of roughly $150 US) (Mueller and Kawahito 1978, 25–26). Nearly every study of government assistance to the Japanese steel industry has arrived at similar conclusions. But European subsidies, in contrast with Japan's, have not been uniformly small; studies of European financial assistance to the steel industry in the mid-1970s yielded estimates of implicit subsidies in the range of $2 US per net product ton.

Even if European financial policies did not increase production or stimulate the creation of new capacity, as Krugman concludes, they surely prevented production and capacity from shrinking at the rates that would have been dictated by market forces alone. Even if European production subsidies and import restraints have primarily affected Japanese exporters, the U.S. industry is indirectly affected due to the integration of global commodity markets. Japanese steel exports that might be sold in Europe in the absence of governmental intervention there tend to be diverted to other countries, leading other producers, who might have concentrated on those markets in the absence of Japanese competition, to divert their own exports to still other markets, including that of the United States. Due to market integration, the mere fact that subsidies to the steel industry have been relatively generous in countries not among the leading exporters to the United States does not establish that they were without implications for the competitiveness of American producers. Policies increasing supply or restricting demand tend to have indirect repercussions on the United States wherever they occur.

Observers have argued further that Japanese firms have been favored by privileged access to borrowed funds, as a result of which their basic industries have enjoyed an artificially low cost of capital. The only systematic comparison of the corporate cost of capital in Japan and the United States, that of Ando and Auerbach (1985), suggests that, while this may have been true for the economy as a whole, the argument has not applied to the basic industries since the mid-1960s. Ando and Auerbach compare price-earnings ratios for samples of Japanese and U.S. companies as a measure of required rates of return. For their samples of roughly twenty U.S. and twenty Japanese companies for the period 1966–81, the median average return to (or cost of) capital is 10.3 percent for the United States and 9.5 percent for Japan. In other words, Japanese firms were able to pay their shareholders a rate of return 0.8 percent less than that required of their American counterparts. While the differences initially appear to be larger for steel and autos (in both industries, Japanese firms have substantially lower returns on, and costs of, capital than their U.S. counterparts), corrections for depreciation, inventories, and inflation change the picture.[9] While tending to further increase the cost-of-capital advantage for the Japanese economy as a whole, these corrections raise the returns to the U.S. steel and auto industries compared to their Japanese counterparts. For example, the before-tax cost of capital for U.S. Steel is estimated at 17.8 percent, compared with 22.0 percent for Kawasaki and 23.1 for Nippon Steel. Costs of capital for Ford and GM averaged 15.5 percent and 17.3 percent respectively, compared with 18.4 percent for Nissan. Adjustments for taxation only reinforce the conclusion, since Japanese industry in general and auto and steel firms in particular paid higher corporate taxes than their U.S. counterparts. Thus, if Japanese firms benefited from a lower cost of capital, the benefits did not extend to autos and steel. And, since the 1960s, direct government policy in the form of corporate tax policy has not worked in favor of Japan's basic industries.

## 5.3 Lagging Demand

The U.S. steel, textile, and automobile industries are all import-competing industries. Hence domestic market growth largely determines the state of industry demand.

The U.S. basic industries have all suffered from secular declines in demand, but to differing extents. The most dramatic decline, that experienced by the steel industry, is portrayed in figure 5.4, which shows U.S. apparent steel consumption relative to real GNP and its trend over a longer period starting in 1960. Although domestic steel use fell significantly over the period as a whole, domestic demand exhibited little trend in the 1960s but declined significantly after 1972 and again after 1978.[10]

The downward trend in U.S. steel consumption relative to GNP reflects the tendency of the steel intensity of production to decline as the economy matures.[11] Phases of rapid industrial expansion and reconstruction like those that followed World War II require inputs of steel for the construction of railroads, bridges, port facilities, power stations, and other infrastructure. Eventually, investment in infrastructure begins to slow and with it the demand for steel; the United States needs steel bridges for only one interstate highway network, for example. Figure 5.4 suggests that the United States had reached this stage of declining steel intensity by the early 1970s.[12]

Simultaneously, technological change created increasingly attractive substitutes for steel. Steel has been replaced by plastic and concrete tubing in many types of construction, by aluminum and plastic in the production of food and beverage containers, by plastics in various stages of automobile production. In several applications, notably automobiles, the shift toward lighter materials was accentuated by the energy price shocks of 1973 and 1979. In 1973, when 14.5 million vehicles were sold, Detroit consumed 23 million tons of steel; in 1985, 15.7 million vehicles accounted for only 13 million tons, a fall of 48 percent per unit.[13] The shift toward steel substitutes also can be seen as a corollary of economic maturity, as increasingly sophisticated technologies require the use of thinner and more formable materials. While there exist countervailing trends, such as the substitution of steel for timber, brick, and concrete in construction, overall these developments have tended to reduce the steel intensity of production (Keeling 1982, 15–17).

Figure 5.4 also reflects the cyclical sensitivity of steel consumption. During business cycle downturns, firms delay investment projects and consumers defer purchases of durables. The ratio of apparent steel consumption to real GNP therefore rises significantly during recoveries and falls during recessions.[14] Consequently, the absence of a notable decline of steel intensity in the 1960s is attributable in part to the relative buoyancy of the macroeconomy over the period. Analogously, slower growth over much of the period since 1973 and the exceptional severity of the post-1979 recession have exacerbated the industry's demand-side difficulties.

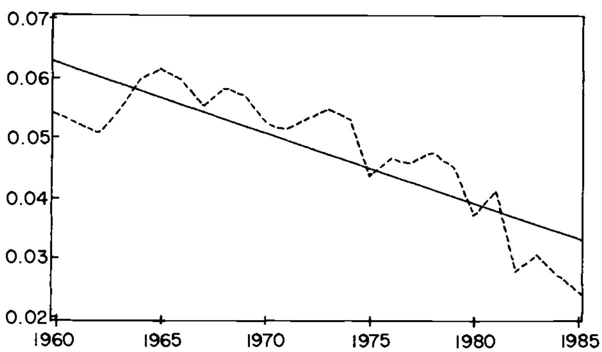


**Fig. 5.4** Apparent steel consumption in ingots as a ratio of GNP at 1982 prices.

U.S. textile producers also have experienced stagnant domestic demand due to shifts in expenditure shares and a slowly growing macroeconomy. Global consumption of textiles has been rising less quickly than total manufacturing production since the early 1960s. The income elasticity of demand for clothing is less than unity and is thought to fall with rising incomes.[15] Consumers' expenditure on clothing and shoes as a percentage of total private consumption in the United States, calculated in current prices as in figure 5.5, has declined from nearly 9.5 percent in 1960 to less than 7 percent.[16] Measured in constant prices, that share has been more stable; while the constant-price share trends down over the period as a whole, most of its decline occurs in the decade of the sixties. Thus, it appears to be mainly falling prices rather than income inelastic demands or shifting expenditure patterns that account for the industry's demand-side difficulties. But the aggregate figures mask a shift toward casual wear at the expense of formal attire, stimulating the demand for the products of some segments of the industry while depressing the demand for others.

Motor vehicle apparent consumption as a share of GNP, shown in figure 5.6, while even more volatile than the share of steel, exhibits an almost imperceptible downward trend.[17] Trends in the share of spending on new motor vehicles in GNP can be decomposed into effects associated with changes in average vehicle life, "saturation" of the automobile market, and changes in the relative cost of purchasing and operating vehicles. The rising average age of passenger cars in use, from 5.7 years in 1973 to 7.5 years in 1984, reflects the combination of improving durability and relatively slow income growth over the period. Both the average price of a new car of constant quality and the real cost per mile of operating a passenger car actually declined between 1970 and 1983.[18] In 1984 the number of cars per thousand population

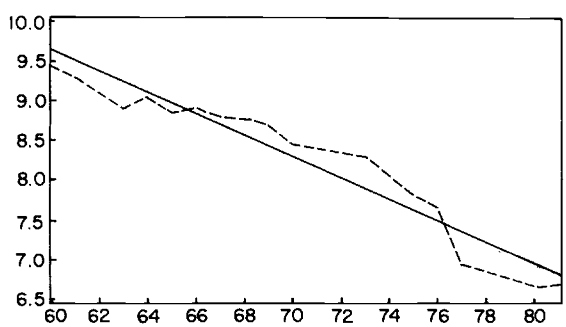


**Fig. 5.5** Share of clothing in personal consumption (current prices), 1960–81.

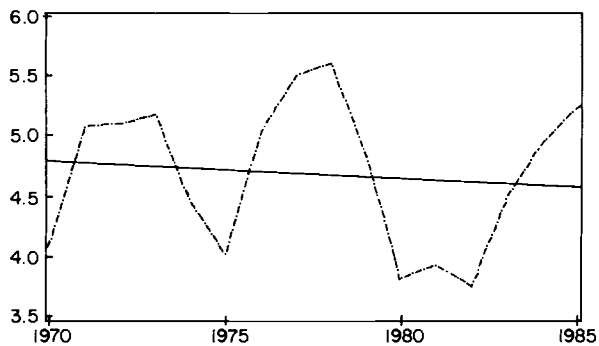


**Fig. 5.6** Motor vehicle apparent consumption as percentage of GNP.

reached 549 in the United States, by far the world's highest (computed from *Motor Vehicle Facts and Figures '85*). OECD estimates put the saturation point at 700, however, suggesting that the industry is still far from wholly dependent on replacement demand (cited in Altshuler et al. 1984, 110). Thus, not only does the automobile industry differ from textiles and steel in that demand has remained relatively stable, but neither the saturation nor the operating cost argument provides much basis for pessimism about future demands. At the end of 1984 the Commerce Department forecast that the number of passenger cars sold in North America would rise by 11 percent between 1985 and 1990 (U.S. Department of Commerce 1984, 60). The principal factor likely to depress the quantity of new vehicles demanded is a rise in their relative price, perhaps due in part to the restrictive effect of voluntary export restraints on foreign producers. The effects of these restraints, which tend to raise the share of U.S. consumer expenditure on passenger cars even while depressing the quantity sold in the domestic market, are discussed in the section on trade policy below. But it is already clear that divergent trends in demand play an important role in explaining the differing fortunes of the automobile and textile industries on the one hand and iron and steel on the other.

## 5.4 Private Sector Determinants of Competitiveness

### 5.4.1 Labor Costs and Labor Productivity

No factor that figures in the debate over the competitiveness of U.S. basic industries has attracted more attention than labor costs (see, for example, Gomez-Ibanez and Harrison 1982). The importance of labor costs is incontrovertible: labor accounts for 46 percent of total costs in motor vehicles (Kreinin 1984, 41), roughly 28 percent of average

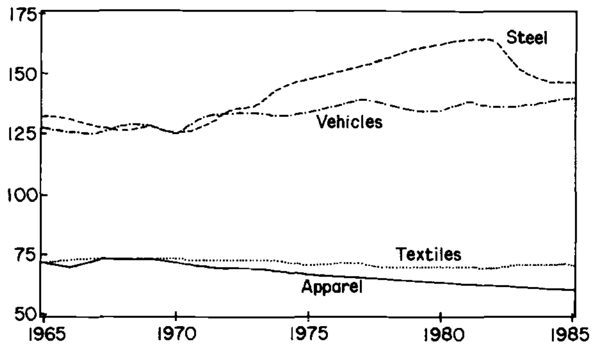


**Fig. 5.7** Hourly earnings in U.S. basic industries (all manufacturing = 100).

total costs in steel (down from 39 percent in 1976; see Mueller and Kawahito 1978, 19), and for the great majority of manufacturing costs in apparel. The question is the extent to which high wages have contributed to competitive difficulties, particularly in automobiles and steel, and who bears the burden of responsibility.

Figure 5.7 shows trends over the last two decades in the average hourly earnings of employees in U.S. basic industries relative to all manufacturing employees. The need to distinguish among basic industries is again obvious. While earnings in textiles and apparel are only 75 percent of average manufacturing earnings and in the latter case have continued to decline, steel and vehicle earnings are at least 125 percent of the manufacturing average, with the differential favoring automotive workers rising slowly and that favoring steelworkers rising rapidly until 1982. The steelworkers' premium rose from 26 percent in 1970 to 64 percent in 1981–82, before falling to 43 percent in 1985.[19]

Productivity growth has not offset trends in labor costs, if anything exacerbating them instead. While hourly output in all manufacturing rose between 1977 and 1982, it changed only slightly in motor vehicles and declined markedly in iron and steel. Table 5.8 shows trends over time in U.S. unit labor costs (hourly labor costs adjusted for productivity). Nominal unit labor costs for all employees, which rose by 30 percent in all manufacturing between 1977 and 1982, rose by 56 percent in vehicles and 72 percent in steel. The impact on costs of the rise in steelworkers' hourly earnings, which was one and two-thirds as rapid as in all manufacturing, was reinforced by a 10 percent decline in output per hour. The rise in autoworkers' hourly earnings, which was one and a half times as rapid as in all manufacturing, was not offset by a relatively small increase in labor productivity.

**Table 5.8 Percentage Increase of Average Hourly Earnings (current dollars) and in Output per Hour of Labor Input, Selected Periods**

| | Hourly Earnings | | Output per Hour | | Unit Labor Cost | |
|---|---|---|---|---|---|---|
| | All Workers[a] | Production Workers | All Workers[a] | Production Workers | All Workers[a] | Production Workers |
| All manufactures[b] | | | | | | |
| 1957–67 | 43 | 40 | 33 | n.a. | 10 | n.a. |
| 1967–72 | 35 | 35 | 16 | n.a. | 19 | n.a. |
| 1972–77 | 53 | 49 | 9 | n.a. | 44 | n.a. |
| 1977–82 | 37 | 48 | 7 | n.a. | 30 | n.a. |
| Steel and steel products[c] | | | | | | |
| 1957–67 | 36 | 34 | 19 | 23 | 11 | 11 |
| 1967–72 | 42 | 43 | 13 | 14 | 29 | 29 |
| 1972–77 | 68 | 70 | 3 | 5 | 65 | 65 |
| 1977–82 | 62 | 82 | −10 | −4 | 72 | 86 |
| Motor vehicles and parts[d] | | | | | | |
| 1957–67 | 51 | 46 | 45 | 48 | 6 | 2 |
| 1967–72 | 42 | 42 | 20 | 20 | 22 | 22 |
| 1972–77 | 55 | 55 | 19 | 18 | 36 | 37 |
| 1977–82 | 57 | 48 | 1 | 7 | 56 | 41 |

*Source:* Anderson and Kreinin 1981 and author's calculations. Calculations from data in *United States Census of Manufactures*, for 1957, 1967, 1972, 1977, and 1985, Bureau of the Census, U.S. Department of Commerce, Washington, D.C., for hourly earnings; *Handbook of Labor Statistics*, 1978 and 1985, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C., for output per hour in aggregate manufacturing; and *Productivity Indexes for Selected Industries*, 1979, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C., for SIC 331 and 371.

a. Nonproduction workers are assumed to work the same annual hours as production workers.

b. Output is gross domestic product (GDP) originating.

c. Standard Industrial Classification (SIC) 331; output is a physical production series constructed by the Bureau of Labor Statistics.

d. SIC 371.

Identifying the reasons for these earnings differentials is rendered difficult by the fact that they incorporate skill differentials, variations across industries in the use of cooperating factors (capital-labor ratios), differences in the organization of production, and differences in bargaining power. A significant portion of the differentials can be explained on the first three grounds without an appeal to market power or labor-market imperfections. A crude measure of skill differentials is educational attainment: in 1975, 30 percent and 35 percent of the workforce in textiles and apparel, respectively, had less than a ninth grade education, compared to 16 percent for U.S. industry as a whole (derived from U.S. Department of Labor 1975). This contrasts with 18 percent in primary metals, 15 percent in fabricated metals, and 12 percent in transport equipment. Since women comprise some 80 percent of apparel industry employees, in part because the industry provides a convenient port of entry for new labor force participants, the growth of female labor force participation may have depressed apparel industry wages by increasing the relevant labor supply. Yet Krueger and Summers (1986) find that controlling for age, education, and gender, among other variables, fails to eliminate most of the observed variation in interindustry wages. Even with controls, basic industry wages in 1984 differed from average wages by 19 percent in transport equipment, 18 percent in primary metals, −2 percent in textiles, and −16 percent in apparel. Krueger and Summers argue that the interdependence of tasks encourages the payment of efficiency wages in steel and autos which account for a portion of the differentials. In textiles and apparel, the diligence of workers is readily monitored through the inspection of output and the payment of piece rates, and the costs of employee turnover are relatively low because of the lesser importance of firm-specific skills. In steel and autos, in contrast, laborers work cooperatively, rendering their effort difficult to observe. In addition, turnover costs may be relatively high, making it efficient for firms to pay wage premia to attract and retain suitable employees.

None of these factors provides an obvious explanation for the growing differential between steel and automotive wages on the one hand and textile and apparel wages on the other, or for the surge in the premium enjoyed by steelworkers after 1970. This leaves the actions of unions and management. It appears that the two share responsibility for the surge in the steelworkers' premium after 1970 and that import competition played a critical role. When attempting to rationalize the rise in steel imports that occurred in the 1960s, management tended to focus on the threat of disruptions of domestic supply. A famous 116-day strike in 1959 forced U.S. steel users to search out alternative sources. As foreign supplies came to be seen as less volatile and uncertain than domestic sources, steel imports ratcheted upward every three years when contracts were negotiated and strike threats were renewed. Perceiving uncertainty about the availability of domestic supplies as the main factor contributing to the rise in import penetration and anticipating a strong domestic market for steel, management attempted to remove supply disruptions starting in 1974 by offering steelworkers real wage increases of not less than 3 percent per annum in return for foregoing the right to strike. It was easier for management to blame labor militancy than management decisions for the difficulty of competing with imports. While removing the cloud of uncertainty covering domestic supplies, this "experimental negotiating agreement" and its successors contributed greatly to the surge in steel industry labor costs. Thus, management and labor strategies led to the adoption of policies that in the long run exacerbated problems of cost competitiveness.

Only in 1983 did the accord break down. By that time the relationship of cost competitiveness to import penetration could no longer be denied. Management shifted its attention from supply disruptions to comparative labor costs, while labor, out of growing concern for employment, moderated its position on wages, negotiating a 9 percent reduction in total compensation in the first year of the new steel contract. In 1985, for the first time in twenty-five years, the United Steelworkers of America (USWA) struck a major steel company (Wheeling-Pittsburgh) after the company had filed for bankruptcy and unilaterally imposed court-approved reductions in wages and benefits.[20] Thus, both the rise and fall of the steelworkers' premium coincide with changes in management and labor strategy.

Alternative explanations for changes in labor costs are less satisfactory. Appealing to the presence of unions is insufficient; even in the low-wage apparel industry, more than half of employees were unionized in 1975.[21] Granting that unions in steel and autos were more cohesive than those in textiles and apparel, it remains unclear that their actions can account for the surge in the differential. Economic theory suggests that members of unions that effectively restrict entry will have higher wages than nonmembers, not that the differential will rise over time. Nor can the fact that union wage premiums tend to rise in recessions account for these trends in light of the almost uninterrupted rise in the steelworkers' premium over the decade of the 1970s. And while union workers, particularly members of the UAW and USWA, have had their positions protected by generous cost-of-living escalators, their earnings premiums rose uniformly in periods of low and high inflation alike.[22]

If the UAW or USWA were responsible for the widening differential, therefore, this must reflect changes in their bargaining power or strategy. In simple models (e.g., Oswald 1982), the level of wages for which unions bargain is a function of the elasticity of labor demand alone;

insofar as foreign competition has increased the price elasticity of final demand for the products of U.S. basic industries and, ceteris paribus, the elasticity of their derived demands for labor, this should have weakened the unions' bargaining power and reduced, not increased, the differential. Although voluntary restraint agreements have strengthened the bargaining position of U.S. auto- and steelworkers over what it would have been otherwise, the continued rise in the import share of the U.S. market suggests that foreign competition has weakened the bargaining position of the unions on balance. Moreover, the decline in the share of steel- and autoworkers unionized suggests that changes in labor market power have been working in the wrong direction.

This brings us to union strategy, the factor emphasized by Lawrence and Lawrence (1985). They suggest that the price elasticity of demand for labor is an increasing function of investment—that industries engaged in new investment are better able to substitute plant and equipment for labor when unions attempt to raise wages, thereby restraining wage demands. Declining industries in which investment is unprofitable are incapable of responding in this way, providing an incentive for unions to capture remaining profits by raising wages, a phenomenon known as "scooping."

The Lawrence and Lawrence interpretation has the virtue of consistency with recent trends in the automotive industry, where guarded optimism over medium-term prospects has sustained investment in recent years and declining automobile sales and plant closings starting in 1979 led to an immediate moderation in wage trends. After reporting record losses, Chrysler management entered national contract negotiations in 1979 and obtained a contract under which the UAW agreed to $203 million in wage concessions over three years. GM and Ford negotiated new contracts six months prior to the scheduled expiration of existing agreements; as at Chrysler, automatic wage increases both for inflation and other reasons were deferred. Only when industry conditions improved were traditional wage rules reinstated. This interpretation also provides a consistent explanation for the rise in steelworkers' wages relative to those of autoworkers, assuming that the steel industry's future was recognized as bleak from the early 1970s while the auto industry was expected to survive. This, however, imputes a remarkable degree of foresight to union leaders and fails to explain the falling steel industry premium after 1982. One might attempt to finesse this objection by positing that the U.S. steel industry is made up of two segments—an integrated sector facing terminal competitive difficulties, in which unions have been engaged in scooping, and another comprised of plants that can survive, in which unions have not engaged in this practice. The wave of plant closings since the early 1980s has shifted the mix toward the second segment and resulted in a decline in the steel earnings premium for the industry as a whole. Ultimately, however, the problem with this explanation is the implausibility of the notion that as long as fifteen years ago steelworkers recognized the future prospects of their industry as bleak, particularly in light of the optimism that pervaded the U.S. steel market in the mid-1970s.

How much labor cost differentials matter for international competitiveness depends on unit labor costs abroad. Comparing unit labor costs across countries is rendered difficult by differences in data, differences in product mix, and exchange rate fluctuations. The Department of Labor's estimates of hourly compensation, which attempt to adjust for these problems, are summarized in table 5.9.[23] Although these estimates should be regarded as approximations, it is clear, whether the comparison is for 1975 or 1985, that the ratio of U.S. to foreign labor costs is higher in automobiles and steel than in all manufacturing, whatever foreign country is considered. The U.S. steelworkers' and autoworkers' wage premiums that emerged in the 1970s were without counterpart in other countries. The only exceptions are Japanese steel- and autoworkers who, like their U.S. counterparts, are better paid than the average manufacturing worker. Still, at market exchange rates, U.S. steel and automotive wages were in 1975 and 1985 roughly double those of Japan.

Textiles and apparel exhibit a different pattern. In contrast to the United States, where textile and apparel workers earn less than the average manufacturing worker, in most developing countries they earn more. Nonetheless, there remains a dramatic labor cost differential between the Asian and Latin American industries on the one hand and those of industrial countries (including the United States) on the other. The United States is not alone; as early as 1975, textile and apparel wages in many European countries exceeded those in the United States. That they fell back below U.S. levels in 1985 illustrates the power of exchange rate movements to bring about dramatic shifts in relative labor costs (see section 5.5 and especially table 5.15 below).

To assess their implications for competitiveness, labor costs must be adjusted for productivity. Table 5.10 presents trends in unit labor costs in iron and steel in five countries since 1964.[24] It speaks to the question of whether unit labor costs in the United States have been rising relatively rapidly over time, thereby contributing the industry's competitive difficulties. Before 1977, steel-industry unit labor costs actually rose less rapidly in the United States. The U.S.-Japanese comparisons are of particular interest. Although Japanese labor productivity nearly tripled in a period when U.S. output per worker hour rose by only 16 percent, hourly earnings rose much more rapidly in Japan, reflecting the low level from which they started. Even though U.S. labor costs have been higher than Japan's, this shrinking disadvantage cannot ac-

**Table 5.9 International Comparisons of Hourly Compensation, Production Workers, 1975–85, Relative to the United States (U.S. = 100)**

| | 1975 | | | | | 1985[a] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Autos (SIC 371) | Steel (SIC 331) | Textiles[b] (SIC 22) | Apparel[b] (SIC 23) | All | Autos (SIC 371) | Steel (SIC 331) | Textiles[b] (SIC 22) | Apparel[b] (SIC 23) | All |
| Canada | 77 | 74 | 104 | 102 | 92 | 65 | 70 | 100 | 87 | 84 |
| Brazil | 16 | 13 | 19 | — | 15 | 9 | 9 | — | — | 10 |
| Mexico | — | 23 | 46 | — | 15 | — | — | 19 | — | — |
| Venezuela | — | 19 | — | — | 31 | — | — | — | — | — |
| Australia | — | — | — | — | 85 | — | — | — | — | — |
| Hong Kong | — | — | 19 | 20 | 12 | — | — | 20 | 24 | 14 |
| India | — | — | 5 | 4 | 3 | — | — | — | — | — |
| Israel | — | — | 49 | 39 | 35 | — | — | 40 | 31 | 33 |
| Japan[c] | 37 | 51 | 52 | 42 | 48 | 40 | 52 | 57 | 48 | 50 |
| Korea | 5 | — | 8 | 6 | 6 | 9 | 10 | 13 | 13 | 11 |
| New Zealand | — | — | — | — | 51 | — | — | — | — | 34 |
| Singapore | — | — | 5 | — | 3 | — | — | — | — | — |
| Sri Lanka | — | — | 15 | 15 | 14 | — | — | 25 | 25 | — |
| Taiwan | 7 | — | 8 | 8 | 6 | — | — | — | — | — |

**Table 5.9** (continued)

| | 1975 | | | | | 1985[a] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Autos (SIC 371) | Steel (SIC 331) | Textiles[b] (SIC 22) | Apparel[b] (SIC 23) | All | Autos (SIC 371) | Steel (SIC 331) | Textiles[b] (SIC 22) | Apparel[b] (SIC 23) | All |
| Austria | — | 56 | 76 | 74 | 68 | — | 43 | 66 | 64 | 56 |
| Belgium | 75 | 79 | 129 | 118 | 101 | 50 | 56 | 85 | 93 | 71 |
| Denmark | 61 | — | 129 | 135 | 99 | 38 | — | 88 | 94 | 63 |
| Finland | — | — | — | — | 72 | — | — | — | — | 62 |
| France | 55 | 57 | 91 | 87 | 72 | 43 | 44 | 73 | 78 | 60 |
| Germany | 83 | 71 | 118 | 120 | 100 | 63 | 52 | 92 | 95 | 76 |
| Greece | — | — | 38 | — | 26 | — | — | 43 | — | 27 |
| Ireland | 40 | — | 63 | 50 | 47 | 30 | — | 58 | 49 | 45 |
| Italy | 54 | 58 | 94 | 88 | 73 | 40 | 42 | — | — | 60 |
| Luxembourg | — | 70 | — | — | 100 | — | — | — | — | — |
| Netherlands | 71 | 80 | 147 | 121 | 104 | 43 | 54 | — | — | 69 |
| Norway | — | — | — | — | 107 | — | — | — | — | 81 |
| Portugal | — | — | 33 | 30 | 25 | — | — | — | — | — |
| Spain[c] | — | — | — | — | 41 | — | — | — | — | 37 |
| Sweden | 78 | — | 153 | 151 | 113 | 51 | — | 99 | 109 | 74 |
| Switzerland | — | — | 118 | 106 | 94 | — | — | 98 | 89 | 73 |
| Turkey | — | — | — | — | 11 | — | — | — | — | — |
| United Kingdom | 42 | 38 | 65 | 54 | 51 | 35 | 35 | 54 | 52 | 48 |

*Source*: U.S. Department of Labor 1986a, 1986b, 1986c, 1986d, 1986e.

*Note*: Table includes nonwage earnings.

[a]Provisional estimates.

[b]1984.

[c]Japan: autos include motorcycles; Spain: autos include all transportation equipment.

**Table 5.10 Unit Labor Costs in Iron and Steel, Five Countries, 1964–81, All Employees (1964 = 100)**

| | United States | Japan | France | Germany | United Kingdom |
|---|---|---|---|---|---|
| Output per hour | | | | | |
| 1964 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1972 | 116.1 | 219.8 | 157.1 | 157.7 | 130.0 |
| 1977 | 116.0 | 290.7 | 172.4 | 178.6 | 117.5 |
| 1982 | 107.0 | 315.7 | 222.2 | 212.0 | 156.9 |
| Hourly labor cost[a] | | | | | |
| 1964 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1972 | 160.7 | 277.4 | 214.8 | 210.9 | 206.1 |
| 1977 | 277.0 | 645.1 | 529.1 | 362.3 | 507.6 |
| 1982 | 496.3 | 887.0 | 1,076.2 | 495.7 | 1,035.0 |
| Unit labor cost (U.S. dollars) | | | | | |
| 1964 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1972 | 138.4 | 150.8 | 132.7 | 166.6 | 142.5 |
| 1977 | 238.7 | 300.3 | 305.8 | 347.2 | 271.0 |
| 1982 | 463.7 | 408.7 | 360.5 | 382.6 | 414.6 |

*Source*: U.S. Department of Labor, Bureau of Labor Statistics 1984.
[a]Includes nonwage earnings.

count for the American steel industry's continued loss of market share relative to Japan or for the industry's worsening (as opposed to persisting) competitive difficulties.

After 1977, conditions changed. The rise in hourly labor costs in the United States vastly exceeded the comparable rise in Japan. And while Japanese labor productivity rose, U.S. productivity fell. In part productivity trends reflect declining U.S. capacity utilization relative to capacity utilization in Japan, which may itself reflect the competitiveness effects with which we are concerned but in any case tends to exaggerate the underlying productivity differential. Nonetheless, the different trends are indicative of a rapidly worsening unit cost problem for the United States in the second half of the 1970s.

Fuss and Waverman (1985, 1986) find a similar situation in motor vehicles. They estimate that the trend rate of productivity growth in motor vehicles during the period 1970–80 was 4.3 percent per annum in Japan compared to only 1.6 percent per annum in the United States. By 1980, American producers, who possessed a considerable productivity advantage over their Japanese competitors at the beginning of the 1970s, had fallen behind. Combined with the labor cost differential apparent in Fuss and Waverman's table 4.2, U.S. producers were at a long-run competitive disadvantage of approximately 12 percent. As in steel, U.S. producers' competitive difficulties were reinforced by relatively low levels of capacity utilization.

### 5.4.2 Labor Relations and Work Organization

Labor productivity is not an exogenous variable to which labor costs must adapt. It depends prominently on four sets of factors: labor relations, the organization of work, physical investment, and technological change. Labor relations have attracted particular attention in the automotive industry, where Japanese work organization is sometimes viewed as a panacea for productivity ills. Reflection and experimentation have led to the realization that, while Japanese modes of organization provide useful lessons for American industry, it is neither feasible nor desirable simply to transplant Japanese approaches. Among the lessons is the inefficiency of an adversarial labor-management relationship which neither vests workers with responsibility for product quality nor taps their knowledge of the production process, and the ability of an implicit contract promising job security to reduce workers' fear that increased efficiency will lead to redundancy. How to apply these lessons in the U.S. context is the unanswered question.

In response to the Japanese example, automotive companies have adopted a variety of "employee involvement programs."[25] In the early 1970s, experiments were conducted replacing the assembly line with work teams. Initially, sharp separation was maintained between changes in work organization and bargaining over compensation, in contrast to Japan. With the expansion of quality- and productivity-related activities following the 1979 slump in auto sales, however, negotiations over work organization have become increasingly integrated with compensation issues, with union leaders trading changes in work rules and work conditions for changes in compensation and profit sharing.

To date, there exist no systematic comparisons of productivity in otherwise equivalent plants using assembly line and team production methods. Insofar as the main effect of the latter has been to increase the flow of information between labor and management, it is hard to see how it could fail to increase productivity. Whether the productivity increase is large is the open question.

### 5.4.3 Investment

The other central determinants of productivity growth are investment and technical progress. Insofar as technical progress in the steel, auto, and textile industries tends to be embodied in new plant and equipment, the importance of investment is heightened. Investment in the basic industries depends both on macroeconomic conditions and on sector-specific factors. To highlight the latter, figure 5.8 shows investment in U.S. basic industries as shares of total manufacturing investment.[26]

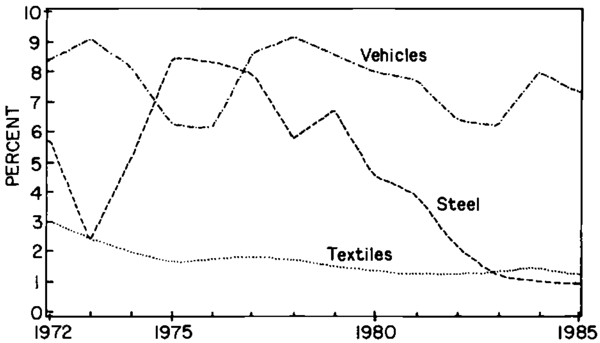


**Fig. 5.8** Basic industry shares of total manufacturing investment, 1972–85.

After declining slightly in the early 1970s, investment in the textile industry has remained steady, even rising slightly as a share of manufacturing investment in the early 1980s. The share of automotive investment is more volatile but, like textiles and in contrast to steel, shows no decisive downward trend. The dramatic fall in steel industry investment over the past decade indicates that modernization has not proceeded at the same rate that it has in the textile and auto industries and provides additional evidence that future prospects for the U.S. steel industry are bleaker than those for textiles and autos.

Textile industry investment reflects attempts to cut costs rather than to expand capacity. Increasing the capital intensity of production enables firms to minimize the consequences of relatively high U.S. wages.[27] Open-ended spinning (which produces four to five times the output of ring spindles), the air-jet loom (which is three times as fast as the conventional shuttle), and computerized finishing are viewed as essential elements of the campaign to increase productivity. That investment has been maintained despite more than 250 plant closings since 1979 suggests that a leaner but more modern textile industry will survive into the foreseeable future. In these respects the situation in automobiles is similar to that in textiles, although there have been instances in recent years where capacity expansion has figured in investment decisions.

The behavior of steel industry investment—or disinvestment—differs markedly from the automotive and textile cases. Spokesmen assert that the American steel industry is vigorously "building for the future" by investing in new technologies.[28] However, calculations by Barnett and Schorsch (1983, chap. 6) suggest that industry investment has been inadequate to maintain the value of the capital stock since the early

1970s.[29] In the last five years, new expenditures have done little to offset depreciation of existing capital. Moreover, before 1980 much of this investment took the form of the development of new iron ore mines and iron pelletizing facilities, from which a shrunken integrated sector now derives little benefit. Since 1980, much of the investment that has been undertaken has gone into the construction of minimills rather than the updating of integrated works. Crandall (1985) calculates that Tobin's $q$ (the market value of capacity in place relative to its replacement cost) is on the order of 0.1 for the integrated segment of the industry; it is not surprising that integrated firms, far from adding to capacity, are closing plants and disinvesting as quickly as possible. At the end of 1985, the most efficient minimill producers, in contrast to their integrated brethren, had a $q$ of roughly 1.15, providing scope for continued investment.

This analysis of investment highlights two distinctions within the basic industries. First, investment trends imply bleaker prospects for American steel than for textiles and automobiles. Second, it is critically important to distinguish the prospects of the minimill subsector from those of integrated steel.

### 5.4.4 Choice of Technology

Choice of technology can exercise a decisive influence over production costs and international competitiveness. U.S. producers have been indicted for failing to adopt cost-minimizing technologies including continuous casting in steel and the air-jet loom in textiles. Since this debate has tended to center on the choice of technology by the steel industry, this section focuses on three recent developments in steel production: continuous casting, the basic oxygen furnace (BOF), and the complex of technologies comprising the minimill. (Section 5.7 below discusses subsequent innovations in steel and the other basic industries.)

Casting is the third of four main stages of primary steel making: smelting, melting, casting, and rolling. Continuous casting permits the elimination of costly and time-consuming discontinuities in the casting process. In ingot casting, liquid steel is transferred by ladle from the converter or furnace to ingot molds which are then trimmed, cooled, and solidified, after which the steel is withdrawn from the molds, reheated in soaking pits, and rolled into slabs, blooms, or billets. In continuous casting, liquid steel is transferred in an even stream first into a water-cooled mold and then to a cooling chamber, from which it is continuously withdrawn by a system of rollers and upon solidifying is cut into pieces of the required length. The advantages of continuous casting include yield, which exceeds 95 percent compared to approximately 80 percent for semifinished products made by rolling ingots in slabbing or blooming/billet mill facilities; improvements in metallurgical quality, including more consistent chemical composition and fewer surface defects; energy saving due to the elimination of the energy-intensive ingot processes; and increased productivity due to the elimination of several labor-intensive stages in the production process (see Association of American Iron and Steel Engineers 1986).

Following the development of experimental machines in the late 1940s, commercial introduction of continuous casting occurred between 1952 and the early 1960s. Continuous casting was first adopted on a large scale in the late 1960s. Figure 5.9 compares the course of adoption in the United States and abroad, illustrating the extent to which the United States has lagged other countries adopting this technology. Although the American industry began to close the gap by constructing or commissioning more than sixteen continuous casters between 1981 and 1983, a sizable shortfall remains (Cantor 1985, 2).

Why has the United States lagged in adopting this innovation? The answer has three components: differences in product mix, differences in related technologies, and differences in rates of growth and investment among national steel industries. Product mix matters because, until the 1970s, continuous casters as installed in the United States and Western Europe were suitable only for producing smaller sections (billets and blooms), which have a square cross section and are therefore relatively easy to cast. Slab continuous casting as developed in Japan is technologically more sophisticated than billet and bloom continuous casting and until the 1970s was not widely utilized. In the 1960s the share of U.S. crude steel production technically suited to billet and bloom continuous casting was lower than in a number of European countries.[30] These differences in product mix are attributable to the composition of end use. Flat-rolled products (sheets and plates, for

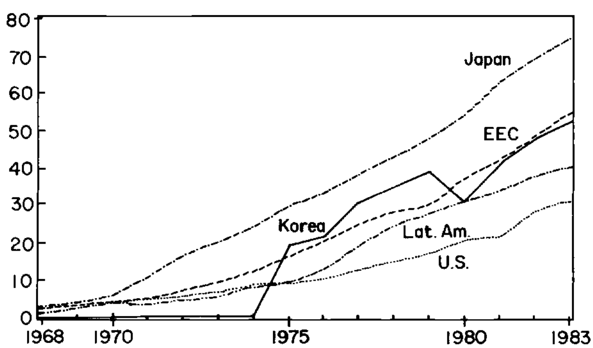


**Fig. 5.9** Shares of continuously cast steel in total ingot-equivalent production.

example) are made from slabs, whereas beams and rails are made from blooms, wire rod and small structurals from billets. The U.S. industry's concentration on slabs partly reflects the importance of the U.S. automobile industry in final demand.

In addition, the cost savings derived from continuous casting depend on the type of furnace capacity in place. The diffusion of continuous casting was favored by the presence of oxygen converters and retarded by the presence of open hearth. As late as 1984, fully 9 percent of U.S. crude steel production used the open-hearth furnace, a technology that had disappeared in Japan and all but vanished in Europe (calculated from American Iron and Steel Institute 1985, table 27). But there must be more to the story: Figure 5.10 shows that, while the United States in 1984 had both a relatively low share of continuously cast steel and a relatively high share of open-hearth capacity, there exists no simple relationship between the two variables.[31] This is because the rate of adoption of continuous casting has also been influenced by the rate of expansion of steel industry capacity. Continuous casters are difficult to append to existing integrated works whose furnaces and rolling mills are not laid out in a manner that permits them to be easily connected by a casting machine. Countries that added capacity in the late sixties and early seventies, before the application of continuous casting to slabs was perfected, are likely to have a smaller share of current output continuously cast, while those that expanded their capacity subsequently tend to have a larger share.[32]

As our discussion of continuous casting makes clear, the basic oxygen furnace had advantages. In addition to its compatibility with con-

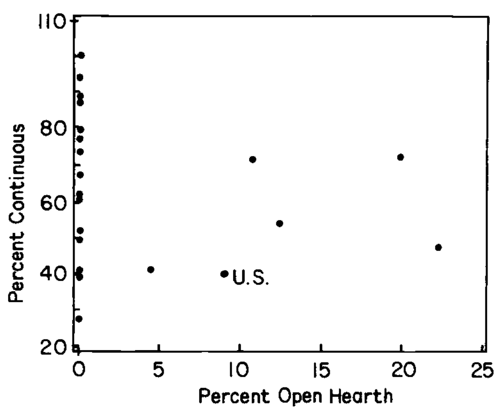


**Fig. 5.10** Continuous casting and open-hearth production, 1984.

tinuous casting, the BOF, by replacing forced hot air with oxygen and relying solely on the heat generated by molten ore, eliminated the need for external fuel sources and reduced heat times by a factor of 12. Table 5.11 compares the adoption of basic oxygen furnaces by U.S. producers and their principal industrial competitors.[33] The United States lagged behind Japan in the adoption of the BOF from the late 1950s and behind Europe from the mid-1970s. As in the case of continuous casting, the lag reflects several factors. In the 1950s, when the new technology came on line, U.S. steel makers had a large amount of open-hearth capacity in place. The cost savings of replacing an open hearth with a BOF were less than the savings associated with installing a BOF rather than an open hearth for countries committed to capacity expansion. Rapidly growing national industries thus were better placed to install the new technology. In addition, BOFs could accept a maximum of 30 percent scrap rather than the 50 percent typical of open hearths; hence the relative abundance of scrap in the United States attenuated their advantages. Finally, entrepreneurial inertia cannot be dismissed; early BOFs were developed in Europe rather than the United States, and American producers were slow to appreciate the advantages of this foreign technology.[34]

As table 5.11 makes clear, some U.S. producers compensated for their failure to adopt the BOF by installing electric arc furnaces instead. In 1984, the share of electric furnaces in U.S. utilized capacity was 25

**Table 5.11** **Adoption of New Furnace Technologies, 1960–84 (shares of total crude steel output)**

| | U.S. | Japan | Nine EEC Countries | Canada |
|---|---|---|---|---|
| Basic oxygen furnace | | | | |
| 1960 | 3.1 | 11.9 | 1.6 | 28.1 |
| 1965 | 17.4 | 55.0 | 19.4 | 32.3 |
| 1970 | 48.1 | 79.1 | 42.9 | 31.1 |
| 1975 | 61.6 | 82.5 | 63.3 | 56.1 |
| 1981 | 60.6 | 75.2 | 75.1 | 58.6 |
| 1984 | 57.1 | 72.3 | 74.2 | 73.0 |
| Basic oxygen or electric furnace | | | | |
| 1960 | 11.8 | 32.0 | 11.5 | 40.4 |
| 1965 | 27.9 | 75.3 | 31.5 | 45.1 |
| 1970 | 63.5 | 95.9 | 57.7 | 45.9 |
| 1975 | 81.0 | 98.9 | 82.6 | 76.4 |
| 1981 | 88.0 | 100.0 | 98.6 | 85.6 |
| 1984 | 91.0 | 100.0 | 100.0 | 100.0 |

*Source*: International Iron and Steel Institute 1985; *Steel Statistical Yearbook*, Brussels, IISI, various issues.

percent greater than in the other countries considered. Advantages of electric furnaces include small size and hence low capital requirements (minimum efficient scale of an electric furnace is 0.8 million tons of steel annually compared to 6 million tons for a BOF), ability to use 100 percent scrap (eliminating the need for coke ovens and blast furnaces and reducing the cost of raw material inputs by up to 50 percent), and compatibility with continuous casting. Karlson (1986) explains the growth of electric furnace capacity in the United States largely on the basis of these factors.

The electric furnace is a central component of the complex of technologies comprising the minimill. Minimills can be constructed for a fraction of the capital cost of a new integrated mill. Using electric furnaces in conjunction with continuous casters and a rolling mill, they initially tended to locate in scrap-abundant regions isolated from integrated producers by transport costs. Most minimill firms have not been organized by the USWA; they pay lower wages and operate under more flexible work rules than their integrated competitors. They have concentrated mainly on simple, low-value-added products such as wire rod and reinforcing bar that need not be produced to high metallurgical standards, leaving to integrated producers the flat-rolled sheet used in automobiles and appliances. Many minimill firms are increasingly adapting their methods to the production of high-quality bars and rods, however, and are expected to enter the market for sheet products by the end of the decade (Barnett and Schorsch 1983, 85). Since U.S. imports tend to be produced by foreign integrated firms (despite the growing importance of Japanese and Canadian minimills), the import penetration ratio in the market segment relevant to minimills is considerably lower than for the American steel industry as a whole. The same transport costs that provide minimills with natural protection from domestic integrated competitors provide protection from imports. This market segmentation has begun to break down, however, as minimill firms have expanded their capacity, moved into product lines traditionally dominated by integrated works, and penetrated the home turf of integrated firms.

The financial performance of the minimill firms has been consistently superior to that of their integrated competitors.[35] While a number of these firms have recently experienced financial difficulties, rendering overoptimistic the enthusiasm of some early analysts, as a group they continued to outperform their integrated competitors and now account for about 16 percent of the U.S. market and 22 percent of domestic shipments. Increasingly it appears that the U.S. industry is bifurcating into a relatively healthy minimill subsector and a declining integrated subsector.

As the example of minimills illustrates, U.S. steel producers remain active in adopting new technologies. At the same time, their record illustrates the disadvantages of an early start: having installed large amounts of capacity in the 1940s and 1950s before the new technologies were available, those established producers that dominated the integrated sector were ill placed to adopt subsequent alternatives.

### 5.4.5 Energy Prices

Higher energy prices have had two sets of countervailing effects on the competitive position of U.S. basic industries. Insofar as steel and vehicles are more energy-intensive than other sectors, higher energy costs raise prices and reduce industry employment both at home and abroad. At the same time, since the share of energy in total costs is greater in the EC and Japan than in the United States, higher energy prices tend to strengthen the competitive position of the U.S. industries vis-à-vis their foreign counterparts.[36] The share of energy in total costs has been relatively low in the United States due to abundant domestic energy supplies and minimal energy taxation. The importance of these effects varies greatly across industries, however. At one extreme, since textile and apparel manufacturing is far from energy-intensive, any comparative advantage accruing to the United States has been minimal.[37] At the other extreme, energy costs have a major impact on the demand for automobiles and are a major element in steel production. As of 1976, coal, fuel oil, natural gas, and electricity accounted for a quarter of major input costs in the U.S. steel industry. Although the impact of changes in energy costs on U.S. steel employment is theoretically ambiguous, Grossman (1986) estimates that U.S. steel industry employment would have been thirty-five hundred greater in 1976–78 had there been no change in the relative price of energy, and that higher energy prices led to the loss of an additional three thousand jobs between 1979 and 1983.[38] Insofar as the relative price of energy has fallen subsequently, these effects have been working in the other direction.

## 5.5 Government Policy and Competitiveness

Government policies affecting the basic industries are of two types: policies explicitly designed to influence output and employment in steel, autos, textiles, and apparel (trade policy, adjustment assistance) and policies targeted at the economy as a whole but with a special impact on those industries (macroeconomic policy, pollution abatement regulations).

### 5.5.1 Trade Policy

U.S. policies governing trade in steel, autos, textiles, and apparel differ from trade policy for other industries by virtue of their reliance on nontariff measures, notably voluntary export restraints. These forms of trade policy tend to be implemented on an incremental basis and to have a variety of unintended consequences which introduce unusual distortions into the pattern of basic industry trade.

Textiles illustrate those features that distinguish U.S. basic industry trade policy from trade policy for other sectors and show how a presumption of protection comes to be built into the policy debate with the passage of time. Voluntary export restraints by Japanese producers were first negotiated in 1937.[39] This agreement established the precedent of handling textile trade policy separate from the general trade program. In 1955, with Japan's admission to the GATT, tariffs on her exports were cut but replaced less than a year later by VERs (voluntary export restraints) and a five-year plan for controlling cotton textile and apparel exports to the United States. Thus, nontariff barriers have been a feature of U.S. textile market for fully half a century. Initially, U.S. textile trade policy was unique; subsequently, its distinguishing features—long-lived protection, reliance on voluntary export restraints, and industry-specific negotiations—spread to other basic industries, notably automobiles and steel.

Following an interlude during which textile imports were restricted by the Short-Term Arrangement on Cotton Textile Trade (1961–62) and the subsequent Long-Term Arrangement (1962–73), the Multifiber Agreement (MFA) was concluded as part of the 1973 GATT negotiations. The Long-Term Agreement had departed from GATT rules for manufactured goods by permitting import restrictions to be applied unilaterally, selectively, and without compensation to the exporter. Moreover, by restricting imports of cotton textiles without affecting imports of man-made fibers and apparel, these agreements induced developing countries to shift into the production of the latter. This provided impetus for the negotiation of a more comprehensive agreement, the MFA, which initially restricted the growth of textile imports from Japan to 5 percent per annum and from Taiwan, Hong Kong, South Korea, and Malaysia to 7–7.5 percent per annum. Imports from new entrants and small suppliers were treated more favorably. Governments were permitted to impose unilateral import controls in the event of market disruption (defined as serious damage to the domestic industry) and to negotiate lower rates of import growth for items upon which domestic producers were particularly dependent. Quotas were established through the negotiation of bilateral agreements covering more than 80 percent of U.S. textile and apparel imports in 1980. Since then, the quota system has been tightened further. In 1986, when Congress passed a textile quota bill and attempted to override the president's veto, the United States adopted new agreements with Korea, Taiwan, and Hong Kong. The first of these, for example, limits import growth to 0.8 percent per annum, compared to 8.6 percent from 1981 to 1984, and extends coverage to silk blends, ramie, and linen, fibers into which foreign producers have moved in response to previous restrictions.

Estimating the effects of textile trade policy is rendered difficult by the nontariff nature of the restrictions and the differentiated nature of the product (creating problems that arise in attempts to assess automotive and steel industry trade policy as well).[40] Fortunately, for at least some foreign products it is possible to estimate tariff equivalents indirectly. For the case of Hong Kong, where export quotas are freely traded, Hamilton (1986) used data on the unit values of U.S. textile imports and the market value of quotas to calculate the import tariff equivalent of U.S. quotas. These tariff equivalents, shown in figure 5.11, are both substantial and variable.

Nontariff barriers have significantly reduced U.S. imports of textile products. The value of U.S. textile and apparel imports (in equivalent square yards) grew by only 1.3 percent per annum between 1973 and 1981, while their composition shifted from textiles to apparel, reflecting differential treatment of the two categories under the MFA. Over the 1970s, the apparel share of U.S. textile and apparel imports rose from 35 percent to 58 percent. Insofar as the U.S. possesses a comparative advantage in the production of highly tailored, high-value-added merchandise rather than unfinished cloth, this side effect of quotas has functioned to the disadvantage of the domestic industry.

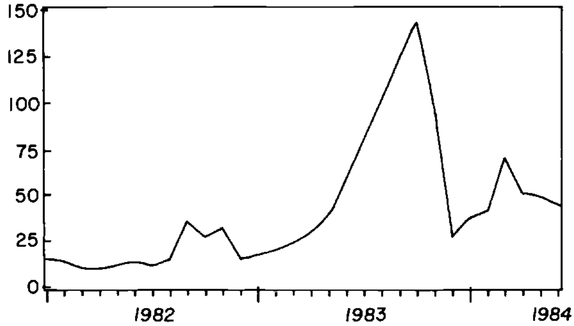


**Fig. 5.11** Rate of import tariff equivalent on U.S. textile imports from Hong Kong.

Since 1981, import growth has accelerated to 15 percent per annum. How could this occur under the provisions of the MFA? First, a newly negotiated bilateral agreement with the Peoples Republic of China permitted quota growth of 10 percent per annum. Second, the NICs moved into those few remaining categories not under quota. Third, production shifted to countries such as Sri Lanka and Mauritius for which quotas did not exist. Fourth, merchandise may have been transshipped through third countries for which quotas were not binding. The incentive to respond in these ways was undoubtedly heightened by the dollar's sharp appreciation, which enhanced the profitability of exporting to the U.S. market. The American response was predictable. Firms lobbied for a tightening of import restrictions and, starting in December 1983, the administration moved to establish three hundred new textile quotas and to prevent their circumvention by transshipping. The rate of growth of textile imports fell to less than 7 percent in 1985. In effect, it appears that the rate of growth of U.S. imports is given exogenously by policy in the long run, despite various forms of slippage which offer scope for a positive price elasticity of supply over short periods of time.

Calculations by Hufbauer, Berliner, and Elliott (1986) imply that restraints depressed U.S. textile and apparel imports by approximately 28 percent in 1981. While offering widely differing estimates of the effect of imports on output and employment, studies of the textile industry uniformly conclude that output and employment effects are likely to be smaller than changes in import volumes. Quotas increase domestic production by less than they reduce imports because they raise domestic prices, reducing market demand. The percentage change in domestic textile industry employment should be roughly equal to the change in domestic production (Pelzman and Martin 1980, 16). Using assumptions such as these, Hufbauer, Berliner, and Elliott (1986) calculate that protection permitted the retention in 1981 of 150,000 jobs in textiles and 390,000 in apparel, increasing the total by 26 percent. Given the inelasticity of consumer demand for textiles and apparel, domestic consumers paid a high price per job, on the order of $37,000 1981 dollars.

The American steel industry is another long-time recipient of protection, the sector's early growth having been greatly stimulated by shelter from British competition. U.S. steel trade policy takes two forms—one traditional, one uniquely modern. The traditional form is antidumping law, which protects domestic producers against sales below cost and price discrimination by foreign competitors. Both practices are prevalent in the steel industry, since their capital intensity compels foreign firms to sell below average cost during cyclical downturns, and since cartelization and protection permit them to export at prices below those prevailing in their home markets. The United States has had statutes to deter predatory pricing in international trade for more than sixty years. Since 1974, antidumping investigations have focused on the "constructed value" criterion for dumping, according to which the United States estimates foreign material and fabrication costs and levies an antidumping duty if import prices fall short of those costs plus fixed margins for general expenses and profits. This constructed value criterion provided considerable incentive for U.S. producers to file antidumping suits, which soon exceeded the government's capacity to process them. This led in 1977 to the trigger price mechanism (TPM), under which the government monitored steel imports and, upon finding that steel was imported at a price below reference prices based on the constructed value of Japanese steel, automatically triggered a Treasury investigation. The TPM operated only so long as the industry refrained from filing antidumping suits. The advantages of this mechanism, from an administrative viewpoint, were that it not only eliminated the burden of antidumping suits but provided the authorities some insulation from industry pressure. But the TPM contained many special features and unintended effects, some of which worked to the U.S. industry's advantage, others which worked against it (for details, see Eichengreen and van der Ven 1984). Ultimately, the industry, concluding that the latter dominated, filed antidumping suits that led to the TPM's suspension and in 1982 to its demise.

The second, uniquely modern form that U.S. steel trade policy takes is VERs, like those in textile trade. VERs were negotiated with the Japanese and European steel industries in 1968, implemented in 1969, and renewed in 1972. Following the first oil shock and the steel market slump, the United States imposed a series of increasingly stringent trade restrictions, including new VERs and antidumping investigations culminating in the TPM. VERs on steel like VERs on textiles were a mixed blessing. As in textiles, foreign suppliers responded by trading up, shifting to higher-value products in which the United States might normally be thought to have a comparative advantage. As in textiles, sales by nonsignatory countries tended to replace restrained imports, and there were reports of shipments diverted through third countries. Once VERs were replaced by the TPM, a "somewhat porous price floor" (Barnett and Schorsch 1983, 240) for steel products was established, and the import share of the U.S. market stabilized in the neighborhood of 15 percent.[41] That the TPM's coverage was not limited to foreign producers that were party to explicit agreements was a major advantage from the U.S. industry's point of view.

Since the TPM's collapse in 1982, U.S. steel trade has again been governed by VERs. These differ from early agreements by defining permissible imports as shares of the U.S. market. The 1985 VERs were designed to limit import penetration to 20.5 percent of the steel market. European producers agreed to restrain their U.S. sales to shares of U.S. apparent consumption ranging from 2.2 percent for tin plate to 21.85 percent for sheet piling. Additional VERs were negotiated with Mexico, Brazil, and South Africa, and by the end of 1985 the number of VERs had increased to fifteen, covering 80 percent of the U.S. market. Quotas are administered by the exporting countries via licensing systems. As a quid pro quo for these agreements, the U.S. industry has refrained from filing antidumping suits against participating countries.

These VERs have not prevented imports from capturing a rising share of the U.S. market since 1981. Their coverage is incomplete (Canada as well as Argentina and Taiwan are excluded), and they can be circumvented by many of the devices utilized by textile producers. At the same time, their impact is reflected in the fact that the import penetration ratio fell from 26.2 percent to 20.5 percent the month following the conclusion of the mid-1985 VERs. One can get a sense of the stringency of these agreements by noting that the red cast-iron telephone booths sold off by British Telecom as souveniers have been counted against the European steel quota.

Since steel products are heterogeneous and import restrictions take nonprice forms, measuring their impact is not straightforward. The percentage premium of spot export prices over the U.S. user price is probably the best measure of the tariff equivalent of VERs and countervailing duties.[42] As shown in figure 5.12, except during the 1973–74 commodity boom, when imports subsided and U.S. exports rose, U.S. user prices have consistently remained above foreign export prices.

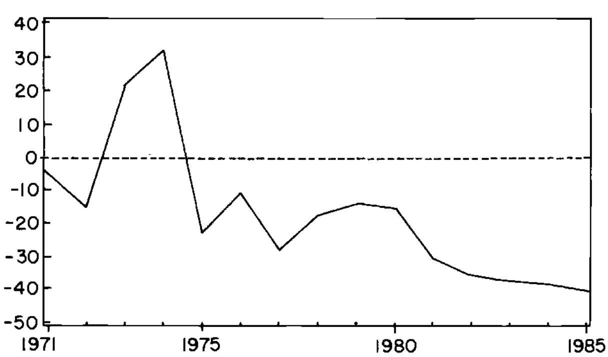


**Fig. 5.12** Percentage premium of spot export prices over U.S. user price, 1971–85.

The differential hovered in the range of 15 percent to 30 percent over the second half of the 1970s and subsequently grew to nearly 40 percent, confirming the increasing stringency of U.S. import restraints. Measured as tariff equivalents, levels of protection received by the industry are substantial.

Tsao (1985) estimates for 1983–84 that VERs reduced U.S. imports from the EC by 17 percent and total U.S. imports by 15 percent. A Department of Commerce study estimates that net imports caused a loss of 148,000 jobs in steel in 1984; together with Tsao's estimate of the change in imports (and assuming no change in exports), this implies that U.S. import restrictions increased steel industry employment by 22,000 workers, or by 15 percent.[43] Grossman's (1986) estimates, in contrast, are predicated upon an elasticity of production employment with respect to import prices of approximately unity. Attributing the entire divergence of U.S. user prices from European spot export prices to the effects of VERs implies that U.S. trade restrictions, by raising effective import prices 30 percent, increased production employment by the same percentage.[44] This higher figure should be regarded as an upper bound, since other variables affecting employment, notably steelworkers' wages, would have adjusted to the change in import prices caused by the elimination of VERs; allowing wages to change by the same percentage as import prices halves the change in production employment, again resulting in an estimate of 15 percent. Still other estimates of the change in production employment are slightly lower (Hufbauer, Berliner, and Elliott 1986; Cantor 1984).

U.S. automotive trade policy takes the same form—voluntary restraints—as policy toward textiles and steel. Explicit VERs for automotive trade are a relatively recent innovation for which textile and steel policies provided inspiration. Until the mid-1970s, the growing U.S. market share of Japan was perceived as coming mostly at the expense of Germany and the United Kingdom. As late as 1970, Japan accounted for less than 20 percent of total U.S. imports (see table 5.12). But once the first oil price shock shifted demand toward smaller, more fuel efficient cars, Japanese producers were well situated to expand their exports. By 1979, Japan accounted for more than half of total U.S. imports and for 15 percent of the domestic market. In response to industry complaints, the United States then negotiated a voluntary restraint agreement under which the Japanese agreed to reduce car exports in the year beginning April 1, 1981, by 7.7 percent. Japanese exports were held to the same level for two subsequent years, after which the ceiling was raised by 10 percent. In 1985 MITI declined to renew the VERs in light of the record earnings of U.S. automakers, although the Japanese continue to restrain their exports to the United States using traditional forms of administrative guidance.

**Table 5.12** **U.S. Imports of Passenger Cars by Country of Origin, 1965–85 (as percentage of U.S. imports)**

| Year | Belgium | Canada | France | West Germany | Italy | Japan | Sweden | United Kingdom | Others | Total Imports[a] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1984 | 0.2 | 22.0 | 5.5 | 8.2 | 0.2 | 55.1 | 2.4 | 0.6 | 5.9. | 4,879,560 |
| 1983 | 0.1 | 22.8 | 5.8 | 9.0 | 0.1 | 57.6 | 3.0 | 1.5 | 0.1 | 3,667,023 |
| 1982 | 0.1 | 22.9 | 2.9 | 11.0 | 0.3 | 59.4 | 2.5 | 0.4 | 0.1 | 3,066,992 |
| 1981 | 0.1 | 18.8 | 1.4 | 12.6 | 0.7 | 63.7 | 2.3 | 0.4 | 0.1 | 2,998,561 |
| 1980 | 0.1 | 18.3 | 1.5 | 14.5 | 1.4 | 61.3 | 1.9 | 1.0 | 0.1 | 3,248,266 |
| 1979 | 0.1 | 22.5 | 0.9 | 16.4 | 2.4 | 53.8 | 2.2 | 1.6 | 0.1 | 3,005,523 |
| 1975 | 1.8 | 35.4 | 0.8 | 17.8 | 4.9 | 33.5 | 2.5 | 3.2 | 0.1 | 2,074,653 |
| 1970 | 2.5 | 34.4 | 1.8 | 33.5 | 2.1 | 18.9 | 2.9 | 3.8 | 0.1 | 2,013,420 |
| 1965 | 0.1 | 5.2 | 4.5 | 67.3 | 1.7 | 4.6 | 4.6 | 11.9 | 0.1 | 559,430 |

*Source*: Calculated from Motor Vehicle Manufacturers Association, *MVMA Facts and Figures*, 1985.
*Note*: Percentages may not add to 100 due to rounding.
[a]Number of vehicles.

As in steel and textiles, auto industry VERs gave rise to a variety of distortions. They provided Japanese producers an incentive to shift into jeeps and light trucks not covered by the initial agreement (although this loophole was closed subsequently). They encouraged the export of components, leading Congress to consider domestic-content legislation. They provided nations not covered by the agreement, notably those of Europe, with an incentive to increase shipments to the United States and encouraged entry by other foreign producers, notably Korea and Yugoslavia. They led to direct investment by Japanese producers in the United States (see section 5.7 below). They provided an incentive for trading up, as Japanese producers shifted into the sale of more luxurious vehicles.

The effects of quota agreements are difficult to estimate because of the extent of trading up. Feenstra (1984) has estimated that two-thirds of the postagreement rise in Japanese car prices reflected quality change, yielding an estimate of the increase in quality-adjusted import prices in 1981–82 much smaller than those of other authors.[45] He estimates that the reduction in import volumes and rise in import prices increased domestic production by 8–9 percent in the first year of VERs and increased production employment by somewhat less (because of the existence of excess capacity). However, Feenstra's estimates for 1981–82, a period when U.S. auto demand remained relatively depressed, may understate the impact that fixed import quotas have had in subsequent years as the domestic market has expanded. Comparisons of the prices of a Toyota Corolla or a Nissan Sentra in Japan and the United States (e.g., Crandall 1986) show that American consumers, who had paid \$500 more than Japanese consumers in 1979–80 before the imposition of VERs, paid \$3,000 more in 1985. Assuming that the initial \$500 reflects transportation and preparation, this suggests a tariff equivalent in excess of 25 percent (assuming an \$8,000 U.S. sales price). As domestic demand has grown and quotas have become more binding, their domestic price and output effects appear to have increased. Auto import restraints are defined as absolute levels, in contrast to steel import restraints which are denominated as market shares. One would expect the former to grow more stringent over time. On the other hand, as new countries have entered the U.S. market—partly in response to Japanese VERs—the effects of these restraints may have been attenuated.

### 5.5.2 U.S. Industrial Policies

U.S. industrial policies fall into three categories: export promotion programs, investment subsidies for modernization, and import protection. The more internationally competitive a U.S. industry, the more policymakers tend to concentrate on export promotion schemes; the less competitive, the more they tend to concentrate on import protection. Not surprisingly, the predominant form of assistance for U.S. basic industries has been import protection. Policy toward the steel industry, for example, has been almost exclusively of this form.

Policy toward the textile industry has been more diverse. The Commerce Department has lobbied for the removal of foreign barriers to U.S. textile exports. For nearly two decades it has assisted U.S. textile and apparel producers wishing to develop export sales by helping them locate foreign sales agents, holding exhibitions, and organizing seminars on export marketing. While the U.S. industry has developed a few successful exports, notably blue jeans, it has essentially remained an import-competing rather than an exporting sector; in consequence, industrywide trends in output, employment, and profitability have been little affected by Commerce Department activities (Arpan et al. 1982, 263–64). In addition, the industry has received federal low-interest loans through the Public Works and Economic Development Act (EDA) of 1965, the Trade Acts of 1962 and 1974, and the Small Business Administration Program. Each of these schemes made funds available to firms unable to secure them through normal channels, so long as there was a reasonable expectation of repayment and the proceeds were used for expansion or modernization of capacity. In practice, the textile and apparel industries have not been major recipients of funds from these programs.

Although U.S. policy toward the automobile industry is dominated by import restraints, financial subsidies have also been important, notably in the case of Chrysler. Assistance to Chrysler starting in 1979 took the form of government loan guarantees, which subsidized borrowing by a firm for which the cost of credit would otherwise have been prohibitive due to bankruptcy risk. The availability of funds for modernization, in conjunction with the upturn in the U.S. auto market and the imposition of VERs upon Japan, permitted Chrysler to repay its government-guaranteed loans. That the loans were repaid does not change the fact that the government guarantee was a subsidy to the firm.

Besides protection, the most important form of U.S. policy toward the basic industries has been adjustment assistance. Adjustment assistance is designed to provide retraining, education, and transitional income for the newly unemployed. In practice, income transfers have been much more important than training schemes. According to Arpan et al. (1982), approximately 95 percent of adjustment assistance to former apparel-industry workers have gone into allowances to replace lost earnings rather than retraining or education. The number of workers that have been placed by the employment service remains negligible.

### 5.5.3 Macroeconomic Policy and Real Exchange Rates

Until recently, economists would have found it difficult to convince laymen that monetary and fiscal policies rather than sector-specific events had exercised a decisive impact on the basic industries. However, the dramatic post-1981 real appreciation of the dollar and its relationship to the monetary-fiscal mix have heightened awareness of the importance of macroeconomic factors (see the discussion in Branson 1986). In addition, the severity of the post-1979 recession has reminded observers of the sensitivity of the steel and automobile industries, as producers of durable goods and of inputs into their manufacture, to macroeconomic conditions (see section 5.3 above).

The budget deficits of the 1980s, combined with a tight anti-inflationary monetary policy, drove up the relative price of domestic goods by causing a rapid real appreciation of the dollar. The dollar's strength was a corollary of the capital inflow needed to absorb the debt issued to finance the deficit, and was reinforced by greater aggregate demand at home than abroad, which required for product market equilibrium that demand be shifted away from domestic goods (see Frankel, chap. 9, this volume). This real appreciation of the dollar impacted the basic industries because production costs in those industries are affected by economywide conditions and are imperfectly flexible in own-currency terms. For example, the 58 percent rise in the multilateral trade-weighted value of the dollar between 1980 and 1984 dramatically reduced the dollar value of the wages paid by foreign steel, textile, and automobile producers. Table 5.13 shows the dramatic decline in German hourly earnings in manufacturing expressed in U.S. dollars and the smaller but nonetheless significant decline in Japanese dollar-denominated labor costs over the period 1980:2–1985:1, when the value of the dollar rose by more than 80 percent against the deutsche mark and rose by nearly 20 percent against the yen. The rise in dollar-denominated foreign labor costs during the subsequent period of dollar depreciation is equally dramatic, although the relationship between the yen and the deutsche mark is reversed: whereas the fall in the nominal yen-dollar rate is nearly twice as fast the second period as its rise in the first, the fall in the deutsche mark–dollar rate is less than half as rapid in the second period as its rise in the first.

Nontariff barriers tend to reduce the price sensitivity of U.S. imports of basic industry products and hence to limit the impact of real exchange rates on employment in import-competing sectors. In addition, changes over time in the height of these nontariff barriers render the price elasticity of production employment extremely difficult to estimate. Estimates in the appendix (table 5.A.1) suggest that this elasticity ranges from roughly $-0.2$ in textiles and apparel to $-0.5$ in automobiles and

**Table 5.13** **Changes in Labor Costs in Manufacturing in Periods of Fluctuating Exchange Rates (in percentage points)**

| | 1980:2–1985:1 | 1985:1–1986:2 |
|---|---|---|
| U.S.[a] | | |
| Total private | 33.0 | 0.2 |
| Textiles | 34.5 | 4.6 |
| Apparel | 27.8 | 0.1 |
| Primary metals | 23.7 | 3.2 |
| Transport equipment | 41.9 | 1.8 |
| Germany[b] | | |
| Local currency | 17.8 | 5.0 |
| U.S. $ | −67.4 | 36.0 |
| Japan[c] | | |
| Local currency | 4.1 | 25.5 |
| U.S. $ | −14.3 | 59.5 |

*Source*: For U.S.: Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*, various issues. For Germany and Japan: OECD, *Main Economic Indicators*, various issues.

[a]Average hourly earnings of nonagricultural production or nonsupervisory workers, in current dollars.

[b]Hourly earnings in enterprises employing more than ten persons.

[c]Average monthly earnings.

steel. According to these estimates, the real appreciation of the dollar between the second half of the 1970s and the first half of the 1980s reduced employment in textiles and apparel by nearly 4 percent and employment in motor vehicles and steel by nearly 10 percent (table 5.A.2). The greater impact of exchange rate changes on autos and steel than on textiles and apparel makes sense when one observes that the dollar has fluctuated most dramatically (especially since the beginning of 1985) not against the currencies of developing countries, which are the principal suppliers of textile exports to the U.S. market, but against the currencies of industrial countries such as Germany and Japan, which are the main suppliers of autos and steel.

### 5.5.4 Pollution Abatement Expenditures

Unlike industry spokesmen, who attach great weight to the impact on international competitiveness of U.S. pollution abatement expenditures, academic analyses have generally concluded that the effects of these costs have been small. Table 5.14 shows pollution control expenditures as shares of GNP and investment for 1975, when concern over improving environmental quality was at its height. U.S. expenditure shares exceed those of its industrial competitors, with the notable exception of Japan. Table 5.15 presents three estimates of environ-

**Table 5.14 Private Sector Investment in Pollution Control, 1975**

| | Percent of GDP | Percent of Total Private Investment |
|---|---|---|
| United States | 0.44 | 3.4 |
| Japan | 1.00 | 4.6 |
| Denmark | 0.17 | 0.9 |
| Finland | 0.22 | 0.9 |
| France | 0.28 | 1.4 |
| Germany | 0.32 | 1.9 |
| Netherlands | 0.34 | 1.9 |
| Norway | 0.22 | 0.7 |
| Sweden | 0.19 | 1.1 |
| United Kingdom | 0.29 | 1.7 |

*Source*: Kalt 1985.

**Table 5.15 Direct and Indirect Regulatory Costs and Trade Performance**

| | Direct Environmental Costs[a] | Direct and Indirect Environmental Costs[b] | All Regulatory Costs[b] | Net Exports[c] |
|---|---|---|---|---|
| Textiles | 0.21 | 1.34 | 2.66 | −0.68 |
| Apparel | 0.03 | 0.66 | 1.48 | −12.39 |
| Iron and steel | 1.28 | 2.38 | 5.36 | −8.70 |
| Motor vehicles and equipment | 0.14 | 0.99 | 6.75 | −6.19 |
| Average of 31 import-competing industries[d] | 0.58 | 1.54 | 3.96 | −7.64 |

*Source*: Kalt 1985 and author's calculations.
[a]Cents per dollar of industry output.
[b]Cents per dollar of final demand.
[c]Net exports as percent of value of shipments.
[d]Weighted by value of total industry output.

mental expenditure as shares of industry output or final demand for the U.S. basic industries and import-competing industry as a whole. Direct costs of environmental regulation include the capital, operating, and administrative costs of pollution abatement. Direct and indirect costs include in addition the expenditures of other sectors which produce inputs into the industries in question. Direct and indirect costs of all regulation add estimates of the costs of health, safety, and economic regulation (including price and entry restrictions).

The steel industry stands out for its disproportionate direct costs. The only other industries with comparable burdens are nonferrous metal mining, paper products, nonagricultural mechanicals, electric power generation, and the government sector (Kalt 1985, 9). In contrast, the direct environmental quality expenditures of the textile, apparel, and automotive industries are well below the U.S. average. When both direct and indirect costs are considered, costs to the steel industry remain above average, but to a lesser extent. Once other regulatory (notably mileage and carbon-dioxide-related) costs are added, vehicles join steel with regulatory burdens in excess of the U.S. average. Clearly, regulatory costs have affected steel and automobiles very differently than textiles and apparel.

Figure 5.13 takes a closer look at the direct pollution abatement expenditures of the U.S. and Japanese steel industries.[46] Japanese expenditures per ton of steel output peaked in 1976. (The year 1976 also marked the peak of Japanese environmental control expenditures as a share of total investment, at 21 percent.) Japanese expenditures fell thereafter, although they turned up in the early 1980s when more stringent water pollution, dust, and soot regulations were imposed. U.S. expenditures also rose in the early 1970s, but from a lower level, and remained stable at a higher plateau into the 1980s. Although the time profile of expenditure differed across countries, there is little evidence that the U.S. industry bore a heavier burden overall.

At the same time, expenditures by both the U.S. and Japanese steel industries have vastly exceeded those of semi-industrialized countries where the pressure to improve environmental quality generally is less intense, placing both industries at something of a disadvantage relative to competitors in lower-income countries.[47] Looking across industries,

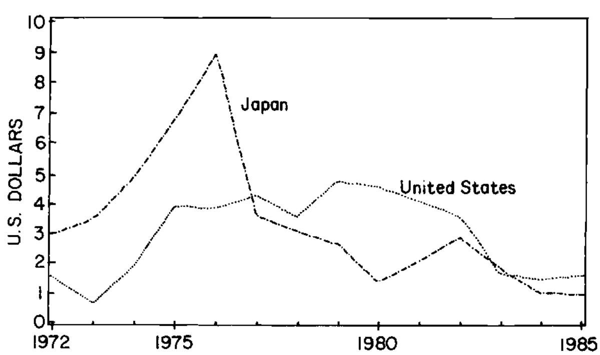


**Fig. 5.13** Pollution control expenditures per thousand tons of crude steel output.

Kalt (1985) finds that higher environmental costs have led to a significant deterioration in U.S. trade performance. As incomes in developing countries continue to rise and their demands for environmental protection grow, any U.S. disadvantage due to environmental regulation can be expected to decline. But this is likely to be a source of little relief in the decades immediately ahead.

## 5.6 Wider Impact on the U.S. Economy

Import penetration and declining basic industry employment have wider implications for the American economy. Of the various effects that might be considered, this section focuses on three: implications for the current account of the balance of payments, implications for the income distribution, and implications for the regional location of industrial activity.

On the surface, the basic industries appear to have contributed significantly to the U.S. merchandise trade deficit. Steel imports are least important in the aggregate: in 1984, U.S. steel imports were only three percent of total merchandise imports, and the deficit on trade in steel was only 8 percent of the total merchandise deficit. The figures for textiles and apparel are larger: textile and apparel imports were 5.8 percent of total U.S. merchandise imports, while the textile and apparel deficit was 14.1 percent of the overall merchandise trade deficit. The most important basic industry deficit was that in motor vehicle trade: passenger cars accounted for 9.1 percent of U.S. imports and 22.4 percent of the deficit. Thus, together these four basic industries accounted for 44.5 percent of the merchandise trade deficit.

It does not follow that trends in the basic industries are a cause of the current account deficit in any meaningful economic sense. The current account is a macroeconomic variable determined by relationships among other macroeconomic variables, notably by any imbalance between savings and investment. Thus, the current account deficit results ultimately from those macroeconomic policies influencing aggregate savings and investment behavior. Developments affecting particular industries determine only the composition of the current account, not its level. Trends in the basic industries influence the current account only insofar as their prospects affect the economywide investment climate or their performance affects economywide levels of employment and profitability sufficiently to alter the aggregate level of savings.

Observers of the American economy have expressed concern that the real incomes of wage earners have failed to rise at historical rates or to keep pace with the cost of living. As figure 5.7 indicates, the declining shares of steel and motor vehicles in total manufacturing employment represent a shift from high-wage categories of manufacturing employment to lower-paid jobs. The elimination of "quality jobs," it is suggested, lowers blue-collar earnings and reduces labor's share of national income.

Were imports of steel and motor vehicles suddenly eliminated, employment in these industries could be considerably expanded even if the wage premiums enjoyed by steel- and autoworkers were maintained. But whether *average* blue-collar earnings and labor's share of the GNP rose or fell would depend on who financed the redistribution. The standard economic argument is that those factors of production used most intensively by the protected industries would benefit, while factors used intensively by other sectors would pay for the redistribution. That steel and motor vehicle production is highly capital-intensive compared to the economy as a whole suggests that protection for steel and automobiles would raise the demand for capital more than demand for labor. Shareholders would be the principal beneficiaries of protection for the steel and vehicle industries. While workers with industry-specific skills would benefit in the short run, in the long run artificial stimulus for these industries is likely to reduce—not increase—labor's share of national income.

The relative decline of the U.S. basic industries has major implications for the regional distribution of manufacturing employment. Tables 5.16–5.19 show how employment in apparel, textiles, steel, and vehicles has been concentrated regionally and how that concentration has shifted over time. Apparel industry employment, for example, already concentrated at the beginning of the 1970s in the Middle Atlantic

**Table 5.16** **Apparel and Other Textile Products (SIC 23): Number of Employees and Number of Establishments (percentage of national totals)**

| | U.S. Total | | | | | |
|---|---|---|---|---|---|---|
| | 1970 | | 1977 | | 1984 | |
| Region | Emp. | Est. | Emp. | Est. | Emp. | Est. |
| 1. Pacific | 5.6 | 6.5 | 9.0 | 17.9 | 10.7 | 20.6 |
| 2. Mountain | 0.1 | 1.1 | 1.5 | 1.9 | 1.2 | 2.0 |
| 3. West N. Central | 3.7 | 3.4 | 3.7 | 3.3 | 3.3 | 3.0 |
| 4. West S. Central | 6.7 | 4.1 | 9.0 | 5.3 | 7.5 | 4.8 |
| 5. East S. Central | 12.3 | 4.1 | 14.2 | 4.8 | 15.8 | 5.1 |
| 6. East N. Central | 6.9 | 6.6 | 6.5 | 6.1 | 5.5 | 5.3 |
| 7. New England | 5.6 | 6.6 | 4.9 | 5.1 | 5.0 | 4.7 |
| 8. Middle Atlantic | 38.5 | 65.7 | 29.4 | 46.1 | 26.4 | 39.3 |
| 9. South Atlantic | 19.8 | 2.1 | 21.8 | 9.7 | 24.7 | 15.2 |

*Source*: Calculated from *County Business Patterns*, various issues.
*Note*: Percentages may not sum to 100 due to rounding.

**Table 5.17** **Textile Mill Products (SIC 22): Number of Employees and Number of Establishments (percentages in U.S. totals)**

| | U.S. Total | | | | | |
|---|---|---|---|---|---|---|
| | 1970 | | 1977 | | 1984 | |
| Region | Emp. | Est. | Emp. | Est. | Emp. | Est. |
| 1. Pacific | 1.4 | 6.5 | 2.1 | 6.0 | 2.1 | 7.1 |
| 2. Mountain | 0.1[a] | 0.2 | 0.3 | 0.6 | 0.3 | 1.0 |
| 3. West N. Central | 0.4 | 0.7 | 0.5 | 0.8 | 0.5 | 1.4 |
| 4. West S. Central | 1.4 | 1.3 | 1.9 | 2.3 | 1.4 | 2.3 |
| 5. East S. Central | 9.4 | 4.9 | 10.0 | 5.7 | 9.6 | 6.1 |
| 6. East N. Central | 2.4 | 3.6 | 2.1 | 4.2 | 2.6 | 4.6 |
| 7. New England | 8.9 | 12.2 | 7.6 | 10.3 | 7.9 | 9.9 |
| 8. Middle Atlantic | 15.1 | 36.0 | 12.3 | 31.3 | 11.1 | 28.3 |
| 9. South Atlantic | 61.0 | 34.5 | 63.3 | 38.8 | 64.4 | 39.4 |

*Source*: Calculated from *County Business Patterns*, various issues.
*Note*: Percentages may not sum to 100 due to rounding.
[a]Idaho and New Mexico not available.

region, has tended to shift south and westward (see table 5.16). In large part this reflects the attractions of low-wage labor in regions where unionization rates are low. Trends in textiles (table 5.17) resemble those in apparel. Textile industry employment is concentrated in six South Atlantic states, with North Carolina, South Carolina, and Georgia alone accounting for more than half of total industry employment. This geographical concentration has continued to increase over time.

Steel industry employment has been concentrated traditionally in western Pennsylvania, the vicinity of the Great Lakes, and to a lesser extent, California. Compared to the coasts, the Midwest retains a small margin of natural protection due to the transport costs of shipping steel from Europe or Japan.[48] Table 5.18 again reflects a tendency for industry to migrate toward the low-wage, nonunionized South, where the growth of minimills has been particularly rapid. The mid-Atlantic has been particularly hard hit by the decline in steel industry employment.

Motor vehicle industry employment is concentrated, of course, in the East North Central (table 5.19). But in this industry also, employment has tended to migrate toward the East South Central and South Atlantic regions.

A decline in basic industry employment need not imply either a persistent unemployment problem or the disappearance of manufacturing jobs. A dramatic counterexample is provided by Massachusetts, where a transition from dependence on the textile industry to sectors

**Table 5.18** **Blast Furnace and Basic Steel Products (SIC 331): Number of Employees and Number of Establishments (percentages of U.S. totals)**

| | U.S. Total | | | | | |
|---|---|---|---|---|---|---|
| | 1970 | | 1977 | | 1984 | |
| Region | Emp. | Est. | Emp. | Est. | Emp. | Est. |
| 1. Pacific | 4.1 | 10.2 | 4.1 | 11.3 | 3.0 | 9.8 |
| 2. Mountain | 0.0[a] | 0.5 | 2.1 | 1.5 | 2.5 | 1.8 |
| 3. West N. Central | 1.7[b] | 3.6 | 1.8 | 4.3 | 2.3 | 3.6 |
| 4. West S. Central | 2.0[c] | 5.4 | 3.1 | 8.0 | 4.6 | 8.2 |
| 5. East S. Central | 6.0 | 6.8 | 5.5 | 6.3 | 4.8 | 15.7 |
| 6. East N. Central | 42.4 | 32.7 | 41.6 | 30.7 | 45.0 | 27.9 |
| 7. New England | 1.5[d] | 6.6 | 1.7 | 6.9 | 1.7 | 6.9 |
| 8. Middle Atlantic | 34.0[e] | 27.1 | 31.4 | 21.5 | 25.9 | 17.5 |
| 9. South Atlantic | 8.3[f] | 7.2 | 8.8 | 9.5 | 10.2 | 8.5 |

*Source*: Calculated from *County Business Patterns*, various issues.
*Note*: Percentages may not sum to 100 due to rounding.
[a]Nevada, Utah, Colorado n.a.
[b]Iowa n.a.
[c]Oklahoma n.a.
[d]Rhode Island, New Hampshire n.a.
[e]New Jersey n.a.
[f]Delaware n.a.

**Table 5.19** **Motor Vehicles and Equipment (SIC 371): Number of Employees and Number of Establishments (percentages of U.S. totals)**

| | U.S. Total | | | | | |
|---|---|---|---|---|---|---|
| | 1970 | | 1977 | | 1984 | |
| Region | Emp. | Est. | Emp. | Est. | Emp. | Est. |
| 1. Pacific | 5.3 | 18.4 | 6.2 | 19.2 | 1.5 | 18.3 |
| 2. Mountain | 0.2 | 1.9 | 0.5 | 3.9 | 1.3 | 3.9 |
| 3. West N. Central | 6.9 | 9.4 | 7.2 | 8.3 | 10.7 | 7.9 |
| 4. West S. Central | 2.0 | 8.3 | 2.6 | 9.6 | 7.1 | 9.7 |
| 5. East S. Central | 2.6[a] | 4.7 | 4.3 | 5.3 | 9.0 | 6.0 |
| 6. East N. Central | 68.5 | 34.4 | 63.4 | 29.6 | 46.1 | 31.0 |
| 7. New England | 1.7 | 3.7 | 1.4 | 3.1 | 2.3 | 3.0 |
| 8. Middle Atlantic | 8.0[b] | 10.2 | 8.2 | 11.5 | 11.4 | 10.2 |
| 9. South Atlantic | 4.7[c] | 8.9 | 6.2 | 9.4 | 10.6 | 10.1 |

*Source*: Calculated from *County Business Patterns*, various issues.
*Note*: Percentages may not sum to 100 due to rounding.
[a]Mississippi n.a.
[b]New Jersey n.a.
[c]Delaware n.a.

based on new technologies has been successfully completed (for details, see Ferguson and Ladd 1986). Yet this experience does not provide a case for untempered optimism. Massachusetts suffered from unemployment in excess of the national average for an extended period prior to its post-1975 recovery; thus, its experience does not suggest that adjustment will be either quick or painless. Second, the reduction in Massachusetts unemployment resulted not from exceptional rates of job creation but from below average population and labor force growth. Unemployment fell because Massachusetts was no less successful than the rest of the country in creating new jobs (a significant achievement itself) and because the commonwealth's depressed economy discouraged in-migration. Third, Massachusetts has singular advantages that enable it to exploit the opportunities offered by high-tech industries, notably a large educational complex. Whether other states can complete their transition with the same success remains to be determined. But by demonstrating the role of an educational infrastructure in facilitating the transfer of resources, the Massachusetts example may contain lessons for the design of public policy toward the regional problem.

## 5.7 Response of the Industries

Two avenues for enhancing competitiveness—reducing input costs and obtaining additional protection—have already been addressed. This section considers three additional means to this end: the development of new products and processes, investment in the U.S. by foreign companies, and diversification.

### 5.7.1 New Products and Processes

Criticism of U.S. basic industries for lagging their foreign competitors in the adoption of new technologies should not be allowed to obscure the technological dynamism of many firms. For the basic industries, advances in manufacturing methods offer more promise than the development of new products. The speed of process innovation will depend on the success with which basic industries apply new technologies developed in the high-tech sector. Much progress has already taken place. In the steel industry, automation and computer control of continuous caster operations enhance control of caster speed, liquid levels, and cooling rates while reducing labor requirements. Computers are increasingly used to regulate fuel consumption in rolling processes and to control the quality of feed input in blast furnaces.

Even in an industry whose output is apparently as homogenous as steel, there is scope for product innovation. Ladle-refining systems, which permit the production of higher-quality "clean" steel, have been widely adopted in recent years. Five electrolytic galvanizing lines, recently completed or currently under construction, promise to increase by 500 percent the industry's capacity to supply the automotive industry with corrosion resistant, uniformly formable electrogalvanized steel. Lasers are used to refine the magnetic domain structure of electrical steel for transformers, improving product quality and permitting a price premium to be charged (see Leonard and Collins 1986; Neiheisel 1986).

Process innovation in the automotive industry is proceeding apace.[49] Microprocessor-controlled flexible machining centers capable of fabricating parts for power-steering pumps and alternators have recently been introduced. These machines can change tools without operator assistance as needed for new jobs. Assembling the parts produced by such machines into completed components is a more delicate task; machines with these capabilities remain at the prototype stage, although robotics have been applied to stamping and to engine, body, and final assembly (Altshuler et al. 1984, 96–97). Computer numerical control has been introduced into engine and transmission machining. Computer-aided design has reduced design costs and lead times, while computer-aided engineering has reduced the cost of skilled tool-room labor. Computer modeling of production flows has reduced inventory costs, enhanced stock control, and helped automate product inspection.

As with steel, the scope for product innovation in the motor vehicle industry is less extensive than in many other sectors. Rather than fundamental changes in the nature of vehicles, it principally takes the form of incremental innovations that enhance their capabilities. For example, on-board computers are increasingly used to monitor engine performance. Electronic traction and skid control can be used to enhance operator control. While the cumulative impact of these improvements can be substantial, it remains unlikely, as Altshuler et al. (1984) conclude, that in the foreseeable future product innovation will radically transform the automobile.

In the textile and apparel industries, technological progress has been less rapid. Nonetheless, at the grading stage, new computer methods are available for selecting the best combination of fibers for a given end use and for eliminating the blend variations associated with hand feeding. At the spinning and weaving stages, technological progress has already led to refinements of existing technology. At the assembly stage, modest technological advances, such as the automated pocket-maker, have been adopted by many firms. The cost of these new technologies is prohibitive for all but the largest producers. This will be even more the case once research currently underway in Japan and New England leads to the development of flexible sewing systems based on robot technology like that already in place in the automobile industry.[50]

What relief from import competition does innovation offer the U.S. basic industries? Although process innovations will remain a critical determinant of comparative production costs, it is unlikely that their adoption will eliminate the gap between production costs in the United States and in its industrial competitors, notably Japan. New technologies applicable to the basic industries diffuse rapidly among industrial countries; there is no reason to anticipate that the United States will be able to appropriate such technologies and sustain a competitive advantage by adopting them to a greater extent than other industrial countries. Insofar as new manufacturing methods entail the substitution of capital for labor, new technologies that increase the scope for substitution may reduce the disadvantage of U.S. basic industries vis-à-vis their LDC competitors. But as the NICs continue to develop and their labor costs rise in the manner of Japan's, the importance of such savings will shrink.

Competitive advantages due to product innovation derive from producers' ability to tailor new products to the tastes and requirements of consumers. The proximity of U.S. producers to what remains a relatively large domestic market situates them favorably in this effort to adapt their products to the preferences of consumers and end users. The production of electrogalvanized steel for the U.S. automobile industry and designer clothing by the apparel industry, cited above, illustrates this potential. Yet the sobering example of the auto industry in the 1970s is a reminder that mere proximity to the market is no guarantee of success in tailoring products to final demand.

### 5.7.2 Joint Ventures and Onshore Production by Foreign Firms

The advent of Japanese automobile production in the United States is the most visible illustration of a general trend. Honda now operates a plant in Marysville, Ohio, and Nissan one in Smyrna, Tennessee, while Toyota and GM jointly produce a small car in what was formerly GM's Fremont, California, assembly plant. Together these three operations produced more than five hundred thousand vehicles in 1986. Mazda, Mitsubishi, and Isuzu/Fuji have plans for plants in Michigan, Illinois, and Indiana, respectively. In 1984, Nisshin Steel acquired a stake in Wheeling-Pittsburgh and Nippon Kokan obtained half of National Steel, while in 1986 Kawasaki Steel acquired half of California Steel. Moreover, there is an increasing foreign presence in the U.S. minimill sector.

To some extent these arrangements represent attempts to import Japanese technology, management, and labor relations techniques in efforts to boost productivity. For example, workers at the Nissan and Honda plants and at California Steel's plant in Fontana are organized into teams responsible not only for regular production duties but for inspection, materials handling, and housekeeping (Katz 1985, 144). Moreover, onshore production enhances the ability of Japanese steel makers to tailor output to their customers in the U.S. automobile industry, an important consideration for producers of coated-steel products. But the principal explanation for onshore production is as a response to U.S. protectionism and as a hedge against even more stringent measures. Not only can the Japanese protect against this risk by producing in the United States, but this strategy itself reduces the danger of tighter trade restrictions by diverting the sales of Japanese companies from goods manufactured abroad to those manufactured in the United States.

Japanese-owned automobile companies project that "immigrant plants" will produce 1.8 million vehicles for the U.S. market by 1990. Since domestic demand is projected to grow slowly, these sales are likely to come partly at the expense of Japanese exports and partly at that of the U.S. competition. While onshore production by foreign firms is likely to slow the decline of U.S. auto industry employment, it will only add to the difficulty domestic firms have had in maintaining market share.

### 5.7.3 Diversification

A final response on the part of U.S. basic industries is diversification, which can be understood as part of a long-standing strategy to make the basic industries "less basic." As early as 1969–71, 30 cents of every dollar invested by steel firms was invested outside of steel-producing activities; by the late 1970s the ratio had risen to 33 percent (Acs 1984, 136–37). USX (formerly the U.S. Steel Corporation) has found new outlets for its managerial and financial resources through acquisitions ranging from chemicals and engineering to real estate and railroads. The same strategy has been adopted by Japanese steel producers, who have branched into areas as diverse as industrial ceramics and silicon wafers. The principal thrust of USX's diversification has been into energy, notably through its acquisition of Marathon Oil in 1982 and Texas Oil and Gas in 1986. At present, only one-third of USX's revenues come from steel, with oil and gas now accounting for a majority of total sales. While this too represents an attempt to move into more promising sectors, it is also a continuance of the steel industry's traditional strategy of using diversification to reduce the cyclical risks of steel making. Since energy is an important component of the cost of producing steel, through the ownership of energy resources, steel companies can hedge against the effects of higher energy prices.

## 5.8 Future Prospects

What are the prospects for the basic industries in the United States? Clearly, the international product cycle will continue to operate. Competence in the production of the products of basic industries tends to be acquired in the early stages of industrialization. This international diffusion of standardized technologies is beyond the control of American producers and policymakers. Hence developing countries where the costs of labor and raw materials are low should have a continuing if not an increasing competitive advantage in the production of standardized basic industry goods. U.S. basic industries, particularly those segments using standardized processes to produce standardized products, will experience no relief from foreign competition.

The precise impact of this foreign competition will depend on the stance of U.S. trade policies. For the foreseeable future, trade in the products of these industries will continue to be regulated by "voluntary" restraints and bilateral quota agreements rather than tariff protection. There is no reason, if quotas are set at sufficiently restrictive levels, that production for the U.S. market could not take place domestically. Studies of U.S. trade policy unanimously conclude that the costs of such policies are high, however. Not only do the high prices charged domestic consumers of the products of basic industries translate into a very substantial cost per protected job, but they divert scarce U.S. resources into the basic industries and out of alternative uses where their productivity is higher. The competitive difficulties of the U.S. basic industries are the market's way of signaling that productivity there is relatively low. Permitting these industries to release resources and even facilitating their smooth transfer through adjustment assistance programs is a way of responding constructively to the productivity slowdown that has been the subject of so much recent attention.

None of this implies that the U.S. basic industries should or will vanish. U.S. producers will retain some comparative advantage vis-à-vis developing country competitors wherever product quality and marketing are important—that is, where skilled labor and proximity to the consumer confer comparative advantage. Those segments of the American automotive, steel, and apparel industries producing high-performance automobiles, electrogalvanized steel, and designer clothing, for example, have brighter prospects than the basic industries as a whole. The ability of the U.S. basic industries to exploit this advantage, which other industrial countries share, depends on their ability to maintain quality, to successfully tailor goods to market, and to moderate production costs, three areas where their record is not unblemished.

Most of all, the competitiveness of these segments of the U.S. basic industries will depend on their ability to apply the new technologies developed by the high-tech sector. Robots, computer-controlled machine tools, and other forms of automated technology continue to offer improvements in productivity and quality control. They are the domestic industries' hope of maintaining a competitive advantage as existing technologies continue to diffuse to newly industrializing countries. Located in a country rich in the human capital used to develop these new technologies, U.S. basic industries might be thought to possess a comparative advantage in their adoption. But much depends on the foresightedness of domestic producers and on public policy. If macroeconomic policies fail to keep domestic demand from declining and the real exchange rate from rising as wildly as in recent years, the investment required for the adoption of these technologies will not take place. If domestic producers are provided overly generous protection, they will have little incentive to develop and adopt these new technologies. Policies of protection that increase basic industry employment in the present may not be conducive to the prosperity of the U.S. basic industries in the future.

# Appendix
## *Regression Results*

This appendix presents regression results cited in the text. Using quarterly data for the period 1973:1–1986:1, employment is regressed on measures of the real exchange rate, the relative price of energy, the economywide unemployment rate, and the sectoral real wage. Data and specification follow Branson and Love (1986) with three modifications. First, the dependent variable is number of production employees instead of total employees. Second, a distributed lag on average hourly earnings is appended to their basic specification to permit the impact of labor costs on employment to be examined. Third, the sample period is altered, starting only in 1973:1 and extending through 1986:1. Data on both number of production employees and hourly earnings are drawn from U.S. Department of Labor, *Employment and Earnings* (various issues). Hourly earnings are deflated by the CPI to construct a measure of the real wage. Other data are as described by Branson and Love. The real exchange rate is the IMF index of relative unit labor costs; the real energy price index is the CPI-Urban energy price index divided by the CPI-Urban index for all consumer goods; the unemployment rate is for all workers, economywide.

Results appear in table 5.A.1. While the results for all manufacturing are quite satisfactory, the results for the four basic industries vary. In contrast to all manufacturing, employment in each shows a significant downward trend even after controlling for cyclical conditions, the real exchange rate, the real price of energy, and the sectoral real wage. Only the textile industry fails to exhibit strong sensitivity to the business cycle (as captured by the coefficients on the civilian unemployment rate). There is considerable variability in the impact of energy prices, which increases as one moves from textiles to apparel to steel and finally to motor vehicles. The large coefficients in the equations for vehicles and steel suggest that the energy price variable may also be picking up the impact of structural factors (shifts toward smaller cars or steel substitutes whose timing coincides with the energy price shocks). Similarly, changes in the real exchange rate had a more powerful impact on motor vehicles and steel than textiles and apparel, suggesting that the MFA limited the effects of import competition even more severely than automobile and steel VERs. Finally, the impact of real wages is generally negative but uniformly weak. (Before concluding from this that firms do not operate on their labor demand curves, it would be useful to adjust hourly earnings for productivity and to deflate them by a measure of sector-specific producer prices.)

Table 5.A.2 uses these regressions to decompose changes in U.S. competitiveness (as they are reflected in changes in production employment) into these four components and a residual. The first line shows that slack macroeconomic conditions, real exchange rate appreciation, and higher energy prices all tended to reduce U.S. manufacturing employment between the second half of the 1970s and the first half of the 1980s. Only some slight decline of real manufacturing wages moderated the trend. Of these factors, the dollar's real appreciation was the most important; by itself it would have caused production employment in manufacturing to fall by more than an eighth. But U.S. manufacturing employment declined considerably less than the movement of these variables would predict. Other sources of enhanced competitiveness ("other factors" in table 5.A.2) contributed significantly to the maintenance of manufacturing employment over the period.

The basic industries show many of the same patterns but important differences as well. Employment in steel and vehicles is more cyclically sensitive than employment in textiles and apparel, more strongly affected by movements in the real exchange rate, and more responsive to changes in the relative price of energy. Although the recent moderation of real manufacturing wages has stimulated employment in all

**Table 5.A.1 Regression Results: Determinants of Production Employment, 1973:1–1986:1**

| Sector | Constant | Trend | Unemployment (4) | Real Exchange Rate (6) | Real Energy Price (4) | Real Hourly Earnings (8) | $p$ | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| | | | Independent Variable (length of distributed lag) | | | | | |
| All manufacturing | 10.916 | −0.001 | −0.300 | −0.687 | −0.097 | −0.143 | .057 | .986 |
| | (12.13) | (0.19) | (12.25) | (3.45) | (1.11) | (1.40) | | |
| Textiles (SIC 22) | 7.906 | −0.006 | −0.134 | −0.246 | 0.060 | −0.007 | −.189 | .863 |
| | (2.02) | (2.25) | (1.01) | (0.47) | (0.57) | (0.26) | | |
| Apparel (SIC 23) | 7.655 | −0.007 | −0.147 | −0.126 | 0.219 | −0.513 | .143 | .984 |
| | (7.65) | (6.20) | (4.56) | (0.70) | (1.30) | (1.40) | | |
| Iron and steel | 11.104 | −0.013 | −0.256 | −0.501 | −1.057 | −0.560 | .546 | .993 |
| (SIC 331) | (5.29) | (5.55) | (3.40) | (1.79) | (1.37) | (0.68) | | |
| Motor vehicles | 14.491 | −0.010 | −0.238 | −0.494 | −1.142 | 0.404 | .027 | .947 |
| (SIC 371) | (3.90) | (2.97) | (3.14) | (1.55) | (2.35) | (1.29) | | |

*Source:* See text.

*Note:* Dependent variable is log of production employees. F-statistics for sum of coefficients are in parentheses below coefficient estimates. Numbers in parentheses below variable names denote number of lagged values of the explanatory variable included. The current values of all variables but real hourly earnings are also included. All equations are estimated on quarterly data using a Cohrane-Orcutt correction.

**Table 5.A.2 Decomposition of Trends in U.S. Basic Industry Employment from 1973:1–1980:1 to 1981:1–1986:1**

| | Percentage Change in Production Employment | | | | | |
|---|---|---|---|---|---|---|
| | | Attributable to | | | | |
| | Total | Cyclical Factors | Real Exchange Rate | Energy Prices | Real Wages | Other Factors |
| All manufacturing | −8.4 | −7.2 | −13.3 | −2.0 | 0.5 | 13.6 |
| Textiles (SIC 22) | −20.2 | −3.2 | −4.7 | 1.4 | 0.1 | −13.8 |
| Apparel (SIC 23) | −13.9 | −3.5 | −2.4 | 5.0 | 5.4 | −18.4 |
| Iron and steel (SIC 331) | −47.9 | −6.1 | −9.7 | −24.1 | 1.4 | −9.4 |
| Motor vehicles (SIC 371) | −16.5 | −5.7 | −9.6 | −26.0 | 0.6 | 24.2 |

*Source:* Computed from regressions reported in table 5.A.1. "Other factors" incorporates the trend term and the regression residual.

four industries, the contribution of wage trends to the change in total industry employment has been relatively small. A striking feature of the table is the contrast in the impact of "other factors" between motor vehicles and the other basic industries. In textiles, apparel, and iron and steel, these other factors contributed to the decline in production employment over the period. The interpretation of this finding is that the further intensification of foreign competition tended to add to the three industries' competitive woes. In automobiles, in contrast, other factors account for a significant rise in production employment. Whether this has been due to increased barriers to foreign competition, notably the negotiation of Japanese export restraints in 1981, or to new investment, marketing, and product development strategies on the part of the U.S. automobile producers cannot be determined by regression alone.

# Notes

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1. See Gerschenkron 1962. The basic reference on the international product cycle is Vernon 1966.

2. Raw steel production (in millions of net tons), average number of employees, and import penetration ratio in steel are taken from American Iron and Steel Institute 1986 and AISI Annual Statistical Bulletins. Motor vehicle production (cars, motor trucks, and buses), all employees in motor vehicle and equipment manufacturing, and import penetration ratio are constructed from Motor Vehicle Manufacturers Association, *Motor Vehicle Facts and Figures*, various issues. Employment in the textile mill products industry and in apparel and related products is from American Textile Manufacturers Institute, *Textile Hilights*, various issues. Output and import penetration ratios for textiles and apparel–apparel fabric are measured in square-yard equivalents and taken from American Textile Manufacturers Institute 1986.

3. Total employees is from U.S. Department of Commerce, *Employment and Earnings*, various issues.

4. Both Chrysler and Ford then reduced capacity and employment in the early 1980s. General Motors followed suit late in 1986, announcing that 11 facilities employing twenty-nine thousand workers would close permanently in 1987.

5. Figures for the steel industry, in millions of net tons, are taken from annual reports of the American Iron and Steel Institute, various issues. Figures for the automobile industry are percentage of domestic retail sales of passenger cars accounted for by imports, taken from *Motor Vehicle Facts and Figures*. Figures for textiles, imports as a share of domestic apparent consumption, are measured in square-yard equivalents and taken from American Textile Manufacturers Institute 1986.

6. This growth rate is for the nine leading third world producers, computed from Hogan 1983, 155.

7. The effective tax rate is from Ando and Auerbach 1985. For further discussion of these policies, see Saxonhouse 1983.

8. A significant share of these debts had been extended by the government itself, especially after 1970. The cost to the states of the restructuring program has been estimated variously at \$2 billion to \$6 billion (U.S. Congress, Joint Economic Committee 1981, 30–31).

9. As the authors are careful to note, their estimates must be interpreted cautiously, since relatively few steel companies (two Japanese, one American) and relatively few auto companies (one Japanese, three American) are included in their sample.

10. Apparent consumption is domestic production plus imports minus exports, taken from OECD 1985 and publications of the American Iron and Steel Institute, with figures from AISI publications converted to ingot equivalents by the OECD method. The trend line is the OLS regression:

$$\underset{}{\text{App. Cons./GNP}} = \underset{(26.82)}{0.064} - \underset{(7.66)}{0.0012}{*}\text{time}.$$

Here and in subsequent notes, figures in parentheses are t-statistics. Breaking the trend in 1973 and 1979:

$$\text{App. Cons./GNP} = \underset{(28.13)}{0.056} - \underset{(0.32)}{0.0001}{*}\text{time} - \underset{(2.54)}{0.0015}{*}\text{post72} - \underset{(1.76)}{0.0014}{*}\text{post78}.$$

Equations such as these are not strictly interpretable as demand curves since they do not adjust the consumption ratio for relative price effects. In the case of steel, however, such adjustments are of little consequence. Adding the price of metals and metal products relative to the prices of all intermediate materials and supplies changes the coefficient on the time trend reported above only from 0.0012 to 0.0013.

11. See the discussion in Jones 1986, 56–58.

12. The data of Barnett and Schorsch (1983, 41) suggest that Germany reached this stage after 1970 and Japan after 1973. Cross-section data suggest that steel intensity declines once per capita GNP reaches \$2,000 (1963 prices); see Jones 1986, 58.

13. For additional statistics, see Barnett and Schorsch 1983, 40.

14. An OLS regression of the apparent consumption/real GNP ratio on deviations of log real GNP from trend yields a coefficient significantly greater than zero at standard confidence levels:

$$\text{App. Cons./GNP} = \underset{(25.47)}{0.0479} + \underset{(2.69)}{0.132}{*}(\text{deviation of log real GNP from trend}).$$

15. De la Torre 1984, 24. For evidence on Engel's law in the context of textile consumption, see OECD 1983, 29.

16. Data from OECD 1982 and previous issues. The trend is

$$\text{Expenditure share on clothing} = \underset{(82.94)}{9.760} - \underset{(15.00)}{0.134}{*}\text{time}.$$

17. The slope of the OLS regression line, while negative, differs insignificantly from zero:

$$\text{App. Cons./GNP} = \underset{(7.57)}{4.960} - \underset{(0.43)}{0.015}{*}\text{time}.$$

The regression for cyclical sensitivity of the apparent consumption ratio is

$$\text{App. Cons./GNP} = \underset{(33.58)}{4.674} + \underset{(2.11)}{8.979}*(\text{deviation of log real GNP from trend}).$$

18. Between 1973 and 1984, for example, real operating cost fell by nearly 19 percent. This calculation adjusts total cost per mile, from *Motor Vehicle Facts and Figures '85,* for changes in the cost of living index.

19. These figures from the U.S. Department of Labor omit nonpayroll items such as pensions, insurance, and supplemental unemployment benefits to facilitate the comparison with all manufacturing. Figures including estimates of nonwage compensation are used, however, in the international comparison of basic industries. Since nonwage earnings have been more important historically in steel and autos than elsewhere in the economy, fig. 5.7 presents a lower bound on the premium over all manufacturing received by workers in these two industries.

20. In 1986 there were short stoppages at LTV and Armco and a large-scale strike at USX (formerly U.S. Steel), the last of which left twenty-two thousand workers idle.

21.To be exact, 56.4 percent. See U.S. Department of Commerce 1978.

22. Their 1979 contract, for example, provided for a one percent hourly wage increase for every 0.26 point rise in the cost of living (Kreinin 1984, 46).

23. National currency compensation costs are converted to U.S. dollars using average market exchange rates. For well-known reasons, their dollar equivalents should not be taken as measures of living standards. Insofar as market exchange rates reflect the relative price of traded goods, however, this is the measure relevant to discussions of comparative costs in traded goods industries.

24. Note that estimates for steel in table 5.8 differ from those in table 5.10. Figures in the latter table have been adjusted by the Labor Department to enhance international comparability. See U.S. Department of Labor 1984.

25. Similarly, in steel the establishment of voluntary labor-management participation teams was encouraged by the 1980 basic steel agreement. By the end of 1985 there were approximately five hundred such teams functioning in the steel industry. The discussion of automotive labor relations that follows draws mainly Katz 1985, chap. 4, and National Academy of Engineering 1983, chap. 7.

26. Capital expenditures in millions of dollars are taken from American Iron and Steel Institute *Statistical Highlights,* various issues; American Textile Manufacturers Association *Textile Hilights,* various issues; and Motor Vehicle Manufacturers Association, *MVMA Facts and Figures,* various issues. Department of Commerce estimates of capital expenditures in U.S. manufacturing appear in the last two of these sources.

27. In a survey of textile industry executives, Toyne et al. (1984, 135–36) found this to be one of the principal motives for investment.

28. See, for example, AISI *Annual Report* for 1985, p. 9.

29. Although their methods, which assume a twenty-year life for plant and equipment, may exaggerate the rate of depreciation and thus overstate the extent of disinvestment, this is unlikely to affect the thrust of their conclusions. Acs (1984, 141), however, estimates that investment in new capacity exceeded depreciation in thirteen of twenty-one years from 1960 to 1980.

30. In the first half of the sixties the share of output technically suited to continuous casting was lower only in Austria; in the second half, it was lower only in Austria and Sweden (Schenk 1974, 245).

31. Continuously cast steel and crude steel production, in metric tons, and share of the total produced using open hearths are taken from International Iron and Steel Institute 1985, tables 2, 4, and 5. Linear regression yields

$$\% \text{ Continuously Cast} = \underset{(13.60)}{66.70} - \underset{(1.14)}{0.78} \% \text{ Open Hearth}; \quad R^2 = 0.05.$$

The sample is comprised of twenty-five developed and developing countries, all of those for which data could be obtained excluding Eastern Europe.

32. The regression is

$$\% \text{ Continuously Cast} = \underset{(12.19)}{12.18} - \underset{(-0.91)}{0.621} \% \text{ Open Hearth}$$
$$- \underset{(1.10)}{1.10} \% \text{ Output Growth 70–75} + \underset{(1.44)}{0.06} \% \text{ Output Growth 75–84}; R^2 = .12.$$

Data are as above, with the addition of 1970 output from OECD 1985. One reason output growth does not have a stronger effect is that in some countries where there have been systematic programs of rationalization, the authorities, when shutting down excess capacity, have shut down those works without continuous casters. Hence in some countries where output has declined most rapidly, the share of steel continuously cast is highest.

33. Data are from International Iron and Steel Institute *Yearbooks*, various issues.

34. See for example Adams and Dirlam 1966. Oster (1982) found that large U.S. producers were slower to adopt the BOF than their smaller counterparts. However, in the subsequent study mentioned later, Karlson (1986) extended the analysis to encompass not only the choice between the BOF and the open hearth but the electric furnace as well, concluding that variations in adoption lag by plant size were trivial. It remains possible, however, as industry observers have argued, that all U.S. firms, irrespective of size, were slow to adopt the BOF.

35. For details, see Barnett and Crandall 1986.

36. Calculated from Mueller and Kawahito 1978, 19. Japanese energy intensity of production has fallen dramatically since the time of these calculations. Between 1973 and 1985, energy consumption per ton of crude steel production fell by 20 percent as the industry shifted toward coal-based energy in place of oil.

37. Arpan et al. 1982, 108–9. However, higher oil prices have improved the competitive position of U.S. national-gas-based synthetic fibre producers. The regressions in the appendix suggest that energy prices have had an insignificant impact on U.S. textile and apparel employment.

38. The estimates in the appendix suggest still larger employment effects.

39. Japan's 1937 exports of 124 million yards of cotton cloth were not matched until 1955 (Brandis 1982, 7).

40. There nonetheless exists a great number of studies of this question. Since they have recently been reviewed by Hufbauer, Berliner, and Elliott 1986, only a selection of the most recent estimates is discussed here.

41. Stabilizing the market share of imports may have been the underlying objective of the scheme, which was administered with varying severity so as to achieve it (Barnett and Schorsch 1983, 241).

42. Data are taken from Paine Webber, various issues. The export price is the Antwerp spot price.

43. The average number of production workers in 1983–84 was 170,000. Assuming it to have been 22,000 less in the absence of restraints, the share of employment accounted for by restraints is 22,000/(170,000–22,000) = 15 percent.

44. The point is not that domestic prices are 30 percent higher and domestic steel industry employment is correspondingly higher under VERs than they were in the preceding period of trigger prices. Rather it is that prices are approximately 30 percent higher than they would be under free trade.

45. See Hufbauer, Berliner, and Elliott 1986, 256, for other estimates.

46. U.S. capital expenditures for environmental control are the sum of air and water expenditures. Those for Japan are the sum of air and water and relatively small industrial waste, noise and vibration, and miscellaneous expenditures. U.S. total crude steel production is measured in net tons, while Japanese figures have been converted to net from metric tons. Sources are AISI Statistical Highlights, various issues, and unpublished MITI estimates supplied by the Japan Steel Information Center.

47. There are exceptions to this rule, such as substantial expenditures on pollution control by Brazilian steel companies.

48. Eichengreen and van der Ven 1984 reports estimates of these costs.

49. This is true of all industrial countries; see for example Marsden et al. 1985.

50. For details, see Toyne et al. 1984, chap. 4.

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## 2. *Charles W. Parry*

### Basic Materials in a Global Economy

In this comment I do not speak for all basic industry today, nor do I touch on those that were well covered in Barry Eichengreen's paper. Rather, I speak generally of factors affecting many basic industries and give some specific examples, using Alcoa as a proxy for other basic materials industries or producers.

Some underlying conditions affect almost all basic industries. They are (1) capacity exceeding demand; (2) low prices, a normal outcome of overcapacity; (3) inadequate financial returns; (4) high, if leveling, labor costs and an unproductive set of relationships between the three affected parties; (5) a broad and perhaps permanent reduction in the material intensity of the developed economies in general and the U.S. economy specifically; and (6) a permanent shift in comparative advantage and factor costs to LDCs and to government-owned operations where the reason for being is not necessarily return on investment.

I return to these characteristics in a moment. But some other, if less pervasive, problems also affect the basic industries, and I want to mention them briefly. All industries and all companies are not affected by them, but they prevail to a degree worth pointing out.

First, the macroeconomic environment in which U.S. industry operates is deteriorating. The combination of budget and trade deficits equals declining competitiveness. In fact, the so-called Tax Reform Act of 1986 will actually further reduce U.S. industrial competitiveness by stalling investment in productivity and by virtually eliminating the possibility of repatriating earnings from overseas operations.

Second, the strength of the dollar has created competitive pressures in recent years that have severely affected many basic industries. At its high, the strong dollar gave most European and Japanese aluminum producers a cost advantage of 20 percent or more vis-à-vis American producers. The result was a flood of imports of products that, all other things equal, would not have been competitive.

While the dollar has fallen against the yen, the deutsche mark, and some other currencies, the flood has not yet ebbed significantly. It seems to me that the dollar will have to fall another 15 percent to 20 percent before those imports retreat to a more typical level. Obviously, those basic industry companies that are multinational have not been as badly injured by the high dollar as those operating only within U.S. borders. But as the dollar falls, we must begin to worry about renewed inflation and the risking risk of disintermediation on the part of foreign investors.

Third, and perhaps more important, the production of basic goods today has changed dramatically and probably permanently. For many years, in some cases more than a century, the most economic production of basic materials came from vertically integrated systems. There were economies of scale that required the matching of various steps in the flow from raw material to finished product. Let me give you an example from the aluminum industry.

In our business the critical cost—and the technical fulcrum—was in smelting, where the refined ore was turned into metal. There was an optimum size for a smelter, depending on its power supply and its specific technology. To provide a feedstock, a refining plant had to be designed—not only to meet the needs of the smelter, but to take advantage of a particular body of bauxite. Assuring both a secure and profitable operation required some pretty deft planning and design work. In the early days, it was far more art than science.

Today, the need for an integrated system is at best questionable. The mines, the refining plants, and the smelters are all off the shelf, technically. Bauxite, alumina, and aluminum ingot are commodities, largely undifferentiated. What matters today lies downstream, in fabricated products and in parts and systems of parts made from those products. Recognizing this change, the U.S. aluminum industry is disintegrating. This change requires a wholly new mind-set, but it is driven by changes that are outside the control of the once-integrated companies.

Other basic industries have made similar responses where their production streams are complex. Steel, copper, tin, aluminum—all differ in their complexity, but all have the characteristics of a commodity. U.S. Steel today would be rolling British slabs at Fairless if the steelworkers had not objected. Aluminum was the last to go. If a definition of basic industry includes the automakers, an interesting parallel can be found in their complex assortment of outsourcing of parts, their joint ventures and international production systems.

My point is that the once familiar, self-contained, vertically integrated production systems are coming apart and that the trend will continue as basic industry continues to become globalized.

Now, let me return to my list of underlying conditions in basic industries.

In almost every basic industry, there is overcapacity. From customers' and consumers' points of view, this has been a good thing. Prices for basic materials have not contributed to inflation and, in the opinions of many, have actually been deflationary. But prices ultimately are a reflection of supply and demand, and shareholders are not known to be overly stupid for long.

In reaction, most basic industry companies in the United States have reduced excess capacity, cutting those facilities that are least competitive (which normally means those that are most technically out of date). In the case of my own company, we have written off uncompetitive capacity, even beyond the tonnage we typically carried for market development purposes. In the future, in periods of high demand we will buy what we are unable to produce. Reports in the media lead me to believe that we are not alone in this strategy.

There are, of course, real questions surrounding a strategy of limited capacity. Implicit in such a strategy is an assessment of limited market growth. There are also those who are uncomfortable with the long-term impact on national defense capabilities.

The reality of a world market in basic materials, however, effectively precludes any meaningful debate of those questions. Most, if not all, basic materials are not commodities. Commodities by definition are undifferentiated, so cost is the single determinant. In U.S. basic industry, critical costs are often determined by public policy, which has frequently been less than kind toward industry.

Again, an example. There are three major cost areas in producing primary aluminum: raw materials, labor, and electricity. In this example, raw materials are of lesser consideration, since economical ore sources do not exist in the United States; we must either import bauxite or its refined intermediates.

In the case of energy, to the extent that we have a national policy on electricity, it is a policy of populism. Power rates that once were based on cost of service have increasingly been based on the political expedient of keeping rates low for individual users. Since electricity is the largest single cost component in a pound of aluminum, it is critical. In the past decade, the United States has gone from being a low-cost aluminum producer to being a high-cost producer. That reality is reflected by the smelter shutdowns of recent years.

I mentioned the third factor of cost—labor. Basic industry in the United States has long been the country's most unionized sector. In recent years, however, declining demand in some industries and flattening growth rates in others have put great pressure on labor costs. The three components of labor cost—pay, benefits, and work rules—have all come under attack in varying degrees. But the real kicker here, and one that neither company nor union can control, is the development of the global economy. National unions, no matter how powerful, have precious little leverage in a global economy.

Union leaders have been in the forefront of those demanding protectionism. Yet union leaders—and past managements—share much of the blame for the noncompetitiveness of many U.S. basic materials. Those industries and companies whose operations lie entirely within the borders of the United States seem to have been hurt more by labor problems. Those of us with operations around the world are protected in varying degrees by our flexibility. While the steel industry, for example, joins with the United Steelworkers in demanding protection from imports, the aluminum industry concentrates instead on seeking fair trade and in opening markets in other developed economies. Other basic industries, such as tin and copper, have also been more global in their outlook.

I said at the start that high labor costs are a problem for basic industry. I also said that there is an unproductive set of relationships between the three affected parties. And there are *three* parties: management, employees, and the unions themselves.

My experience last year in dealing with the first simultaneous strike by both of Alcoa's major unions brings me to the conclusion that union leaders do not necessarily behave in the best interests of their members. Nor are union members necessarily hard-line, recalcitrant, or anti-management. In fact, the agenda of the union may be quite different from the agenda of the employee. This reality of separate agendas may serve the interests of both companies and employees in the future, providing common ground for experimentation and renewed trust. It remains to be seen whether the agenda of the international union becomes the odd man out.

So far, what I have discussed relates to some of the underlying causes of the general lack of competitiveness in basic industry. Those causes are fairly well known to anyone who has sought them out. I end my presentation by giving you my thoughts on the future for these enterprises.

First, basic industry has to make its case to the public for relief from those policies that affect it negatively. I refer specifically to such policies as a tax policy that penalizes investment, energy policies that pretty much rule out competitive costs, and trade policies that stifle rather than encourage competition. Changes in public policy are essential to create a supportive macroeconomic environment within which U.S. basic industry can become competitive.

Next, those of us in basic industry have got to get *our* act together and compete. This means coming to grips with new technologies, stepping up to the sometimes frightening prospect of reducing labor costs, and internationalizing mind-sets by internationalizing operations. We must rid ourselves of the false notion that the United States is a separate island in the sea of world trade.

In addition, U.S. basic industries need to get back to competing by going back into the marketplace. Products must compete on cost, but they also must compete differentially. The day of waiting for customers to call in an order is gone. This is especially true when basic materials are essentially undifferentiated. By adding value to a customer's product, a basic material is no longer the same as all others—a concept too many have either forgotten or never learned.

Finally, U.S. basic material producers must pursue quality. Quality must be redefined in terms of the user: quality products are those that add value because they eliminate rejects, cause no incidents in the customer's operations, and allow the customer to produce a quality product in turn.

Given a stable macroeconomic environment, U.S. basic industries *can* compete. The question then becomes one of whether it will *choose* to compete.

# 3. Philip Caldwell

## U.S. Competitiveness in a Global Environment

While there are many differences among industries and companies, most of my more general observations on basic industries are intended to be applicable to manufacturing overall.

Success of a firm requires success in fundamentals in the way it plans, funds, and conducts its business. Product development, quality, cost, customer value—all achieved within the context that the incomings must exceed the outgoings over time—are the sine qua non; productivity, human resource management, and integrity are essential ingredients wherever the business is located. These qualities are not proprietary to the United States or to any nation, and the opportunities for competitive advantage for a firm or a country are not necessarily great or long lasting either.

Let me illustrate this fragility with an example from the automobile industry in the United States.

U.S. automakers have made *dramatic* gains in profitability, quality, productivity, supplier relations, and work force management. *But* in major market segments, foreign automakers *continue* to gain shares of markets. Foreign producers continue to make major innovations in product and manufacturing processes. If present economic relationships continue, *existing* U.S. *small car* and *sports car* manufacturing capacity will be largely redundant by 1990 in a free trade environment.

Analysts project that only two-thirds of domestic auto manufacturing capacity will be used. By 1990, auto-related employment at the *four domestic auto producers* will decline to 340,000 from 700,000 in 1978 and 400,000 in 1983. A similar situation also exists in Western Europe and may yet occur in Japan by the next decade.

Martin Feldstein (1986) gets to the heart of the problems and opportunities facing basic manufacturing industries in the United States:

> The principal problem with which the world economies must deal during the coming decade is the unsustainable imbalance of international trade. The United States cannot continue to have annual trade deficits of more than $100 billion financed by an ever increasing inflow of foreign capital. The U.S. trade deficit will therefore soon shrink and, as it does, the other countries of the world will experience a corresponding reduction in their trade surpluses. Indeed, within the next decade, the United States will shift from trade deficit to trade surplus. The challenge is to achieve this rebalancing of world demand in a way that avoids both a decline in real economic activity and an increase in the rate of inflation.

The United States has been in a competitive decline for the last two decades, losing out to countries like Japan, and more recently Taiwan and Korea. These countries have little natural wealth, but they have exploited technology—imported largely from the United States—while skillfully managing their human and financial resources and policies. As more countries successfully imitate this strategy, our ability to earn a rising standard of living becomes progressively more difficult.

Our basic industries began losing market shares in the last decade, but this was sometimes characterized as the failure of management, the stranglehold of unions, or unusual circumstances. Other segments were enjoying a boom as oil prices and exploration increased and high tech became the panacea, which some once thought would save us all in the United States.

Then in the 1980s Americans went on a credit binge—government, corporations, and individuals—consuming more than they produced—creating the twin deficits of budget and trade.

Feldstein (1986) describes the trade situation this way:

> The recentness of the U.S. shift from trade surplus to trade deficit deserves emphasis because it indicates that the cause of the trade deficit is not the character of the American workforce or of American management, as some have recently suggested. Such fundamental aspects of American industry cannot change in as short a time as the five years in which the United States has gone from a persistent trade surplus to a massive trade deficit. For the same reason it is wrong to attribute the massive trade deficit to a fundamental deterioration of U.S. productivity, of American product quality, or of other basic aspects of potential competitiveness. The primary reason for our deteriorating trade imbalance was the 70 percent rise of the

> dollar that occurred between 1980 and the spring of 1985. This unprecedented increase in the dollar dramatically increased the price of American products relative to decline while merchandise imports have increased by nearly 50 percent.

Of course, there were other causes. Private sector managers and government politicians and administrators contributed their deficiencies. We all put some dirt in the carburetor, but the high value of the dollar was the common hurdle of discouragement across American industry and only a very few could jump it without injury.

Bruce Scott and others of the Harvard Business School have studied in depth the subject of national competitiveness. Since I find my own experiences in tune with their findings, in these remarks I quote liberally from their writings (Scott and Lodge 1984; Scott 1987).

National competitiveness is a national aspiration. In its most fundamental sense, it means the ability of a nation to earn a rising standard of living. As our trade deficit tells us, our present standard of living is only partially earned. More and more recently it has been borrowed.

Competitiveness in part is a question of goals. The United States is shouldering important international commitments for military security, economic aid, and various programs to insure a measure of economic security and to assist the least favored segments of other societies. Competitiveness for the United States means financing these various commitments without falling behind other industrial countries in standard of living. This sounds like perpetual motion to me, and I do not think we can do it. It is time this load be shared more broadly by Japan and others who enjoy the benefits and have the capacity to pay.

Reestablishment of a competitive economy will require changes in national priorities, policies, and institutional practices.

Public policy has promoted short-term consumer benefits on the one hand and added a growing array of consumer entitlements on the other. The role of Americans as producers has been taken for granted. The United States must adopt a more balanced view of Americans as producers as well as consumers. We really can kill the goose that laid the golden egg. The choice for the United States is either to increase the competitiveness of its economy or to revise downward its national goals and international commitments. Private firms do this or they do not survive.

In our quest for "free and fair competition," we say that true competitiveness can only be evaluated on a "level playing field." Such a definition overlooks the fact that countries have differing goals, differing economic strategies, and differing roles for their economic *actors*—notably for government. Countries have different ideas of what the game is all about and how to keep score as well as how to play.

Brazil, Japan, Korea, Mexico, and Taiwan do not necessarily share our view of the system. For them the goal is not so much to raise short-term living standards as to increase national wealth and economic power.

Government is an active participant in their economies; part player, part coach, perhaps part manager. As a player-coach, government is concerned with shaping the outcomes as well as establishing and enforcing the rules. We enact trade laws; our competitors complete trade programs.

The United States focuses on rules and procedures and complains that some other countries do not play according to the rules. This is an expression of an implicit U.S. economic strategy which assumes that free markets and interfirm competition give the best outcomes for the United States and presumably will for other countries as well. Government, in the U.S. view of the system, is a referee and not a player, coach, or manager. Government takes responsibility for the fairness of the game; the players, coaches, and their managers have responsibility for the outcome.

In part due to our munificence, some countries, which have been able to pursue strategies different from ours and whose governments play a role different from ours, have consistently had higher levels of performance and thus have been more competitive than us. These countries, notably Japan, have become models for other countries that are also trying to accelerate their economic growth. These countries, all of which have focused on manufactured exports as the leading economic sector, have had a remarkable impact on international competition.

True "leveling of the playing field" may require changes in our theory of international competition. It may mean that we as well as others must change.

Zysman and Cohen (1987) say that "we may have become a post industrial society, but we are not a post industrial economy" and "it is important that we not become one."

We need manufactured exports to pay for our imports. After deducting interest, dividends, and fees for "services" in our trade statistics, service income is only 15 percent of income from manufactures. At home we may make hamburgers for each other and take in the washing, but we cannot exchange those services overseas for automobiles and VCRs. Manufacturing is the core market for much of the services economy.

Technological innovation is frequently spawned in a manufacturing environment and engineering skills at home atrophy when production is located overseas. A healthy, vibrant manufacturing base is a must if our military security is to have real substance. Can we really forgo the capability to supply machine tools and semiconductors? I might risk leaving home without my American Express card, but it would be foolhardy and irresponsible to rely on a national security establishment supplied totally or primarily in its essentials by friend or foe overseas. Leadership of the free world requires strength and that includes economic strength.

I could spend considerable time enumerating the many steps we Americans need to take to keep America competitive. Since they have been well documented in a number of thoughtful studies, including most recently the report of the Young Commission on Competitiveness, I need not repeat them for this group.

I conclude these brief remarks, however, by posing two challenges, particularly relevant to this group and to the constituencies we represent.

1. In physical sciences, R&D programs are often directed toward finding solutions to problems standing in our way. Many times they are successful because we focus brainpower adequate to the task in quality and quantity. Could we do more of this in R&D in the social sciences? Most practitioners I know believe the international monetary system does not deal satisfactorily with establishing currency values. Is it possible that new technologies in communications and the impact of the rapid transfer of huge sums of money across national boundaries as compared to the transfer of physical goods have outmoded important facets of the present system? Could we concentrate our thoughts and launch a serious search for a more stable mechanism by which we can price our currencies?

2. Can there be a closer partnership between economists and the principles that guide economic thought and the practitioners of business in their pursuit of competitiveness in a global economy? A greater exposure to shared experiences could make both groups more effective for our country and for the world.

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## Summary of Discussion

Saburo Okita asked whether the Japanese should move their parts manufacturing capacity to the United States as they have done with assembling, given the large surplus capacity that exists in the United States. Caldwell responded that surplus capacity is a problem in many industries and that what is needed is a solid dose of growth. The Japanese could have foreseen this excess capacity when they made their investment decisions.

In evaluating the global competitiveness of U.S. basic industries, Philip Caldwell identified exchange rates as the broadest and most troublesome factor for business management. Wide and rapid swings in currency values result primarily from macroeconomic factors. Individual companies and industries are incapable of dealing with these causes yet they bear the consequences from the frequent changes in relative value. Basic industries with heavy capital requirements needing long capital payback periods are particularly devastated. Such has been the effect in many parts of the U.S. economy during the 1980s.

He called for fresh thinking on this issue, arguing that exchange rates today are not predominantly established by the impact of the physical flow of goods, but by the overwhelming size of money flows across international boundaries. He suggested that many now feel that the floating regime is not a satisfactory long-term solution. He pointed out that the Japanese are just as upset as the Americans or any other nationality when there are major changes in exchange rate values.

Okita continued this line of thought by proposing a contradiction in liberalization of capital and commodity flows, in that liberalizing capital flows might lead to an excessively fluctuating exchange rate.

Robert Ingersoll contended that orderly marketing agreements and other government activity would not solve the problem. The Japanese circumvented the 1969 steel OMA by increasing the value of their products, and neither this OMA nor the current automobile restriction helps U.S. competitiveness. In the long run a managed economy is not as innovative or good for the general public as a more free economy. He proposed that Martin Feldstein's solution, involving a reduction in the trade deficit through a reduction in the value of the dollar, was attractive.

Caldwell suggested that the 1981 automobile voluntary import restraint program could have yielded much broader benefits for the United States if it had a three-dimensional characteristic. In exchange for a change in government policy that brought forth the voluntary restraint program, the industry could have been strongly encouraged to upgrade its product quality and productivity characteristics and organized labor could have been expected to modify the noncompetitive labor cost structure and work practices. He agreed that the exchange rate was very important and pointed out that even if the private sector fulfills its obligations in marketing, quality, cost structure, and labor management, the exchange rate can be a dominant factor. This, he argues, is part of government's responsibility.

He pointed out that the Chrysler situation had some elements of such a three-way deal. The critical parts of the solution to the Chrysler problem were a timely wage reduction and debt remission, both of which were largely engineered by people in government. The industrywide voluntary import restraint program could have been more fruitful if three-way cooperation had been brought to bear. This was suggested by some from the industry, but the government was not willing. As a result, in 1982 wages grew, albeit at a slower rate.

Unless the government, the unions, and management can work together on trade and wage restraint and new investment, automakers may have to look at the world from a more supranational point of view. There is no one in the auto industry who cannot produce anywhere in the world. In the case of a decision by automakers to move offshore, private sector judgments might not be in sync with public interest and there would be a change in the role of the United States in the world.

Anne Krueger emphasized the importance of macroeconomic factors and pointed out some dangers of protecting basic industries. She suggested that there might be a tension between competition and protection of basic industries. The United States has an interest in the global system, so U.S. interests are similar to global interests. A free trade regime must be maintained, she argued, since it is key to the debt problem.

What, Krueger asked rhetorically, is so special about basic industries? She pointed out that the service industry is no different; in fact, it is considered a service when a manufacturing firm contracts out work it would otherwise do in-house, whereas if the firm does the work itself it is manufacturing.

Macroeconomic solutions, Krueger suggested, are in the common interest. Furthermore, simply fixing or stabilizing exchange rates may be appealing, but without a reduction in the U.S. budget deficit there is no way to escape either high real interest rates or high inflation.

Caldwell recognized the importance of macroeconomic factors, but wondered whether we all are willing to accept the consequences of living only by macroeconomic objectives even when they will demolish fundamental national objectives. He reported a conversation with a key government economic official in 1979 who had been encouraging the free inflow of imports regardless of the adverse impact on the automobile, steel, machine tool, electronics, and many other basic industries. When it was suggested that if imports in overwhelming magnitude are good for our country, it would be even better for our country if all automobile producers moved all of their production overseas so that they could ship back to the United States products for the "consumer," he responded, "But you wouldn't do that, would you?" with a hopeful note in his voice.

Barry Eichengreen addressed the importance of the dollar in explaining the recent decline in basic industry employment, concluding that while the dollar has been key in predicting production in basic industries since 1981, its success was varied by industry. Cyclic factors, energy prices, wages, and productivity have also been very important, and the real exchange rate cannot explain the entire story.

Much of the discussion revolved around the globalization of the aluminum industry and its implications. Charles Parry explained that he was content with Alcoa's strategy of producing mostly secondary products in the United States. Venezuela, for example, has the bauxite and low energy costs to produce the primary product. There is also significant government support. National development and employment are the investment criteria.

This strategy is not available in steel, he noted, since steel does not have the variety of uses and opportunities that aluminum has. Steel production in the United States has fallen and will fall further, partly as a result of short-sighted management decisions and insufficient modernization. Copper production has been driven out of the United States by environmental regulations, which makes ironic the World Bank financing of a dirty copper smelter about twenty-five miles south of the Mexican border, with prevailing winds to the north. Aluminum production will be all right as long as the share of manufacturing in GNP is relatively stable. There will be increased dependence on foreign sources of primary products, and continued high levels of research and development are needed to maintain a position in finished aluminum products. Environmental regulations are not very onerous in the aluminum industry, he noted.

Parry explained that aluminum-finished imports are moderately sensitive to exchange rates. There has not been much decrease yet due to the fallen dollar, but Alcoa's calculations indicate that importers may be losing on each pound at the going exchange rate and prices.

George Vojta pointed out that the case of Alcoa illustrated the general themes of increasing deintegration and globalization of production. Parry agreed, noting that Alcoa has no worries about internationalizing the upstream end of production, which is simply a result of comparative advantage. Alcoa does not worry about the national defense issue.

James Schlesinger pursued this line of analysis, wondering if the United States can conceive of itself as providing military protection for the economy of the free world. For example, the producers of semiconductors on the Asian rim might need protecting. Compared to the consequences of the free Asian rim going to the Soviets, the risks associated with having aluminum production in Venezuela are not bad. He noted also that the United States was losing the edge in many militarily relevant areas, such as semiconductors and electronics, leading to a dilution of our abilities to formulate policies for the alliance.

Geoffrey Carliner mentioned a recent paper by Robert Lipsey which found that total exports of U.S. firms to third parties from onshore and offshore production have not fallen. This suggests that the problems with U.S. exports are not with management.

Parry addressed some questions associated with productivity-sharing arrangements. He acknowledged that the existence of industrywide unions creates problems. There is a big difference, he argued, between the individual worker and the union in attitudes toward work. Profit sharing of some sort is coming, however. Kaiser is doing what might be called pseudo–profit sharing now, and in 1989 Kaiser will start profit sharing. Alcoa neither can nor wants to decertify the union, and workers will not and should not give up collective bargaining. Profit sharing is the only way to equalize the base wage rate in healthy and unhealthy plants. Parry expressed hope for real productivity improvements, however, noting that during the recent strike Alcoa ran their operations with white-collar personnel and learned an enormous amount about productivity.

Parry acknowledged that assurances of continued employment will be a necessary accompaniment to profit sharing. Incentives and separation agreements will reduce the work force as productivity increases.

Robert Ingersoll pointed out that the Japanese use bonuses to achieve flexible labor costs. Parry agreed that this would be another implication of profit sharing. Profit sharing as a methodology of decreasing labor costs is one thing, but profit sharing could change the concept of the stakeholder and of the corporation.

Lionel Olmer wondered where the constituency for free trade lies, in an environment of wrenching structural adjustment in basic industries, cutthroat competition for market access, excess capacity, and fluctuating exchange rates. He has observed a trend to market sharing all over the world, in the aluminum industry as well as generally. Parry replied that the aluminum industry has always been for free trade. He expressed hope that bilateral negotiation with Japan, using the threat of a section 301 action, will lead to a bilateral agreement. European barriers too will come down by 1988. He suggested that enlightened management may explain this position. Olmer noted in this context that the apparent differences between GM and Ford on protectionism disappear on closer inspection, as GM wants it both ways behind the scenes, seeking special treatment for its own imports.